India has been acknowledged by the world as an Information Technology Superpower in software services for many years. The economic meltdown has been an eye opener for Business users and IT companies to re-evaluate their strategy. We are seeing a dramatic shift on application of Technology in end-user organizations and solutions provided by IT consulting organizations. It is important that senior managers and IT professionals are aware of the benefits and risks associated with evolving trends before they implement them for their clients or in their organization.

Computer Society of India (CSI) and Bombay Management Association (BMA) are jointly organizing a one-day Information Technology conference in Mumbai on February 26, 2010. The conference has two tracks covering the technology and business aspects with talks, debates and panel discussions from experts in the field and will enable the Information Technology and Business Management professionals to get a better perspective of the road ahead. It will increase awareness and create an action plan for issues to be resolved so that India can retain its leadership role in the global IT market.

Who should attend?
- CSI and BMA invites delegates from organizations with responsibilities or involvement in the major streams listed below:
  1. President
  2. Vice President
  3. Chief Information Officer / Risk Officer / Security Officer
  4. Chief Information Security Officer
  5. Head of Information Technology / Security
  6. Academicians, Analysts and Researchers
  7. Entrepreneurs
  8. Others interested in these areas

Key Program Committee Members

- Conference Advisor: S Mahalingam, Executive Director and CFO, TCS and President, CSI  
  Prof. (Dr) S Ghai, President, BMA
- Conference Chair: M D Agrawal, Head - IT, BPCL, Refinery, CSI Fellow and Convention Chairman BMA
- Organising Committee: 
  - Rajiv Gera, Deutsche Bank Group, Chairman, CSI - Mumbai Chapter
  - Ravi Eppaturi, TCS, Managing Committee Member, CSI - Mumbai Chapter
  - Ravi Miranda, Managing Committee Member, CSI - Mumbai Chapter
  - L S Subramanian, Managing Committee Member, CSI - Mumbai Chapter
  - Gladwyn Pinto, Executive Director, BMA
  - V L Mehta, Director - MIEL, Regional VP - Region VI, CSI
  - Mansih Shah, Managing Committee Member, CSI Mumbai Chapter
  - Dr. Vishnu Kanhere, Hon. Secretary, CSI Mumbai Chapter
- Program Chair: 
  - Ravi Raman, Ex-CIO Citibank, Vice-Chairman, CSI Mumbai Chapter

Visionary Talk: S Ramdorai, Vice Chairman, TCS

Keynote Address: Dr. Vijay Bhatkar, Chairman, Home Education

Program Chair: Ravi Gerela, Deputy Director, C-DAC

Conference Overview

Who should attend?

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<tr>
<th>Event</th>
<th>CSI/BMA Members</th>
<th>Others</th>
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<tr>
<td>Main conference</td>
<td>3500 INR</td>
<td>4000 INR</td>
<td>Rs. 500/- Early Bird discount per delegate for Main conference registration before 20th January 2010.</td>
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<tr>
<td>Tutorial</td>
<td>1500 INR</td>
<td>2000 INR</td>
<td>Rs. 250/- Early Bird discount per delegate for Tutorial registration before 20th January 2010.</td>
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</table>

Payment can be done by cheque/DD and should be sent in favour of “India IT 2020” at Computer Society of India, Mumbai Chapter.

E-217, Floral Deck Plaza, Near SEEPZ, MIDC, Andheri (E), Mumbai 400 093 Tel: +91 22 2823 5476, 2823 5548

For Sponsorship contact:
Mr. Ravi Eppaturi ravi.eppaturi@yahoo.com  
Mr. Venkat Rajan indiata2020@csimumbai.org

For more details about the conference visit our conference website www.csrf2020.org
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Volume No.33 Issue No. 10 January 2010
Engineering is the endeavor that creates, maintains, develops, and applies technology for societies’ needs and desires. Its origins go back to the very beginning of human civilization where tools were first created and developed. Indeed, a good case can be made for the defining of humans as those animals that create, develop, and understand the significance of technology. Over time, the part of technology that acts as an extension of human capabilities became the purview of engineering.

Although it is a very old activity or trade, engineering is a relatively young academic discipline or profession. Only in recent years has it reached a stage of maturity where some of its “defining details and differentiating characteristics can be articulated”.

Engineering uses maths, science, creativity and design to solve problems and improve lives. Most people don’t have any direct contact with engineers, yet engineering will have had a hand in designing nearly everything they come into contact with in their daily lives.

Engineering as a discipline has always focused on the sustainability of operations at all levels. The mandatory “Performing Engineering Operations” include Working Safely in an Engineering Environment, Working Efficiently and Effectively in Engineering, Using and Communicating Technical Information. Software Engineering is just four decades young.


- The operational environment and its characteristics
- Major system components and the interconnection among those components;
- Interfaces to external systems or procedures
- Capabilities, functions, and features of the current system
- Charts and accompanying descriptions depicting inputs, outputs, data flows, control flows, and manual and automated processes sufficient to understand the current system or situation from the users point of view
- Cost of system operations
- Operational risk factors
- Performance characteristics, such as speed, throughput, volume, frequency
- Quality attributes, such as: availability, correctness, efficiency, expandability, flexibility, interoperability, maintainability, portability, reliability, reusability, supportability, survivability, and usability
- Provisions for safety, security, privacy, integrity, and continuity of operations in emergencies. Changes need to be tracked very carefully during the development process.

“As long as there were no machines, programming was no problem at all; when we had a few weak computers, programming became a mild problem and now that we have gigantic computers, programming has become an equally gigantic problem. In this sense the electronic industry has not solved a single problem, it has only created them -it has created the problem of using its product.”

- E. W. Dijkstra, Turing Award Lecture, 1972

It’s hard to develop software and to manage software projects, because software is: complex, invisible and easy to change. Because of its invisibility, the quality of software is difficult to measure, it is difficult to track changes & development progress and specify the operations as indicated in the IEEE document referred to earlier.

The track record in IT based developments shown in the figure below clearly indicates a metaphorically rich and operationally feeble approach.

Only 60% of the IT projects make explicit provisions for Operations and usually around 15% of the overall budget is allocated for this purpose.

Businesses worldover are moving now to the next phase of automation that emphasizes, Configuration discovery, Change execution and Operational data analysis. Auto-adaptive IT remains science fiction and many of today’s skills in the area of IT operations may soon become obsolete.

Ms. Sulochana Ganesan and Mr. Chandra Kumar Raman of the “Software Process Improvement Network [SPIN]” have readily agreed to “Guest Edit” the theme section for this issue on “Sustainable Operational Excellence”. On behalf of the CSI Communications team I thank the Authors and the Guest Editors.

Dr. Gopal T V
Hon. Chief Editor
gopal@annauniv.edu
Dear Members,

Let me begin 2010 by conveying my best wishes to all of you for a New Year full of professional enrichment and personal happiness.

As it is customary to make New Year resolutions, here is my list of 10 things that we, at CSI, must accomplish in 2010:

1. Draw more members into CSI and thereby increase and diversify the membership base.
2. Attract more student members and ensure that they remain active members once they enter the IT or allied professions.
3. Enrich the experience of each member when they interact with CSI – for instance by extensively using the to-be-launched Membership Service and Knowledge Management System that becomes a pre-dominant resource for each professional.
4. Engage the members through monthly free Chapter Meetings addressed by eminent professionals.
5. Add more Chapters and revive dormant ones. CSI Chapters should be present in every town with where IT has a presence.
6. Hold more professionally and technically enriching Regional, Divisional, SIG and National Conferences.
7. Make CSI Communication a “must read” for each professional and “must advertise” for vendors.
9. Play a leading part in bringing international conferences to India and involve members more in the activities of our international affiliations such as IFIP, SEARCC and BASIS.
10. Be recognized as the voice of IT professionals by the Indian Government.

Many of these ideas are not new but it is important to re-iterate our goals and remind ourselves of our focus areas.

For CSI, 2009 was a year of preparation to meet these goals and enter a new phase of growth – in membership levels as well as in terms of the scale and scope of its activities. I saw tremendous passion and energy among members and office bearers during Consef 2009 which I attended at Chennai in December. This was an international conference, dealing with the State of Art issues and generated great interaction. Such events reinforce our faith in the direction that CSI is taking.

I expect to see the same spirit in the Conferences to come – IT 2020 in Mumbai on February 26, where we will also launch of our Knowledge Management Portal. I am also looking forward to important regional events like the Regional Conference in Visakhapatnam and the Coimbatore Chapter celebration of its Silver Jubilee as well as other Conferences.

1. Enlarge the use of IT in education at all levels.
2. Help build local language interfaces.
3. Use the power of IT to connect with citizens and deliver service – Reach citizens in villages and remote parts.
4. Assist Government through IT System for better Governance.
5. Exploit the power of IT in India – for better Project Management and resource utilization.
6. Forge close interaction with industry and develop path breaking software products.
7. Expand the use of IT in Small Business through Innovation Solutions.
8. Spread IT businesses to smaller towns – develop the concept of Rural BPOs.
9. Enlarge the pool of employable IT professionals.
10. Share India’s experience of using low cost IT for the masses with other developing countries.

Above all, IT is truly a great leveler. It is a transformation agent and can truly help in the creation of an inclusive society. Let CSI make this vision come true.

In three months time, we will have a new team taking over at the helm of CSI. As envisaged by the Constitution, it will have continuity as well as change. Please cast your vote.

S. Mahalingam
Executive Director & Chief Financial Officer
Tata Consultancy Services Limited
Sustainable Operational Excellence

Sulochana Ganesan*, Chandra Kumar Raman**

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** Programme Manager - Quality, HP Enterprise Services, CITIUS-A, Olympia Technology Park,#1, SIDCO Industrial Estate, Guindy Chennai 600 032. Email: chand rakumar.r@hp.com

In the current industry scenario Superior performance, differentiated products & services, and focusing in a niche area, are the three key parameters that help a company grow. The concept of Operational Excellence addresses the first two aspects.

The Wikipedia defines **Operational Excellence** as a philosophy of leadership, teamwork and problem solving resulting in continuous improvement throughout the organization by focusing on the needs of the customer, empowering employees, and optimizing existing activities in the process.

From a practical perspective Operational Excellence involves continuous improvement and demonstrated, quantifiable, sustained improvement in all areas and functions of work in an organization leading to continuous improvement in all business parameters, organization growth, customer delight and best in class benchmarking.

As per the business excellence models, Operational excellence is typically demonstrated by results that reflect (1) sustained improvement over time, (2) improvement in all areas of importance (both performance areas and segments within each area), and (3) performance at a level that is at, or superior to, ‘best in class’ organizations.

Traditionally IT companies, have in the initial stages focused on process improvement initiatives in specific areas, leading to silos of improvement not integrated with other functions and hence there is no sustainability. However several organizations have transcended that stage and have started adopting integrated approaches that include all functions and are part of the management strategy for organization growth and development. This means that there are initiatives that lead to continuous, sustained improvement in processes and results across functions. In this issue of CSI Communications we feature articles that depict some concepts and initiatives and the associated benefits and results that organizations have seen.

Operational excellence is built on a model that incorporates the following key features –

- **Process driven approach** where processes are well defined and adhered to and are integrated for cross-functional efficiencies.
- **Operations are standardized and well controlled**
- **Effective use of automation and proper tools for all areas of work**

- Management and leadership system provides good governance and focuses on facilitating ‘faster and better’ work practices, ensuring standardization and process discipline, and building a culture of excellence
- Data driven approach to decision making, use of key performance indicators, metrics and analysis of data for decision making. The article *Information Technology Decisions* highlights some aspects.
- A culture that rewards waste elimination and increased efficiency, motivates and encourages excellence, ensures discipline and decisiveness

Several improvement methods, models, frameworks are currently in use in organizations that have taken up operations excellence initiatives. In the IT organization context these include ISO 9001 that address overall organization processes; ISO 27001 to address Information Security Management; CMMI to address software development and project management aspects; People CMM for improving the people processes; Agile methodologies, XP, Scrum and others to address IT Engineering; ITIL to address IT Service Management; Six Sigma, Kaizen, TOC and Lean for focused improvements in specific areas; Business excellence models like the RBNAQ and Rajiv Gandhi Award for overall enterprise process improvement, TRIZ for encouraging innovation.

Operational Excellence requires combining Process excellence tools and methodologies, use of metrics, a leadership system, and building a culture of excellence to achieve Operations excellence. Any operations excellence initiative normally includes well coordinated improvement programs in all areas and functions in the organization. Care has to be taken to ensure that such improvements are well integrated and are designed to ensure continuous improvement. Improvement of processes; introduction of automation, tools and techniques; building a culture that supports excellence should all go hand in hand.

Several organizations have done this successfully. The article *Creating and Sustaining process excellence* highlights some initiatives. Organizations have initiated people development processes as part of the operational excellence program. The article *Operational Excellence through effective people*...
practices highlights some initiatives. Organizations have institutionalized several best practices that drive overall operational excellence in an organization. Examples of some best practices that have resulted in improvement in On time delivery index, Project Health, reduction in defects, improved quality are detailed in the article titled Key Best practices @ Polaris Software driving Process Excellence.

These initiatives/programs follow the time tested method –
- Define what you want to do and strategize
- Measure where you are and what level of improvements you desire to achieve
- Analyze processes, systems, quality, employees, culture etc.
- Improve, optimize, transform through business re-engineering
- Control and ensure continuous improvement
- The benefits of operational excellence include
  - Business benefits – increased revenue, increased profits, decreased cost of operation, increased productivity
  - Improvement in ability to solve problems
  - Improved customer experience
  - Consistently exceeding customer expectations and benefits
  - Increased instances of doing it right the first time
  - Improved data collection and analysis techniques

Cranfield University, University of Cambridge and others have come up with a course on ‘Operational excellence’ that address the need of developing managers in manufacturing industry and several leading organizations like Toyota have contributed in designing this course. It would be truly worthwhile for academia and IT industry in India to get together to design a similar course addressing the specific needs of the IT industry.

As already mentioned above some key aspects of sustaining Operational excellence have been brought out in the following articles in this issue –
- Creating and Sustaining process excellence by Mr. Kannan Veeraraghavan, Vice President, Quality-head, Quality group and Mrs. Sridevi Sundararajan, Senior manager, Quality of HCL Technologies highlights some initiatives taken by their organization.
- Operational Excellence through effective people practices by Sankaran Venkataramani, Associate Director-KPMG highlights some initiatives relating to people development taken by organizations.
- Key Best practices @ Polaris Software driving Process Excellence by Quality team, Polaris Software Labs highlights some best practices that drive operational excellence in their organization.
- Information Technology Decisions-Practitioner’s Perspectives on Sustaining Operational Innovation by Navneet Bhan, Croffitti.com highlights some aspects of data driven approach to decision making.

Sulochana Ganesan has over 26 years experience in the Software Consultancy Services Industry. During the course of her career she has been involved in Software design and development of commercial applications; Management of offshore projects for large corporations in US, Europe and Japan; Quality management; Quality Consulting for overseas clients; Information Security management; Development and implementation of internal IT systems for IT services organization. She has been involved in Quality Management for the last twelve+ years and her primary responsibilities during this period has been in the area of organization change management, process management, process consulting, initiating and implementing a metrics program, generating a quality culture and preparing these organizations for external assessments against international standards.

She retired as Senior Vice President, Hexaware Technologies Limited where she was responsible for Quality Management, Information Security management and Internal Information Systems. She successfully prepared and steered the organization to Level 5 of the Capability Maturity Model for software and CMMI and helped the organization achieve ISO 9001:2000, BS 7799, ISO 27001 and TickIT certification. She was also spearheading several initiatives in the organization relating to business process improvement and process automation. She has carried out several Process Harmonization initiatives to help overseas (Europe and US) customers align their internal processes to the vendor processes to increase the benefits from the outsourcing engagements.

She is currently an independent consultant in the area of Quality and Process management, and a Senior Examiner for the Ramkrishna Bajaj National Quality Award. Her current interests are in
- Promoting an integrated approach to Quality management to help organizations achieve Business excellence
- Improving the effectiveness of IT Services organizations by integrating Quality management principles in all areas of management
- Bring in feasible, actionable, executable, results oriented approach to Quality Management, change the perception of it being seen as a separate entity, and enable Quality Management to become a part of the management philosophy of an organization

Her vision is to spread the Quality culture in Indian IT services industry and help position India as the most productive, high quality destination for IT services.

She holds an Honours Degree in Economics from the University of Calcutta and a Post Graduate Diploma in Computer Programming and Systems Analysis from Madurai Kamaraj University.

Chandra Kumar Raman is graduated in Engg with P.G Diploma in Mgt. He is currently associated with HP in their Quality operations as a Programme Manager. Earlier to this assignment he was with Wipro Technologies, in their Mission Quality and Operational Excellence function. He is a certified Six Sigma Black belt, ISO 9000 Lead Auditor Lean Leader and a ITIL V3.0 certified professional He is having twenty one years of experience which includes Quality Management/Process Optimization. He is one of the key contributors to the CMMI v 1.2 at HP and Wipro and PCMM initiatives at IBM. He is adept in the application of process models and standards like ISO, CMM, CMMI, PCMM and Six Sigma for the overall Quality and operational improvement in Organizations. He is current President of SPIN Chennai and active member in NASSCOM Quality group. He was teaching Software Quality Engineering for ME (Quality) at Anna University as a visiting faculty. Delivered series of guest lectures on topics such as Quality management, Cost optimizations and Defect Management in various Institutions /Professional forums.
**Information Technology Decisions—Practitioner’s Perspectives on Sustaining Operational Innovation**

Navneet Bhushan

Founder Director & Co-Crafter, Crafitti Consulting Pvt. Ltd., #3, NSRCEL, IIM Bangalore, Bannerghatta Road, Bangalore - 560076. Email: navneet.bhushan@crafitti.com

Centrality of Information Technology (IT) in the globally distributed enterprises and in fact the modern day life has created an unmet need to help managers, engineers and businesses to make decisions that are not only robust but help create operational innovation in a dynamic world that we have created. Hence IT decision-making, be it offshore-outsourcing, software project management, system design and development or software development and maintenance, has taken a central position. The problem is that the existing methods of normative or prescriptive decision making described in decision theory, operations research etc fails miserably as they typically doesn’t take into account the non-physical nature of software, the difference in knowledge worker versus industrial worker, the global nature of software development and many imponderables due to technology and innovation pace. This paper explains various scenarios and methods developed, adopted and adapted for IT Decisions which has helped sustaining operational innovation and excellence in multiple real life IT projects the author has been part of.

**Introduction**

A dynamic, thriving, living enterprise of today is a remarkable system of wonderful complexities. The complexities evolve over a period of many years, many initiatives, multiple technologies, and multitude of people, multiple mistakes and learning. The initiatives result in processes that have tacit knowledge embedded in people, departments and specific organization structures. The processes have legacy Information Technology (IT) applications as a source of processed data, information, knowledge and decision enabling actions. There are many new technologies that have been appended or enmeshed in this structure through careful adoption and adaptation. This results in creating further complexities as the enterprises have Information Technology applications of multiple age profiles working together in business processes to create a thriving organization.

Enterprises need to take IT decisions on a more sound scientific footing. This paper describes the offshore-outsourcing, software delivery, software complexity, and software reliability scenarios and proposes an integrated approach for IT decisions. In Section 2, Offshore-Outsourcing decisions with a case study are explained. Section 3 explains the Lean way of software delivery and a metric called project cacophony that has been found to be useful. Section 4 explains the benefits and scenarios of in-process software complexity monitoring. In Section 5 the value of Reliability modeling and choosing a particular reliability model are explained. This can help is decisions relating to product release. Finally we conclude in Section 6 with pointers for further work.

2. **Enterprise Entropy due to Information Technology – The Offshore-Outsourcing Decisions**

Many large enterprises are struggling to come to grips with Global Innovation Complexity, which requires fundamental shift in the organization structure. Although many enterprises have successfully made this transition, however, the thinking of the people/leaders continues to be hierarchical rather than networked. The new world needs a rapid shift to networked thinking in the organizations. The problem is - a solution that may look optimal in a specific time period may lose its efficiency and in fact validity in a world where technology has advanced into hitherto uncharted waters. It is impossible to re-architect the enterprise with every technological advance. However, enterprises advance by adopting new technologies in piecemeal fashion. Business processes are changed...
and Information and knowledge bases changed in a form and use that is typically unpredictable. It is this continuous piecemeal improvement to get quick solutions and may be business value that creates the enterprise entropy — a measure of disorder in the enterprise. The enterprise becomes extremely connected spaghetti of business processes, people, IT applications, computer networks, multiple customer channels and multiple supplier connections.

When one juxtaposition this thriving complex and dynamic enterprise in a globalizing world the complexities increase exponentially. In the globalizing world, the economics of the business demands that skills, capabilities and even knowledge can be leveraged from across the geographies provided these geographies are connected through robust data and information networks. In such a scenario it becomes exceedingly difficult for CXO’s to not to explore the options of global optimization strategies. This is more so, as the benefits that can be generated through leveraging of the global village if done right can create order of magnitude differences in bottom line performances. Thus we have the widespread trends of outsourcing and further off shoring — to follow the sun so that one designs a 24x7 enterprise. If one looks at the questions of what to outsource/offshore it becomes clear, that one need to understand the inherent complexity of the enterprise architecture. The enterprises face three important problems in tackling these questions

**Complexity** - Fundamentally we deal with complexity by partitioning the process into manageable functions, creating boundaries and interdependencies. The size of these functions (number and complexity of work steps) is determined by our ability to control/manage the work steps. There is a tendency to take responsibility for only the work we can control. Because of this, for the people doing the work, functions becomes the purpose of the work. Bureaucracy and ritualized work soon follow. Functions become optimized at the expense of the overall organizational purpose. Soon the individual functions become desensitized to the overall organizational purpose, become resistive to change, compete for resources, and blame problems on other functions they are most dependent on. The organization becomes unable to adapt quickly to changing markets, organizational learning stagnates and organizations start decaying. The silos in large enterprises are testimony to this trend.

**Constant Change** - The second factor is that the world we live in is constantly changing. Future is approaching us faster than history is leaving us. Any organization that is not constantly adapting to this change is progressing towards elimination. In other words there is no perfect organization, no optimal work flow, no optimal measures, and no ideal vision. What is needed is holistic purpose driven adaptation to an ever changing environment. Organizations, processes, measures, and visions only have value as structures that help us adapt. People adapt more quickly than structures. Only the learners will inherit the future. Hence incorporating the change lenses in the enterprise at all levels is the only way to embrace future.

**Fuzzy Common Operating Picture** - Because of silos that we work in, the specific person, role, department, has a fuzzy visibility of the end to end process. The partitioning of roles within the enterprise puts people in conflict. That conflict can be seen most clearly at the boundaries of their roles, ritualized work practices with localized sense of purpose. How do we share responsibility for achieving the enterprise (shared) purpose?

**CASE STUDY - A Global Medical Devices Enterprise - Creating a Common Operating Picture**

A global medical devices company had to evaluate the options of offshoring-outsourcing of their design and development processes involving multiple components and multiple departments. They were struggling with the complexity as the common operating picture was not emerging. This was essential so that all stakeholders get a common view of the situation rather than have piece-meal views.

In two days of interactions in a facilitated workshop setting using the Design Structure Matrix (DSM) [1] approach combined with the System Complexity Estimator (SCE) [2], a comprehensive much clear common operating picture emerged that helped identify and validate complexity blocks, bottlenecks and possible pitfalls. The figures below show the results of the DSM-SCE workshop.

**Intra-process dependencies**

The DSM input sheet where the experts were asked to mark intra-process dependencies is shown in Figure 1. The tasks are listed as per the given sequence each dependency has been marked as 1 in the DSM. Each 1 indicates that the row task needs input from the column task for its functioning. The output of DSM analysis of the intra-process dependencies is shown in Figure 2. The tasks are re-sequenced so that all the independent tasks are placed ahead of dependent tasks (the DSM partitioning). The analysis also mark those tasks that are so interconnected that they can’t be separated from ea ch other, thereby forming blocks (shown in blue color). Further the set of alternate colored bands (the violet colored and white colored bands) indicate output of DSM banding. The DSM banding marks bands such that within each band all tasks can be done concurrently, if they...
do not belong to a block. Further tasks belonging to a band with low number has to be started before tasks belonging to higher band numbers. This analysis helps in re-sequencing the tasks. As can be seen from Figure 2, maximum coupling lies in Level 9, which has most of the activities within scope of outsourcing partner. This needs to be analyzed further as more information is obtained to mitigate any unforeseen issues in these dependencies.

Inter-organization dependencies

Since this change initiative is impacting the Enterprise as a whole, it is imperative that inter-organizational dependencies should be identified, analyzed and taken care of upfront. Figure 3 gives the inter-organizational interdependencies captured during the DSM workshop. As is evident the product/design engineer’s role is central in the organization as he/she interacts with almost all other departments and actors.

The DSM analysis of organizational dependencies indicates the extremely coupled nature of communication links between various roles in the organization. These dependencies also surface the inherent complexity and coordination effort needed for executing an enterprise-wide change initiative. As can be seen, the following actors – Product/design engineer, Supplier engineer, and Manufacturing engineer play main roles in the organization.

Relative Complexity of the Tasks

Using the System Complexity Estimator (SCE) tool, the relative complexity of each task in the process is computed. The complexity map of the process is shown in the radar plot shown in Figure 5. This plot gives the relative magnitude of coordination effort needed for each task in the process.

Since we know the relative complexity of each task, we can assign the task to specific team members appropriately based on their competency and experience.

3. Project Cacophony – Software Delivery Decisions

Lean software development is about providing usable functionality to client at regular interval of time by designing, managing and maintaining the flow of single units of usable functionality. In a software application development project one can craft the design in such a way that Single Units of Usable Functionality (SUUF) can be separated as independent units of work. Further the system evolves over a period of time rather than integrated after developing the components, the provider can deliver early usable functionality to the customer. Using the concepts of Takt time, the customer gets one SUUF at a regular interval of time during the life of the project. This is in contrast to existing batch scenario, where the customer gets all SUUFs at the end of project duration. The speed up achievable with Lean is \( (2N)/(N+1) \) where \( N \) is the number of SUUFs. Hence if the project is delivered as per Lean way, the value delivery to the customer can speed up. Further this approach shows the constraint on the speed up due to dependencies. The interdependencies of SUUFs constrains the degree of concurrency that can be achieved, in turn impacting the speed up adversely. The mathematical relations derived in below from fundamental concepts can be used to measure and track the efficacy of software development projects and in fact minimize the “project cacophony”. We propose a measure termed Project Cacophony that can help software project teams to minimize possibility of projects degenerating into crisis and disaster situations.

In the regular way of Software Development Projects, customer receives \( N \) units of usable functionality in time \( T \). For simplicity let us assume that each single unit of usable functionality (SUUF) is equally important and there are sequential dependencies. In the Lean way of software development, a measure called Takt time is defined. The Takt time, defined as the ratio of Time Available and number of SUUFs, is \( T/N \). That means, every \( T/N \) units of time, the customer receives one unit of SUUF. Since each SUUF has equal value, the overall value to the customer can be considered as equal to \( N \). Table below gives the time at which the customer gets % value.

<table>
<thead>
<tr>
<th>Value %</th>
<th>Existing Delivery Time</th>
<th>Lean Delivery Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/N</td>
<td>T</td>
<td>T/N</td>
</tr>
<tr>
<td>1/N</td>
<td>T</td>
<td>2T/N</td>
</tr>
<tr>
<td>1/N</td>
<td>T</td>
<td>3T/N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(N-1)T/N</td>
</tr>
<tr>
<td>1/N</td>
<td>T</td>
<td>(N-1)T/N</td>
</tr>
<tr>
<td>1/N</td>
<td>T</td>
<td>T</td>
</tr>
</tbody>
</table>

If one computes the total value delivered in total time taken for the existing way of delivery, one gets \( \sum i/(N) \times T = T \). However for the lean way of delivery, Value delivery time is

\[
\begin{align*}
(1/N) \times (T/N) + (1/N) \times (2T/N) + \ldots + (1/N) \times (N-1)T/N + T/N = T \times (N+1)/(2N).
\end{align*}
\]
Existing time to deliver 100% value is $T$. However, in the lean way of delivery the customer will get the value in $T(N+1)/2N$ time. Thus, there is a speedup ($S$) of $T/(T(N+1)/2N) = 2N/(N+1)$, i.e.,

$$S = \frac{2N}{N+1} \quad (1)$$

Or, the schedule compression, $C$, is

$$C = \frac{N}{S} \quad (2)$$

**Example**

Let us assume there are 5 SUUF. Let these need to be delivered in $T=20$ months time frame. The possible schedule compression $C$ is $C = 6/10 = 0.60$ and speed up $S = 10/6 = 1.67$ times.

This indicates that customer gets same value in 60% of time as compared to non-lean way of delivery. In the lean way of delivery, customer starts getting value much early hence the Value Delivery speed up is enhanced.

**Degree of Concurrency**

In the more complex scenario when the dependencies between various SUUFs are taken into account, the Takt time has to be studied. We define the degree of concurrency as below. Look at the dependencies of each SUUF on every other SUUF in a pair-wise manner. The Dependency Structure Matrix (DSM) can be used for this purpose. Ideally in the SUUF DSM only diagonal elements should be marked 1. If one sum up the number of 1’s in the DSM, it should amount to $N$.

However, in real life systems, SUUF’s will depend upon each other. Let us call the sum of all elements of the SUUF DSM as the Degree of Functionality Coupling (DFC). Hence,

$$DFC = \sum_{j=1}^{N} \sum_{i=1}^{N} d_{ij} \quad (3)$$

Where, $d_{ij}$ is the element of the $i$th row and $j$th column of the SUUF DSM.

In the ideal case, the ratio $N/DFC$ will be 1.0. We term this ratio the Degree of Concurrency.

Hence, Degree of Concurrency (DoC)

$$DOC = N/DFC \quad (4)$$

Let us extend the example. Table below shows a hypothetical SUUF DSM of 5 SUUFs.

<table>
<thead>
<tr>
<th>SUUF1</th>
<th>SUUF2</th>
<th>SUUF3</th>
<th>SUUF4</th>
<th>SUUF5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
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<td>1</td>
</tr>
</tbody>
</table>

In the SUUF DSM shown above, the Degree of Concurrency (DOC) is computed as described below -

$N = $ Number of SUUF = 5;

$DFC = 7$

$DOC = 5/7 = 0.71.$

**Speed-up and Degree of Concurrency**

Combining Speed-up equation, i.e., Eq (1) and Concurrency Equation, i.e., Eq (5), the possible speed up in the concurrency constrained environment ($S_{constrained}$) is as follows

$$S_{constrained} = S \times DOC = \frac{(2N)}{(N+1)} \times \frac{N}{DFC} \quad (5)$$

In our example, $S_{constrained} = S \times DOC = 1.67 \times 0.71 = 1.19$ times.

Hence, even in this complex scenario, where the degree of coupling is high and hence degree of concurrency is low, speed up of 19% is possible in delivering customer value using the Takt delivery paradigm.

**Project Cacophony – A Lean Metric**

We propose Project Cacophony ($k$) as a Lean Metric to monitor the health of the project on a regular basis. Let us say, the actual delivery times of each SUUF to the customer are $t_1, t_2, t_3...t_N$. We define, Project cacophony ($k$) as

$$k = \sum_{i=1}^{N} (\Delta t_i) - (t/N)^2 \quad (6)$$

Where, $\Delta ti$ is the difference between delivery time of $ith$ SUUF and delivery time of $(i-1)th$ SUUF. At each deliverable, Project Cacophony should be measured and tracked.

We consider three scenarios of delivering 5 SUUFs as defined in the example

<table>
<thead>
<tr>
<th>Scenario 1</th>
<th>Time of Delivery (months)</th>
<th>$\Delta t$</th>
<th>Distance from Takt</th>
<th>Project Cacophony ($K$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUUF1</td>
<td>3.5</td>
<td>3.5</td>
<td>-0.5</td>
<td>0.50</td>
</tr>
<tr>
<td>SUUF2</td>
<td>8.5</td>
<td>5</td>
<td>1</td>
<td>1.12</td>
</tr>
<tr>
<td>SUUF3</td>
<td>12.5</td>
<td>4</td>
<td>0</td>
<td>1.12</td>
</tr>
<tr>
<td>SUUF4</td>
<td>17.5</td>
<td>5</td>
<td>1</td>
<td>1.50</td>
</tr>
<tr>
<td>SUUF5</td>
<td>20</td>
<td>2.5</td>
<td>-1.5</td>
<td>2.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenario 2</th>
<th>Time of Delivery (months)</th>
<th>$\Delta t$</th>
<th>Distance from Takt</th>
<th>Project Cacophony ($K$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUUF1</td>
<td>8</td>
<td>8</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>SUUF2</td>
<td>18</td>
<td>1</td>
<td>-3</td>
<td>5.00</td>
</tr>
<tr>
<td>SUUF3</td>
<td>18</td>
<td>9</td>
<td>5</td>
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</tr>
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<td>SUUF4</td>
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<tr>
<td>SUUF5</td>
<td>20</td>
<td>0</td>
<td>-4</td>
<td>8.25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenario 3</th>
<th>Time of Delivery (months)</th>
<th>$\Delta t$</th>
<th>Distance from Takt</th>
<th>Project Cacophony ($K$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUUF1</td>
<td>18</td>
<td>18</td>
<td>14</td>
<td>14.00</td>
</tr>
<tr>
<td>SUUF2</td>
<td>18</td>
<td>0</td>
<td>-4</td>
<td>14.56</td>
</tr>
<tr>
<td>SUUF3</td>
<td>18</td>
<td>0</td>
<td>-4</td>
<td>15.10</td>
</tr>
<tr>
<td>SUUF4</td>
<td>20</td>
<td>2</td>
<td>-2</td>
<td>15.23</td>
</tr>
<tr>
<td>SUUF5</td>
<td>20</td>
<td>0</td>
<td>-4</td>
<td>15.75</td>
</tr>
</tbody>
</table>
and track the project cacophony. Scenario 1 is closer to Takt delivery while Scenario 3 is closer to batch delivery at the end. Scenario 2 is in-between possibility – where the first delivery requires substantial investment of time. The Project Cacophony plots for the three scenarios are shown in the figure below. As is clearly visible the project delivery closer to the takt time delivery will have less $\kappa$.

If one measures the project based on total time of delivery and the specific deliveries in terms of SUUFs, one can track the project and minimize the crisis situations that invariably develop in projects that are not delivered as per the takt planning.

The Project Cacophony ($\kappa$) is proposed as one of the Lean metrics for software development projects. Besides, we have introduced the mathematical expressions for the upper limits on the speed-up possible due to Lean delivery, under perfect conditions of complete concurrency. Degree of concurrency and degree of functional coupling are also defined for a software design. It is a design guideline that a software design should try to maximize degree of concurrency and minimize the degree of functional coupling. The input to this design guideline and the Lean metric is what we term the Single Unit of Usable Functionality (SUUF). How to identify the SUUFs in a coupled set of needs for the system is beyond the scope of this short paper.


The system complexity is monitored during the phases of software development. Various possible software development complexity (SDC) scenarios versus the software development phases are shown in the figure below. 

**Cumulative Increasing Complexity Scenario (Curve 1)** - shows a typical case where the system complexity increases with every phase in the software development. The complexity of the earlier phase just adds up to result the final software output with a high complexity. The testing of this complex and error prone software is a herculean task. Further, high system complexity increases the multi-mode fault in the software.

**High Design Complexity Scenarios (Curve 2)** - shows the case where the design complexity is higher than the requirements complexity. Here, while converting the requirements to the design, the inherent requirements complexity is increased further giving a more complex design. However, in the subsequent phases, the complexity is managed and reduced. The final code has a lower complexity than the design complexity. In this case, the integration testing, which validates the software design, would be challenging. This is due to the higher design complexity.

**Oscillating Complexity Scenarios (Curve 3)** - shows a high internal variation of the system complexities in the various phases. In this scenario, the requirements are extremely complex with a high interdependence between the requirements. The subsequent design for the requirements made much simpler with higher cohesion within a module and lesser coupling between the modules. In the low level design phase, however, the complexity again increases steeply which is further reduced in the source code. McCabe complexity, software entropy and maintainability index are some of the measures that can be used for measuring code complexity. In this scenario, it is hard to do an effective testing. Higher complexity of requirements and design will make acceptance, system and integration testing difficult.

**The Decreasing Complexity Scenarios (Curve 4 & 5)** - shows the system complexity with a decreasing trend. The complexity at any given point of the time never increases the initial requirements complexity. This scenario is preferred. The end software will have higher quality. Testing this software is also manageable.

With complexity monitoring during SDLC, a better control and a more robust estimate of the next phase can be achieved. The complexity monitoring dashboard during SDLC can help minimize the project overruns and can create a more robust software system.

5. Software Reliability Growth Models – Deciding on When to Stop Testing

Software reliability models are developed with a premise that with more testing and bug-fixing, reliability will increase as number of bugs remaining in the system will go down. This is based on the assumption, that total number of bugs in a developed software system are fixed. These models are called software reliability growth models (SRGM). This is however the perfect debugging scenario, where the process of fixing bugs doesn’t introduce more bugs. In the SRGMs where imperfect debugging is assumed, the modeling is based on the assumption that by fixing bugs, one may introduce more bugs, but always the number of bugs after the fix will be less than the number of fix before the fix.

Since the process of bug occurrence and bug fixing is non-deterministic, most of these models are stochastic in nature. This implies that there is a probability functions associated with both the error content in the system and the error detection rate at a particular instance of time in the life cycle of the system. Typical probability distribution assumed is the Poisson distribution. When the averages of the probability distribution vary with time, it is called the Non-Homogeneous Poisson Process (NHPP).
One of the earliest models in this class is the Musa Model, which has been developed from the basic Goel-Okumoto model.

Musa model belongs to NHPP exponential model class and was first proposed in mid 1980’s. Since then the field of software modeling has progressed further and many new models closer to reality have been developed and used. In the NHPP models class, NHPP S-shaped, NHPP imperfect debugging and NHPP S-shaped imperfect debugging models are new advancements.

All these models require an accurate and robust parameter estimation mechanism. A major parameter of interest in these models is the estimate of total number of bugs in the system. By having an estimate of total number of bugs, a decision on when to release the product can be taken by estimating the remaining bugs at a particular instance of time. Ideally one would like to have zero bugs when product is released. However the amount of testing needed to find and eliminate all the bugs is time and cost prohibitive. The SRGMs can help the designers/developers to estimate the remaining bugs which can be used to take a call on fit to release.

### Steps in Applying Reliability Modeling

Due to inherent uncertainties in the occurrence of failures, operational scenarios in which the system will be put in, the failure process need to be defined as a random or stochastic process. This leads to the requirement of estimating various parameters of the model, which reflects the real life operational profile of the system. We define general guidelines and steps that need to be followed for Reliability/Availability analysis of Systems.

- **Step 1:** Define System Failures
- **Step 2:** Classify System failures
- **Step 3:** Choose Reliability Model, which reflect the system and its operational profile
- **Step 4:** Estimate or Predict Model parameters (Can be MLE or Interval Estimate)

### 7. Conclusions

IT Decisions are on centre-stage due to increasing use and incorporation of IT in enterprise and business contexts. In this paper, we describe various IT decisions and possible ways they can be made in terms of creating a common operating picture, monitoring and minimizing complexity, increasing customer value and maximizing software reliability. This paper is an initial attempt by the author to integrate various frameworks and techniques and we hope this can pave a way for more focused practice, research and development on IT decisions.

#### References

1. DSM web site [http://www.dsmweb.org](http://www.dsmweb.org)

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### The top 10 IT disasters of all time

[Some Excerpts from a blog by Colin Barker, ZDNetUK]

**Note:** We have purposely omitted incidents that resulted in loss of life.

1. **Faulty Soviet early warning system nearly causes WWIII (1983)**
   The threat of computers purposefully starting World War III is still the stuff of science fiction, but accidental software glitches have brought us too close in the past.

2. **The AT&T network collapse (1990)**
   In 1990, 75 million phone calls across the U.S. went unanswered after a single switch at one of AT&T’s 114 switching centers suffered a minor mechanical problem and shut down the center.

   In 1996, Europe’s newest and unmanned satellite-launching rocket, the Ariane 5, was intentionally blown up just seconds after taking off on its maiden flight from Kourou, French Guiana. The European Space Agency estimated that total development of Ariane 5 cost more than $8bn (£4bn).

4. **Airbus A380 suffers from incompatible software issues (2006)**
   The Airbus issue of 2006 highlighted a problem many companies can have with software: What happens when one program doesn’t talk to the other.

5. **Mars Climate Observer metric problem (1998)**
   Two spacecraft, the Mars Climate Orbiter and the Mars Polar Lander, were part of a space program that, in 1998, was supposed to study the Martian weather, climate, and water and carbon dioxide content of the atmosphere.

   Business services giant EDS waded in with this spectacular disaster, which assisted in the destruction of the U.K.’s Child Support Agency (CSA) and cost the taxpayer over a billion pounds.

   Many IT vendors and contractors did very well out of the billions spent to avoid what many feared would be the disaster related to the Millennium Bug.

8. **When the laptops exploded (2006)**
   It all began simply, but certainly not quietly, when a laptop manufactured by Dell burst into flames at a trade show in Japan.

9. **Siemens and the passport system (1999)**
   It was the summer of 1999, and half a million British citizens were less than happy to discover that their new passports couldn’t be issued on time because the Passport Agency had brought in a new Siemens computer system without sufficiently testing it and training staff first.

10. **LA Airport flights grounded (2007)**
    Some 17,000 planes were grounded at Los Angeles International Airport earlier this year because of a software problem.
Key Best Practices @ Polaris Software driving Operational Excellence

Sudha Gopalakrishnan

In the context of software projects, Operational Excellence may be defined in simple terms as a goal of executing projects in a manner that improves speed of delivery and quality of deliverables while reducing rework effort. Operational excellence focuses primarily on need of the customer, and makes use of employee empowerment for optimization of people, assets and processes. Adoption of industry best practices through process models such as CMMi and tools like Six Sigma accelerates the journey of operational excellence.

Another way to accelerate is to identify, understand and replicate the best practices in use in other organizations. This article discusses some of the best practices in use at Polaris Software that has helped us in achieving operational excellence in the context of providing technology solution to complex business needs of tier 1 global financial institutions.

Out of many best practices in use, a selected few are presented here. Selection is done in such a manner that, they cut across various process areas, and have a potential for adoption with ease. Common elements behind successful implementation of these best practices are (a) development and use of supporting frameworks (b) management review.

- **Proposal Process – Probability of Successful Project Execution**
  It has been observed industry wide that in many cases, the root cause of high cost and schedule overruns and poor quality of deliverables lie in proposal stage. While it is necessary to focus on winning the deal during proposal stage, it is also important to assess the chances of successfully executing the project, if deal is awarded, in a such a manner that all the promises made are delivered. For addressing this, a simple instrument “Probability of Successful Project Execution” is used in Polaris that helps in assessing common challenges that are likely to come in the way while executing the project. Various dimensions considered in this assessment include resources, infrastructure, requirements clarity, delivery timeline Vs effort needed etc. Relative score of individual dimension help in identifying any special strategy that is needed to tackle the challenge and help improve the score. For example, if requirements clarity is an issue in a fixed bid situation, a two stage approach may be proposed – first stage for collecting detailed requirements on a time and material basis, and second for design and development in a fixed bid mode.
  
  Depending on factors like criticality of the account and size of the deal, this assessment is reviewed with senior / top management. In case, after applying all possible strategies, if overall score remains low, management takes NOGO decision, and proposal is not submitted.

- **Project Planning - Estimation and Scheduling**
  A proprietary “L1 to L5 Estimation Methodology” has been developed and used in Polaris, which is far more superior as compared to traditional complexity based estimation. In this methodology, apart from technical complexity, consideration to resource skills as well as duration is given at atomic level using bottom-up estimation approach. Skill requirements depend on criticality of underlying functionality of a unit from business perspective, whereas certain tasks like regression testing is duration driven rather than development effort. Excel based home grown tool, Intellect Estimator, supports this methodology, and helps in estimating skill wise effort and resource loading. This method has advantage over function points based effort estimation also, as it enables estimation, scheduling and defect tracking at same level of atomicity.

- **Project Execution – On Time in Full (OTIF) delivery principle**
  “90% Syndrome” (Tasks progress quickly until they become 90 percent complete and then remain at 90 percent forever), is a history and no more a common scenario, thanks to improved project management practices over last two decades. However, delayed delivery is still an issue in most organizations. To address this issue, Polaris innovatively adopted “OTIF”, one of Goldratt’s principles, which is popular in manufacturing industry. It primarily deals with identifying intermediate milestones, which if met in a timely manner, will ensure on time delivery with complete scope. At Polaris, we have enriched iPlan...
(integrated project management tool used in Polaris), to support effective planning and tracking of milestones with necessary management control over rescheduling of milestones after creation of initial baseline.

During weekly management reviews, on time index ((%Milestones Completed On Time / (Milestones Completed On Time + Milestones Completed Late + Milestones Slipping)) and future planning index ((%Total Future Milestones / Minimum expected milestones)) are used to review the projects which misses predefined spec limits for the same, to ensure early corrective action along with needed management support.

Implementation of OTIF has resulted in more than 25% of additional projects getting delivered on or before time as compared to previous baseline. This has also resulted in improved customer satisfaction rating. Subsidiary benefits of tracking payment milestones has been a reduction in aged REB (Revenue in Excess of Billing) and improvement in DSO (Days Sales Outstanding) from 62 to 52 days (one of the best in the industry).

- Project Execution – Early Warning Management

While proactive risk management helps in identifying and addressing the risks on a proactive basis, Early Warning Management system helps in catching the early signals for non-mitigated as well as unidentified risks for triggering necessary actions as soon as signals are sensed. At Polaris, Early Warning Management system has been developed with focus on lead and lag measures pertaining to 5 dimensions (called PANIC - Process Compliance, Associate Skills, Non-Mitigated Risks, Performance Indicators, and Customer Satisfaction). Based on values of these measures, project’s health is assessed on a 3 point scale of red-amber-green (RAG).

Green projects are healthy projects, which do not require any special management intervention. However, amber and red colors indicate issues, and require plan of action to go back to green, and review of situation with appropriate layer of management.

This process is now completely institutionalized across Polaris and available across all geographies through a web based online system. Strong evidence of improvement in performance has been found with respect to the different EWMS metrics, viz., % of Red/Amber projects, % of Red projects and % of “Low Comfort Level” dimensions have decreased consistently Q-O-Q. Balanced Scorecards (Goal Sheets) of all the stakeholders include, to a significant extent, performance with respect to the RAG. This ensures that the same business objectives that drive the project goals also percolate through the performance appraisal system and there is complete synchronization.

- Handling of non-functional requirements

Many projects face issues during advances stage of implementation due to lack of common understanding and documentation of non-functional requirements. At Polaris, an explicit focus is needed for non-functional requirements. To start with, non-functional requirements are discussed and agreed up-front during requirements stage. A strategy note is prepared during analysis stage that lays down the strategy for addressing these requirements through appropriate tasks of design, construction and testing.

- Reviews and Testing – defect prediction model

Primary reason of high defects in acceptance test is leakage of defects from early phases. Based on extensive statistical analysis of defect injection and defect detection patterns, defect prediction model has been calibrated at Polaris, which gives range of defects present in the software by lifecycle phases. This forms the basis for setting defect detection goal for review and test activities. Unless the goal is met (or substantiated with evidence the case of superior engineering), project cannot go to next stage, and require more extensive review and testing to detect more defects.

- Integration and Testing – testing dashboards

One more best practice related to testing used in Polaris is, usage of dashboards for analysis and sharing of information related to test execution progress and defects. In terms of inputs, dashboard requires (a) day wise test execution plan (b) details of detected defects (c) analysis of defects and current status. In terms of outputs, it gives trends and snapshots in many useful cuts that help in ensuring that (a) progress of test execution is satisfactory (b) defect fixing rate is good, and will not become a bottleneck for retesting (c) defect detection rate is good, and will hit the predicted defects on test completion (d) timely action planning for addressing product quality issues based on analysis of defects by module, by severity, by nature of defect etc.

- Construction – statistical process control of code review and unit testing sub-processes

To ensure minimum leakage of defects to system testing and acceptance testing phases, we have decided to have higher focus on code reviews and unit level testing through application of statistical process control in real time to these sub-processes. Specification limits are set based on two things (a) defects predicted through the use of defect prediction model (b) stretch over established control limits through project’s own performance. In general effectiveness (focusing on number of defects uncovered), and efficiency (focusing on review / test time) charts are used in tandem for

Objective: Set interim Milestones during a Project and measure progress against them

Best Project Managers almost always achieve 100% OTIF index, On Time completion, all the time, with no left-overs

How to achieve it?

a) Plan a minimum of 4 Miestone tasks in a month
b) Track progress against plan
c) Report completion status

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analysis. Statistical control of these critical sub processes has resulted in significant reduction in the delivered defect density and failure cost.

- **Process Compliance – Escalation Levels**

To get the maximum benefits out of a process step, it must be executed at the right time. To address the issues of delays in closure of reported non-compliances, we have defined objective escalation rules, based on which NCs are escalated to 4 management layers for their intervention for analysis and closure, as depicted in the picture below. While the non compliances are addressed by different layers in the management hierarchy, this framework has enabled in bringing the necessary senior management focus and attention to critical compliance issues.

- **Process Framework and Governance– Integrated Processes and MIS**

At Polaris, Software Process Engineering Group has been transformed into Business Process Excellence Group. In other words, processes pertaining to software engineering, business operations as well as internal processes of support groups like human resources and infrastructure technology are under the purview of unified process group. Not only that all the process elements pertaining to all the different functions are integrated under single QMS portal. Thus QMS is the one stop solution for all the process needs of the organization as a whole.

Polaris makes use of various automated systems for business operations. Some systems are COTS product where as some are developed in house to suit the specific way of Polaris working. For MIS reporting and analysis all these systems are integrated to provide integrated view. As a result of these, there is a complete traceability amongst all the systems and MIS provides end to end picture starting from opportunity creation to project registration to resource allocation to project management to billing and collections.

Integrated processes and MIS have
been helping Polaris in taking information based decisions, and effective management reviews at all levels.

**About Polaris Software:**

Polaris Software Lab Limited (‘Polaris’) is a leading Financial Technology company, with its comprehensive portfolio of products, services and consulting. Polaris has a talent strength of over 9,000 solution architects, domain and technology experts. The company owns the largest set of Intellectual Properties in the form of a comprehensive product suite, Intellect Global Universal Banking (GUB) 10.0. IntellectTM is the first pure play SOA based application suite for Retail, Corporate, Investment banking and Insurance.

Polaris is ranked amongst the premier IT service providers with a successful track record of implementing solutions and services among 200 of the world’s largest financial institutions. Polaris is the chosen outsourcing partner for 10 of the top 15 global banks and 6 of the top 10 global insurance companies. World’s top analysts have recognized Polaris amongst the global leaders in banking and insurance software. Polaris is headquartered in Chennai and has a strong global reach, with Sales & Marketing and Development centers spanning across 29 locations in over 16 countries including the major financial hubs globally. Polaris has 9 Business Solution Centers within India across different locations each specializing on specific areas of the Financial Technology domain. At any point in time, there are over 400 projects executed across these Business Solution Centers.

The organization has a long history in process improvement especially in working with SEI models. They have conducted multiple CBAIPIs and SCAMPIs from the early 1990s. The organization has a strong culture towards Quality and Process Improvements with a 100 member strong Quality Assurance and Process Group. The SEPG is a 25 member strong Business Process Excellence Group (BPEG) focusing on business process improvements that transcend software engineering processes.

Polaris has a robust organizational measurement program in place driven by business objectives and customer needs. The business drivers are Customer Satisfaction and Profitable Growth. These business objectives translate into organizational process performance goals and project goals on one hand and through the balance score card framework and individual performance goals on the other. Hence to achieve the organization objectives, these performance goals are mandatory for every project. Using the GQM (Goal – Question – Metric) paradigm, the business objectives translate into measurement objectives that get further mapped as engagement and project level goals. The Human resource performance management system ensures that the same business objectives also percolate into the goal sheets at all levels through the Balance scorecard framework. This ensures that the individual, team and project performance are completely aligned to achieving the organizational objectives.

**References:**

• OTIF Principle – Eliyahu M.Goldratt
• High Quality Low Cost Software Inspections – Ronald Radice

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**Hat’s Off ...**

To people who made this possible

Please call 0422-2200695 or 94430 93253 for registration
Creating and Sustaining Process Excellence

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This article provides an overview of Process Excellence, tools / methodologies used, role of leadership in implementing Process Excellence and building culture for sustaining process excellence in an organization. Also, this article has detailed review on the lean approach taken to optimize processes to achieve process excellence.

Part - 1
Process excellence – an overview:

As per Peter F. Drucker’s management theory which states, “Efficiency is doing things right, Effectiveness is doing the right things”. Process excellence can be simply termed as efficiency and effectiveness in processes. Process excellence is the unrelenting focus to create and deliver the value to the customer. Process excellence is geared to meet the needs of the customers, employees and stakeholders.

For example, in a typical service industry such as production support processes, process efficiency is the measurement of how long it took for a support person to resolve the issue from the time the issue was opened. Process effectiveness would be how well the issue was resolved and/or the customer satisfaction measurements.

Tools and methodologies used

Process Excellence is about quality, continuous improvement and is biased towards action and change. Some common tools and methodologies used in Process excellence include Lean, Six Sigma, Design for Six Sigma, Change management etc.

Fig. 1: Process Excellence framework

Fig. 1 shows the framework which can be adopted for achieving process excellence in an organization. This framework has certain lead indicators like improving product reliability, enhancing customer satisfaction, cycle time reduction, productivity improvement and improving quality of deliverables as “Enablers”. These enablers will use the six sigma methodologies such as DMAIC, DFSS and LEAN as “Drivers” which will implement and sustain process excellence in their organization, helps yielding customer and business.
Usage of Metrics and tools:

Process management provides a comprehensive view of the entire business process and includes a measurement framework which will help the leaders/stakeholders for establishing process goals, monitoring process performance relative to business and customer goals, and identifying projects that significantly enhance the process excellence. By linking the business objectives to core business processes, leaders can identify gaps between the current and desired future state. Six sigma methodologies like DFSS, DMAIC and LEAN can act as “Drivers” to close the gaps. Below is the snapshot, which lists some of the metrics and SPCs, QC tools from Six sigma.

Role of Leadership in implementing Process Excellence

Leadership in organizations that excel in Process Excellence have the ability to create the vision, to develop the organizational structure that promotes the vision, to build skills/competencies needed to execute the plan or vision, and prevent potential hurdles or bottle necks while executing the Process Excellence. Below is the snapshot of top down approach on the leadership drive for Process excellence.

Leadership envelope four major areas namely:
- Strategic leadership
- Business insight
- People leadership
- Personal skills

Building a culture for sustaining Process Excellence

Process excellence is a means to ensure meeting and exceeding increasing expectation of customers & other stakeholders, overcome the challenges posed by changing market forces. The fundamental concepts of process excellence are continuous learning, innovation and process improvement.

Fig 4: Fundamental concepts of Process Excellence

The prerequisites for making process excellence a culture include:
- Establishing clear organizational goals and strategies to achieve the same.
• Establishing right priorities and measures.
• Reviewing implementation of strategies against the plans is a major source of organizational learning.
• Establishing a culture of finding ways of improvement – in contrast with the culture of finding faults (basic barrier to innovation).
• Use of scientific analytical tools / statistical tools that provide new insights into performance.
• Readiness on the part of leaders to listen to and support innovative ideas and concepts.
• Sense of ownership in the employees combined with control over the job or process.
• Empowerment is the value a company must bind.
• Crushing the notion that “we are the best” and instead look for best practices for triggering innovative ideas.

Part 2:
Case study – LEAN approach (Cycle time reduction)

In Part 2, this article will take you through of case study of process excellence; where in the Lean Six sigma approach is used to drive the process excellence parameters such as productivity enhancement, cycle time reduction and enhancing customer satisfaction.

The project’s work scope is on the manual documentation process, which impacted an execution time of 38 days and 3 delivery defects per delivery rate. This is treated as high priority pain area for the customers.

Charter:
Problem Statement:
Current Execution time of the process cycle time on an average is 38 Days

Per delivery defect rate internally is 3.

Goal Statement:
Identify the factors influencing the execution time and the defects with the following targets.
• Defect rate less than 1% and
• Reduce the time taken by 75%.

This Six Sigma Project goal was maturing towards a defect rate less than 1% and cycle time reduction by 75%.

Tools & methods used:

Kano model is interpreted as a relationship model of expected quality vs. excited quality. Fig 6 shows the six sigma project’s Kano model aiming towards basic needs of reducing manual errors to excitement attribute of effort optimization.

Fig 7 shows the basic documentation process flow and the identified MUDA (waste) by the core team (delivery and six sigma team) based on the analysis of process and data.

Sample data on document cycle time were analyzed on their estimated overall cycle time. Statistical Analysis helped in measuring the current capability level of the documentation process. Data Collection helped in understanding document creation process and the non value added activities (NVAs) - MUDA which contributed the
The core team along with Six Sigma arrived at certain kaizens and automation tools to improve effort optimization and reduce the impact of the wastes identified in process flow analysis. The above listed kaizen were implemented and the process improvement was checked for stability and improvement tracking for a month, for its sustainable growth using various statistical Process Control Techniques.

The operational benefits incurred out of this LEAN six sigma approach were reduction of defects to average 1 defect / day and reduction in documentation cycle time to 24 days / delivery.

Summary

Process Excellence is a journey and results in creation of value. Leadership plays a pivotal role in the journey by creating the vision and strategy, providing resources, eliminating bottlenecks and by sustaining the momentum for Process Excellence.

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Congratulations to **Dr. R.M. Suresh**

Computer Society of India congratulates Dr. R.M. Suresh, Professor & Head, Computer Science & Engineering and Vice-Principal, RMD Engineering College for receiving the national award for the Best Engineering College Teacher Award – Anna University National Award for the year 2009 at a ISTE function held at NIT Surathkal on 19th Dec 2009. Dr. Suresh is an active member of the CSI Chennai Chapter and also serves as a member in the management committee of CSI. He was closely associated in organizing the SEARCC Students Software Contest during CSI 2008 held at Chennai. An enthusiast in Open Source, he has organized a no. of events in OSS and also in emerging areas in Computer Science.
Peter Drucker once said “You take away the entire company infrastructure such as equipments, machineries, Land, etc. Leave me and my Men, we shall create another one”. Success of achieving the goals largely depends on the people in the Organization. Constant people enablement will be the key to progress in varying market conditions. Installing effective people practices has been the Leadership agenda for many successful Organizations. Operational Excellence can be achieved with right attitudes and mind-set. Key to constant focus on operational excellence emerges from the assignment of right set of people with required competencies. Quality results are directly proportional to the Quality people. People Quality further depends on having conglomeration of highly effective and efficient workforce practices. Workforce practices comprises of talent attraction, selection, motivation, development and retention. Structured and systematic approach to institutionalizing people practices can provide strong foundation to sustainable Operational excellence.

Continuous focus on talent development and retention has lead Organizations to reap unbelievable business results. In order to focus on key business outcomes and sustainable operational results, first the focus needs to be established on the key ingredients. Key ingredients include having right people for the right job. This would mean focus on structured approach to competency management can lead to significant results. Complex engagements have started emerging in many Organizations. Customer demands have intensified and focus on getting significant complex work has become key differentiators. Handling such complex or mission critical engagements provide competitive edge. Competent professionals and employees are key factors to handle significantly complex engagements and ensure value proposition to the client organizations. Customers are no more sticking on to those Organizations on loyalty grounds alone. Customers prefer to have value add on every endeavor and those have become primary reasons for their association. Several Organizations have started benchmarking their people practices as against renowned people based models such as People Capability Maturity Models. At times it is imperative to have a ruler to draw a perfect straight line. Corporate needs models that contain acceptable industry practices that can engage the Organizations and make them realize the power of collective work. Cohesiveness in almost every aspects of Organizational transformation can result in permanent change or shift to betterment. Sticking on the fundamentals and basics enables Organizations to evolve structured transformation without causing adverse impact. Alignment to globally recognized models can cause systematic and structured evolution of people practices resulting in Operational excellence.

Significant factor that contributes to the Operational excellence is the evolution and installation of structured competency modeling. Competency modeling and framework acts as a key input to direct the Organization towards the path of continuous enablement of team. Constructive and comprehensive competency framework can provide extraordinary results. Competency comprises knowledge, skills and other abilities. Combination of these components provides clear identity for individuals and team on their ability to contribute to the Organizational excellence. Several Organizations could not reap the full benefits of competency framework primarily due to lack of involving pertinent stakeholders. Competency modeling exercises require extensive study and understanding of Organizational dynamics, culture and operations. Coupling excellence phenomenon with the Quality people enables Organizations to place themselves in a sustainable growth path.

Those successful Organizations have experienced the results and return on Investment on evolving Competency based people management. Individuals and team needs to be constantly challenged to harness their competencies. Continuous stay in comfort zone can result decay of existing skills. Organizations need to evolve and get on to the path of transformation. Beneficial transformation is the only way to grow and set new rules for the competition. As the saying goes, although we are on right track we will get run-over if we don’t progress. Progressive transformation leading to innovation and value addition to customers can put an Organization in an accelerated growth path. Excellence is the choice Organizations makes. Leadership commitment to constancy in competency development can make significant difference.
Right methodology is the essence of seeing success in the competency based management. Organizations learn based on past experiences. Individuals and team must be engaged with challenging tasks that can result in bringing newer thoughts and mind-set. Fullest benefit of competency management can be attained only when all key and pertinent stakeholders are involved. Involving a few functions such as Human Resources would not provide complete insights to the developmental areas. With swinging market conditions, Organizations need to constantly focus on creating jobs and environment for people enhance their capability. Environment of cultivating the capacity among the individuals and team is of primary essence to set newer rules. Competency management initiatives have to be planned in a manner to change the rule of competition rather than facing them. Innovative products and exceeding customer expectations with immense value proposition would take the Organizations to a greater altitude. In order to ingrain these as a habit in the culture, the focus needs to be on cultivating the capacity with structured development programs and strategy.

Time has come to put a strong foundation on key people engagement areas to survive market variations. Long term thinking and focus on means claims utmost importance. Continuous focus on goals without strengthening the means does not lead to sustainable excellence. Dealing with attitudes have always been a difficult moments for many Organizations. A few Organizations have stood-up to this challenge and made it possible by extending positive culture across all departments. In the focus on competency modeling, care needs to be taken to cover all associated functions and shall not be seen as an independent movement. The Competency transformational model needs to embrace the whole entity with network of functions and departments. This may not sustain if approached in silos.

**Noteworthy Industry Practices**

Organizations adapting to structured competency modeling initiatives have experienced significant improvements on Productivity, Resource utilization, Attrition and Employee satisfaction. Key demonstrations observed from those Organizations include expeditious alignment of competencies to basic workforce practices. For instance Competency based recruitment strategies, competency based selection mechanism, competency based performance management, competency based compensation policies and competency based development programs. As the competency modeling is aligned to business strategy, the workforce practices alignment to those business need competencies becomes critical and provides competitive edge. Meticulous mapping enables Organizations to prioritize on key focus areas on individual development that guides towards exhibiting performance with customer delight. Apart from external focus, internal to Organization is people centricity. Individuals playing multiple roles were able to clearly distinguish their developmental aspects as the needed competencies are clear. Individuals were able visualize and appreciate their relevance to the business and associated business components. Competency management also accounts future needs on the workforce and enables their readiness to play significant role from potential challenges. Systematic and structured competency management not only enables operational excellence but also gets the Organizations and its entities fully prepared to face challenges in future. Some of the typical quantitative benefits observed by the Organizations those adapted to Competency based workforce management includes Productivity improvement by 30 – 35%, Resource utilization improvement by 55 – 60%, Attrition reduction by 15 – 20% and Employees satisfaction / engagement rating by 60 – 65%. These numbers are based on the significant transformation seen or observed before and after adapting to sustainable competency modeling exercises and also planting a strong development programs in the Organizations. In order to enable effective transformation and become more competitive it is imperative to adapt to competency management aligned with the current and future business needs coupled with customer requirements.

**Key Lesson from Eagle**

Need to learn a very important lesson from the Eagle. Yes, the Eagle has the longest life-span among Birds. It can live up to 70 years. But to reach this age, the eagle must make a hard decision. In its 40s, its’ long and flexible talons can no longer grab prey which serves as food. Its’ long and sharp beak becomes bent. Its’ old-aged and heavy wings, due to their thick feathers, become stuck to its’ chest and make it difficult to fly. Then, the eagle is left with only two options: die or go through a painful process of change which lasts 150 days. The process requires that the eagle fly to a mountain top and sit on its’ nest. There the eagle knocks its’ beak against a rock until it plucks its out. After plucking it out, the eagle will wait for a new beak to grow back and then it will pluck out its’ talons. When its’ new talons grow back, the eagle starts plucking its’ old-aged feathers. And after five months, the eagle takes its’ famous flight of rebirth and lives for 30 more years.

Many times in order to survive, Organizations have to start a change process. Sometimes need to get rid of old habits and past traditions. Only freed from past burdens, Organizations can take advantage of the present and attain beneficial transformation towards excellence. A positive attitude causes a chain reaction of positive thoughts, events and outcomes.

“If you focus only on results, you will never change. If you focus on change, you will get results”

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**Top 10 Trends in IT for 2009**

**By Samuel Greengard on 2008-11-26**

For Baseline Online Magazine


1. **Software as a Service (SaaS)**
2. **Virtualization**
3. **Mobility**
4. **Green Data Centers**
5. **Risk Management**
6. **Social Networking**
7. **Web 2.0**
8. **E-Discovery**
9. **PPM**
10. **Video Collaboration**
I. Introduction

A Digital watermarking

An ideal watermarking system is used to embed an amount of information that could not be removed or altered without making the cover object entirely unusable. A digital watermark \([1,2]\) is a piece of information which is embedded in the digital media and hidden in the digital content in such a way that it is inseparable from the data. Digital watermarking is classified into various aspects. Watermarks can be visible or invisible. Visible watermarks are physically displayed on the multimedia documents. At the same time it is important for watermarks not to deteriorate the overall quality of the document. Invisible watermarks are inserted into documents to trace a possible illegal use.

A.1 Principle

The working principle of the watermarking techniques is similar to the steganography \([1,3,4]\) methods. A watermarking system is made up of a watermark embedding system and a watermark recovery system.

Digital Watermarking provides a way to imperceptibly embed digital information into both digital and conventional media content. Information contained within the watermark can be used to add value to a variety of applications such as security, copy prevention, authentication etc. A unique advantage of a digital watermark is that the information is imperceptibly bound to the original medium. The purpose of this paper is to represent a survey of various watermarking techniques since their inception and the discussion of various watermarking techniques employing Genetic algorithms which have contributed in these problems.

A.2 Properties of Digital watermarking

There are a number of important Properties\([1,2]\) that watermarks exhibit. Some of the important ones are given below.

Robustness

Robustness describe how well watermarks survive common signal processing operation. The digital media content audio ,video or digital image
may undergo various kinds of distortions. Some of the common distortions are lossy compression, rotation, scaling, translation, alteration of colors, modification of bass. Detected decoder watermark information.

Data Payload
Data payload refers to the number of bits a watermarked encodes within a unit of time or within a work. For a photograph, the data payload would refer to the number of bits encoded within the image. A watermark that encode N bits is referred to as an N bit watermark. Such a system can be used to embed any one of $2^N$ different messages.

Fragility
This is reverse of robustness. For specific applications where it is required that watermark in a text document should allow copying, but even if there is a small alteration in text, the watermark should be destroyed. Thus if not detected, it can be ascertained that something wrong has happened with the original text. The watermarks may be designed to withstand various degrees of acceptable.

Fidelity
The fidelity of a watermarking system refers to the perceptual similarity between the original and watermarked versions of the cover work.

Tamper Resistance
In addition to the normal signal distortions, the watermark should be resistant to distortions against the deliberate signal processing operations intended to remove the watermarks. A successful attack on a watermark system can damage or completely remove a watermark. Anticipation of such attacks and resistance against them comes in the category of tamper resistance.

A.3 Application of Digital Watermarking
A small watermark noise is added to a piece of the multimedia documents like music or picture. This piece of information known as watermark, serves many applications [1,2] listed below.

Copy Control
Using watermarks to tell recording equipment what content may not be recorded. Watermark may contain information required by the content owner, that decided the policy of copying the digital content. The information contained by the watermark may specify 'content may not be copied' or 'only one copy' etc. Subsequently, the devices used for copying the content may be required by law to contain watermark detector, which follows directives given by the content owner.

Owner Identification
Watermarks may be used to identify the owner of the content. By having this information the user may contact the owner for acquiring the legal rights to copy or using the content.

Authentication
Watermark is used to provide authentication. It may be designed in such a way that, any possible alteration in the data either destroys the watermark or creates a mismatch between the content and the watermark, that can easily be detected.

Broadcast Monitoring
A commercial advertisement may be watermarked by putting a unique watermark in each video or sound clip prior to broadcast. Automated monitoring systems can then receive broadcasts and check for these watermarks, identifying when and where each clip appears. This proves very helpful for the advertisers as they actually pay for only the number of times the advertisement was actually relayed.

Fingerprinting
A fingerprinting technique can be used to trace the source of illegal copy. Every copy available can be watermarked with a unique bit sequence. Now, if a copy is made illegally the source can be easily tracked since each original copy had a unique bit sequence embedded into it.

Secret Communication
The technique of watermarking is also used in transmitting secretly information from source to destination in a hidden way. This method refers to steganography where the important or secret information may be hidden behind an image. Several public domain and shareware programs are available which use watermarking for secret communication.

Medical Applications
Names of the patients can be printed on the X-ray reports and MRI scans using techniques of visible watermarking. The medical reports play a very important role in the treatment offered to the patient. If there is a mix up in the reports of two patients this could lead to a disaster.

B. Genetic Algorithm
Genetic algorithms [5,6] are search algorithms based on mechanics of natural selection and natural genetics. They combine survival of fittest among string structures with a structured yet randomized information exchange to form search algorithms with some of the innovative flair of human search. In every search, a new set of artificial creatures (strings) is created using bits and pieces of fittest of the old creatures.

Conventional search techniques are not very suitable for optimizing non-linear functions with multiple variables. However, genetic algorithms this can be conveniently done.

In the genetic algorithms, the parameters are represented by an encoded binary string called the “chromosome” and the elements in the binary strings or the “genes” are adjusted to maximize or minimize the fitness values. The fitness function has to be carefully selected specific to a particular application and the kind of optimization required. Thus, the entire process of genetic algorithm starts with a set of proposed solutions randomly generated and try to produce further possible solutions to achieve the desired optimization. This is the reason of the wide application of genetic algorithms in optimization areas.

8.1 Principle
The figure shown below basic principle describes a simple genetic algorithm in its simplified form.

![Genetic Algorithm Diagram]

B.1 Principle
The figure shown below basic principle describes a simple genetic algorithm in its simplified form.
Selection: Selection is based on the survival-of-the-fittest mechanism. Chromosome are selected based on the fitness value.

Cross Over: The Chromosome with the higher fitness values generate more offspring.

Mutation: After Crossover, the strings are subjected to mutation. Mutation of a bit involves flipping it changing 0 to 1 and vice versa with a small probability.

B.2 Application of Genetic Algorithm

Genetic algorithm generally used in optimization application[19]. Some of field where genetic algorithm used.

1. Image Processing.
2. Engineering Design.
3. Robotics.
4. Optimized Telecommunication Routing.
7. Scheduling.
8. Data base Mining.
9. Economics.

II. Survey of various Techniques used in Watermarking

A. Traditional Techniques and Problems

There are many watermarking methods which have been developed to embed a watermark into the cover image. Some of the important contributions of various proposed methods of digital watermarking during initial research period in digital watermarking are presented here.

A watermark was generated using the least significant bit of the original image by Schynedel et.al [7] to produce the watermarked image. The watermark was extracted from a suspected image by taking the least significant bits at the proper locations. Cross-correlation of the original and extracted watermark was made by Schynedel, which showed that the resulting image contained an invisible watermark with simple extraction procedures. However, the robustness was not proper.

Cox [8] noted that in order for a watermark to be robust to attack, it must be placed in perceptually significant areas of the image. The watermark was inserted using Digital Cosine Transform (DCT) coefficients of the original image, and the inverse DCT was taken to retrieve the watermarked image.

Xia, Boncelet and Arce [9] proposed a watermarking scheme based on the Discrete Wavelet Transform (DWT). This transform was based on mechanism where the watermarks were embedded in lowest frequency component in a controlled quantization process.

Digital watermarking is the technology that has been developed to protect digital image from illegal manipulations. Bartolini [10] generated a watermarked image from DCT coefficients.

Kundur and Hatzinakos [11] embedded the watermark in the wavelet domain. Delaigle [12] proposed a unique watermarking scheme based on the human visual system. Binary m-sequences were generated and then modulated on a random carrier. This image served as the watermark, and then it was masked based upon the contrast between the original signal and the modulated image. The masked watermark was added to the original image to form the watermarked image. Their technique was robust to additive noise, JPEG coding, and rescanning. Craver noted that certain watermarking techniques were susceptible to counterfeiting attacks. They showed that the method proposed by Cox [8] could be attacked by creating a fake original image and fake watermark that is indistinguishable from the true original image and watermark.

To prevent this scenario, the algorithm developed by Cox was modified by making the watermark dependent on the original image. This new scheme was less susceptible to counterfeiting and still maintained robustness.

The DCT-based watermarking technique was robust to JPEG compression, while spatial fractal coding produced block artifacts after compression. A method for casting digital watermarks on images and analyzing its effectiveness was given by I.Pitas [13] and immunity to subsampling. Craver noted that certain watermarking techniques were susceptible to counterfeiting attacks. They showed that the method proposed by Cox [8] could be attacked by creating a fake original image and fake watermark that is indistinguishable from the true original image and watermark.

Anderson and Petitcolos [14] in their paper described an approach to detect hidden messages in images that uses a wavelet-like decomposition to build higher-order statistical models of natural images. Support vector machines were then used to discriminate between untouched and adulterated images. Kundur and D. Hatzinakos [11] used wavelet-based image watermarking methods to exploit the frequency information and spatial information of the transformed data in multiple resolutions to gain robustness. Although the Human Visual System (HVS) model offers imperceptibility in wavelet-based watermarking, it suffered from high computational cost.

In most of these techniques it was observed that with the increase in robustness of watermarking there was an inverse effect on fidelity of watermarked image. Due to these reasons, new techniques of watermarking to optimize robustness with the minimum adverse effect on fidelity using evolutionary technique like Genetic Algorithm were proposed by various research as given in next.

B. Watermarking Techniques Employing Genetic Algorithms

An innovative watermarking based on Genetic Algorithm in the transform domain [15] was proposed. It was robust against watermarking attacks. It was robust because it used Genetic algorithm to train the frequency set for embedding the watermark. However, tradeoff between the fidelity and robustness was not addressed.

Kitti and Arithit [16] presented a new approach for wavelet image watermarking using Genetic Algorithm. The watermark insertion and watermark extraction were based on the CDMA technique and did not need the original image in watermark extraction. However, the PSNR of the watermarked image and NC of the extracted watermark was not satisfactory.

Jin cong and Jiaxiong Peng [17] proposed an affine invariant watermark scheme using genetic algorithm. In this paper the Shape specific point Technique and feature point matching method were used by genetic algorithm for resisting geometric attack. Yi-Ta Wu and Frank Y.shin [18] presented a Genetic algorithm of generating a stego-image to break the detection of the spatial domain and the frequency domain steganalytic system by artificially counterfeiting statistic features. In this paper design a fitness function to evaluate the quality of each chromosome in order to generate the stego-image that can pass through the inspection of steganalytic systems. This method provided good performance in terms of fidelity and robustness but a customized control between them was not available.

Dengeun Lee, Takeyung Kim, Seongwon and Joonki Paik [19] present a novel watermark extraction algorithm based on DWT and Genetic algorithm. In order to inset the watermark strongly, the proposed algorithm transform the image into wavelength domain and insert the watermark in to lowest frequency band. The proposed watermarking algorithm was robust against various attacks such as JPEG image compression and geometric transformation. However, with the increase in the robustness there was an adverse effect on the fidelity of the watermarked image.

Zhicheng, Hao Li, Jufeng Dai and Sushuang Wang [20] proposed image watermarking based genetic algorithm. In order to improve the robustness and imperceptibility of the image spread spectrum watermark algorithm, a new approach for optimization in 8x8 domain.
using genetic algorithm.

Chien-Chang Chen and Chien-Shian Lin [21] propose Genetic algorithm based image authentication approach to improve the image quality of a protected image. In the evaluation process, the embedding positions are simulated as chromosomes. The nearly optimal embedding position is then obtained by natural selection that employs Mean square error and GA operator. The technique could be successfully used for authentication purposes. However the solution to control the tradeoff was not provided in this technique also.


III. Conclusion

With the literature survey of proposed watermarking technique given by various researches, it is evident that the technique based on Genetic Algorithms have certainly influenced positively towards increase in robustness of watermarking without compromising the quality of watermarked image. The various Genetic Algorithm technique which have proven their importance in a variety of optimization application may certainly help to optimize the robustness of watermarking technique also thereby enhancing the quality of watermarking technique.

Reference


Science is what we understand well enough to explain to a computer. Art is everything else we do.

– Donald Knuth, Foreword to the book A=B , 1996

Email is a wonderful thing for people whose role in life is to be on top of things. But not for me; my role is to be on the bottom of things. What I do takes long hours of studying and uninterruptible concentration.

– Donald Knuth versus Email

“If any number can be said to encapsulate our times, 404 is it.”

A Study on Network Security System

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It is a matter of great concern for the computer network researchers to study and analyze the network so far it’s security is concerned. In the growing world of networked environment eavesdropping, hacking and other malpractices have made a negative impact into it’s existence. Many different approaches have been taken by the computer scientists and researchers to combat this almost dynamically to protect the network system. The technological shift has made new areas to look into study further and develop both software and hardware systems to first detect and then protect from software and hardware based malpractices.

I. Introduction
The faster growth of the networked environment (internet accessibility) all over the world has led into a new area of crime in the early 1990s to till date-called Cyber crime. Normally, the users break into the other systems by seeking anonymity and do everything whatever was the intention leaving everything into chaos. Doing so they not only make the network system unsafe but also cause injustice to other people associated with the system. To put all the network users, researchers, engineers and scientists all over the world at a comfortable position, new researches are being carried out using different systems like IDS, IPS etc. This is a time where the hybrid or appropriate mix of technology must be incorporated to put the system safe and secured for the future generations.

Network security in other words means -provision of technological mix of software and hardware components and incorporating them into the organizations internal network in order to protect the resources from any unwanted unauthorized access without the owner’s knowledge.

II. Overview of the network security system
As of now the network security begins simply with two step process—“Who he/she claims to be” ? and “What access privileges does he/she have on a set of resources (given by the system administrator in a Linux OS) ? This phenomenon is called authentication—usually used at a single level everywhere. Normally each user is given a user ID and password to use to log onto the network. Different levels of authentication can be used by using more authentication factors. Two level authentication would mean use of a security token to ease the authentication process. Further three factor authentication can also be used with the incorporation of biometrics. Once the user has been successfully authenticated, immediately the presence of the firewall imposes all the access privileges on him/her. Firewall is effective in protecting from any unwanted access of the resources. However the content flow can be a cause of network disruption due to the inflow of computer worms on the failure of monitoring system.

Examples of network security systems:
Many such systems used are IDS, IPS, anamoly-based intrusion detection system, APIDS, PIDS etc. Surveillance systems can also be incorporated to detect early attacks in the system. The communication between the systems should be strictly encrypted.

III. Need of the security system
The need of the security system depends on the kind of set up of the network system. For a typical large set up of the organization the following hardware and software systems are mandatory. To list them—
(1) A strong firewall and proxy to keep unwanted people out. (2) A strong antivirus software package and Internet Security Software package. (3) For authentication, strong passwords should be used and frequent change is must (weekly twice). (4) When using a wireless connection, use a robust password. (5) Communication between any two systems be always encrypted -in case if the organization is a government research institute. (6) Exercise physical security precautions to employees if it is a large business. (7) A network analyzer (for analyzing the content of the packet) must be used when needed if it is a large business. (8) Closed vigilance should be maintained at the entry areas for a large business set up. (9) Put all network hardware in a secure zone (for a government set up). (10) All the hosts should be in private network (for a government set up) (11). All the servers should be in a DMZ or a firewall from inside or from outside. (12) Security fencing is needed to mark the boundaries of the set-up.

IV. Evaluation of network security system
This started off with the network set up by the dial-up connections that used modem called UUCP (Unix-to Unix copy, used for connecting unix hosts). It had limited security and was difficult to trick into it. An additional authentication layer was added later called the sequence...
DoS (Denial-of-Service) limitations, it exists. A safe state to total access (a state with between the two extremes of total security organization to decide for itself where which does not use any encryption. User from neighbouring host, without letting session hijacking: here a session started allow login based on the IP address. (2) IP packets may/may not pass through based the router’s access control lists define which All these have to identified and evaluated in the context of security to ensure safety of your system, with accepted level of risk factors. The actual means by which this is accomplished varies widely, but in principle, the firewall can be thought of as a pair of mechanisms: one which exists to block traffic, and the other which exists to permit traffic. Some firewalls place a greater emphasis on blocking traffic, while others emphasize on permitting the traffic. Need of Firewalls: As soon as an organization / enterprise is connected to the internet it ends up creating a two-way traffic flow. However in many instances in case of many organizations, they do not intend to share their intranet (a TCP/IP network within the organization) with the Internet. This is at this juncture that firewalls have been introduced. In the context of internet technology, the firewall can be defined as a system or group of systems that forms by enforcing an access control policy barrier between the two or more networks. In principle, the firewall can be regarded as a pair of mechanisms: one which exists to block traffic, and the other which exists to permit traffic. They can be implemented in both hardware and software, or a combination of both. Generally, firewalls are configured to protect against unauthenticated interactive logins from the outside world. This helps prevent hackers from logging into machines on your network. More sophisticated firewalls block traffic from the outside to the inside, but permit users on the inside to communicate a little more freely with the outside. Firewalls are essential since they can provide a single block point where security and auditing can be imposed. They provide summaries to the administrator. Bastion host: It is a general purpose computer used to control access between the intranet (internal private network) and the Internet (or any other untrusted network). These are hosts with unix OS that has been customized in order to reduce its functionality to only what is necessary to provide its functions. The general purpose features are normally turned off, and in many cases, completely removed, in order to improve the security of the machine. Router: A special purpose device/switch configured at the network layer to connect together. Routers does the routing of the packets on the networks they connect as per the configuration script, running on it. Access Control List (ACL): Routers performs the function of routing the packets according to the policies listed as acl’s on the router. It includes the origination address, destination address, destination service port, and so on. These can be employed to limit the sorts of packets that are allowed to come in and go out of a given network. Demilitarized Zone (DMZ): The DMZ is a critical part of a firewall: it is a network that is neither part of the untrusted network, nor part of the trusted network. But this is a network that connects the untrusted to the trusted network. The importance of a DMZ is tremendous: someone seeking access into your network from the Internet should have to get through several layers in order to successfully do so. Those layers are provided by the various components within the DMZ. Proxy: A server that sits between a client application (such as a Web browser) and a real server. It intercepts all requests to the real server to see if it can fulfill the requests itself. If not, it forwards the request to the real server. The use of proxy servers enhances the performance of the groups of users. Proxy servers are also used to filter requests, thus preventing a group of employees the specific sites to access according to the policies of the proxy server. Types of Firewalls: There are three basic types of firewalls. They are: (1) Application Gateways (2) Packet Filtering (3) Hybrid systems.

Different types of network threat

(1) DoS (Denial-of-Service): here the attacker’s program makes a connection on some service port, by somehow forging the packet’s header information, claiming from where the packet came from and then subsequent dropping off the connection.

(2) Unauthorized Access: includes those requests coming from the host/users “who does not owe what he claims for”. This includes: (a) Execution of commands illicitly: attack seeking access to the host intending to change the IP address or any configuration set up of the host etc as a administrator. (b) Confidentiality Breaches: when a competitor makes an access to a host and does nothing but only for the sake of thrill, he does gains access, and at times with more thrill, he is persuaded to do harm to the host. (c) Destructive Behavior: are of two types - Data Diddling (where data is changed) and Data Destruction (data is deleted).

A question arises then-How do the attacker gains access to your computer? This includes internet connections, dial-up modems, and even physical-apparatuses. Of course, there are many type of attacks against IP. They are: (1) IP spoofing (a technique adopted is a technique adopted in order to change the IP address or any configuration set up of the host etc as a administrator)

1. Bastion host: It is a general purpose computer used to control access between the intranet (internal private network) and the Internet (or any other untrusted network). These are hosts with unix OS that has been customized in order to reduce its functionality to only what is necessary to provide its functions. The general purpose features are normally turned off, and in many cases, completely removed, in order to improve the security of the machine.

2. Router: A special purpose device/switch configured at the network layer to connect together. Routers does the routing of the packets on the networks they connect as per the configuration script, running on it. Routers performs the function of routing the packets according to the policies listed as acl’s on the router. It includes the origination address, destination address, destination service port, and so on. These can be employed to limit the sorts of packets that are allowed to come in and go out of a given network. It is a critical part of a firewall: it is a network that is neither part of the untrusted network, nor part of the trusted network. But this is a network that connects the untrusted to the trusted network. The importance of a DMZ is tremendous: someone seeking access into your network from the Internet should have to get through several layers in order to successfully do so. Those layers are provided by the various components within the DMZ. A server that sits between a client application (such as a Web browser) and a real server. It intercepts all requests to the real server to see if it can fulfill the requests itself. If not, it forwards the request to the real server. The use of proxy servers enhances the performance of the groups of users. Proxy servers are also used to filter requests, thus preventing a group of employees the specific sites to access according to the policies of the proxy server. There are three basic types of firewalls. They are: (1) Application Gateways (2) Packet Filtering (3) Hybrid systems.

1. Application gateways: are also known as proxy gateways. These are made up of bastion hosts that run special software to act as a proxy server. It runs at the Application layer of the ISO/OSI Reference Model. Client systems use the proxy gateway to connect to the Internet. Scripts are normally written to configure the application gateways and decide on the what traffic should flow or not through this gateway.

2. Packet Filtering: is a technique adopted by the firewalls with the inclusion of ACLs (Access Control Lists). By defacto, a router would pass through all the traffic coming /going from it without any restrictions imposed on the packets. Packet filtering, is advantageous over the application gateway, as the feature of the access control is performed at a lower ISO/OSI layer, typically the transport or the session layer. Hence packet filtering is faster than application gateways. TCP/
been encrypted, without showing up to the Internet privately as the link has going between their branches would go through the Internet. Many organizations are using virtual private networks to connect their branch offices with whom one must discuss the issues based on one’s requirement to build the firewall architecture of a network. The techniques of cryptoology have been adopted as the link has gone between the routers to not let the traffic pass. It can be possible to include both packet filtering and application proxies. This way it provides protection to your systems, giving services (say, a web server) to the Internet and as well provide a measure of the security of an application layer gateway to the intranet (internal network). The attacker then have to break through these two routers to access the resources/services of the internal network.

Secure Network Devices: Firewall should be only the entry point to the network. Modems being an entry point to dial-up networks should be administered. It is the consultant and the other vendors of firewalls, with whom one must discuss the issues based on one’s requirement to build the firewall architecture of a network. The techniques of cryptoology have been adopted in between the routers to not let the traffic flow between them as it is, and rather be seen by the middle man while in transit. Many organizations are using virtual private networks to connect their branch offices privately over a leased line. The session going between their branches would go through the Internet privately as the link has been encrypted, without showing up to the real world. Firewalls vendors are providing this schemes to connect over many offices together.

V. Deployment of the security system at the front end

The security of a network system is a design issue (network architecture) which needs a lot to explore yet. The technology can be integrated and then deployed for better performance. As for an example the network architect can decide whether to have one or two firewalls and DMZ for all the services. Provision of two firewalls will provide more security to the networks. The deployed system should have its own defined policies as adopted by the system administrator. It should deny unauthorized access to the resources to provide continuous, consistent monitoring and overall effectiveness. Normally, if seen from the external world it should be at the front end (at the boundary of the internal network of the organization).

VI. Analysis of different security systems

The available security systems should be studied in-depth and can be summarized based on their merits and demerits. Each system has the following overheads-cost of software and hardware systems (design issues), cost of maintenance, reliability and feasibility. Design of the security system is complicated. Scalable and flexibility of the security systems should be analysed. The security system can be centralized and it must enforce organization wide security policies. There is no formal way to describe the architectural structure of the security systems and nor there exist any specific properties to be satisfied by them. These techniques are based on abstract mathematical models. In practice there exists no ways to verify and predict the composition of security systems that satisfies the properties.

I. Simulation of a security system in a network (use all technological methods)

A security system is to be created based on security models design issues.

The design issues [1] are at various levels:
(1) Top level security model architecture.
(2) Specification of system wide security-constraints.
(3) Decompose the system wide security constraints into intermediate constraints to design the components.
(4) Verification of the constraints between system wide and the component wise constraints.
(5) Incremental design and verification of the components.

II. Existing commonly used softwares for network security

Some of the freely available softwares on the net are OSSEC (Host Based Intrusion Detection System), Snort (Network Intrusion Detection System), Prelude (Hybrid Based Intrusion Detection System) etc.

III. Testing of the security system in a network

Once the designing is over the system must be tested at the component and system level. This is a stage where a lot of study is required in order to test all the constraints imposed on the system by each of the component or sub-components.

IV. Performance of the security system

The performance of the security designed, is to be seen over a period of time under different conditions. It should be carried on some factors-cost, hardware and software, reliability, efficiency and feasibility altogether. The security polices formed in a security system enforces on every component of the system.

V. Future scope of the network security system

The security system designed, tested so far should be further explored for the scalability and flexibility.

References


Point to Ponder

“Although Tim Berners-Lee once famously declared that “Cool URIs don’t change,” factors beyond our control make it hard for most of us to avoid link rot. Geoffrey Bider is the director of strategic initiatives for CrossRef, a company whose mission is “to be the citation linking backbone for all scholarly information in electronic form.” CrossRef, in other words, is in the business of combating link rot.

The world of scholarly and professional publishing revolves around reliable citation. In previous podcasts with Tony Hammond and Dan Chudnov I’ve explored some of the technologies and methods used by these publishers – including digital object identifiers and OpenURL – to assure that reliability.

CrossRef plays a key role in that technological ecosystem. In this conversation, Geoffrey and I discuss how everyday blog publishing systems could offer the same kind of persistence, integrity, and accountability provided by scholarly and professional publishing systems. And we explore why that might matter more than most people would think.”

Shared Main-Memory Persistent Object Store (SMPOS) for Real-Time Database Architecture

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Today, distributed object oriented databases play an increasingly important role as enterprises develop systems and infrastructure to deal with more complex data requirements. Whether an organization is extending business operations to the Internet, supporting a network infrastructure, or building leading-edge software to accommodate unlimited distributed transactions and users in real-time, SMPOS provides an effective strategy for managing data distribution.

1. Introduction

SMPOS that is a distributed set of components that delivers data to performance-critical services fast - and in a format tuned to their requirements. Designed to provide optimal balance between core memory and secondary storage, the SMPOS leverages the existing database of record to continuously move data out to the edge using an object model optimized for a particular use case.

2. Benefits of the Shared Main-Memory Persistent Object Storage (SMPOS)

Regardless of your deployment - an SOA-based web service, high traffic website, or cached data layer in a distributed grid - the SMPOS affords high performance, linear scalability and reliable access to critical data. Unlike simple caching solutions, the SMPOS continuously and seamlessly moves data from multiple sources to performance-critical applications - directly to memory at the edge, in the appropriate object model. The combination of moving data to critical services with transformation to the appropriate object model offers unmatched performance and agility while insulating mission critical databases of record from the impact of change and high demand.

Fig. 1: Example of the Persistent Object Storage
3. Provide Services with Data at main-memory Speed

Local Data: Distribute your data with processing. Deploy a distributed storage with a service and ensure that data is available where it’s used. The storage data is maintained in memory, reducing, even eliminating, network and disk access and significantly lowering latency. Deploy multiple instances of a service with specific use cases and smaller footprints for increased throughput. Network and disk access are biggest bottlenecks - don’t let them throttle services.

3.1 Optimal Format:
Caching memory a relational result set isn’t enough. Bridging the gap between a complex object model and a relational model requires additional time and effort. In most cases, a complex model requires a large number of joins across tables or may even be impossible to model - both of these characteristics prevent optimal performance and increase maintenance costs. An object-oriented cache memory ensures that persistent data structures and relationships directly align with the use case of the service offering.

4. Fetch information to the right place

Continuously Update: Accurate decisions need accurate data; if your cache memory has stale information it’s worthless. SMPOS keeps the data in cache memory current with low latency updates from multiple heterogeneous data sources. Database of employees, customers and services have the most up-to-date information for every transaction.

4.1 In a Complete Manner: As business grows so do the quantity, type and locations of data necessary to run it. The SMPOS integrates multiple heterogeneous data sources to supply the content of a cache memory - regardless of the format or source. Cache memory will contain a coherent, unified and complete view of the data need to make decisions.

4.2 With Quickness: Gain the flexibility to easily maintain existing cache and data source integrations as well as quickly offer innovative new services with new sources. The effort to maintain consistency of multiple heterogeneous sources throughout the lifecycle of services can be daunting. The effort required to maintain more than a few simple point-to-point integrations will quickly become a black hole for time and resources hindering the ability to respond to changing business requirements.

4.3 Meet service requirements: Use a cache memory because in business critical applications require update and complete information now. For these applications database cache memory must be highly available and offer seamless failover. A durable memory allows the state of one process to be transferred effortlessly to another with no loss of state. Make sure always there to meet the demands of customers.

4.4 Available resources: Efficient, scalable deployment of many services requires a smaller memory footprint per service.
or more hardware. Adding hardware is likely to be neither cost effective nor operationally feasible. A durable cache memory automatically moves the appropriate data from disk into memory and back out again providing a smaller footprint to leverage existing hardware.

4.5 Fetch More from Existing Database of Record

The database of record should maintain the canonical view of data - suitable for business intelligence as well as low-impact transactional operations. It should be optimized and structured in the manner that best meets those goals. Don’t waste time and money scaling up relational database in an attempt to meet high performance, transactionally-intensive demands. SMPOS insulates database of record from frequent change and high demand by offloading the work to a cache designed to meet goals, leaving with a more agile, maintainable development and deployment process that will exceed performance requirements with less effort.

5. Conclusion

In this paper we have explored several ways to satisfy the performance requirement of a high-speed real-time object-oriented distributed database application. Our approaches have been demonstrated in the design and implementation of high-performance persistence object storage. In this paper, we will summarize what we have achieved in our work.

References

Software Engineering, which formally had its origin in a NATO report of 1968 has become an increasingly important discipline. Given the proliferation of IT and ITeS, it is fair to say that effective software engineering will be to 21st Century what basic engineering was to the 20th Century. CSI has been organizing conferences and events that are relevant to the IT industry for more than three decades. International Conference on Software Engineering-09 (CONSEG-09) was an event organized by CSI Division II (Software) and Chennai Chapter to underscore the growing importance of Software Engineering, especially in the globalized environment championed by India. It was held in Chennai from December 17th to 19th, 2009 and was supported by IEEE Computer Society, Madras Chapter, Software Process Improvement Network (SPIN), Chennai Chapter and Bangalore SPIN (BSPIN). About 150 people participated in the event.

CONSEG-09 was the culmination of more than a year of meticulous planning. The event was conceived in late 2008 as a forum for showcasing the current developments in the area of Software Engineering from across the world. The advisory board, organizing committee and the program committee were formed with thought leaders from the industry and academia from across the world. It was decided that the conference will address the broad spectrum of Software Engineering – from requirements to testing to maintenance; from education to project management to globalization issues like linguistic computing. We also decided that, in keeping with India’s growing stature in the global software arena, this conference should be a truly international one.

With the above goals in mind, seven eminent speakers from reputed international organizations were invited to give keynote addresses in areas that are of importance and current and topical interest in Software Engineering. Two tutorials that covered the entire Software Development Life Cycle were also scheduled.

There were two pre-conference tutorials conducted on December 17th. These were designed to cover the entire spectrum of Software Engineering Life Cycle activities.

Tutorial 1: Topic - Eliciting Architecturally Significant Requirements

Presented by Prof. Mathew Bass of Carnegie Mellon University, USA.

This tutorial covered the activities of requirements gathering and architecture. He used the example of technology of cell phones to illustrate how fast innovations are hitting the market and the need for a product organization to have nimble methods to generate as many as 25-30 variants of products in a year. Having a system that exhibits the properties needed to support an organization’s business context relies on having an architecture that is ‘fit for purpose’. To do this, one must be able to extract the requirements that are architecturally significant from the business context. This calls for being able to build a flexible architecture based method of gathering and specifying requirements. Prof Bass’s talk underlined that traditional requirements elicitation approaches typically do not explicitly identify requirements that drive the architecture and put forth several practical approaches to achieve this architecture foundation and be able to elicit and prioritize requirements effectively.

Tutorial 2: Topic - End-to-end SDLC with Agile Methodologies

Presented by Baiju Joseph of Yahoo! and Srinivasan Desikan of HP, India.

This tutorial covered how the seemingly different activities of development and testing get blended and shaped and made more effective by the use of Agile Methodologies. This tutorial took off from where the previous one left and focused on rapid delivery of products with constantly changing requirement. The tutorial focused on the use of Agile Methodologies, which have gained momentum in the past few years. The tutorial presented valuable practical tips on why Agile Methodologies are more amenable to managing change than typical heavy weight Waterfall-like models. The strength of the Agile Model is in to be able to use the team’s capabilities in their entirety instead of pigeon holing people as “developers”, “testers” and so on and causing artificial barriers that cause time delays.

Both these tutorials were extremely relevant for Software Engineering in the globalized context showcased by India, for the following reasons:

- They underscored the importance of “product oriented thinking” in terms of innovation and time to market
- They emphasized the need to be responsive to changes by using nimble methodologies like Agile and its variants.
- They brought to fore the opportunity for the professionals to broaden their skill sets.
Day One: Friday, 18th December 2009

The conference was inaugurated by Mr. S. Mahalingam, Chief Financial Officer, TCS on 18th Dec. In his inaugural address, Mr. Mahalingam stressed the changing façade of software industry and the increasing importance of software engineering in the new era of putting more business focus. He traced the growth of Software Engineering from the early days starting from structured programming to today’s model of collaborative applications on large volumes of unstructured data. He also highlighted the changing façade of applications from static to richly visual. He also recounted Prof. Mahabala’s contribution to the Indian IT industry.

In his welcome address, Mr. H.R. Mohan, Chairman, Div II, stated that CONSEG is being hosted at Chennai after a gap of 12 years. Mr. Ananth Krishnan, Chairman, OC gave an overview of CONSEG-09 and it was followed by the programme highlights by Mr. Gopalaswamy Ramesh, the Chairman, PC. Mr. S. Ramasamy, Chairman, CSI-Chennai while proposing the vote of thanks, thanked the sponsors, speakers, authors and the all that had supported the event.

The topics for keynote speeches covered a broad range of Software Engineering. Prof. Bass’s talk covered Software Architecture as a Strategic Asset. The talk was based on the premise that there is a strong relationship between the properties that a system exhibits and the ability of an organization to achieve its strategic objectives. While many intuitively understand this, maintaining alignment between the business context and these properties is often very difficult to do in practice. The talk highlighted the nature of this relationship, described the source of these difficulties and presented some common methods to overcome these difficulties.

The changing business paradigms were reflected by the talks What is not commonly known about SaaS (Software as a Service) by Venugswamy Ramaswamy of TCS and Cloud Computing and Hadoop by Chidambaran Kollengode of Yahoo Inc, Bangalore.

Day Two: Saturday, 19th December 2009

These two presentations – on fairly related topics – brought to light the changing way the software business will function in the years to come. Swamy highlighted the great opportunity for India in the SaaS arena, because the present does not necessarily foretell the future. The presentation on Hadoop talked about the drawbacks of traditional architectures for scalability and ROI and how cloud computing can change all that. In traditional High performance settings, one often assumes a “well-behaved” system: no faults or failures, minimal security requirements, consistency of state among application components, availability of global information and simple resource sharing policies. While those assumptions are arguably valid in tightly coupled systems, they break down as systems become more distributed. He outlined how Cloud Computing can address these issues.

Prof T V Gopal of Anna University traced back the tumultuous history of Software Engineering by his presentation Software Engineering – Forty Years and Wobbling. This presentation recounted many facets in the evolution of Software Engineering and also stressed the importance of oft-ignored Mathematics and basic sciences in this context. Some strategies for steadying the Software Design and Development process were discussed.

A panel discussion on Developing Affordable Software Profitably was chaired by Prof. C R Muthukrishnan, and the panel had representations from industry and academia comprising of Dr. Sashikant Albal of SSN School of Advanced Software Engineering, Mr. Chandrakumar Raman of HP (and President, SPIN, Chennai), Mr. Kishore Padmanabhan of TCS and Mr. N. Chandrasekhar of Ashok Leyland. This panel discussion brought forth the dimensions of quality, productivity, profitability, availability of skill sets, nurturing of skill sets and so on. A unique aspect of this panel discussion was that it brought forth the views of academia, software developers, human resource professional, quality as well as the end customers.
Software Engineering Program, in collaboration with TCS. The session concluded with interactive discussion from the conference delegates. These discussions and the recommendations thereof will be summarized and published in a separate article later.

The keynote lectures on the second day included one by A. Kumaran of Microsoft Research who gave a talk **Water, Water Everywhere: Data Driven Computational Linguistics** on a topic of great importance to India. His talk presented the common problems of Natural Language Programming (NLP) and illustrated how NLP can be made more effective by making it data driven, rather than purely semantic driven.

Dr Anders Wall of ABB, Sweden highlighted the challenges of sustaining large systems in his talk **Managing Sustainable Software Systems**. This presentation discussed some of the challenges and solutions in developing large scale, mission-critical applications.

In addition to the keynote lectures, we also had sessions for contributed papers and a student paper. The Call for Papers received an overwhelming response. 130 papers were received from close to 20 countries. Out of these, eight papers were selected for presentation. The papers covered areas like project management, requirements engineering, ontology, metrics, agile development, regression testing and test case mutation. The authors of the selected conference papers again represented Canada, France, China, Tunisia and India. There were presentations from TCS and Infosys on the current technology trends.

During the Valedictory session, the participants provided an excellent feedback on the quality of the presentations and the overall organization of the conference. It was proposed to form an egroup to facilitate exchange of views and experience sharing in the area of software engineering. Some of the thoughts for the future conferences included the use of technology for “virtual conferencing”.

Overall, going by the feedback from the participants’ feedback, the conference was very well received and appreciated. The fact that people from more than 20 countries submitted papers in such large numbers and that such a wide range of topics was covered, justified that this was indeed an International Conference on Software Engineering and marked as a recognition of India’s growing stature in the Software Engineering arena.

The conference proceedings, a select keynote talks and tutorial presentations are available at the conf. website at http://www.csi-chennai.org/conseg09/

**Felicitations to Prof. H N Mahabala**

A highlight on the **first day 18th December, 2009** was a felicitation for Prof. H. N. Mahabala, doyen of Computer Science education and IT Industry in India for over four decades, who turned 75 in December 2009. Several of his old students and those closely associated with him in CSI and IIT including Mr. Mahalingam, Mr. Ananth Krishnan and Mr. Kishore Padmanabhan of TCS, Mr. C. Mohan of IBM, USA, Mr. H. R. Mohan of The Hindu, Mr. Gopalaswamy Ramesh of IIIT-Bangalore, Chennai and CSI – Prof. C. R Muthukrishnan, Dr. Kamala Kirthivasan, Mr. S. Srinivasan, Major General Balasubrahmanian, Mr. P Unnikrishnan, Mr. G Ramachandran and a number of others recounted fond memories of their association with Prof. Mahabala. True to his dynamic nature, Prof Mahabala had presented a lead paper on “Rethinking About Computer Science Curriculum – Long Overdue” (CSIC, Nov, 09). He chaired the lively session in the second morning on this topic.

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Internet Governance Forum (IGF) – IGF 2009

At the fourth annual meeting of the Internet Governance Forum (IGF) at Sharm el-Sheikh, Egypt, held during 15-18 November, stakeholders deliberated on the Governance of the Internet.

The World Summit on the Information Society (WSIS), held in Geneva (2003) and Tunis (2005), inspired by UN’s Millennium Development Goals, took up the theme of using ICTs for Development. Article 72 of the Tunis agenda mandated the formation of IGF, a non-binding, multistakeholder platform. Unlike most other UN meetings—usually dominated by national governments—IGF treats all stakeholders (governments; the technical community; Internet technology bodies such as ICANN, IETF, and ITU; business; and civil society) as equals. IGF’s non-binding nature removes the usual UN obsession on “text” (the exact wordings, even punctuation, of the outcome document) and enables free discussion between stakeholders.

IGF’s focus areas include Security, Diversity, Openness, and Management of Critical Internet Resources. The latter includes resources such as Domain Names, Internationalized Domain Names (IDNs), IP Addresses and the 13 root servers. A major shift that has happened from the first IGF is the gradual relinquishment of control of these resources by the US Government, and transfer to a more transparent and international control.

The main theme for IGF09 was “Creating Opportunities for All”. IGF09 was significant for its use of social media such as Facebook, Flickr, Twitter, and YouTube. Tim Berners-Lee, who delivered a keynote address, also launched the World Wide Web Foundation by tweeting in the middle of his address.

While the original mandate of IGF was for five years (concluding with the 2010 summit at Vilnius, Latvia) there was an overwhelming mandate in IGF09 to let IGF continue in the present form.

Main Debates at IGF 09

The following issues had stimulated significant discussions amongst participants in IGF 09:

- Focus on youth and children as stakeholders of the Internet Society; Child Protection.
- Ensuring data security, protecting privacy, and preserving the openness of the Internet as the joint responsibility of all stakeholders.
- Ensuring access for the disabled, and ensuring linguistic and cultural diversity as an important and continued focus area for IGF. Internet access as a human rights issue. Affordable access to ICTs as basic need.
- New focus on Social Media and its role in creating a better informed society.
- Consensus on the continuation of IGF beyond its initial 5-year mandate.
- Inclusive, people-centered Information Society.
- Introduction of Internationalized Domain Names.
- Free access to knowledge, need for less stringent Intellectual Property regimes in order to ensure different stakeholders could take informed decisions.
- More accountable and transparent administration of Critical Internet Resources (gTLDs, IDNs, IPv4 and IPv6 allocation, root domain servers).

BASIS and IGF

The International Chamber of Commerce (ICC) created BASIS (Business Action to Support the Internet Society) in 2006, in order to contribute business expertise and perspectives to the IGF. BASIS was very active through the duration of IGF, and made several highly-appreciated interventions including one by Mr. S. Ramadorai, Chair of BASIS and Vice Chair of TCS. BASIS also exhorted the international community to continue the IGF in its current form.

CSI and IGF

While both Government and Civil Society from India did participate in IGF09, the Indian presence was less than its size would warrant. CSI, as a unique representative of independent users, academia, and students, has a responsibility to highlight India’s causes at this global forum. It is recommended that CSI becomes a member of BASIS, and through that forum, present the perspectives of CSI’s members and the country as a whole to IGF.

Further, CSI should consider specific programmes (seminars, talks) to popularize IGF recommendations in action areas such as Child Protection, ICT for the disabled, and access to knowledge.

In all, IGF 09 was a refreshing change from the regular UN meetings, and given the open nature of the Internet, perhaps the most appropriate way the debate on its governance can be held.

Satish Babu, Past Secretary of CSI, attended the 2009 IGF meeting at Egypt. Transcripts, videos and reports of IGF09 can be found at http://www.intgovforum.org/cms/
As the global economy faces its complex and comprehensive challenges, Information and Communications Technologies (ICT) can play a vital role. By enhancing the understanding of ICT’s ability to transform the global economy, this conference seeks to demonstrate the power of 21st Century developments in ICT to create new opportunities for social, environmental and economic growth.

The conference brings together academic, industry, and government professionals to a premier multi-track forum on the applications of ICT towards Global Growth.

We invite researchers and practitioners to submit technical papers describing original ideas, interesting results and/or quantified system experiences. This is open for contributions from professionals in India and abroad.

Topics of interest include, but are not limited to, the following Themes:

- **Technology for Human Use**
  Areas such as the Semantic Web, AI, Intelligent Agents, Cybernetics, Human-Technology interaction, Accessibility, and usability.

- **Technology for Participatory Citizenship**
  Areas such as e-governance, Citizen interaction systems.

- **Technology for Communities**
  Areas such as virtual community development, digital repositories and cyber identities.

- **Technology for New Learning**
  Areas such as interactive and collaborative learning, e-learning, edutainment.

- **Technology for Common Knowledge**
  Areas such as Knowledge Management, building knowledge societies, information systems in organizations.

- **Technology for Development**
  Areas such as localization, affordable computing, Indian language computing.

Please address all queries to papers@csi-2010.org

**Call for Reviewers**

The Conference organizers need reviewers to provide in-depth analysis of papers submitted. If you are interested and feel that you will be able to respond in a timely manner, please fill in the Reviewer Form online at the conference Website.

**Papers Committee**

- J Gokhale, VESIT
- Mohan B. Rao, IES Mgmt. College (Chair)
- Pradeep Pendse, Welingkar Inst. of Mgmt
- Padmashri PVS Rao, TIFR
- Ravi Miranda, CSI Mumbai Chapter
- Ravi Raman – Program Chair
- Sasikumar M, CDAC, Mumbai
- Mathew T J, SNDT Women’s University

**Key Dates**

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**Host Chapter**

CSI Mumbai Chapter
E-217, Floral Deck Plaza
MIDC, Near SEEPZ,
Andheri (East),
Mumbai – 400 093, India.
info@csimumbai.org

**Awards and Recognition**

- Maximum of 10 papers from each theme will be selected for oral/poster presentation in the conference
- Cash Award for the Best Overall Paper – Rs. 50,000/- (USD 1,000). Travel subsidy will be provided.
- Cash Award for the Best paper in each theme – Rs. 10,000/- (USD 200)
- All selected papers will be given a certificate.
- All selected papers will be published on the Conference Website and included in the Conference CD

For complete details please visit http://www.csi-2010.org
About the Conference
These are the times of unprecedented economic recession sweeping across continents not witnessed in generations. Moreover, this is the first such slow-down to have occurred after the advent of IT based economy. In such situations, contrary to popular belief IT should play a major role not only in generating jobs thereby helping reverse the recession, but should also act as a deterrent solution to prevent such occurrences in future. IT is the only technology which has the capacity to open new vistas and frontiers in never-seen-before realms of human endeavours at a rapid speed. Once these are opened up to commercial exploitation, they help in boosting the economy. In this milieu, India being recognized as one of the few global IT-superpowers, should take prime role in nucleation, germination of new ideas in IT and their commercial deployment and exploitation for the common good of humanity at large and Indian society in particular. With this in the back-drop, CSI-Vizag Chapter has chosen as its theme - The Advances in Information and Communication Technology (ADICT) - for its Southern Regional Conference being held in Visakhapatnam. It is therefore but imperative for all the stake holders related to IT, be it Corporate Sector, Educational Institutions, Government Sector, Public Sector to seize the opportunity for showcasing their achievements, or get a glimpse of new offerings on IT by participating in the seminar. It also provides a forum for the Industry, Academia and students to interact, debate and exchange their knowledge and experience on latest innovations and issues in ICT. In addition to the presentation of selected papers, there will be invited talks by eminent IT experts and professionals on the latest trends in ICT. A panel discussion of experts on the theme of the convention is also planned. So, get ready to get ‘ADICTed’.

Invitation
Invitation is extended to all the CEOs/CIOs, IT professionals, IT managers, IT users, academicians, students and members of the CSI to attend as delegates in this conference. Invitation is also extended to those who wish to submit papers reflecting original research work and practical experience in the areas covered in the conference. Software firms, Industries and business houses are invited to participate in the conference and present and exhibit their products and services. Please visit CSI Vizag website www.csi-vizag.org further details about the program.

Areas of interest
This conference aims to bring professionals, researchers, business people and people in IT industry to bring together to discuss, deliberate and understand the security needs and concerns. The topics of this conference include but not limited to:

- Manufacturing Execution Systems (MES)
- Web-Technologies
- Networking and Security
- Disaster Recovery Management
- Wireless Technologies
- Cloud computing
- Nano computing
- Molecular computing
- Business Intelligence
- Embedded Systems
- Business Process Management
- Virtualisation in Servers and Infrastructure
- Any other relevant topic

Paper Submission
All papers should be original, and not published / presented or sent for publication / presentation elsewhere. Selected papers will be published in the souvenir brought out on the occasion. Authors of some of the selected papers will be invited for presenting the paper at the convention.

Scheduled Last Dates
- Full Paper Submission: 15th January 2010
- Notification of Acceptance: 20th January 2010
- Delegate Registration: 28th January 2010

Delegate Fee
- Non CSI members: Rs. 2,500
- CSI Members & Academicians: Rs. 2,000
- CSI Student Members: Rs. 700
- NRIs and Foreign Delegates: US$ 100

Sponsorship
- Platinum Sponsor: Rs. 1,00,000
- Gold Sponsor: Rs. 50,000
- Silver Sponsor: Rs. 25,000

Address for Correspondence
DV GARG Varma
Secretary, CSI, Visakhapatnam Chapter, AGM (IT), Central Computer Center, Visakhapatnam Steel Plant, Visakhapatnam - 530 031
Tel: 9177229965 E-mail: dvarg_varma@vizagsteel.com; secretary@csi-vizag.org
CSI Vizag website: www.csi-vizag.com
CSI Calendar 2010

January 2010
NCAC-10: National Conference on Advanced Computing  
**Date:** 20-22, January 2010 at Aluva, Cochin, Kerala  
**Organized by:** Dept. of Computer Applications, Union Christian College, Aluva, Cochin, Kerala in association with CSI Div. II on Software and Cochin Chapter  
**For details contact:** Dr. Sunny Kuriakose, ncac2010@gmail.com, Mr. Shynu P G, pgshynu@yahoo.com

SPICON-2010: Operational Excellence for Sustenance and Growth  
**Date:** 22-23, January 2010, Chennai  
**Organized by:** Software process Improvement Network - Chennai Chapter and supported by CSI Div.II & Chennai Chapter, IEEE Computer Society - Madras Chapter  
**For details contact:** admin@spinchennai.org, Mr. H.R. Mohan, hrmohan@gmail.com • Website: www.spinchennai.org

February 2010
NCISE-10: 2nd National Conference on Information and Software Engineering  
**Date:** 26 - 27, February 2010, Chennai  
**Venue:** Dept. of Information Technology, Aarupadai Veedu Institute of Technology, Vinayaka Missions University in association with Div.II (Software) - CSI, IEEE Computer Society - Madras Chapter, IEEE Computer Society Branch Chapter-AVIT.  
**For details contact:** Dr. A Anthony Iruhdayaraj, ncise2010@gmail.com OR Mr. H R Mohan, hrmohan@gmail.com • Website: www.avit.ac.in

India IT2020  
**Date:** 26th February, 2010  
**Venue:** Hotel Intercontinental The Lalit Mumbai, Sahar Airport, Andheri (E), Mumbai  
**Host:** Mumbai Chapter  
**For details contact:** Mr. Ravi Eppaturi, ravieppaturi@yahoo.com  
Mr. Venkat Rajan, indiait2020@csimumbai.org

National Seminar on Computational Science and Engineering  
**Date:** 27-28 February 2010, VIT University Vellore  
**Host:** Academic Staff College, VIT University, Vellore  
**Organized by:** CSI Division III and Vellore Chapter  
**For details contact:** hrvishwakarma@vit.ac.in, kngasesan@vit.ac.in

March 2010
LIIT-2010: National Conference on Latest Issues in Information Technology - 2010  
**Date:** 1st March 2010  
**For details contact:** Organizing Secretary at rmdliit2010@gmail.com  
Phone: (044) 27925910 OR Mr. H R Mohan, hrmohan@gmail.com  
Web site: http://www.rmd.ac.in

ConfER-2010: The 3rd National Conference on Education and Research  
**Date:** 6-7 March 2010, JIT Guna (MP)  
**Host:** Jaypee Institute of Engineering & Technology  
**Organized by:** CSI Division V, Region III & Bhopal Chapter, IEEE MP Subsection and Madhya Pradesh Council of Science & Technology, Bhopal  
**For details contact:** hrvishwakarma@vit.ac.in, dr.vipin.tyagi@gmail.com

April 2010
CSI Radiance 2010: Seminar on Radical Innovation in Academics for Next-generation Computing Education  
**Date:** 2 - 3, April 2010, Chennai  
**Organized by:** Dept. of Electronics & Communications Engg, Aarupadai Veedu Inst. of Technology, Vinayaka Missions University and supported by Div.II (Software) & Div.IV, IEEE Computer Society- Madras Chapter  
**For details contact:** Mr. R Vijaya Arjunan, ncvescom2010@gmail.com  
Tel.: 044-27443802 OR Mr. H R Mohan, hrmohan@gmail.com

May 2010
IFIP Networking 2009 - Conference  
**Date:** 10-14, May 2010  
**Venue:** Indian Institute of Technology Madras, Chennai, India  
**For details contact:** Prof. S V Raghavan. Email: srv@cs.iitm.ernet.in

AutInfo-2010: The 1st National on Automotive Infotronics  
**Date:** 20-22 May 2010  
**Organized by:** TIFAC-CORE in Automotive Infotronics and CSI Vellore Chapter  
**For details contact:** hrvishwakarma@vit.ac.in, kngasesan@vit.ac.in

June 2010
ICAET-10: International Conference on Advances And Emerging Trends In Computing Technologies  
**Date:** 21-24, June 2010  
**Venue:** Chennai  
**Host:** School of Computer Science & Engineering, SRM University in association with University of Arkansas, Little Rock, USA, Div II & CSI Div IV, IEEE Computer Society, Madras Chapter  
**For details contact:** Dr. S Chellaiah, icaet10@srmuniv.ac.in OR Mr. H R Mohan, hrmohan@gmail.com

November 2010
45th Annual Convention  
**Date:** 25-27 Nov. 2010, Mumbai  
**Venue:** Mumbai  
**Host:** CSI Mumbai Chapter  
**For details contact:** www.csi-2010.org  
**Prof. P Thirumurthy**  
Vice President & Chair, Conference Committee, CSI

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**Artificial Intelligence usually beats real stupidity.**

Who is General Failure and why is he reading my disk?  
Change is inevitable, except from a vending machine.  
Good programming is 99% sweat and 1% coffee.  
Honey, I Formatted the Kid! Your e-mail has been returned due to insufficient voltage.  
Stack Error: Lost on a cluttered desk...  
Stack Overflow: Too many pancakes...  
If at first you don’t succeed, call it version 1.0  
Good programming is 99% sweat and 1% coffee.  
According to my calculations the problem doesn’t exist.
A two day 5th National Conference-“IT in Defence” was held on Nov 25th and 26th, 2009 at the NIMHANS Convention Hall, Bangalore. This conference was spearheaded by the Special Interest Group on Information Security (SIG-IS), Division IV and CSI-BC. DRDO was the Main Technology partner.

The Theme of the Conference “Next Generation IT for Next Generation Indian Defence” was to address the issues, such as, the Rapid Advancements in Information technology and revolutionary developments in the defence weapons systems which have totally changed the scenario in the present day warfare systems. With these changes came the challenge of integrating various technologies and systems. Cyber Terrorism poses additional challenges even during peace time while Battlefield challenge is to reduce the Reaction Time. The sessions were designed to discuss the various issues under this theme. Dr. V K Saraswat, the Scientific Advisor to Raksha Mantri, suggested that Conference should have one separate session on Information Security and need in the present day IT Scenario. Therefore the Special Interest Group – Information Security (SIG-IS) took an active role in ensuring that the information security topics are well covered and discussed in a separate focussed session. Leading players, such as, M/s ECIL, Hyderabad, Symantec, RSA, TCS, Sun Microsystems, Bharat Electronics, and IBM, all discussed the importance of information security and various Speakers from each of the organizations outlined on the implementation, Methodology of different security protocols in the present day communications and information security network requirements.

The brief outline of the conference is presented below

Mr. H Raghavedra Rao, Chairman, CSI, Bangalore Chapter presented the welcome address. He specially welcomed Dr. V K Saraswat, The Chief Guest, Dr. Prahlada, all the DRDO and Ministry of Defence Officials, the IT Industry Sponsors and all the distinguished delegates. He was very happy that the response for the conference was over whelming and there were over 250 delegates at the conference.

Dr. R K Ramanathan highlighted the activities of CSI Bangalore Chapter and its achievements.

Prof. Thirumurthy, Vice-President of CSI outlined the activities and the role of CSI. He very much appreciated the special initiative taken by the SIG-IS for organizing such a high level Technology Conference and focussing on the need for information security. He appreciated the effort put in bringing out on one platform all the Three Defence Services – Army, Navy and Air force to discuss “State-of-Art” of IT in Defence weapon systems and IT Security.

Inaugural Address by Dr. V K Sarawat

The advancement in the field of information technology has completely changed the battlefield scenario. In addition to electronic warfare, Information warfare has become a very important challenge and has added “a new dimension”. The Continuous and dynamic advancements in the weapon systems has totally changed the threat scenario. Reaction time has become a very critical factor. The advancement in networking technology, increased bandwidth has posed new challenges in information security. Interoperability, multi sensor and information fusion, information management, war gaming, Virtual reality simulation for command and control communications is the emerging technology.

Network Centric Warfare/Operations, Advanced C4I Information Systems play very vital roles in the modern warfare scenario. Network security,
information warfare, identity management and cyber terrorism are very important aspects which have to be attended too.

Dr. V K Saraswat mentioned that military Robots, Embedded Systems, Development of Advanced multicore chips-density greater than One Billion Transistors, Several Tera bytes of storage requirements of ruggedisation, advanced computing (Quantum Computing) are the emerging technologies. The integration of commercial systems would be the futuristic technologies. With the manner in which advances in IT are taking place, the futuristic battlefield will shift to the Board rooms - Information warfare posing a new threat.

The Defence Research and Development Organization (DRDO) will soon develop unmanned combat aerial vehicles (UCAVs) for surveillance, detection and destruction of targets, said V K Saraswat, Scientific Adviser to the Defence Minister.

The UCAVs will be controlled from command control centres in different parts of the country; he told press-persons after he inaugurated the Fifth national Conference on ‘IT in Defence-2009’.

The crash of the Medium-Altitude Long-Endurance Unmanned Aerial Vehicle (UAV) Rustom I near Bangalore last week had been a learning experience, and lessons from this test flight would propel the development of long-endurance UAVs with the capability for surveillance, communications, imaging and intelligence gathering systems, he added.

Radar: On the Indian Ballistic Missile Defence Programme, Dr. Saraswat said that DRDO would be developing more long-range tracking radars which are capable of detecting very small targets (around 0.1 sq/mt.) from a distance of between 600 to 800 km. “We will be producing six or seven more types of radars as part of a Rs.6,000 to Rs.7,000-crore programme.

DRDO exchanges information with the Indian Space Research Organization, which has its own Defence-based programme but “our main approach today is to bring in more industry partners in the manufacture and development of radars”.

IT and warfare:
The future of warfare lies in miniaturization, high performance, and fault-tolerance systems and also in the deployment of space-based radars, robots and hypersonic technologies, Dr. V K Saraswat said. The role of information technology in warfare is only going to grow, he said, and added that several “network-centric warfare programmes” were being developed with the help of software engineers.

“These include development of sensors, digitally enabled weapons and an information grid which will enable efficient operation of these systems,” he said. He also talked about the role of IT in miniature warfare, insect size gadgets that are now a reality and a challenge of the future.

Mr. T Sabapathy, Chairman of the Programme Committee expressed thanks to Dr. V.K Saraswat for delivering the inaugural address and to Dr. Prahlada for his keynote address. He also thanked DRDO who have been associated with CII as a Technical Partner in conducting this program for the 5th time. He thanked Prof. Thirumurthy for coming from CII Headquarters to inaugurate the conference. He expressed CII’s gratitude to the various Industry Sponsors- M/s ECIL, Symantec, TCS, RSA, Sun Microsystems, BEL, ASM Technologies and AFRAS, Invited Speakers, Session Chairs, and the various organizations for deputing their delegates. He also expressed thanks for the to all the Committee Members, CSI-BC Staff and to all the service providers for the execution of the conference. He also thanked the NIMHANS organization for the use of the Convention hall.

Key note Address by Dr. Prahlada

Dr. Prahlada in his keynote address on the second day gave an excellent overview of futuristic technology – NextGen Defence weapon system. He also emphasized the availability of very small reaction time and the need to have advanced C4I systems with total information and network security. He reiterated on the various technologies and DRDO initiatives which where mentioned by Dr. V.K Saraswat. DRDO would take the initiative to develop UCAVS (Unmanned Combat Arial Vehicles) in the near future. Network Centric Warfare/operations would be the future technology. The real challenge would be for multi sensor weapon and data fusion systems, advanced electronic warfare systems and to meet the very low “Reaction Time” availability. Information warfare is again a new factor which we have to reckon with.

The first technical session was on cyber security and was chaired by Dr. R Sreehari Rao, Outstanding Scientist, CCR&D, ECS, DRDO. Mr. Mayya, Chairman and Managing Director of ECIL gave a talk on information and communication security. He gave an excellent overview on the Crypto graphical Algorithms both symmetric and asymmetric keys. He emphasized the need of network security and protocols. This was followed by Mr. Vishal Dhupar, Managing Director of Symantec Corporation excellent overview on the security paradise, Methodology for building IT security strategy. He emphasized the need to evolve IT security policy in every organization and IT assets life cycle management.

The post lunch session chaired by Mr. N Sitaram, Advisor, BEL had papers on Information Security as well as on Network Centric Warfare. The first paper was by Mr. Ajib B Choudary, Scientist E, DRDL on Missile Guidance and Control. Following this Mr. Amuleek Birla of RSA Security Division gave an excellent overview on Information Centric measures. Then Mr. Kartik Shivakumar, Information Security Architect of IBM explained different layers of security and methodology of implementation.

The next session was chaired by Mr. V. S. Mahalingam, Director, CAIR. The first paper was on the successful implementation of Field Artillery Command Control Communication System in a project called Shakti presented by Maj. Gen. Rajesh Pant, ADG Info Systems (Indian Army) and operational in India Army. Following this, there was a paper on Maritime Domain Awareness – Recent times, a presentation by Mr. C. H. Swamulu, Scientist “F” from CAIR, Bangalore. He talked about a system that is being developed for the Indian Navy that will help track all the maritime ships that are in the vicinity of the Indian Waters and hence would be able to help if there are any hijacked or pirated ships or ships in distress. This would greatly enhance the safety of the vast Indian coast line. The last presentation in this session was that of Dr. M R Seshadri, Managing Director of DELOPT on Trends in intelligent Video Surveillance Systems. These related to developing indigenously a number of systems for the Indian Defence companies as well as for export systems in the area of electronics and Optics.

On November 26th after the Keynote Address by Dr. Prahlada, in the first session chaired by Dr. Chakravarthy the first paper was by Dr. S Varadarajan, Director, LRDE, Bangalore highlighted on the impact of IT on the design of futuristic military radar systems and making them totally digital. He also talked about the multimode radar being designed for the Light Combat Aircraft. The next speaker was Brig Abhimanyu Ghosh, Commander Army cyber Security Establishment, who dedicated his talk to the heroes who laid down their lives during the terrorist attack on Mumbai 26/11, 2008. A photograph of some of those top Officers were displayed and everyone stood up and paid their respect by observing a two minute silence as a mark of respect to them and others who laid down their lives in the line of duty and to the innocent people who were killed in that attack. Then he proceeded to talk about the importance of...
In the sixth session the first speaker was Dr. Lalit Kumar, Director MTRDC, Bangalore. He described in detail the various elements of Network Centric warfare which was briefly covered by Dr. Prahalada and how it is being achieved. Mr. Ajay Ahuja of Sun Microsystems presented the security requirements for IT infrastructure for NextGen Indian defence. He talked about both hardware and software solutions from Sun Microsystems wherein a chip is available to code the information security. Mrs. Hemavathi, Senior Scientist, of CRL (BEL) addressed the various challenges and requirements of security for Tactical networks. Then there was a paper by Mr. Sumant Mukerjee, Scientist, ISSA on Modeling and Simulation of Network Centric Warfare Systems. The Session was concluded by Dr. H V Srinivasa Rao, Director, Systems at ADA. He gave a presentation on the LCA Avionics and the LCA weapons platform. He also showed videos of the various weapons trials and the various sensors being integrated on the LCA. The next paper was by Mr. Shailesh Sonone of CAIR, Bangalore, who highlighted the technological advances in Army Air Defence Systems. This is a system which is yet to be implemented. The final paper was by Dr. Sunil Sherlekar, who was the Founder and Head of Research of Computation Research Laboratories Ltd. the HPC initiative of the Tata Group. He talked about the HPC system EKA the fastest commercial system in the world. He said that the system had been used for Crash Simulation, CFD, Nano Material studies and Information Security. He sought initiatives from the delegates and participant organizations to use the EKA for further research and development studies to extend its scope of use.

Valedictory Session:
Dr. C R Chakravarthy thanked Dr. V.K Saraswat, Dr. Prahlada, distinguished invited speakers, the sponsors viz. DRDO, M/s Symantec, ECL, Hyderabad, Sun Microsystems, TCS, RSA, BEL, ASM and Afsas who have made this conference a notable success. He thanked the CSI Bangalore Chapter in general and particularly Mr. T Sabapathy, Chairman Program Committee, Dr. R.K Ramanathan, Co-Chairman, Program Committee, Mr. H Raghavendra Rao, Chairman Organizing Committee, Mr. Vishwas Bondade, Chairman Finance Committee Dr. Anirban Basu, Vice-Chairman, Prof. Shantaram Nayak, Mr. T.S. Ravindra, Mr. T N Seetharamu, Mrs. Yeshwani, Mr. Anand Jangid and Mr. Bhaskar Rao and Mr. Appa Rao and all the members of the Managing Committee of CSI BC. He would like to express special thanks to the unstinting support provided by CSI Bangalore Chapter secretariat-particularly Mr. H C Sridhar, Manager. He also thanked the rest of the CSI-BC staff.

CSI Accreditation for MIEL PRISM Program on Information Security
MIEL has developed and launched a 4-trimester post-graduate Program in Information Security Management called PRISM™ (PRogram in Information Security Management). This program is designed to create trained information security personnel at the middle management level. The program is offered by MIEL through partnering educational Institutions. After assessment and evaluation of the maturity of the MIEL PRISM program, CSI has signed an MOU with MIEL e-Securities Pvt Ltd. granting accreditation for the program. Successful Participants will receive joint certification from CSI, MIEL and the partnering Institution.

Those, interested in joining the program can write to MIEL at the following address for more information about the course calendar, contents, partnering Institutions and fee structure.

MIEL e-Security Private Ltd
4th Floor, AML Center 1
8, Mahal Industrial Estate, Off Mahakali Caves Road, Andheri (East), Mumbai - 400 093
Mobile: +91 98201 30911 (Mr. V L Mehta), E-mail: vlmehta@mukand.com / vlmehta@mielesecurity.com
As India’s largest and one of the world’s earliest IT professional organizations, the Computer Society of India has always aimed at promoting education and research activities, especially in the advanced technological domains and emerging research fields. It is also committed to take the benefits of technological progress to the masses across India in particular to unrepresented territories. In order to promote research and innovation meeting the grass-root level ICT needs and emphasize the importance of joint research by faculty-students, the CSI has been providing R&D funding for last several years.

The CSI Student Branches and member institutions are requested to motivate the young faculty members and students (including undergraduate and postgraduate) to benefit from this scheme. The proposals (based on the ongoing or new projects for the academic year 2009-10) the following aim/objectives, expected outcome, indicative thrust areas for research funding may be submitted to: The Education Directorate, Computer Society of India, CIT Campus, IV Cross Road, Taramani, Chennai 600113.

Last date for Receipt of Proposals: 31st January 2010

**Aim and Objectives**

- To provide financial support for research by faculty members, especially for developing innovative techniques and systems to improve teaching-learning and institutional management processes.
- To provide financial support to students for developing new systems catering to the needs of socially relevant sectors and/or involving proof of concepts related to emerging technologies.
- To facilitate interaction/collaboration among academicians, practitioners and students.
- To develop confidence and core competence among faculty/students’ through research projects.
- To foster an ambience of ‘Learning by Doing’ and explore opportunities of industry funding and mentoring for inculcating professionalism and best practices among students and faculty.
- To recognize innovation and present excellence awards for path-breaking projects through CSI YITP awards and industry associations, Govt. Agencies and professional societies.

**Expected Outcome**

- Identification of thrust areas, capability assessment, gap analysis, recommendations and future education and research directions.
- Integration of research methodologies into the university teaching-learning process and evolving a quality control mechanism for academic programmes and curricula.
- Strengthening of industry-institutes interaction through commercialization of technologies and products developed by students and faculty.
- Publication of research studies (ICT penetration, technological innovation, diffusion & adaptation), state-of-the-art reports and case studies of education/research initiatives.
- Identification of potential new and innovative projects of young faculty, researchers and students for possible business incubation.

**Indicative Thrust Areas for Research funding**

The financial assistance up to Rs 50,000/- for hardware projects and up to Rs 30,000/- for software projects would be provided to cover items like equipment, books/journals, field work, questionnaire, computation work and report writing. The indicative thrust areas for funding include (but not limited):

Introduction
The conference offers a diverse program and cutting-edge exposition exploring the intelligent application of information technology & energy management to bring a better tomorrow. One will gain an insight into how to leverage technology to help bring about the changes in the present scenario.

Call for Papers

Track I – Information Technology
India’s IT growth in the world is primarily dominated by IT software and services such as Custom Application Development and Maintenance (CADM), System Integration, IT Consulting, Application Management, Infrastructure Management Services, Software Testing, Service-Oriented Architecture and Web Services.

Track II – Energy Management
Attention world over is focused today on economical usage of energy and finding new unconventional methods to generate power, as the demand of energy is going up as never before. This conference, therefore, would deliberate in great details on various aspects related with energy directly impacting the human beings.

Track III – Management Practices in Energy Sector
The Track will cover the entire energy spectrum. Focus will be on global environmental issues which effect Indian scenario, the development of existing and emerging renewable energy sources. One will gain an in-depth understanding of fundamentals in energy management, energy technologies and industries, energy markets and trading and energy policy in major regions and countries.

Guidelines for Full Paper
• The paper should be in MS-Word format in Times New Roman and 12 font size.
• Abstract should not exceed 200 words and the paper should not be of more than six pages.
• The authors are required to sign the declaration form.
• Papers will be accepted for publication in the proceeding only when at least one of the authors registers & presents the paper in the conference.

Conference proceedings
Proceedings of the conference will be published in the form of an edited book through a leading publisher for wider dissemination of the deliberations containing all the papers.

Important Dates/Deadlines
Full Length Paper Submission: Wed, Jan 27, 2010
Notification of Acceptance of papers: Fri, Feb 05, 2010
Conference Dates: Sat-Sun, Feb 20-21, 2010
Full papers should be mailed through e-mail at:: conf.glagroup@gmail.com, charul@glaitm.org

Registration Details
All delegates are required to register for the conference as per the details:
Corporate Participants : Rs.2,500/-
Academicians/ CSI Members : Rs.1,200/-
Students : Rs.500/-
Fee is payable by DD in favour of “G.L.A. Institute of Technology & Management” payable at Vrindavan.
For details kindly visit www.glagroup.org

For any inquiries please Contact:

Convener
Prof. (Dr) Charul Bhatnagar
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About 40 years ago, Stanford University had some financial problems. The authorities of university tried to solve the problems by leasing part of the university land to high-tech companies for 99 years. Carolyn Tajnai clarified this point of Stanford's history in more detail:

"In the 1950's, the idea of building an industrial park arose. The university had plenty of land over 8,000 acres....but money was needed to finance the University's rapid postwar growth. The original bequest of his farm by Leland Stanford prohibited the sale of this land, but there was nothing to prevent its being leased. It turned out that long-term leases were just as attractive to industry as out right ownership; thus, the Stanford Industrial Park was founded. The goal was to create a center of high technology close to a cooperative university. It was a stroke of genius, and Terman, calling it "our secret weapon," quickly suggested that leases be limited to high technology companies that might be beneficial to Stanford. In 1951 Varian Associates signed a lease, and in 1953 the company moved into the first building in the park. Eastman Kodak, General Electric, Preformed Line Products, Admiral Corporation, Shockley Transistor Laboratory of Beckman Instruments, Lockheed, Hewlett-Packard, and others followed soon after."

Fred Terman, The father of Silicon Valley
by Carolyn Tajnai, 1995

Silicon Valley is an area that "located on the San Francisco, California, peninsula, radiates outward from Stanford University. It is contained by the San Francisco Bay on the east, the Santa Cruz Mountains on the west, and the Coast Range to the southeast. At the turn of the century, when fruit orchards predominated, the area was known as the Valley of Heart's Delight " as Carolyn E. Tajnai, former Director (1988 - 1997) of Stanford Computer Forum begins one of her comprehensive online-manuscripts that described Silicon Valley history from some of the WWW best personal viewpoint. According to Varian Associates it was a simple decision: "Gradually, facilities were moved from leased quarters in San Carlos to a quiet corner of Stanford land, thus creating what is today the Company's headquarters site, and incidentally bringing into being the Stanford Industrial Park - the most successful complex of its kind in the world." Source: Varian Associates: An Early History The first building was the Varian Associates Building, Stanford Industrial Park, Palo Alto, California constructed in 1953.
BANGALORE

A talk on “Beyond 3G - True Mobile Broad Band - 4G?” was organized on 12.12.2009 at CSI Bangalore Chapter premises. The speaker was Dr. M H Kori, Technical Director, Alcatel-Lucent Technologies India.

Dr. Anirban Basu, Vice Chairman welcomed the speaker and members present.

In his talk, Dr. Kori introduced the evolution of Wireless Technology and the concepts of Generations. While the road to 3G used to be fraught with uncertainty, delays, technical challenges and financial hiccups, today 3G services are increasingly widespread around the world. Two well-established 3G technologies – W-CDMA (UMTS) and CDMA2000 1xEV-DO – are currently serving many millions of customers worldwide, and a third standard – time division-synchronous code division multiple access (TD-SCDMA) - is poised to play a significant role in the delivery of 3G services in China and perhaps other markets.

However, technologists have already started working beyond 3G. Wireless connectivity is on the verge of a monumental evolution that will fundamentally redefine the way people live and work.

More than 20 participants from different organizations attended this talk. The session was very interactive and informative. Finally, Dr. Anirban Basu, Vice Chairman CSI-BC presented the summary of the talk and thanked the speaker & all participants.

DELHI

The Chapter organized an Evening Symposium on “Next Generation Computing Technologies” on 11th December, 2009 at India International Centre Annex, Lodhi Road, New Delhi. Prof. M. N. Hoda, Chairman, CSI DC has briefed the audience about the new initiatives of the Delhi Chapter.

There were three technical talks in the symposium. Mr. S. N. Gupta, Director and Chief Regulator, Regulatory Affairs, British Telecom, has given a detailed presentation about the technologies involved in “Next Generation Networks”. Mr. Bijoy Singhal, Architect and Evangelist, Microsoft India, discussed on “Next Generation Development Technologies”. He unleashed the psychology, challenges and concerns of architects and developers with reference to the problems posed before them by the prospective customers and system users. Third speaker was Prof. K. Subramaniam, Director, Centre for Innovative and Advanced Learning, IGNOU, New Delhi. He spoke on “Next Generation Education Technologies”. He discussed the current status of ICT uses in Teaching Learning process. He also discussed the MHRD initiated National Programme on Technology Enhanced Learning (NPTEL) which is co-coordinated by IITs and IISc. He unleashed Education Grid activity of National Knowledge Commission, Govt. of India. He also presented the initiatives of IGNOU in taking the education to most rural parts of the country, using ICT.

Prof. A. K. Saini, Immediate Past Chairman, CSI DC, Mr. Manoj Sethi, Hon. Secretary, CSI DC and Mr. R. K. Vyas, Regional Students Co-ordinator, R-I, introduced the eminent speakers. Mr. R. K. Gupta, Past Hon. Secretary, CSI, presented the mementos to the speakers. Mr. S. D. Sharma, Hon. Treasurer, CSI Delhi Chapter, presented vote of thanks.

The Symposium was well attended by very senior members of CSI Delhi Chapter from all walks of life and was actively received by the participants.

MUMBAI

STF Meet: BI tools for security forensics, 12th Nov. 2009:

Under the Security Technology Forum series, the chapter conducted...
a lecture on BI tools for security forensics on 12th Nov.2009. at ICSSR Hall, Mumbai University, Santacruz, Mumbai. The speaker was Ashwin Dedhia, Director, MAIA Intelligence Pvt. Ltd. In his session, Ashwin explained the concept of forensics, need & purpose for forensics, role of IT for forensics. He also took the audience through various Data collection and Data Mining tools for Forensics and fraud detection & Auditing.

The lecture was well attended by students and professionals from various facet of IT domain.

SPIN Meet - Challenges in Estimation for Software development Projects, 18th November 2009: A Seminar cum meeting of CSI-SPIN (Mumbai) Group was organized on 18th Nov. 2009 at the chapter office. The speaker Mr. Mahesh Kumar, Process Consultant, Datamatics Global Services spoke on Challenges in estimation for Software development projects.

Through Deliberations & interactions on the topic Mr. Mahesh Kumar covered various issues to discuss the real life scenario for estimation. Some of the concerns included the various techniques involved in effort estimation, deriving the schedule from the project effort estimation. The discussion points included Standish report 2009, impact of assumptions and constraints on project costing and revision of estimate and costing during tracking of project costing.

Seminar on Frauds & Crimes In The Digital World, 20 Nov. 2009: The chapter organized a one-day seminar on Frauds & Crimes in the digital world on 20th Nov. 2009 at Hotel Tunga International, Andheri East, Mumbai. The speaker Dr. Vishnu Kanhere explained the basics of fraud, Computer & Internet frauds, various management & employee frauds. Dr. Kanhere aptly addressed the issues and covered fraud detection, control, prevention, investigation and mitigation management. Dr. Kanhere also shared various legal elements of fraud, how do online frauds happen and how to deal with them.

The seminar was very successful and well attended by professionals from various facets of IT domain.

Training on “Bidding for IT Projects : A Successful Approach”, 21st Nov. 2009: The chapter organized a one-day training on Bidding for IT Projects: A successful Approach on 21st Nov. 2009 at the chapter office. The training was conducted by Prof. V.K.Garg.

The training helped the participants to understand generic framework for analyzing requests for IT Projects, estimating effort, cost & Schedule for IT Projects, Proposal review and evaluation. Prof. Garg also took them through good practices in responding to requests for IT Projects, Industry benchmark data and risk analysis, generic mitigation strategies. The program was successful and was a value addition to the participants.

Certificate course on Project Management 4.0, 23-26 Nov. 2009: The chapter conducted four-day certification course on Project Management 4.0 from 23rd to 26th Nov. 2009 at the chapter office. The training helped the participants learn the Fundamentals of project management skills, concepts and techniques, Identity stakeholder needs requirements and document project scope.

Develop work breakdown structures, Document project management plan, Estimate project cost and schedule, Understand dynamics of project management including HR and communication aspects of effective team building & management and Establish a dependable project monitoring and control system.

CSI Chapter Knowledge Forum Session: Datacenter Energy Efficiency, 27th Nov, 2009: Under CSI Chapter Knowledge Forum Series, the chapter conducted a lecture on Datacenter Energy Efficiency on 27th November 2009 at WRIC Hall, Mumbai University, Santacruz, Mumbai. During his session Raghunandan spoke about the need to reduce data center operational costs now and make sure that these investments provide the right foundation for the future. He also explained how to develop a roadmap of short-term projects to cut costs today, while helping to transform the data center and deliver green outcomes. He also gave the audience insights into planning options for transforming to a green next-generation data center.

CSI Mumbai Chapter Get-together 28th November 2009: The chapter arranged a Get-together on being adjudged the Best Chapter for the year 2009-2010. This was attended by Mr. S Mahalingam, President of Computer Society of India, Fellows of Computer Society of India, staff of Computer Society of India, Head Quarter and all the office bearers of the Mumbai Chapter.

STF Session: Take Control of Identities & Data, 10th Dec. 2009: Under the Security Technology Series, the chapter conducted a lecture on Take control of Identities & Data on 12th Nov.2009. at CISSR Hall, Mumbai University, Santacruz, Mumbai. The speaker was Rajendra Dhavale, Director – Technical sales, Computer Associates. In his session Rajendra gave insights on the current state of corporate Information Security. He also provided the audience with challenges and solution for Identity Management, Secure Web Business Enablement, Data & Resource Protection and Security Information Management.

The lecture was well attended by students and professionals from various facets of IT domain.

COM-IT International Exhibition, 10th – 13th Dec. 2009: The chapter participated in COM-IT International Exhibition & Conference held from 10th to 13th December 2009 at MMRDA Ground, Bandra, in Mumbai. The event was the ideal forum to explore the latest international and regional developments in Technology. COM-IT EXPO 2009 was organized by TAIT - the premier IT Association in the country.

The exhibition proved to be an excellent opportunity to showcase the Mission of Computer Society of India to the visitors.

SPIN Meet: Process Improvement - Two Approaches, 16th Dec. 2009: A Seminar cum meeting of CSI- SPIN (Mumbai) Group was organized on 16th Dec. 2009 at the chapter office. The speaker Ms. Shabana Mashraki discussed the two approaches

1. Process Improvement through Internal Quality Audits
2. Process Improvement through Measurement and Analysis.

In her session Shabana aptly addressed the issues, what should be the approach/techniques for conducting such audits, measurement definition and implementation approaches being adopted, what are the impediments to watch out for & the most prevalent types of measures being used in the industry.

CSI Chapter Knowledge Forum Session: Transforming Business Productivity, 18 Dec. 2009: Under CSI Chapter Knowledge Forum Series, the chapter conducted a lecture on at WRIC Hall, Mumbai University, Santacruz, Mumbai. The speaker was Dr. Nitin Paranjape, CEO, MaxOffice Services Pvt.Ltd. During his session Dr Nitin demonstrated the real power of productivity and gave insights on how day to day operations performed by users can be dramatically improved by using the right feature in the right place.

The session was attended by students and professionals from various facets of IT domain.
A technical talk titled “Data Envelopment Analysis (DEA)” was organized by at Conference Hall of Computer & Information Technology Dept. of Rourkela Steel Plant. on 8th August 2009. Dr. Sreekumar, Dean of academics of Rourkela institute of management studies, Rourkela was the speaker.

A technical talk titled “Data Centre Architecture” was organized by at Conference Hall of Computer & Information Technology Dept. of Rourkela Steel Plant. on 28th August 2009. Mr. Bijoy Chowdhury of M/s Emerson network power was the speaker. In his deliberations he discussed all the issues related to modern data centre and suggested remedies.

A technical talk titled “Knowledge Management In Steel Industry” was organized by at Conference Hall of Computer & Information Technology Dept. of Rourkela Steel Plant. on 24th November 2009.

The event was presided by Mr. V Nandagopal, ED(F&A) who is also the chairman of Knowledge Management execution team of RSP. On this occasion, the speaker Mr. Rohit Jayas of WIPRO discussed various activities of Knowledge Management In his deliberations he explained how K M focuses on organizational objectives such as improved performance, competitive advantage, innovation etc.

Chapter conducted a written quiz test on Computer hardware, Programming Basics, Networking & Whos Who in Computer Business on 20th September 2009 (Sunday) at St. Pauls School, Rourkela as well as DAV Public School, Kanshbahal where (selected students from class IX & X of each schools of Rourkela and its periphery participated.

An elocution competition titled “As a student, how can I best utilize my computer?” was organized among school students of class-VII and class VIII of Rourkela where total of 24 student (2 students from each school) had participated.

Mr. S S Mohanty, ED (P&A), Rourkela Steel Plant graced the occasion as chief guest and distributed prizes and certificates to winners. The principals, computer teachers and parents of winners were also present on the occasion.

TRIVANDRUM

The chapter organized the following technical talks: on 02.12.2009 – Technical talk on “Wiki Websites - The Free Software that Helps Students to Read, Write, Communicate, and Collaborate” by Dr. Clif Kussmual, PhD, Chief Technology Officer, Elegance Technologies, Inc., USA, Technical talk on “e-Commerce - Standards” by Prof. Kannan Sreenivasan, Assistant Professor, Sree Chitra Medical Centre, Trivandrum on 09.12.2009, Technical talk on “Industrial Medicine” by Dr. V Indira, Chief Medical Officer, V S S C, Trivandrum on 16.12.2009.

AISSMS COLLEGE OF ENGINEERING, PUNE

The branch organized the two days Workshop on “Very High Speed Integrated Circuit Hardware Description Language (VHDL)” during the period October 29-30, 2009 under the guidance of Prof. Madhavi A. Pradhan, HOD, Computer Engineering Department.

The Expert Faculty was Prof. Nitin P. Mawale. He explained the importance of VHDL in Computer as well as Electronics field. He also explained how VHDL different than the other computer languages. The practical session conducted by SE Computer students Ms. Anuja Tupe, Ms. Shaily Fotedar, Ms. Anipra Patil and Ms. Priyanka Singh Rathore. The workshop was coordinated by Ms. Deepiti Pundalik. In all 75 students were present for workshop.

LOYOLA COLLEGE, CHENNAI


Organized by Dr. A. Albert Muthumalai S. J, Principal, Loyola College, Chennai.

The National Conference NCIDEEE 2009 began on 01.12.2009 with the Inaugural function in the morning. Prof. G. Ramamurthy, Vice Principal, Loyola College welcomed the gathering. Rev. Dr. A. Albert Muthumalai, Principal, Loyola College. Chairman & Convener of the Conference explained the theme of the conference. The Guest of Honour, Mr. Ram Agarwal, CEO Karishma Group of Companies
spoke on the importance of Technology for the differently-abled and the tools for carrying out Information and Communication. The Chief Guest Dr. S. S. Singh, Technical Director –NIC, Ministry of Social Justice and Empowerment, elucidated the need to create more opportunities for differently-abled. The conference was divided into three tracks for Researchers/Academicians, Web Designers and Differently-abled and conducted simultaneously.

**Afternoon Session**: The session started with a talk on “ICT Tools for Expression” by Dr. Rajan Varda from UNESCO. Dr. Sam Dharapurwala, Joint Director of Xavier’s Resource Centre for the Visually Challenged shared his views on the topic “Setting up Resource Centers”. Prof. Sudhir Krishnasamy from National University of Juridical Sciences spoke on “Constitutional and Legal Basis of disability Law”. Mr. Harish Totian from RBI shared his ideas on “Building Communities Online”. It was a very informative session.

Paper Presentation was organized during the second session of Day 1. Over the 36 papers submitted online, only 20 of them were selected for presentation. Dr. S. P. Victor, Head, Department of Computer Science of St. Xavier’s College, Palayamkottai was the moderator during this session. The paper titled “Emotion Agent and Sound Agent for Differently-abled learners” presented by Mrs.R.Senthamarai of Aarupadai Veedu Institute of Technology was declared First Prize and the paper titled “Augmentative Communication in Intellectually Disabled Children with Cerebral Palsy” presented by Mrs.A.Turin Martina, Holy Cross College, Trichy-620 002 was given Second Prize.

Deliberations on Day 2 had OCR Round Table discussion chaired by Dr. Santanu Chaudry , IIT, Delhi who delivered a talk on “OCR as a tool for visually challenged”. Dr.Jawahar , IIIT, Hyderabad spoke on “OCR Technology: State of the Art”. Dr. Gurpreet Singh Lehal, Punjabi University, Punjab shared his expertise on the topic “OCR Technology for Indian Scripts”. Mr. Dipendra Manocha discussed on the topic “Unicode & Braille-conversion Issues”. The interaction of the participants during the deliberation and discussion was phenomenal. A demo on Indian Language OCR was given by Dr. Tusar Batnaik & Team, CDAC, Noida. After the demo session a Panel Discussion was organized wherein the researchers shared their experiences in their respective field of research.

Third day proceedings mainly focused on TTS (Text To Speech). Dr. Hema Murthy, IIT, Chennai began the session with her impressive talk on “TTS Technology”. Dr. Kishore Prahalad delivered a speech on “Unit Selection TTS”. Mr. Dipendra Manocha and Mrs. Anu Bajpai from Sigma Science Tech shared their proficiency on “TTS Requirement for the Visually Challenged”. Dr. Das Mandal from CDAC, Noida and Santhosh Thotingal also shared their expertise on TTS.

**Workshop on Web Content Accessibility Guidelines 2.0**

This Session was taken jointly by four facilitators:

- Mr. Rahul Gonsalves - a free lance web designer, founder of the web designing company Pexlogue.
- Mr. Manish Agrawal - Software Consultant at Sapient.
- Mr. Prashant Verma - ICT Resource Centre, Delhi University.
- Mr. Srinivasu Chakravarthula - Accessibility Lab Manager, Yahoo India!

Mr. Manish, Mr. Prashant and Mr. Srinivasu were highly inspiring as they were all visually impaired to some extent.

This was surely an interesting conference for all the attendees due to the high level of interaction, lab activities and the down to earth nature of the resource persons. It has inspired, shed light to many and made them aware of the importance of making their sites accessible to all.

**Report of Track 3 &4 – Capacity Building Workshop for the Differently Abled.**

NCIDEEE 2009 Conference created the awareness about the employability of the Visually Challenged and thus plays a catalytic role in bridging gaps to create an inclusive environment and thereby achieve Social Integration. Using their superior listening skills and retention power, they are able to produce better results in certain fields of activity such as music, data entry, telemarketing, call center jobs, medical transcription, food tasting, assaying (fragrances, essential oils and extracts etc), counselling and physiotherapy.

NCIDEEE2009 conference really paved the way through the training and support for the visually challenged to excel in their life.

**MBCET, TRIVANDRUM**

A one day Workshop on C/C++ in Linux for Faculty members was organised by the Student Branch of Mar Baselios College of Engineering & Technology, Nalanchira (MBCET) in association with FSUG-TVM on December 12th 2009. The audience was welcomed by Mr. Vishun Kumar S, Lecturer, Department of Information Technology. The sessions on Basic Linux Commands, Command Line Editors (vi and Emacs), GNU C/C++ Compilers and GNU Debugger was handled by Mr. Santhosh Raju, Developer ZYXWare Technologies and the session on using Netbeans IDE for C/C++ development was handled by Mr. Ashik Salaludeen.

All the teaching faculty and technical staff of both Computer Science & Engineering and Information Technology departments attended the workshop.

The vote of thanks was delivered by Mr. Biju B Varghese, CSI chapter counsellor.

The hands-on sessions were well appreciated by all.

**MCKV INSTITUTE OF ENGINEERING, KOLKATA**

MCKV INSTITUTE OF ENGINEERING, KOLKATA : RSC Region-II, Sushanta Sinha inaugurating the branch
MCKV Institute of Engineering, Liluah organized Student Branch Inauguration on 24th October, 2009. Event started with the lighting of lamp in presence of Mr. Sushanta Sinha, Regional Student Coordinator from Region-II, along with Mr. D P Sinha- Fellow of CSI, Prof. D D Sinha - immediate past chairman, Dr. Subhabrata RoyChowdhury - distinguished patron, and Prof. Parasar Bandyopadhyay, Principal MCKVIE.

Total 110 enthusiastic students from CSE, IT & MCA took their membership with a promise to continue their sustained and active participation with CSI through various vibrant activities.

Apart from excellent presentations on Data-Mining and Genetic-Algorithm, students conducted Quiz Competition ranging various fields starting from brain teaser in Super Computers to run-getters in IPL.

### MEDI-CAPS INST. OF TECH. AND MGMT., INDORE

The Branch of Medi-Caps Institute of Technology and Management, Indore was inaugurated on 16th November 2009 under the leadership of Chairman CSI Indore Chapter, Dr. N. Dagdee. The initiative was entirely the credit of Computer Science and IT department with the continuous effort of Mr. Dheeraj Rane, Branch Counselor. The welcome note came from Dr. Shamsher Singh, Chief Executive Director, Medi-Caps Institute of Technology and Management. He congratulated the students and motivated them to put their efforts continuously over academic relevant activities.

Dr. Dagdee addressed the students with the significance of making the courses of engineering professional through involvement in such bodies.

### NMAMIT, KARNATAKA

A Technical talk on “Human Computer Interaction” by Prof. K P Rao, Head, dept of printing, MIT, Manipal was organized at NMAMIT Nitte by the CSI Student Branch on 16th October, 2009. This function was followed by the felicitation ceremony of Prof. K P Rao who has contributed a lot in the field of IT in Kannada.

Prof. Rao in his address, started with the comparison of the computer which we had in older days and the advanced machine that we have at present. He spoke about how the human interface has evolved and touched upon some advanced techniques. He showed few glimpses of a project which is going to be the next generation of Human computer interaction where there are two young Indian researchers working at MIT, Cambridge, Massachusetts. One among them is a student of Prof. K. P. Rao.

After this technical talk, Principal, NMAMIT, Dr. S Y Kulakarni felicitated him on behalf of NMAMIT and CSI student branch of NMAMIT for his contribution to IT, especially in Kannada. He is the one who also wrote script for the NUDI, the kannada language typing software.

Professor Niranjan N Chiplunkar, HOD Dept of CSE and Vice Principal, NMAMIT Nitte introduced him to the gathering. RSC Mrs. Sharada U Shenoy, director Dr. K.M Hebbar, Dean Prof B. S. Samaga and the student committee members of NMAMIT student branch were present.

### RVCE, BANGALORE

The CSE & ISE departments of R.V.College of Engineering in association with Aptech has organized a seminar on Friday 27.11.2009. Mr. Harish & Ms. Uma from Aptech were the resource persons for this seminar. The aim of this seminar was to give an insight about Web 2.0 technologies and web application developments.

The seminar started with brief introduction about the Web services. Mr. Harish told about different web services and web applications development. Web services is a software application that can be accessed remotely using different XML supporting languages. XML will help to define our own rules that can suit for web applications development. Ms. Uma was the other speaker briefed about the openings in this domain for project development. She told about Technology available in this area and the students can gear up with Sun certification which can help to have more confidence for facing the challenges. Total of 75 M.Tech students from CSE / ISE branches have participated and benefited from this seminar.

### THIAGARAJAR COLLEGE OF ENGG., MADURAI

As a part of CSI student branch activity, we have conducted a contest for year and Pre-final year students to test their linux skills. Final year coordinators organized the event. Around 45 CSI members participated in the event. The event was conducted along with GLUGOT, The GNU Linux User Group of TCE, A forum for peer to peer learning of Linux and open source technologies, to test the students’ knowledge in Linux commands and their uses. It
is conducted as a 2-level contest. The preliminary round was full of objective type questions while the final round was a practical one, done with Linux installed machines.

In his inaugural speech, Mr. Bhattacharya urged the students to innovate and to experiment on emerging technologies. He encouraged the students to come up with new ventures in the IT sector and promised all assistants from Infopark authorities. Prof. P J Joseph, President, TIST, in his presidential address encouraged the students to make the best of Computer Society. Dr. Job V Kuruvila, Principal TIST felicitated on the occasion. The inaugural session was attended by deans & heads of various departments.

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The inaugural ceremony was followed by a technical talk on “looking back to see the future” by Ms. Mini Ulanat, Regional Student Co-ordinator, region VII, CSI.

More than 150 students from the department of Computer Science & Information Technology & faculty members attended the session.

Mr. Siddharth Bhattacharya, CEO Inforpark inaugurating the branch.

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