WE UNDERSTAND YOUR BUSINESS

GLOBAL INFRASTRUCTURE SERVICES

THE REVIEW 2012

Variabilization of Technology
P-07

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Addressing your Industry Concerns
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Wipro’s Global Infrastructure Services with its strong domain capabilities and specialised offerings helps businesses across the globe to transform their vision into results. The cover depicts the “One World” with many demands on IT infrastructure management services, and how Wipro is enabled to deploy the latest in technology solutions, ensure accelerated growth and deliver with continuous innovation, globally.
We live in technology-dependent times – and in the midst of such rapid, even chaotic technological growth, it takes a reliable, innovative partner to design and implement solutions that enable businesses to do business better – regardless of their industry, geography, or maturity.

Today, Wipro has clients around the world across a spectrum of business challenges – in industries that range from brokerage and banking, energy, and audio/infotainment to mobile, pharmaceutical, and consumer products. Some are struggling with survival due to increased competition in a difficult economy, while others are frantically managing extreme growth. Still others find themselves distracted with having to cope with ageing technology that needs not just an upgrade, but a robust, well-conceived refresh.

Agile, efficient, and cost-effective technology infrastructure can be the differentiator that makes businesses successful and enables companies to refocus on their core services and products. In fact, it has become a lever for growth. Global organizations are re-examining IT in customer interface processes and looking at how IT can address their business problems.

Wipro is partnering with multiple customers to help them grow and better compete in their industry with the best and most innovative technology infrastructure solutions available. We hope that you, too, will find our expertise valuable.

The “Global Infrastructure Services – The Review 2012” is our endeavor to tell you the story about this robust expertise, which has helped several customers do business better. This is a set of articles which gives you a glimpse into how we at Wipro can enable technology transformation.

Happy Reading!

Sureni Rout
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GLOBAL INFRASTRUCTURE SERVICES SNAPSHOT
What Influencers Say About Wipro

Winner of NASSCOM innovation award for Global Command Centers.

Winner of IT Outsourcing Project of the Year Award for the transformational IT partnership with Diversey. NOA awards are one of the most coveted in our industry. The award recognized the mutually beneficial partnership where Diversey utilized Wipro’s expertise to improve organizational Key Performance Indicators (KPIs) and overall business experience.

Wipro rated as ‘Leaders’ in Forrester Wave™: IT Infrastructure Outsourcing Wave 2011 much ahead of TCS, Infosys, HP, Accenture and CSC in Strategy. Forrester, in the same research, appreciates that “Wipro has the largest overall market presence among Indian providers, with strong geographic breadth and balance across North America and EMEA as well as Asia Pacific, including its extensive operations in India”.

“Wipro has demonstrated a strong retention rate of 94% for DCO (Datacenter Outsourcing) and IUS (Infrastructure Utility Services) clients. This indicates that Wipro is delivering on its commitments to clients, which is a good sign for organizations seeking a long-term provider of DCO and IUS services” – Gartner Magic Quadrant for Data Center Outsourcing and Infrastructure Utility Services, North America 2011. “Clients indicated that Wipro delivered effective services and that the price/value equation was very favorable. Again, this shows Wipro’s willingness to take ownership of deals, fix problems and proactively make changes” – Gartner Magic Quadrant for Help Desk Outsourcing, North America 2011.

Gartner chose Wipro to analyze in their research “SWOT: Wipro, Infrastructure Outsourcing, Worldwide” because of our position in the marketplace, the importance of infrastructure outsourcing to Wipro, and recent changes in the company’s leadership including a new CEO and the formation of a Global Infrastructure Services Business Unit through the consolidation of Wipro’s India/Middle East and Global IT Infrastructure Business. Below are few of the positive mentions from that report:

- Wipro is among the fastest-growing providers of infrastructure outsourcing. Wipro reported Technology Infrastructure Services revenue growth of 22% during the quarter ending September 2011, a growth rate significantly higher than our current forecast 2011 annual growth rate of 7.7% (3.4% at constant currency) for IT outsourcing (ITO), indicating that Wipro is taking share in ITO.
- Wipro was also among the 15 fastest-growing providers of IT Infrastructure management with annual IT management revenue greater than $500 million in Gartner’s most recent market share analysis in which Wipro grew by 15% in 2010, significantly outpacing IT management market growth of 3%.
- Wipro’s strategy in infrastructure outsourcing is to provide quality delivery at an offshore price through its global delivery as a key factor in delivering value for money.
- Wipro’s customer service orientation produced client retention of greater than 94% in its ITO contracts.
- Wipro’s breadth of infrastructure outsourcing services is also reflected in the company’s market share. Based on Gartner’s 2010 IT Management market share analysis, which reflects application outsourcing and infrastructure outsourcing, Wipro is the second-largest offshore heritage provider in terms of IT management revenue.
- Wipro already has solutions for several industries that incorporate industry domain intellectual property (IP) with the supporting infrastructure. These include Bank in a Box, Wireless Place and Wipro ShopTalk for Retail.
Global Infrastructure Services Snapshot

Overview

$1.3B 27%*
Revenue  CAGR Growth

26K+ 6%**
Employees  Research & Innovation

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**Global Infrastructure Services Snapshot**

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**Overview**

**Revenue**

**CAGR Growth**

**Employees**

**Research & Innovation**

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**CLIENT WANTED TO ENABLE WORK FROM ANYWHERE, IMPROVE USER PRODUCTIVITY AND REDUCE OPERATIONAL COST.**

Wipro migrated 10,000 users to the virtual environment, increasing productivity by 28% and reducing desktop provisioning time from a week to minutes.

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**CLIENT WANTED TO INCREASE MARKET SHARE IN A HIGHLY COMPETITIVE ENVIRONMENT.**

Best of breed pre-integrated stack, Rapid Deployment framework resulted in 9 month average roll out time (against an industry average of 15 months), a 30% reduction in IT costs and achievement of subscriber target much ahead of time.

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**CLIENT WANTED TO ADDRESS VARIABILIZATION OF COST, ENHANCED SERVICE LEVELS AND TIME TO MARKET.**

Wipro built an engagement model to address Variabilization across hardware, software, facilities and services spend. Achieved 66% cost variabilization as well as increased transparency, time to market and control on IT consumption.

---

**CLIENT NEEDED ENHANCED RELIABILITY OF IT AND VARIABLE COST**

Remote Backup as a Service engagement, Backup Cost based on volume of Business Data stored resulting in 35% cost savings and increased back up rate from 90 to 95%, increasing critical data recovery rate.

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**Services Portfolio**

**END USER COMPUTING**
- Service Desk Messaging Services
- Mobile Device Management
- Desktop Engineering & Migration Services
- Desktop Virtualization Unified Communication
- Directory Services

**CLOUD**
- IaaS
- Virtual Desktop as a Service
- Collaboration services
- Cloud Orchestration layer services
- Private & Public cloud services
- Disaster Recovery & Backup as a Service

**MANAGED SECURITY**
- Information Security
- Application Security

**BUSINESS ADVISORY**
- Sourcing Strategies
- Emerging Technology Assessments
- Green IT
- IT Cost Transparency Solutions

**NETWORK**
- LAN, WAN, Voice, Video
- Contact Center/Call Center Telecom
- IP Convergence CTI/IVR
- Connectivity & Collaboration Services

**CROSS FUNCTIONAL**
- Business Service management (BSM)
- IT Asset Lifecycle Management
- IT Infrastructure tools
- PMO & Governance

**DATA CENTER OPERATIONS**
- Services, Storage, Databases
- Security, Mainframes
- Data Centre network
- Data Centre management & operations

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**Financial services**

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**Energy & utilities**

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**Manufacturing & hi-tech**

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**Healthcare & services**

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**Retail**

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**Global media & telecom**

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“TUI needed to simplify its communication and collaboration technologies to provide better business value to our employees. Wipro gave us the efficiency of Microsoft advanced technology to do so and exceeded our expectations by completing the project on time with ease of implementation”
— TUI UK & Ireland
To maximize IT’s potential and support the business strategy, CIOs must look beyond long-established fixed costs and adopt a variabilization of technology model, enabling innovation while balancing spends and demands.

Wipro’s variabilized projects account for 75 to 80 percent of our total infrastructure customer base, with cost reductions in the neighborhood of 25 to 40 percent for existing customers and as much as 50 percent for new customers.

The Great Recession may be in the rear-view mirror, but many enterprises are still struggling, uncertain about the trajectory of their growth and profitability. The slow recovery continues to breed caution in consumers, even as newer, more agile businesses are creating unexpected competitive threats to established organizations. This double challenge is forcing the hands of those in the C suite as they look for innovative ways to grow their business while reducing costs however they can.

One of the best ways they can focus on both growth and reduced costs is through innovating their IT. But that can be a challenge. While IT has clearly been established as a fundamental element to achieving business growth, upgrading and maintaining a large inventory of differently aging open and legacy applications and systems, especially in a rapidly changing technology landscape, can be cumbersome and pricey. Add to this the ever-altering business environment, in which enterprises are going through mergers, acquisitions, and divestitures. These changes can bring their own complex issues of dealing with people, cultures, and, of course, newer IT scenarios.
The era of the old IT “war horse” has long since passed in favor of nimbleness and agility. Through the CIO, IT has to facilitate quick business realignment while ensuring costs remain in line with business realities and goals. So, if state-of-the-art IT is key to achieving business success, its costs must be variable in the context of the greater business. The CIO must be in tune not just with the specific IT silo, but have a mindset for how the IT strategy will align with the requirements of business.

To maximize IT’s potential and support the business strategy, CIOs must look beyond long-established fixed costs and adopt a variabilization of technology model, which enables innovation while balancing spends and demands.

**VARIABILIZATION DEFINED**

The concept of variabilization is both simple and complex. Simple from the perspective of expressing it as a vision statement. Complex when it comes to the details of an executable plan.

To put it simply, Variabilization is about providing an agile IT architecture tailored to align with individual business environments within a single large enterprise. It provides cost alignment to variances (upswings and downturns) in each of the businesses. Fixed costs had their place when markets and technology were stable. But volatility is the new reality and agility is the new strategy. To be competitively nimble, it’s important to keep costs variable.

Variabilization of IT encompasses the bulk of an organization’s business, operations, and IT environment, applying proven management tenets – scale, standardization, and simplification – to drive efficiency, optimize delivery, and lower unit costs. It also brings in other proven practices, such as lean-management techniques, which reduce waste and increase productivity. Most frequently, virtualization, Cloud, and collaboration technologies are intrinsic to this approach and allows enterprises to variabilize their current asset footprint and built scalable designs that respond to dynamic market and business needs.

In short, Variabilization enables business to make new technology investments with greater ROI and cost transparency, and it enables it to happen swiftly – even on demand – and certainly better aligned to business needs.

Let’s look at variabilization in the context of a bank. The bank has multiple divisions, each an individual profit and loss center. These units continually launch new services. The fundamental issue here is what kind of IT requirements does each division have with respect to scale and criticality? A single IT infrastructure may be too much for some businesses yet insufficient for others. There could be a business which may not require any variabilization but requires extremely high uptime, while another business may not have criticality but has a high degree of variance. It’s all about tailoring an IT landscape to meet individual business dynamics, while integrating it within the larger organization’s IT environment.

That means thoroughly examining each business unit’s requirements and developing an IT architecture and landscape for each one. And, it means combining all the resulting business architectures to develop a final blueprint in which all points of integration, rationalization, and consolidation are considered. All told, it’s a process of looking at the current architecture and defining a road map of moving from the current to the future IT landscape.

The Wipro Approach to Variabilization

Wipro’s variabilized projects account for 75 to 80 percent of our total infrastructure customer base, with cost reductions in the neighborhood of 25 to 40 percent for existing customers and as much as 50 percent for new customers.

Our greatest strength across applications, infrastructure, and networks is our ability to transform and provide the best negotiated variabilization models. We have two approaches to this.

The first is what we call “Asset Lite.”

It has two touch points:

1. Wipro develops an integrated solution across process, technology, and service management. Here, differentiated business services and business service levels drive underlying business processes, reference architecture, technology choices, and transformation agenda. It includes the strategy and delivery of the transformation and service management – everything from vertical frameworks and global delivery to tools and processes.

2. Remuneration is based on success and consumption, leading to financial re-engineering. There is an outcome-based risk/reward model, an innovation-linked risk/reward model, a business SLA-based risk reward model, and a usage-based model based on the number of subscribers, for example, the number of towers, or the number of online customers serviced.
Wipro’s percentage of revenue is linked to the customer’s increase in its subscriber base. Wipro delivered business transformation through an alignment between business and IT, enhancement services via implementation of future-ready IT architecture, and the deployment of tools and information technology outsourcing efficiency services.

The value of leveraging these principles, based on business needs and culture, is not limited to cost savings. Those organizations that embrace variabilization increase efficiency, responsiveness, and functional productivity. It’s a compelling case for organizations to focus further investments for IT-based innovation into new technology and solutions for business value creation. That is a major competitive differentiator for business – and, certainly, what our customers have experienced.

Wipro takes three broad steps to deliver variabilization to our clients:

- Using our tools and technologies, we first analyze IT costs for the organization and provide a transparent and detailed breakdown of expenditures by business.
- Then we work with the customer to define the value of IT for each business.
- Based on these findings, our last step is to collaborate with the customer to outline the most optimal and variabilized architecture, which also outlines the road map for arriving at the final outcome.

For example, Wipro worked with a leading global financial services firm in need of a more agile and cost-effective IT platform. Based on their needs, we agreed that a Cloud infrastructure – including apps, servers, storage, backup, and security – was the best approach for their business model and worked with the firm to provide these services. The transformation was dramatic; they experienced a reduced time to provision from 52 days to a few minutes and more than a 25 percent reduction in total cost of ownership.

We’ve also worked with a leading telecom operator in a gain-sharing engagement. Wipro’s percentage of revenue is linked to the customer’s increase in its subscriber base. Wipro delivered business transformation through an alignment between business and IT, enhancement services via implementation of future-ready IT architecture, and the deployment of tools and information technology outsourcing efficiency services.

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Variabilization as an end-to-end concept is still in its infancy, today the growth of on-demand services means that most new IT projects have some component of variabilization built into them. We have seen this in our own infrastructure contracts with renewing clients over the last two years.

Do you see the need for transformation in IT and the streamlining of business processes to improve user productivity and reduce operational costs? Wipro helps seamlessly integrate multiple, non-standardized processes, while enhancing service levels, efficiency and time to market.

Looking ahead, Wipro expects that variabilization of technology will be the preferred approach to IT upgrades and management. Our research suggests that up to 74 percent of all IT can be variabilized. What does that mean for you? This is a huge opportunity for customers to become more efficient and do business better, even as vendors innovate to gain market share. It enables CIOs to be in better alignment with the needs and goals of business leaders. And it means today’s organizations, long caught in a vise as competition grows but the IT spend budget shrinks, can take advantage of cutting-edge technology to be agile, even formidable, players in their markets.
“The University of Canberra (UC) has been impressed by Wipro’s approach to innovation in their engagement with UC. Wipro strives to constantly deliver larger value to the engagement by bringing in thoughts beyond their stipulated roles. Wipro’s focus on optimization of business processes, their understanding of the education sector and their ability to manage change have impressed UC. We are confident that beyond achieving our articulated outsourcing goals, the University will significantly gain in technology and process advancement during this period.”
— University of Canberra
As the amount of data proliferates across all industries, organizations of all types are facing a challenge of optimizing their data center operations. With data being at the very heart of most businesses, it benefits organizations to develop a strategy in order to deal with their data centers.
During uncertain economic times, the fixed costs can weigh heavily on organizations of all types, limiting options and hindering growth. The variabilization of technology, which enables businesses to move from a fixed technology cost model to a variable cost model, can enhance business agility while enabling these organizations to pay for technology they use, as they need it. It is therefore imperative that organizations must address their data center challenges in order to operate efficiently, be able to access and leverage their data, and remain competitive in a heated marketplace.

Today, many organizations have multiple data centers spread across geographies, due to organic growth and growth from mergers and acquisitions. These data centers typically have disparate technologies, including a wide range of servers, some of which are old, obsolete and some that are new. These arrays of assets are typically difficult to track and manage. Older assets consume more power, take up more space and require a higher degree of maintenance in order to function efficiently. The storage estate, which is probably the most inefficient of the assets and the most complicated to resolve, has added issues of backup and data management challenges.

While the hardware can be problematic, the software can present many critical challenges as well. A wide range of applications can further complicate the technology challenges of data centers, since each geographic location may have its own set of applications. These disparate data center environments can lead to interoperability issues, and are difficult to manage and staff with individuals who have the right skill sets.

These challenges plague organizations of all types, because of the spread of business over time and complexity due to acquisitions. “These challenges were always present, but organizations are feeling them more acutely because of the changing business environment, where following the last recession, every dollar spent is being looked at very closely and
Variablized technology makes use of tenets like scale, standardization, simplification and lean to drive efficiency, optimize delivery and lower unit costs, ultimately helping organizations do business better.

is measured against value to business. Fast-growing organizations are finding ways to reduce IT costs. Add to that the looming prospect for another recession, and we have the perfect environment for variabilization,” says Rajan Sampath, Head, Data Center Transformation Services, Wipro Technologies.

Outsourcing Center and Wipro conducted a survey that included seventy-five CIOs and Heads of IT from Fortune 1000 companies across US, Europe and APAC that aimed to determine the current state of organizations’ data centers as well as explore the attitudes and challenges towards data center optimization. The participants represent a range of industries that include retail, telecommunications, financial services, transportation logistics, manufacturing and healthcare.

While not a comprehensive picture of how organizations from various industry segments are currently addressing their data center challenges, the findings point to some general trends in this area.

More than 40 percent (43.8%) of the companies represented in the Wipro and Outsourcing Center survey are from organizations that report more than $1 billion in annual revenue. Another quarter (25%) of firms report less than $20 million in annual revenue. Roughly a quarter (25.8%) of organizations are large enterprises, with more than 20,000 employees, and the same percentage of firms are from organizations with fewer than 500 employees. Approximately another quarter (22.6%) said that their companies employ between 5,000 and 9,999 individuals.

Slightly more than 60 percent of survey participants work for organizations with very healthy IT budgets. Nearly one-half (45.2%) of participants reported that their annual IT budget for 2012 is more than $50 million, and another 16.1% said their organization’s IT budget is between $10 million and $49 million. Less than 20 percent (16.1%) of participant organizations have IT budgets of less than $1 million.

How is your organization meeting it’s data center management challenges?

FINDING #1
DATA CENTER STRATEGIES (IT INFRASTRUCTURE, APPLICATIONS, NETWORK AND FACILITY) CLEARLY IMPACT BUSINESSES.

Wipro and Outsourcing Center survey participants seem to agree that a data center strategy impacts their organization’s business. While more than half of participants (53.1%) said that they believe a data center strategy impacts their business, only a scant 15.6 percent of participants said that such a strategy has no impact on their organization.

Survey members from the manufacturing industry did not feel that a data center strategy had the potential to impact their business, while representatives from other verticals either believed that such a strategy either clearly impacted their business – or possibly had an impact.

Wipro’s Rajan Sampath notes that some businesses might misunderstand a data center to be just a pure facility, without considering the IT infrastructure, although it’s difficult to believe that any of today’s organizations would consider its data center as not being critical to their business.

“Organizations should consider the data center to be IT infrastructure, applications, network and facility,” says Rajan. “This way, the data center clearly has business value.”
FINDING #2
MOST ORGANIZATIONS OPERATE FROM MULTIPLE DATA CENTERS BUT OWN FEWER THAN HALF.

According to the Wipro and Outsourcing Center survey, a majority of organizations currently operate from more than just one or two data centers. In fact, less than 40 percent (38.7%) are running fewer than two data centers. More than two in five participants (41.9%) said they operate from three, four or five data centers. More than 10 percent of participants (12.9%) said they operate from more than 20 data centers.

Larger enterprises typically have multiple data centers, as do those that have a truly global reach. If an organization operates in multiple markets, for instance across APAC, including Australia, Japan, India or in Europe or Latin America, it would typically have multiple data centers.

Many organizations establish local data centers in regions where they expand their business into new markets, and other firms inherit data centers in local geographies as they acquire other companies. While there are benefits to multiple data centers spread across geographies, organizations find that having many different data centers is very expensive and outweighs some of the benefits of localization.

“Considering the availability of bandwidth and resolution of performance issues, it is clearly established that the consolidation of Data Centers has a significant business benefit to organizations,” said Rajan from Wipro.

More than half of survey participants (56.2%) said that they owned fewer than half of their data centers. But more than 40 percent (43.8%) own more than half of all their data centers.

Certain industries tend to keep their data centers in-house. For instance, financial services firms and telecommunications operators typically own their own data centers. However, other organizations tend to have hosted data centers.

The trend over the past several years, according to Rajan Sampath, has been for organizations to host data centers instead of owning them, however this varies from vertical to vertical and depends on the size and reach of the organization. “A large and established banking or telco enterprise, for instance, would be hesitant to give up their data center ownership, while a smaller retail enterprise might be more likely to go with a hosted data center option,” Rajan says.

FINDING #3
MOST ORGANIZATIONS ARE NOT AWARE OF THE DETAILED COST BREAKDOWN OF EACH OF THEIR DATA CENTERS.

Are your current Data Center costs a big worry for your business?

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<tr>
<th>Yes</th>
<th>31.3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maybe</td>
<td>25%</td>
</tr>
<tr>
<td>No</td>
<td>43.8%</td>
</tr>
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</table>

Fewer than a third of participants (31.3%) in the Wipro and Outsourcing Center survey said that their current data center costs are worrisome for their business. Nearly half (43.8%) of group participants said that data center costs were not a concern for them.

Interestingly, while data center costs are generally not top-of-mind for survey participants, these individuals also said that they really aren’t completely aware of how much money their data centers are costing their organizations.

Do you know the detailed cost breakdown of each Data Center?

<table>
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<th>Yes</th>
<th>28.1%</th>
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<tbody>
<tr>
<td>No</td>
<td>71.9%</td>
</tr>
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</table>

A whopping 71.9 percent – nearly three-fourths – of all survey participants reported that they do not know the detailed cost breakdown of each data center. And, says Rajan, most organizations only know a portion of their data center costs – not the whole cost picture.

“It isn’t surprising that most organizations do not have a breakdown of costs. If these organizations don’t know where the costs are going, how can they know where to invest money to make improvements in efficiency?” Rajan notes. “It’s likely that these organizations have been spending money on things that are less critical.” Survey participants that did have a handle on their data center costs identified their top three costs in terms of both parameter and percent. Their biggest costs were related to the facility itself, for instance – building allocations. Other big identified costs were energy related, due to power consumption in order to meet operational requirements, including cooling. Other chief
costs are hardware and software related, as well as storage, staffing and maintenance.

The impacts of these measures ranges significantly. Survey participants report that their measures have realized cost savings of between 5 percent and 50 percent, although most report savings in the 10 percent to 20 percent range. Many are not sure at this time of the full extent of implementing these measures.

“Businesses must know the detailed cost breakdown to be able to determine cost improvement strategies and investments that impact business,” Rajan explains.

These organizations have taken different measures to contain costs. Measures included server and storage virtualization, application rationalization, back-up optimization, process standardization, facility and data center consolidation as well as taking steps to reduce energy and cooling costs. Survey participants also identified outsourcing and opting for a managed service provider as top cost reducing measures.

**FINDING #4**
**FEWER THAN HALF OF ORGANIZATIONS HAVE ADOPTED ALTERNATIVE MODELS FOR DATA CENTER MANAGEMENT.**

Have you adopted alternative methods to manage your Data Center?

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<th></th>
<th>YES</th>
<th>NO</th>
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<tbody>
<tr>
<td>46.9%</td>
<td>53.1%</td>
<td></td>
</tr>
</tbody>
</table>

The participants in the Wipro and Outsourcing Center survey were about evenly split on their adoption of alternative models for data center management, although slightly fewer (46.9%) said they have not yet adopted these models to manage their data centers.

Notes Rajan, the biggest challenge for organizations today doing any data center consolidation change models is to actually determine how the measures will improve their operations and still provide an acceptable return-on-investment. “But since organizations don’t really know what their data center costs are, they have to make a lot of assumptions,” says Rajan. “And since they don’t know their costs, they find it extremely difficult to justify ROI.”

**FINDING #5**
**LACK OF MEASURABLE RETURN-ON-INVESTMENT IS HOLDING ORGANIZATIONS BACK FROM MOVING TO ALTERNATE DATA CENTER MANAGEMENT MODELS.**

A majority of participants in the Wipro and Outsourcing Center survey cited lack of measurable ROI as a challenge they face in moving to alternative data management models. However, since organizations don’t know their costs, they can’t really gauge how, or whether or not, the alternative models are benefitting them in terms of cost. The cost of such an initiative and lack of necessary budget was identified by 22.6 percent of participants.

People issues are also a concern. For instance, resistance to cultural change within the organization was cited as a reason to hold back from implementing an alternative data management model.
What are the challenges for you to move to alternative models?

<table>
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<tr>
<th>Challenge</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Lack of measurable ROI</td>
<td>54.8%</td>
</tr>
<tr>
<td>Process re-engineering is too daunting</td>
<td>22.6%</td>
</tr>
<tr>
<td>Too much resistance to cultural change within my organization</td>
<td>19.4%</td>
</tr>
<tr>
<td>Organization currently lacks skill set/talent required to implement and manage</td>
<td>32.3%</td>
</tr>
<tr>
<td>Consider big data initiatives solely for large companies</td>
<td>3.2%</td>
</tr>
<tr>
<td>Initiatives too costly/Lack budgetary resources</td>
<td>22.6%</td>
</tr>
<tr>
<td>Data security</td>
<td>29%</td>
</tr>
<tr>
<td>Privacy concerns</td>
<td>25.8%</td>
</tr>
<tr>
<td>Policy issues</td>
<td>16.1%</td>
</tr>
<tr>
<td>Others</td>
<td>6.5%</td>
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</tbody>
</table>

by nearly one in five (19.4%) survey participants. A lack of employees with necessary skillsets also prevent organizations from adopting new data management models. Nearly a third (32.3%) said that their organization currently lacks the skillset/talent required to implement and manage a new model for data center management.

“Organizations typically don’t have enough skill within their firms to be able to successfully evaluate an exercise like this,” Rajan offers. “This means that if an organization decides to experiment with change, and a service provider comes in with an ROI proposal, there’s not enough competency within organizations to be able to evaluate the proposal and decide whether or not to pursue it.” Therefore they hire an external advisor to continue to make tactical decisions on investment.

The other roadblocks to moving to alternative data management models include security and privacy issues. 29 percent identified data security as an issue, and 25.8 percent cited privacy concerns. Certain industries that are highly regulated – like financial services – are often more hesitant to move to an alternate data center management model for these reasons.

Wipro has an array of offerings that have been developed to help organizations from all sectors overcome today’s data center challenges. Wipro’s data center services have been designed to help customers reduce IT infrastructure and operational costs, achieve higher service and performance levels and manage IT infrastructure efficiently and effectively. Wipro is able to variableize client IT costs while delivering next-generation services.
CONCLUSION

In order to meet current data center challenges, organizations must take measures to consolidate data centers and look at outsourcing arrangements and alternate models of data center management. Because carrying out a data center strategy typically requires a large investment in time and costs, organizations today are making tactical decisions instead, which have minimal impact. While some organizations are contemplating alternate models for data center management, others seem to be dragging their feet in making any meaningful changes to their strategy.

New approaches to the data center can provide organizations of all types with myriad benefits. By standardizing, consolidating, virtualizing and automating processes, organizations can transform their data centers to be lean and energy efficient. Transforming the data center can enable growth, minimize risk, increase speed and agility, and lead to dramatic cost reductions.

A Three-Step Approach to Data Center Economics

Cost Transparency: There are tools and technologies available today that give a detailed breakdown of data center costs specific to each organization. Using these costs, one needs to take a consulting exercise to determine the business value of IT. This would be the first step in deciding the IT investment directions for business.

Data Center Consolidation: Businesses need to take a consolidation approach, based on the investments businesses decide to make, outlining application and process rationalization, asset consolidation and the migration approach. This approach should include the “cloud journey,” which would finally result in variabilized IT.

Modular Data Centers: In their consolidation evaluation process, organizations should consider modular, energy efficient data centers. Depending on the current state of the data center, an organization could implement a partial or full modular strategy. Modular data centers provide flexibility, modularity and mobility to the organization, in addition to reducing its carbon footprint.
“OnStream envisages that the Private Cloud based framework will drive consistency across IT environments so that OnStream can build on existing investments and skill sets. The private cloud based approach provided by Wipro will enable OnStream to tap and address opportunities in a market friendly manner and at a greatly altered cost structure”
— Onstream, a National Grid Group
Journey To Cloud

IDC believes that with consistently good service levels being associated with cloud services and a broader service palette, organizations in the Asia/Pacific region will selectively choose cloud services that suit their business needs. While this choice of services allows much flexibility and agility, it also presents new challenges to the CIO and the IT staff responsible for ensuring that business receives uninterrupted service. Managing service delivery which incorporates elements from a number of providers, if not planned properly, could open the organization up to poor service availability and potential risks of failure to meet governance benchmarks.

WHY CLOUD, WHY NOW

During the last two years, organizations’ level of understanding of where and how different types of cloud services can be utilized has risen and become more widespread.

With such choice available, cloud services are being considered as viable alternatives that address a wide range of business service requirements. For example, organizations can now consider the sourcing and delivery of new or replacement services from the cloud as a viable alternative to traditional asset ownership and on-premises operation, as well as an extension of the outsourcing model. But organizations are still looking to cut costs while increasing productivity, particularly as economies across the Asia/Pacific region are growing faster than their global counterparts, and cloud services have several key benefits to meet these dual and often conflicting goals. The benefits include providing the ability to provision IT assets while sharing resources, lowering costs, standardizing IT processes across the enterprise, and providing a more pricing model that is more closely linked to demand. However, key hurdles remain in the region, including issues around security and comfort levels regarding cloud service availability and resource management. Based on IDC’s APeJ 2011 Cloud End-User Survey, the overall outlook for cloud services, particularly private cloud, remains strong. In this survey, 20% of the 928 respondents reported that they were already using cloud services, and a further 30% reported that they were either currently implementing or would do so within the next 12 months. The question now is when and how, not if, organizations will move at least partially toward a cloud services model.

50% would have integrated cloud services into their IT ecosystem, by end of 2012. The question now is when and how, not if, organizations will move at least partially towards a cloud services model. Is there a cloud implementation plan in your company?
To better understand why cloud has captured such widespread attention, let’s take a look at some of the key drivers:

**The quest for business agility**: In today’s fast-changing business environment, organizations require agile operations and infrastructure resources to capitalize on new market opportunities or simply to meet customer needs. Cloud-based services address this challenge by offering organizations the opportunity to expand existing operations with a minimal cost outlay. Current IT deployment models can often be costly and require long implementation cycles, making it a challenge for internal IT to meet the organization’s new expansion strategies. With cloud-based services, the enterprise can scale up relatively easily, provide the latest technology available (and instant upgrades), and allow for more easily manageable version control across the organization.

**Trend toward outsourcing**: Particularly in the Asia/Pacific region where there continues to be a shortage of skilled IT workers for employment in-house (and not to mention the associated costs of an IT in-house workforce), cloud-based services allow an organization to outsource internal IT operations and infrastructure to an established third party.

**Continued shift toward utilizing opex instead of capex funds to procure IT**: The current economy is forcing organizations to change their outlook on traditional IT implementations and seek alternative low-cost solutions that minimize use of still scarce capital. There is a need to cut costs as well as move to an opex model with pay-as-you-use functionality. This approach better aligns IT to fluctuating business demands.

Cloud computing is rapidly becoming “one more option” for the IT manager – and very often it is an option that must be managed closely, following a decision to let selected workloads go into the cloud, rather than on-premises, for processing. IDC’s demand-side research shows that organizations are looking for cost-efficient data processing when they evaluate cloud computing. IDC’s APeJ 2011 Cloud End-user Survey also found that 80% of respondents were looking for elastic scaling and self-service applications. Most wanted to deploy apps faster than is currently possible with their IT infrastructure and to establish standard services across their organization. Cost-efficiency was rated as the single, greatest driver toward cloud computing.

Cloud computing now offers a way to address many long-standing IT issues quickly, by opting to have an external provider host selected applications on an entirely different infrastructure. That cloud infrastructure is likely to be built around industry-standard components, to be highly virtualized, to be optimized for high network speeds, and to support a variety of computing languages and programming tools. It is, in short, an opportunity to start again – at least for the workloads that have been selected for deployment in a cloud model.

IDC believes that with consistently good service levels associated with cloud services and a broader service palette, organizations in the Asia/Pacific region will selectively choose cloud services that suit their business needs. A very likely scenario is that an organization will choose to source non-core applications from the public cloud – such as email, human resource management (HRM) and applications development and testing – and retain core applications such as their enterprise resource planning (ERP) system within their own delivery infrastructure.

While this choice of services allows much flexibility and agility, it also brings...
some new challenges to the CIO and the IT staff responsible for ensuring that the business receives uninterrupted service. Managing service delivery which incorporates elements from a number of providers, if not planned properly, could open the organization up to poor service availability and failure to meet governance benchmarks.

**CIO PRIORITIES**

Sentiments a year ago were barely lukewarm toward cloud computing, whereas today feelings are vastly changed. CIOs in the Asia/Pacific region consistently ascribe a strategic value to cloud computing now. Inflection points are rarely so steep in IT as the adoption growth extending out for cloud computing. IDC forecasts cloud growth to be more than five times faster than IT market growth in the region. This is no surprise, as C-suite priorities align with the benefits of cloud services. Executives want:

- More innovation and less maintenance;
- Improved ability to decide which new IT projects to start;
- IT budgets that are sized properly to reflect business returns; and
- Through elastic usage and billing, lower upfront costs, and self-service capabilities, cloud tackles these concerns.

CIOs’ priorities have changed dramatically, with influences from the Global Financial Crisis still being felt. The CFO now encourages the CIO to minimize capex and to keep IT assets off the books wherever possible. This is not just cost minimization, but also a way to increase the business
agility of the organization. The CIO’s priority now is to achieve these higher levels of agility while still minimizing opex and capex.

As the cloud-sourcing model develops, an increasingly common viewpoint put by CIOs will be, “I am not a technology mechanic. I am a service provider.” IT maintenance – the bane of many CIOs – will persist and worsen if the approach to cloud deployment does not change.

Cloud is, in essence, a bridge or coping mechanism and over time, cloud of all flavors will settle into general technology procurement, and cloud will become simply another means of buying IT.

GOING HYBRID

Cloud services are fundamentally about an emerging delivery/consumption model – one that can be applied to IT industry offerings but also, more broadly, to offerings from many other industries. At a high level, cloud services can be described simply and informally as consumer and business products, services, and solutions delivered and consumed in real time over the Internet.

CLOUD SERVICES DEPLOYMENT MODELS

There are several types of deployment models for cloud services – public cloud, virtual private cloud (vPC), private cloud, and hybrid cloud.

Public Cloud Computing Services
Public cloud services can be defined as a delivery model for on-demand IT and business services for a market, over public Internet, based on pay-as-you-go models for an unrestricted user population.

Private Cloud Computing Services
Private cloud services can be defined as a delivery model for on-demand IT and business services to a defined set of users, that is typically limited to users within a single organization.

Hybrid Cloud Services
IDC defines public and private deployment models of cloud services, but the future reality of cloud services is that no single cloud deployment model will suit all applications and organizations. Most organizations will use both public and private cloud services as dictated by the workload and SLAs which must be met for the overall business process which the IT service supports (see figure below). The ensuing mixed public/private/legacy system environment is what IDC terms the hybrid cloud.

WHY HYBRID CLOUD?

Organizations will increasingly find that to gain the benefits possible from use of the full range of cloud services, a hybrid cloud environment will be necessary. For example:
Different clouds for different use cases:
Many organizations select different clouds for different purposes, adding external cloud resources to internal clouds or legacy systems, thus creating a mixed, or hybrid environment.

Business continuity: Many organizations will find that cloud infrastructure as a service (IaaS) is a much more cost-effective solution to providing disaster recovery for certain locations and workloads and will extend their IT environment to include external resources.

Availability of “cloud bursting”: Cloud bursting, where users can access compute and storage requirements for very short periods to supplement on premises resources, will prove very attractive for project use. If cloud bursting is used, a hybrid cloud environment is created and management of the expanded IT environment must be considered.

Cost minimization by price arbitrage: Different workloads have different requirements and priorities, and with cloud services being offered at price points which reflect their availability (i.e., offpeak use) users will sometimes choose to utilize the most cost-effective service for their requirement.

Most businesses that adopt cloud IaaS have existing IT infrastructure and, as such, they generally have a datacenter (either their own or a third party’s); an enterprise WAN; IT hardware including servers, storage and network equipment; applications deployed on that infrastructure; and established IT processes, including IT operations management. As businesses adopt cloud IaaS, there is a need for solutions and services that allow the federation of cloud environments and the organization’s other IT environments.

A key facilitator for the use and ongoing management of a hybrid cloud architecture is the selection of services and products which use consistent API standards. Some cloud services are based on vendor-specific APIs, while others use open standards - such as the Open Cloud Computing Interface (OCCI) – which have been collaboratively developed by vendor consortia. The use of more widely adopted standards is an important factor in cost-effectively integrating products and services from multiple vendors to build a cloud-based solution.

IDC’S VIEW ON HYBRID CLOUD
By 2015, most organizations will be using cloud services from different suppliers to meet different business needs. As a result, we are certain that the most common enterprise IT scenario will be one where business services are sourced and hosted from different providers and locations.

For example, let us examine a typical path to a hybrid cloud:

1. A customer starts with on-premises systems which are accessed via the corporate intranet that is being transitioned to an in-house private cloud.

2. This is supplemented by a public cloud-based platform as a service (PaaS) for application development and testing in order to avoid additional capital expense.

3. To accommodate a new ERP system that must initially operate in parallel to the existing system, a vPC may be used for secure hosting of an ERP system.

4. Finally, a public cloud-based, low-cost storage service is chosen for bulk archival of information.

The resulting hybrid environment will give the CIO and the enterprise new levels of flexibility and agility which will enable them to deliver new types of business services – services which would not have been commercially feasible in a traditional service delivery model.

This freeing up of resource constraints will be as challenging as it is liberating. While IT applications and resources will be readily available, ensuring timely provisioning and accurate billing and chargeback for their consumption will present problems for many organizations. Some do not have an internal chargeback model where individual business units or end users can be charged for service use, which makes it difficult for them to readily adapt to cloud-sourcing. Others, which are well advanced in their transformation to a more dynamic IT model, will reap commercial benefits from cloud services that can be sourced, provisioned and delivered in response to changing business conditions.

HYBRID CLOUD ROI GOALS
As outlined earlier, the creation of a hybrid cloud has a number of drivers, and with each different approach there are differing ROI goals which themselves require different implementation approaches. Typically, a project which entails the creation of a hybrid cloud will have targets such as:

• Implementation of a new application system with capital expenses limited to 10% of total project costs.

• Increase of secure transaction capacity by 250% to accommodate government electronic census.

• Total replacement of regional data centers with cloud-sourced services to reduce IT annual spending by 20%.

Determining the actual ROI must be done with care, as it is essential that all factors for implementation are included within the calculation; often internal costs (such as network upgrades or support) are ignored completely, or underestimated. And when the cost of an internally sourced and implemented solution is compared to that of a cloud-sourced solution, the cloud solution ROI can appear less attractive. What is typically not taken into consideration is the significant cost of IT service management (ITSM) – monitoring and management of availability, security, performance and SLA compliance.
The customer can choose a service which includes service management to standard SLAs, or select a specialist partner to provide the service management capability for the hybrid cloud environment. For many organizations, internal ITSM capability is not well developed, and the use of an external partner or cloud service which includes ITSM will often prove to be the best practice.

As the use of cloud services continues to evolve across organizations, the CIO will be forced to consider how to better manage the delivery of a service which has components sourced from external suppliers – all of which have individual service-level agreements. This presents significant challenges to the CIO in the area of IT governance. For example:

- Maintain compliance with an end-user SLA when the service chain contains components from a number of suppliers
- Ensure that all the services comply with the relevant data security and privacy legislation
- Implement business continuity plans
- Provide comprehensive reporting of service consumption and costs to end users

**MAKING HYBRID WORK FOR YOU**

There are some important questions which must be answered before planning to evolve your datacenter into a hybrid cloud environment, and as many are about governance as they are about technology. For example, when considering the options for your requirements, please consider the following:

- Is your security policy violated by transfer of data to an external location?
- Does the solution provide the necessary metrics and access to ensure that compliance can be assured?
- Does your internal IT team have the capability and bandwidth to implement and support a hybrid cloud?
- Do the service providers have the capability to provide the ITSM service required?
- How will you pay for this service (e.g., monthly fee, per user fee, by resources consumed)? Can you transform your IT budget so that opex can accommodate this change?
- What is the business continuity plan now that part of your service delivery infrastructure is owned and managed by a third party?

If these questions cannot be satisfactorily answered, then either more investigation of options and partners is required, or a hybrid cloud is not for you. However, the additional work will help you gain a better understanding and increase your chances of project success.

When planning to build a hybrid cloud environment, management of the environment to meet operational, compliance and cost objectives must be considered.

**Stage 1: Have a strategy**

Once the decision has been made to “cloud source” hosted infrastructures, organizations must decide which applications are best suited for cloud deployment and which models best suit their applications. This initial decision has become increasingly complex, because cloud providers have widened support for operating systems, platforms, hardware and levels of support.

Applications that have interdependencies with in-house systems and those that would require modifications or rewrites to support the cloud platforms do not make good candidates, because the additional costs to make these applications “cloud ready” can reduce the project’s ROI potential. Suitable applications include Windows- and Linux-based applications that have unpredictable scaling and benefit from flexible cloud delivery models. Further assessments should establish requirements regarding security and privacy.

**Stage 2: Choose the right service and source for your requirements**

Using the information from Stage 1, it is important to match your application requirements with those provided by potential suppliers. Key areas where a good match must be sought include:

- Security of the service and of the physical facility
- Scope of SLAs
- Degree of service management provided by vendor
- Performance reporting provided by the vendor
- Billing and chargeback capabilities
- Datacenter facility/carrier options

**Stage 3: Build agreement**

This stage is critical as marked differences exist in different cloud services. Organizations need to focus on three critical areas:

**SLAs** – Users need to understand what is realistic and establish their base expectations around which metrics are mission-critical and which are “nice to have.” Common SLA metrics across a hybrid hosted environment will revolve around customer issue response and resolution.

**Contract length** – A number of choices are available for contract length, depending on the commitment to the service which the customer is prepared to make and the requirement of the workload.

**Change management capability** – Change management for cloud services, including configuration, patch, security and performance management, can be the domain of service providers. Unless shared access is part of the original agreement, users are locked out of administrative tasks.

**Stage 4: Operate**

Ongoing evaluation of the cloud providers’ capabilities will be necessary for each platform, because most providers have not yet ramped up most of their feature sets and capabilities. Organizations must
also continually evaluate how effectively the hosted environment meets business process requirements and tune the service mix accordingly.

All of the above constitute a potentially large project drawing on skills which are scarce in the market and even rarer in most organizations. Initial feedback from users is that the cloud journey has been harder than expected – mostly because of a lack of experience in these new technologies and the increased management complexity of the resultant hybrid environments. From IDC’s APeJ 2011 Cloud End-User Survey, we have seen that more than 60% of the 928 respondents are planning to use external professional services providers to help them build their cloud environments – especially in the early stages of the process. This early stage is critical, as the strategy sets out the cloud roadmap, and a poor choice here will have long-term impact on the ability of the organization to efficiently and effectively deploy and manage cloud services.

### ROLE OF WIPRO

Complex technologies and changing business environments are among the main challenges faced by organizations on the path to growth. Taking these into account, IT organizations embarking on the cloud journey need to integrate the latest technology components in a way that seamlessly aligns with the business and drives organizational efficiency. Understanding the complexities of the IT environment, Wipro extends its systems integration expertise to ensure that the technology is in line with business objectives, no matter the size and nature of the organization.

Wipro’s systems integration services include consultancy, systems integration and project management of IT services that provide:

- Application and enterprise systems integration
- Business continuity planning
- Contact center infrastructure
- Data centers
- Disaster recovery services
- Enterprise management
- Network integration
- Platform integration
- Retail automation
- Security infrastructure

Wipro’s certified processes, service experience spanning over 15 years, and ISO 9001:2000 compliant status, combined with strategic alliances with leading technology players, further enable the delivery of cost-effective integration services that are steady, scalable, smart, innovative and results-oriented. Being a pure-play systems Integrator, the company delivers best-of-breed solutions with a vendor agnostic approach.

Wipro has wide experience across industry verticals and, with a deep understanding of technology within those verticals, is focused on making cloud computing a reality for organizations and cloud service
Originators. They have developed expertise and processes to migrate existing applications to the cloud and to build entirely new capabilities, as illustrated in the figure given alongside.

- Business Process as a Service: Wipro provides outsourcing solutions that are based on cloud services tailored for industry verticals and for specific business functions.
- Software as a Service: Wipro has partnered with leading SaaS providers like Salesforce.com and Microsoft to provide professional and systems integration services for organizations.
- Platform as a Service: Wipro has developed a fully featured cloud platform for developing new applications for private cloud deployments.
- Infrastructure as a Service: Wipro’s services include: Cloud migration advisory and assessment; Architecture, pilot and proof of concept development; Build, test and deployment; Cloud infrastructure management services.

Partnerships with leading infrastructure providers including EMC, Cisco, Sun/Oracle, HP, IBM and BMC enable Wipro to provide infrastructure solutions that best suit various business requirements. Wipro has also continued to grow its capabilities to help organizations build a hybrid cloud environment.

### CHALLENGES

Despite the recent and rapid maturation of cloud services in Asia/Pacific, it is easy to forget that cloud is still an emerging area of ICT. CIOs face several challenges, and as Wipro is positioning themselves as the CIO’s trusted partner, they face the same set of challenges:

#### Control:
This is the biggest issue when it comes to using cloud computing. This means that the cloud provider can make changes to the infrastructure without telling the company at any time; this has to be managed, as a failure to communicate changes in service delivery can destroy a provider/customer relationship.

#### Performance/Reliability:
When using resources that are not located within a firm's buildings, the question of how much computing horsepower is available when needed comes up. Additionally, failures will happen and so Wipro must ensure the customer’s understanding of how they will be notified and how quickly issues will be resolved is critical.

#### Security:
The question of who can be held responsible for security, when someone else is managing IT for you, is one that is central to cloud services. Wipro must demonstrate bullet-proof security management.
Transparency and auditability: With cloud services, customers have difficulty when doing an audit of IT resources and applications. Without true visibility into the cloud, a CIO cannot say for certain who has access to the data and how the cloud service provider can keep people out of sensitive data.

Reliability: There is risk with every IT sourcing decision, and CIOs need to decide if their service provider can handle the risk that comes with cloud computing. Wipro’s track record before cloud has been excellent, and now that must be extended into this new era of hybrid cloud management.

FUTURE OUTLOOK

Organizations have come to understand that cloud computing is a deployment model, an architecture, an application-delivery model, but it is not a tangible concept that can only exist in specific locations. Those who have already come to that conclusion are likely to also recognize that hybrid cloud is merely an integration strategy. It is the means by which they can control their applications and infrastructure while taking advantage of public cloud computing resources.

Regardless of whether a hybrid strategy focuses solely on internal deployment or includes external deployment options, the key to hybrid is effective integration of a range of internal and external services. Achieving this nirvana of seamlessness will prove beyond the capability of many organizations, and they will seek to engage experts to help them plan, deploy and manage their hybrid environments.

When service-oriented architecture (SOA) and Web-oriented architecture (WOA) were riding the hype wave as cloud is now, everyone focused on integration. How do we integrate applications that simply couldn’t be “Webified” – mainframe-tethered applications, for example – into our Web architecture?

This same process is occurring now, but at the infrastructure level. Instead of simply integrating applications – something with which IT is well versed these days – we are shifting our focus toward integrating infrastructure – something with which IT is not so well versed. But like its application predecessors, a successful hybrid cloud integration strategy must be able to incorporate on-premises, off-premises and legacy systems to enable consistent processes and management of resources across the entire infrastructure.

Simply provisioning a service from a public environment is not enough. It must be tied back to the infrastructure and the delivery process. It must be joined to the existing resources so that it appears a seamless extension of the corporate compute resource pool. This process requires integration into existing infrastructure architecture, using skills which few are able to deliver. Accordingly, a good choice of partner for advising you on your hybrid cloud journey is essential.

IDC summarizes the actions for CIOs to consider as follows:

• Serve business requirements with the most appropriate delivery model based on a strategic plan.
• Hybrid is the future of cloud. Define the right balance of infrastructure and applications.
• Determine which areas of legacy IT resources require less or more investment.
• Starting with governance is fine but do try not to get mired in it.
• Educate IT professionals to get everyone facing in the same direction.

CONCLUSION

As exciting as the new field of cloud computing is, CIOs need to slow down and take a deep breath. This is a new area and that means not all of the details have been worked out just yet and cloud services experience and knowledge are hard to find. However, as in outsourcing, cloud services are less about technology and more about the management and delivery of a business service to the end users.

And as CIOs begin their cloud services journey, setting up a roadmap that aligns with both existing IT investments and the expected business demands for IT-enabled services will, for most organizations, require specialist help. Defining that roadmap is essential to ensure strategy and service dead-ends, but the question of how the hybrid cloud environment will be managed must also be addressed as a priority before the cloud projects are commenced.

Management of complex hybrid IT environments requires expertise based on a solid track record and best practice processes to ensure strong ongoing IT governance. CIOs must perform a realistic appraisal of their organization’s ability to deliver a securely managed hybrid cloud environment and, if necessary, engage an experienced partner to guide their steps to the cloud.
“Wipro is a strategic partner, which delivers superior cost structure and improved efficiencies to our complex IT environment. Throughout this project, the technical expertise and commitment exhibited by the Wipro team enabled the successful delivery of the new devices, with their new support, applications and the mobile infrastructure, to over 500 business users to very challenging timescales. The project had a positive business impact by greatly improving our customer satisfaction”
— Northern Gas Networks
The ever increasing customer expectations, coupled with various challenges, have created a renewed focus on organizational transformation. The case study describes the journey of achieving the same.

This initiative is to build a strong delivery organization, which can deliver consistent, optimal and efficient performance for the customer. This also helps in retaining and attracting skill groups through providing a structured growth path for the delivery teams within the engagement, catering to the horizontal (technical) and vertical (service management) career ambitions within the team.

This two year initiative aims at delivering a predictable service availability and business continuity model by building a capability model in a center of excellence approach, which can cater to large growth requirements. It also entails developing a support structure that will focus on implementing Line of Service (LOS) specific best practices in IT service management and service performance improvement.

The outsourcing initiatives with the customer started as a Time & Material model with 65+ work packs and a resource strength of 500+ spread across Telecom Operations areas.

There was a need to integrate common processes for improved service delivery, higher productivity, and customer satisfaction. The transformation enablers called for a solution from multiple domains – process standards, IT driven solutions, and business process/service delivery transformation.

The paper is structured as follows:

A. Value delivered in stages
B. Implementation Approach
C. Delivery Transformation Reference Model
D. Customers involvement
E. Benefits
F. Change strategy

The Delivery Transformation Reference Model was designed by mapping the
enablers and drivers for transformation in the following five steps.

**Step 1:** Depicted the current state of operations, where the delivery is limited to the functional/technology view structured in the scope of work for outsourcing.

**Step 2:** Envisages raising one level above in understanding the relevance of Wipro deliverables in step I in correlation to the end-to-end service/process view in the customer’s enterprise environment.

**Step 3:** Envisages achieving a standard process for similar activities in an effort to achieve uniform service experience, consistent performance and a shared delivery model.

**Step 4:** Envisages maturing the delivery framework through proactively implementing processes towards improved service levels and higher levels of customer satisfaction through focused initiatives like right first time, reduced cycle time etc.

**Step 5:** Targets initiatives towards aligning the services with the business objectives in delivering integrated services and managing end to end customer experience.

The model is best suited for multi service line and/or a multi-location scenario, which is most prevalent in the industry today.

**A. VALUE DELIVERED IN STAGES**

Value as perceived by the customer changes with the maturity of the relationship. The initial need from a customer is to improve their efficiency by achieving right first time, improving service quality and doing the same things – differently.

Having achieved the first step of outsourcing, the focus shifts to business outcomes of enhancing the services by improvement of business performance, improvement in as-is process & process efficiency by way of reduction in cycle time and time to market.

As the relationship further matures, a transformation of the entire business model is envisaged by improvement on the ROI through automation/innovation or process itself thereby providing an enhanced end to end customer experience.

**B. IMPLEMENTATION APPROACH**

The initiative offers a more holistic approach towards managing a high visibility program. As against going through a big bang approach, the plan is to have a phased rollout-comprising of four phases:

- Grouping
- Process and Service Level Consolidation
- On Road to Shared Delivery with-in LOS
- Automation/Optimized Shared Delivery Services

The complete implementation of the above framework can take 12-18 months as shown in the table on the following page.
### C. Delivery Transformation Reference Model

The Delivery Transformation Reference model (depicted in the figure on the following page) leverages the best of various standards and process frameworks like CMMi, Lean, Six Sigma, ITIL, 7-step Improvement, DIKW, etc to demonstrate transformation at micro & macro level, to arrive at best Hybrid Model for successful implementation of Transformation case.

The Tenets used to address the purpose of Transformation

**Brainstorming:** Helps to generate goals and ideas along with the approach to be undertaken. Identification of all activities based on LOS, Co-Locate delivery based on LOS, Delivery Ownership under one head with functional support.

<table>
<thead>
<tr>
<th>Grouping STAGE 1</th>
<th>Process and service level consolidation STAGE 2</th>
<th>Shared delivery within LOS Stage 3</th>
<th>Automation/ Optimized shared delivery services STAGE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify all the processes based on line of service (LOS)</td>
<td>Identify common tools/systems, common SLA’s in LOS</td>
<td>Cross skilling between process</td>
<td>Shared delivery model within customer functions at our organization</td>
</tr>
<tr>
<td>Co-locate delivery based on LOS</td>
<td>Common planning documents</td>
<td>Focus on end-to-end customer experience</td>
<td>Optimized and efficient services</td>
</tr>
<tr>
<td>Single delivery ownership with functional support</td>
<td>Create/Build skill level within LOS</td>
<td>Minimize operation head count</td>
<td>Benefit from cost of delivery (desktop/transport/shift allowance)</td>
</tr>
<tr>
<td>Leverage various skills and expertise across process</td>
<td>Create common Incident and Service Request Management</td>
<td>Achieve agreed/target savings</td>
<td>Automation</td>
</tr>
<tr>
<td>Ensure right first time service</td>
<td>Common solution/capability strength analysis</td>
<td></td>
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</table>

**TIMELINE:**

- **STAGE 1:** 1-2 MONTHS
- **STAGE 2:** 3-4 MONTHS
- **STAGE 3:** 8-9 MONTHS
- **STAGE 4:** 2-3 MONTHS

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**FMEA:** Identification of all Strategic, Design and Operational level of Risks, Mitigation and Visibility of risks enabling effective decision making.

**ITIL v3 Framework:** Helps for sourcing good practices, Implementation of ITIL v3 Framework to deliver quality services to customer. Helps achieve a common scoping & plans for the account Identification of Non Value Adding (NVA) SLA’s for business aligning & delivering services as per ITIL v3 Operations process, i.e. Event Management, Service Request, Incident Management, etc.

**Six Thinking Hat:** Technique used for effective decision making, looking at the same from various angles, providing a detailed task list for completion of deliverables at every stage.

**Dependency Structure Matrix (DSM):** Tools that help identification of loops and process hierarchies among tasks. Gantt chart for all the tasks along with Scheduled durations of tasks taking into account the interdependency and sequence to be followed.

**7 Step Improvement Model:** Helps to answer questions like “What do you actually measure? Where do you find the information? What is the integrity of the data”, etc. A systematic approach towards delivery of the task list, helping in defining the Shared Delivery with-in LOS along with reduction in Penalty Triggering SLA’s (thereby derisking) and increasing SOW compliance (of agreed contract)

**DIKW Model:** Knowledge Management displayed within the Data-to-Information to-Knowledge-to-Wisdom (DIKW) structure.
Process and Service Level consolidation with a systematic approach towards delivery of project, reduction in Penalty Triggering SLA’s and also increasing SOW compliance (of agreed contract).

Value Stream Mapping (VSM): Helps to identify missing link & wastages in process thereby assisting in improvement of the process efficiency post alignment of the Delivery of Services as Lines of Services (LOS).

Work Load Leveling: Helps in better work allocation & prioritization along with Cross Skill between Processes/Systems and Identification of Process Merger and resource training plan.

Visual Controls: Visual controls help to control or guide the actionable for completing the tasks identified, giving a very transparent tracking and communication of status on a weekly basis, including the status of the Cross Skilling, Mergers, and Trainings.

**D. CUSTOMER INVOlVEMENT**

- On presenting the transformation model, the customer was in agreement and understanding of the proposed model based on the benefits achievable from the same
- The customer program director invited the delivery team to share the model and its business benefits to all stakeholders at customer's location
- The customer recognized outcome of the transformation initiatives and it's adherence to their business goals of right first time and cycle time reduction, resulting in right sizing/skill and fitment
- All merging of functions to align within delivery service Lines were approved through customers change control process
- Worked as catalyst between the functional managers on merging teams within the customer’s business units

- Recognized as an ideal model of transformation to be rolled out within other functions of the customer business portfolio
- Created a unique proposition within the customer's global outsourcing because of LOS based shared delivery model
- LOS Model related analysis helped the organization to propose movement towards transaction pricing model to meet contractual revisions coming year
- While the customer ramped down thousands of work force members across the globe, this LOS based service model helped us retain our unique proposition in the customer's world
- Adherence to the best practices of ITIL v3 aligned LOS delivery

**E. BENEFITS**

- Met contractual savings as agreed YOY and more
- Won the confidence of the customer to re-use 27 workforce members into their new work packs due to productivity savings resulting in increased revenue for Wipro and savings for the customer too – a win-win situation

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**Sources for Institutionalize Improvement**
- PDCA (ISO Philosophy)
- ITSM – IT Service Management
- 7 Steps Improvement
- Process
- DIKW

**Drivers for Institutionalize Improvement**
- Redundant
- NON VALUE ADD/WASTE

**Enablers for Institutionalize Improvement**
- Homogeneity in Skills
- Customer Experience Enhancement
- Revenue Maximization/Cost Reduction
- Improve cycle time/Right first time

**Best Practices/ Process Discipline**
- Continuous Improvement (Pragati)
- Six Sigma/LEAN
- Customer
F. CHANGE STRATEGY

In the current competitive world, change is constant. Business objectives change, processes change, security measures change etc. So change is constant and change inculcates resistance. There may be many reasons for resistance, but the most common reasons observed are:

• Fear of the unknown – The unknown can be people, process, etc
• Fear of failure – What happens if the initiative fails? People may talk negative about the core team! etc
• Fear of overload of work – Over-utilization
• Fear of attrition due to enhancement of resource skills

The following simple steps helped in achieving success:

• Articulation of the need – The team clearly identified the need apart from the contractual obligations

• Visualization of the result – The team brainstormed on the possible end result of the initiative using six thinking hats methodology for better articulation

• A well integrated core team – The core team integrated well in terms of identifying clear roles & responsibilities and interdependencies. The champion being extremely supportive, dedicated and committed

• Stakeholder analysis – Since the initiative has multiple stakeholders like customers, their business LOS, internal senior management, HR, IMG etc being involved right from the start, extensive support and any risks were foreseen upfront & mitigated

• Influencing strategy – An influencing strategy was worked out primarily using peer to peer relation

• Communication strategy – A periodic and effective communications with all the stakeholders by weekly updates, posters etc helped achieve the goal of Transformation.

ACRONYMS

• CMMi – Capability Maturity Model Integrated
• DIKW - Data Information Knowledge Wisdom
• DSM - Design Structure Matrix also referred to as Dependency Structure Matrix
• FMEA – Failure Mode Effect Analysis
• HR – Human Resource
• IMG – Infrastructure Management Group
• IT – Information Technology
• ITIL – Information Technology Infrastructure Library
• LOS – Line Of Service
• NVA – Non Value Adding
• SLA – Service Level Agreement
• SOW – Statement Of Work
• YOY – Year On Year
• RFT – Right First Time
• RCT – Reduction In Cycle Time
• CoE – Center Of Excellence
“Wipro’s proven development and project management expertise will complement our company’s core audio and infotainment skills to deliver innovative customer solutions and make us more competitive. This expanded capability and capacity will also position Harman to better serve large emerging market opportunities in Asia.”
— Harman
service in the ways their customers want services provided. Yet retailers also have to plan for the future in terms of expansion or relocation to address a global marketplace. There is one rapidly developing technology that can support those goals: wireless. Wireless technology can be used to address specific retail business problems, such as long lines or quick price changes. Increasingly, the wireless paradigm is the way customers view the shopping experience. Also, wireless technology has the ability to bring the entire retail organization more closely together to function more efficiently and effectively. And wireless infrastructure makes for a more agile, flexible – and therefore future oriented – retail organization.

Most retail organizations have experience with wireless technology in some capacity, but many do not have the overall expertise and experience needed to embrace and exploit it. Retailers should look to a service partner to paint the big picture and lock down the details of a comprehensive and competitive wireless strategy.

ADRESSING YOUR INDUSTRY CONCERNS: RETAIL

Retail organizations are uniquely situated to benefit from an aggressive wireless strategy; a service-provider partner can help make it happen.

THE MODERN RETAIL EXPERIENCE

Today, technology and shopping go hand in-hand. It says a great deal about our tech-savvy culture that the most intense shopping day of the holiday season in the United States, the day after Thanksgiving commonly referred to as “Black Friday” – is being eclipsed by “Cyber Monday,” the Monday after the holiday when shoppers are back to work and at their desks. According to a new consumer survey of self-identified “active Internet users” by The Ponemon Institute, 67 percent say their online purchases on Cyber Monday and during this holiday season will either exceed in-store purchases or stay at the same level.¹

Even that emerging trend is already evolving. The Ponemon survey indicates that 37 percent of those early-adopting consumers plan to use smartphones for their Cyber Monday and holiday shopping, and 12 percent intend to use tablet devices.
So wireless technology is already an integral part of many consumers’ retail experience. Mobile commerce, multi-channel shopping, and online coupons are familiar features of today’s tech-driven retail environment.

That wireless tech-savvy experience includes in-store shopping as well as online. The consumerization of IT represented by smartphones and tablets has empowered consumers with the ability to compare prices, inventory, and retail service in detail and on the fly. Retailers need to acknowledge these powerful trends and seek to maximize the advantages they offer.

WIRELESS ADVANTAGES

Earlier this year The Wall Street Journal reported that search engine giant Google is teaming up with MasterCard and Citigroup to leverage a wireless technology known as near-field communication (NFC). NFC enables devices to exchange information wirelessly over short distances. With NFC embedded in Google’s Android operating system, shoppers will be able use their smartphones to complete transactions, foregoing the use of credit cards.

While examples like this show how wireless technology in the retail environment is expanding and accelerating, wireless is certainly not new in terms of how to improve the customer experience. The use of so-called “line busting” wireless systems to complete transactions individually on the spot is familiar to anyone who has rented a car. Self-service kiosks are common accoutrements from airports to motor vehicle bureaus.

This demonstrates that, while wireless technology is increasingly essential at all levels of retail operation, most retailers are experienced with wireless solutions in some form. For instance, retail employees may use walkie-talkies to communicate with each other within a store or throughout a warehouse. Specific retail chains have had great success providing wireless hot spots in their stores so customers can access the Internet while shopping or relaxing.

However, these so-called wireless solutions are often ad hoc and standalone. Security and performance issues may be a regrettable afterthought. On the other hand, a comprehensive wireless strategy that supports all aspects of the retail organization, from store operations, to warehouse or distribution centers, to corporate offices, can provide advantages for and across all those areas.

Wireless technology addresses buyers’ frustrations through reduced wait times for sales, service, and checkout. It also enables retailers to market products and prices directly to consumers wherever they are in the store, including in-store displays and kiosks.

Also, wireless technology increases worker productivity, in the store, in the warehouse, and in the office. And a wireless strategy provides retailers with flexibility in terms of location and infrastructure and enables a reduction in costs imposed by traditional wired installations.
WHAT’S THE HOLD UP?

If wireless technology is such a boon to retailers, why aren’t they more ambitious about it? It’s already been demonstrated that wireless is used in some form in most retail organizations. But reticence about a wider, deeper strategy and investment may have several explanations.

First, for a vertical segment that operates on such slim margins, retailers already invest in technology plenty. And legacy systems are often hard to move off, and usually hard to open up.

Second, retailers are very concerned about security – and rightfully so. Early reports about hackers exploiting wireless transaction systems may have spooked a lot of retailers. Similarly, retailers are very concerned about performance. Bad wireless architecture may have led to customer complaints or worse – blocked transactions.

Finally, and make no mistake, a comprehensive wireless strategy involves considerable investment. And that is not something most businesses necessarily want to consider in this challenging economic environment.

Nevertheless, it is because of our rapidly evolving economy, and because retail customers are helping to drive that evolution through their use of mobility devices, that it is imperative that retailers embrace wireless technology and the competitive advantages it offers.

LOOK FOR WIRELESS EXPERTISE

So, while retailers should be looking to leverage the advantages of wireless technology to match customers’ expectations and growing expertise, they should also be looking for the most effective and strategic way to approach the technology.

Wireless technology is increasing in sophistication, business application, and security requirements. A retailer’s in-house IT department may not have the experience and expertise needed to execute in such a specialized area. That’s why a sensible approach for retailers in launching a wireless initiative is to partner with a service provider that can support a wireless strategy from beginning to end – from architecture to security to centralized managed services to implementations for the end-user.

Wipro’s WirelessPlace is just such an initiative. “WirelessPlace provides end-to-end services for the wireless infrastructure, from the architecting into the managed services,” says Mahesh Esthuri, head of verticalization for Wipro’s RCTG Unit.

By offering in-house expertise and leveraging alliances with major networking players and product developers, WirelessPlace can provide wireless services that integrate all the elements of a modern retail operation. That means wireless technology can be used to track inventory in real time, from warehouse to POS system, and between and among employees in those areas. Because WirelessPlace is a centralized management service, it allays fears of security and performance problems. And since WirelessPlace starts at the beginning – the architecture – it offers future-oriented wireless strategy that helps address rapid shifts in markets, customers, geography, and real estate.

“We have alliances with the major players, for devices, and for licenses of the tools,” Esthuri points out. “Also we have a proof-of-concept center where we test before we provide these services.”

Esthuri is not hesitant about the investment involved for retailers when embarking on a comprehensive wireless strategy. Esthuri recommends that retailers look to align their technology refresh cycle in concert with adopting the WirelessPlace initiative. They can also take it one step at a time. “It can be architected, then implemented, and managed, all in separate cycles,” he says. “Security works as a separate service.”

While the holidays may not be the best time to embark on an organizational overhaul – “Most retailers don’t want to change anything during holiday season,” Esthuri admits – it is a good time to judge for yourself just how profoundly wireless technology is changing the way customers want to shop. And therefore the way retailers need to service those customers.

A MOMENTOUS TIME IN THE MARKET

Most retailers are aware of the advantages of wireless technology, and how some companies have had success with wireless in some particular instances. However, the time for experimenting is over. Tech-savvy consumers are demanding retail service experiences that are best accommodated with wireless systems.

To truly exploit its advantages, wireless technology should be an integral part of the entire retail organization, stretching from distribution center to warehouse to back office to retail outlet. The most logical way to jumpstart such an ambitious wireless strategy is to partner with a knowledgeable, experienced, and trustworthy services provider. Wipro, with its new WirelessPlace initiative arriving at such a momentous time in the retail market, is just such a partner.

1. “Mobile payments & shopping: Survey of U.S. consumers,” the Ponemon Institute, executive summary, September 2011
“The integration of the proactive monitoring tools along with rigorous implementation of the ITIL based processes has helped us in achieving the business objectives. The strong domain expertise achieved by the Wipro team over the past four years of engagement and equal amount of customer orientation has helped us in speedy and effective transformation.”
— Tata AIG Insurance
Banks constantly face regulations and restrictions, yet they need to cope with the increasing demands of market expansion; a partner expert in IT and business process optimization is an invaluable asset.

ADRESSING YOUR INDUSTRY CONCERNS:
FINANCIAL SERVICES
Banks are heavily dependent on their IT systems. So when these institutions come under outside pressure, much of it relates to their best use of IT.

Banks are indeed under increasing pressure. The most obvious, and in some ways the most demanding, are the problems created by regulatory oversight of operations and systems. These regulations present banks with challenges in terms of both capital requirements as well as IT operations.

But banks have other significant challenges. They are under pressure to grow, and to do that, they must expand outside their home territories. At the same time, banks need to improve aging IT systems to increase flexibility and optimize performance in a fast-moving, global marketplace.

Outsourcing is still a viable and valuable strategy for banks, even though the easy wins in the area of IT services have mostly reached their limit in terms of simple cost cutting. What’s needed is an outsourcing partner that can handle the hardcore IT improvements and business process optimization banks require to keep pace with a market environment that is, at the same time, more restricted, more dynamic and more far-flung.

It’s not that banks are spending less on technology. “IT budgets in 2011 are up or holding steady” across financial institutions in North America, Europe and Asia-Pacific, according to a recent report from Aite Group, an industry research and consulting firm.

Rather, it’s that banks are being forced to maximize every capital expenditure they make. The regulations enacted recently in the wake of ongoing oversight of global financial systems, such as Basel III and Dodd-Frank, impose higher capital requirements, among other measures. That means banks have to hold more money to cover potential risk, which simply translates into having less capital with which to make money.

Of course, these financial reforms will have benefits, encouraging banks to adopt improved governance and risk management practices. On the other hand, they will have an impact on banks’ profitability due to a significant increase in regulatory costs. “A common theme in the reform legislation,” wrote Bob Reinhold, principal in financial services at Ernst & Young, in an article entitled “9 IT Priorities for 2011,” in Wall Street & Technology earlier this year, “is a substantial increase in the breadth, depth and frequency of regulatory reporting, which will raise the bar on data management, governance, quality and architecture, covering not only risk and finance, but also operations, HR and other domains.”

Capital restrictions mean that analyzing and forecasting capabilities will become critical, dictating increases in hardware and software investments. And this is a time when banks’ data centers are full to bursting with legacy data and applications. In other words, reform legislation not only forces banks to hold capital they might otherwise invest, but also it compels them to spend more money on more powerful IT systems when they can least afford it.

So growth today for banks very often involves leaving the confines of an established home base and expanding into emerging economies. Replicating business structures in unfamiliar areas is demanding. For instance, most of banks want to replicate the standard Tier I, Tier 2, and Tier 3 levels of service they offer domestically in their foreign branches. However, in order to optimize returns, many don’t want to – or can’t – invest the same amount of money in those branches abroad as they do domestically.

Add to that the byzantine nature of global privacy regulations that makes data access and storage in a foreign country a complicated, and potentially dangerous,
Other solutions that also are of utmost importance for banks address the challenges of data security and regulation compliance, while mitigating the costs associated with desktop support even on a global scale.

Wipro has even made friends with the “captives.” “We look at them as our partners,” says Chandna.

A recent trend for banks, according to Chandna, is high demand for agile IT. “We are coming out with our own IT methodologies to make things modular,” he says, “therefore enabling them to change quickly – and respond to the market dynamics.”

One of those modular methodologies has to do with the data center. “In many cases, data centers are in a big mess,” Chandna says. That’s because banks’ data centers are filled with legacy applications and systems, making the addition of new services problematic due to power and cooling issues.

Providing solutions that are predesigned, prefabricated data-centers-in-a-box, which are optimized for efficiency, cooling, power and space, is what customers are expecting from IT partners. Chandna feels these solutions are particularly applicable in the banking industry because, to meet the demands of newer regulations and enable shorter time to market, “they are the people who like to expand their existing data centers in a modular form to ensure quick turnaround and variability.”

THE END-USER PERSPECTIVE

“At times, end user computing, or EUC, can be a bigger challenge for CIOs as compared to data center operations because end users make more noise,” he says. “If you want to give better service to end users, the base for everything you can do from an end-user perspective is profiling,” Chandna says.

Tools that can capture the way end users behave, what time they log in, what time they log out, what they access, and the kinds of services they demand, enables an organization to group users accordingly,” says Chandna. “If you can bucket them across various categories and you know their characteristics, their service requirements, you can provide different service to them, which will reduce your cost of providing services and increase customer satisfaction,” Chandna says.

Other solutions that also are of utmost importance for banks address the challenges of data security and regulation compliance, while mitigating the costs associated with desktop support even on a global scale.

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AN EXPERT PARTNER

These days, banks are presented with a unique set of challenges, all related to IT systems and business process optimization. The burden of regulation, expansion, cost optimization, and business transformation — all at the same time — can be overwhelming and paralyzing. Having an expert partner with experience in these areas can help vital institutions accommodate those demands and thrive in the 21st Century global financial market environment.
ADRESSING YOUR INDUSTRY CONCERNS:
MANUFACTURING

“We believe that Wipro is the right choice for transforming our messaging systems into a state-of-the-art service. This is vital for us as today’s communication and collaboration is highly dependent on this service”
— ArcelorMittal
Mobile technology can profoundly and positively affect the manufacturing environment, but you need a well-considered and well-planned strategy to make it work.

ADRESSING YOUR INDUSTRY CONCERNS: MANUFACTURING

Manufacturing is more than an industry. It is a global engine of productivity and growth. Yet, like almost every other industry in today’s struggling economy, manufacturers are under a great deal of pressure from customers and competitors, as well as partners and suppliers, to increase their capabilities in terms of faster speed to market, customization and addressing emerging business opportunities. That’s on top of continually searching for new ways of cutting costs in every aspect of their business operations.

Savvy CIOs in any industry realize that increased capability, cost control and extended reach can be derived from a successful synchronization of sophisticated technology implementation and improvements in business processes. One recent technology trend that lends itself to such an enterprise-oriented technology strategy is mobility.

Implementing a mobility strategy provides a way for manufacturers to address issues of productivity, capability, cost effectiveness and efficiency. But an enterprise mobility strategy is not easy or quick. Because it requires process change and the involvement of personnel, mobility in manufacturing must be addressed in terms of both enterprise strategy and organizational tactics. That’s why an experienced partner can be an important asset in making a mobile manufacturing effort more effective.

MOBILITY IS A PEOPLE-DRIVEN TECHNOLOGY

Mobile technology is a populist, bottom-up phenomenon. In the United States alone, 232 million mobile phones are in the hands of people older than 13, according to Nielsen Media Research.\(^1\) The fact that smartphones represent 43 percent of those devices means that a lot of mobile technology is meant for more than just talk.

Indeed, the proliferation of mobile phones in the work environment, smartphones in particular, is the epitome of the trend known as the “consumerization of IT.” The increasing desire by employees to use their own personal mobile devices to aid them in their work has generated its own trend-related acronym: BYOD (bring your own device).

The fact that vast swaths of the population have embraced mobile technology means manufacturers will likely have a pool of cell phone-savvy employees, as well as a ready-made platform for enhancing communication and data transfer throughout their organizations. With technology ranging from shop floor wireless systems to sales force support, mobile devices and applications can help manufacturers embrace agile production techniques and extended organizational communication and integration.

MANUFACTURING IS A PEOPLE-DRIVEN INDUSTRY

Despite its reputation for cutting-edge automation and robotics, manufacturing is still an industry driven by people. Employees – management, engineers and support personnel – are the life’s blood of any manufacturing operation.
In general, three areas in most of the manufacturing operations offer the best chance to affect business outcomes by implementing mobile technology. These are areas where workers are not bound to desks but operate relatively independently. However, because these workers are not “desk-tied,” the potential arises for communication disruptions, lost productivity, and especially for latency in the capture and reporting of real-time data.

• **The Shop Floor:** Shop-floor workers and engineers manage and assemble items on the production line or monitor process specifications. They typically record production and process data manually, leading to data latency and inaccuracy.

• **The Warehouse:** Warehouse personnel are responsible for inbound shipments, inventory tracking and traceability, and replenishment of goods. Accurate, real-time logistical and inventory data is critical for just-in-time manufacturing, efficient supply chain operation and quality of service.

• **The Field Force:** Field-force personnel interact with customers, partners and suppliers directly. They require the most accurate and up-to-date data regarding products and services. And accurate, real-time capture of demand and inventory data will provide the manufacturing organization with valuable insight for production scheduling.

Mobile technology, whether cell phones, smartphones, tablets and/or electronic pads, can effectively address these “desk less” data requirements – but not without a wellplanned and well-executed mobile technology strategy.

**THREE AREAS OF OPERATION**

Manufacturing is also driven by data. Accurate, real-time views of operational data, both within discrete functions and across the corporate value chain, are critical. And it’s manufacturing personnel who are responsible for the effective use – capturing, reporting, interpreting, synthesizing – of that operational data.

For example, American automakers are pushing hard against the boundaries of just-in-time manufacturing techniques. A Ford assembly plant in Wayne, Mich., has made flexibility an important element of its manufacturing strategy, implementing a production line capable of supporting several different vehicle types and designs. A large part of the success of that strategy depends on the close involvement of assembly line workers. According to one of the plant managers, “We are asking them to be problem solvers.”

When it comes to process manufacturing, there are two priorities: upgrading aging IT systems and addressing requirements imposed by new regulatory initiatives, such as the Food Safety Modernization Act. The first is a strategic opportunity, while the second is a matter of making accurate and timely manufacturing data a priority, which requires personnel to be diligent in process tracking and record keeping.

These examples help show how mobile technology and manufacturing have a natural working relationship with regard to communications, operations and data. “Workers in the manufacturing industry are mobile in nature,” points out Roopesh Bangalore, practice head for manufacturing for Wipro Technologies. Leveraging that mobility with an effective mobile technology strategy must be a priority for manufacturers.

**A COMPREHENSIVE APPROACH**

Although mobility in manufacturing seems suited to a targeted approach, that does not mean it should be limited in scope or strategy. “Mobility involves
a comprehensive study of the business processes that you want to take mobile,” says Bangalore. Such a comprehensive study would incorporate an internal assessment of enterprise strengths and pain points related to worker mobility and data entry, notes Bangalore. That internal study should be complemented with a benchmarking study of the mobility deployments of competitors and organizations in related industries. Also, feedback from mobility experts and potential vendors would be invaluable.

An effective manufacturing mobility strategy goes beyond implementing a few simple policy changes and a suite of mobile IT applications. Automating role specific transactions through a user-friendly display with easily identifiable icons for tasks such as data entry, support calls, barcode scanning, etc., will help workers make a hassle-free jump from manual operations to device-based execution.

Device ergonomics, such as form factor, features and ruggedness, are an important consideration. Tablet devices are on their way to becoming part of the manufacturing mainstream, and it’s exciting to see how manufacturers will leverage the limitless possibilities of such tools for maximum advantage in the value chain.

Overall, manufacturers must realize that a mobile technology implementation is much more than a tactical change – it is a strategic effort intended to directly affect business processes profoundly, positively and for an extended period of time. Such an effort requires careful planning and implementation.

THE PARTNER IMPERATIVE

That’s why manufacturers planning a mobile technology strategy would do well to consider enlisting the help of an experienced and knowledgeable partner. An outside associate can provide valuable expertise in terms of technology and trends, as well as objective insight regarding an organization’s critical processes and problem areas.

To help a manufacturer optimize a mobility strategy, a service provider must have experience and expertise in two areas. First, knowledge of the manufacturing sector at large, across diverse markets and segments – discrete, process and batch – provides valuable perspective. Second, depth of skill and talent in mobile technology, both at the individual-device level and the infrastructure level, are a must for a servicer in such a fast-moving, highly evolving area of IT.

When considering outside help, look for a service provider that partners with best-of-breed technology vendors to help furnish and support a comprehensive, cutting edge mobile technology solution. In addition, look for a servicer with a track record in enterprise-oriented technology solutions – one that can show you verifiable case histories and customer recommendations.

Experience should equate to data. Actionable data from benchmarking real-world mobile solutions should be an important element in a mobile service strategy.

CONCLUSION

More and more, employees are shifting computing tasks from traditional devices, such as desktops and laptops, to mobile devices, such as smartphones and tablets. Manufacturers must protect data that’s being sent back and forth between the corporate network and these users’ devices. They must also manage and secure the proliferation of diverse devices – employee-owned and company-owned – that are running on different platforms.

A mobile technology strategy can help both discrete and process manufacturers create new and better efficiencies in their organizations. Mobile technology can help address key problem areas within the manufacturing environment, including production workload, wait time, latency, loss of productivity, unnecessary motion, defects, asset utilization, logistics and inventory accuracy. Addressing these areas will help manufacturers reduce costs, increase speed, and extend flexibility and reach.

Most importantly, a mobile technology implementation can help manufacturers leverage their two greatest assets: personnel and data. By making employees more productive, and data more accurate and timely, a manufacturing organization can realize significant process change and competitive advantage.

But creating an effective mobile strategy and technology isn’t quick or easy. Manufacturers would do well to seek out experienced advice and support to aid in this vital, future-oriented effort.

“We believe Wipro’s demonstration of a strong industry competency, a mature global delivery model, alignment with our near-term and long-term objectives and a compelling value proposition made Wipro the supplier of our choice to enable IT separation and support our business strategy over a 5 year horizon.”
— Electricity North West
Energy and utility companies are facing difficulties, many of them relating to operating in an always-on global environment. A big-picture business view as well as cutting-edge technology expertise is necessary in order to succeed.
It’s been a tough couple of years for the energy and utility industries. First BP suffered a traumatic accident in the United States’ Gulf Coast last year that cost it millions of dollars and a good bit of its reputation. Next, electric companies in the U.S. Northeast were unable to provide energy to many of their customers for several weeks after a freak snowstorm this fall, causing an uproar among customers that resulted in executive departures and a flurry of regulatory oversight. It also jump started the local market for home generators.

These incidents were unusual, to be sure. But they suggested the deep-seated problems that these two industries are dealing with, to a great extent, are related to their best use of technology. Both industries must contend with aging infrastructures, expanding demand, increasing environmental and legislative issues, and the loss of valuable knowledge and expertise due to aging workforces.

The technology landscape in both industries, and in general, is changing significantly. It’s clear that IT executives will be called on to apply their technology expertise in more extended, sophisticated and effective ways.

**DOMAIN-CENTRIC**

The explosion and sinking of the BP oil rig Deepwater Horizon dramatically demonstrated one fact: how difficult oil exploration and extraction has become. Indeed, the modern oil industry is characterized by rigorous exploration and engineering feats conducted in the farthest-flung regions of the globe, from the Arctic Circle to the ocean floor.

Unfortunately, technology – and investment in it – has not necessarily kept pace with the oil industry’s ambitions and geographic reach. These days oil exploration is very often conducted in areas of the globe where communication and technology support, not to mention basic life necessities, are not readily available. And while oil can be profitable in the long run, exploration is a high-stakes game of chance, which means investment in expensive, cutting-edge technology may involve something of a trade-off. “The energy industry is highly domain-centric, not technology-centric,” points out Rajan Sampath, head of Energy and Utility for Wipro, the global IT consulting firm.

For instance, one area of potential technology investment has to do with 4D seismic analysis. This technology adds the dimension of time to the traditional 2D and 3D modeling technologies used in oil-field exploration and maintenance. 4D seismic analysis is valuable, in particular, for monitoring and analyzing oil-field production over time.

However, it’s not simply the expense of the 4D seismic technology itself that is problematic. It’s the infrastructure required to support the additional data generated by the 4D technology, in terms of network capacity and data storage – if an adequate infrastructure solution is available, that is that is causing many companies to drag their feet in implementing it.

It has oil industry officials asking themselves, “How do we ensure that 4D technology doesn’t involve huge investment in the back end as well?” says Wipro’s Sampath.

**PROBLEM AREA**

Indeed, data management is a problem for the oil industry in many areas. “Data management is the biggest piece for them,” Sampath says.

For instance, simply transporting highly valuable exploration data in a timely manner from a remote point in the globe to the place where the geophysicists can analyze it can be problematic. These remote areas more than likely lack basic connectivity in terms of network or satellite communication, necessitating the physical transfer of data storage media cross country. In that context, physical security becomes a challenge as well.

Even after having uploaded this valuable data at the point of control, there are challenges. The scientist must analyze the data quickly in order to make a decision on the success or failure of exploration. Unfortunately, that speed imperative is rarely served well by the current technology. “Scientists spend 30 percent of their time doing the analysis and 70 percent of their time searching for the data,” says Sampath. Add 4D seismic data to that and the challenge increases exponentially. “More intelligence is needed in the interpretation of data,” he says.

One other challenge the oil industry faces is not unique to that industry, but it is becoming acute. Like a lot of employee
populations, the pool of experienced oil experts and scientists is aging quickly. This becomes a technology challenge in the sense of deploying knowledge retention and collaboration technology to take advantage of that expertise, wherever it is, and to hold onto it for use by future employees.

**SERVICE ORIENTED**

The recent electricity outage in the U.S. Northeast brought home the major factor that makes the utilities industry different from most other industries – the human factor. The utility industry is big, incorporating as it does electricity, gas and water. But most utility companies are limited and relatively small. They operate in small sectors and with some relationship to governmental oversight. That makes their ambitions limited and their challenges targeted. “Their issues are related to customer service,” says Sampath.

Most utility companies want to ensure that they keep troubleshooting to a minimum and make problem resolution as quick and efficient as possible. That means utility personnel on the street are being used most effectively to improve customer service.

Collaboration technology is a major service improvement aid and is a big priority at most utility companies. IT managers at utilities are under pressure to determine which of the myriad devices now available – laptops, netbooks, smartphones, tablets, walkie-talkies – are the most effective for their street-level personnel, then how those devices can be integrated into their back-end systems to best serve their customers and the organization. And given utilities’ governmental ties, price is definitely a factor.

Still, the single biggest challenge facing the utility industry relates to infrastructure. In established countries, the citizens are well aware of problems with aging pipelines and an overburdened electric grid. In developing economies, quality of service varies in direct proportion to investment in infrastructure.

Utility companies too often work at cross purposes, or at least at independent purposes, when seeking to improve or repair their pieces of utility infrastructure an upgraded transformer here, a new piece of pipeline there. That can cause trouble when there is a problem in one of the networks. “There are no design maps, no data maps that are available that are current,” says Wipro’s Sampath. That keeps utility personnel from being able to determine exactly where the problem originated, which is similar to what happened in the U.S. Northeast.

That’s where the smart grid comes in. The smart grid is an effort at improving the intelligence – data gathering and interpretation capabilities – of a utility network. Most utilities have begun the process of installing smart meters at business and consumer sites. The next iteration of smart-grid technology involves implanting sensors at many locations along the network to track variables as closely as possible in real time. The smart grid is an important element in the shift from fossil fuel based energy to renewable energy, as well as the evolving relationship between consumer and energy provider.

Such sophisticated data gathering and interpretation will require a new synergy between information technology (IT) and operational technology (OT). The same is true with integrating intelligent handheld devices into that evolving data flow. However, that synergy will have a profound effect on the service utility companies will be able to provide to their customers. “To be able to say, ‘We know exactly what is happening,’” says Sampath, “is going to be the biggest change to customer service.”

Such data management offers another advantage to utility companies. Utilities, like other industries, are developing capabilities for differentiated service based on customer characterization such as high need or high priority. Such capability will ultimately help support the utility industry’s prime directive: customer satisfaction.
SIMILAR CHALLENGES, SIMILAR OPPORTUNITIES

It’s clear that the energy and utility industries have similar challenges in terms of strategic use of technology, and that IT managers will be instrumental in addressing those challenges. For instance, the effective use of collaboration technology will help both industries integrate and optimize their extended workforces and leverage badly-needed expertise.

It’s obvious that data management is a challenge in both industries. The fact is, most IT executives in energy and utilities companies are familiar with business intelligence and data analytics technology in terms of internal IT systems such as enterprise resource planning (ERP) and customer-relationship management (CRM). However, data analytics should be applied more aggressively to the increasing amount of data.

And both industries face similar challenges in terms of the evolving compute landscape. For instance, according to a recent survey by Gartner, energy and utility CIOs estimate that 50% of energy trading and risk management (ETRM) will move to a cloud computing infrastructure and SaaS applications in the next five years. However, “IT departments must tackle the complex nature of legacy deployments first,” Gartner says.

AN OUTSIDE ADVANTAGE

A big-picture business view as well as cutting-edge technology expertise will be necessary to help energy and utility IT executives face this challenging future. An outside third-party partner might be the best solution.

Wipro has been working with some of the industry leaders in the oil and gas sector to develop expertise and extend its value chain, so it can better help energy and utility companies embrace and extend their opportunities in the global market. To strengthen this objective, Wipro recently acquired the oil and gas IT service unit of SAIC through which it can help customers rationalize cost through IT.

“As an organization, we can provide the end-to-end integration of field pieces as well as the back-end integration,” says Rajan Sampath.

ENERGIZED FOR THE FUTURE

There are big-picture opportunities in the energy and utility industries that business and technology executives may be missing by addressing near-term challenges with point solutions, or no solutions at all. IT solutions such as collaboration, application integration, and in particular business intelligence and data analytics hold the key to more competitive profiles and better customer service for companies in both industries. What might help is an outside partner that can see the big technology picture and help with the practical business application.
“Wipro has been involved right from the conceptualization and design stage to implement IT systems and solution’s at IGIA. Building a scalable and flexible IT setup to manage rapidly evolving requirements for a green field project is a tough task. But Wipro delivered globally ‘best-in-class’ customer experience for all stakeholders, exceeding service quality targets by leveraging expertise in IT to implement global best practices.”
— Delhi International Airport Limited
Internet Protocol, right from its inception in the 1970’s, has gained widespread acceptance and is recognized as the de facto channel for Internet communication. The Internet Protocol Version 4 (IPV4) is widely used in networks across the globe for private and public communication. The IPV4, by virtue of its design provides only a limited number of addresses for use in various web based services. The growth in technology and communication infrastructure along with globalization of business over the decades has led to increased use of the internet and associated services. Online web based transactions have grown multifold in the recent times with several services looking to be offered via the Internet. This dramatic growth of internet based services has driven the IPV4 public address allocation very close to its maximum possible limit. The IPV4 public address depletion was expected a decade back and, as a result, IETF developed a newer version of the Internet Protocol called IP Version 6. IPV6 is extremely scalable with billions of addresses for use in the internet. The address space is so big that it can be translated to billions of IP addresses for each person on earth based on the current world population! Therefore, IPV6 is considered as the perfect panacea for numerous issues including the future scalability of the internet address space.

IANA completed the allocation of /8 IPv4 address blocks to RIRs by January 2011 thus exhausting the IPV4 address space. APNIC the regional RIR for Asia-Pacific is allocating the last /8 IPV4 address block. The RIRs are expected to exhaust all their IPV4 addresses by 2014. For current status of IPV4 usage refer to http://www.potaroo.net/tools/IPV4/
So why don’t we quickly make the shift to IPV6? What is the preventive factor in IPV6 adoption? The main issue is that IPV6 is not backward compatible with IPV4. So an IPV6-only node cannot communicate with an IPV4-only node or vice versa. This has obvious repercussions that lead to complexity in the adoption of IPV6 globally. It has forced users to handle a list of challenges to enable interoperability, such as the following:

- Assessment of IT infrastructure for IPV6 capability in terms of hardware, operating systems and applications. Assessment of ISP and WAN provider capability on IPV6.
- Analysis and design of suitable solution(s) for interoperability between IPV4 and IPV6.
- Evaluation and adoption of a solution for IPV6 name resolution and Infrastructure management
- Evaluation and design security solutions that can provide a secure infrastructure equivalent to the current IPV4 implementation
- Developing a migration plan from IPV4 to IPV6 without affecting business functions
- Piloting and deployment of IPV6 solution with newer components or upgrading existing IP
- IPV4 address depletion has, in a way, forced the adoption of IPV6 with the current internet utilizing both IPV4 and IPV6 networks. Since IPV6 migration is not viewed as a cut-over process with a fixed deadline, both networks will coexist in the internet for years with IPV6 gaining an increasing share. As these diverse internet protocols are supposed to coexist with each other, there are several doubts and perplexing questions in the minds of the IP users.

**IPV6 - WHY?**

Why should I transition to IPV6? Or, why do I need to adopt IPV6?

Internet is a catalyst for business growth. It is a faster, easier and more effective way of reaching customers. This is revealed by the 2011 report from McKinsey titled “Internet matters: The Net’s sweeping impact on growth, jobs, and prosperity”, which states that the internet accounts for 21% of GDP growth in the last five years in mature countries and it creates 2.6 jobs for every one job lost. Thus it is evident that Internet plays a major role in economic growth. The question remains whether businesses can afford to lose the internet advantage due to lack of scalability with IPV4? The answer is always “No”. Most enterprises are internet users, either as service providers or as service consumers.

Additionally, businesses with aspirations to expand and grow will require a scalable internet solution, one that can be provided by IPV6.

If we revisit the past, understand the present and foresee the future of internet services, the need for IPV6 transition is all too predictable. Beginning from analog PSTN and ISDN links in the past, communication infrastructure has grown by leaps and bounds with newer higher performance communication infrastructure and solutions such as fiber optic communication, wireless and cellular transmissions. This has led to consistent changes in the business operation model. From the centralized model with mainframes and dumb terminals we moved to distributed computing with the client server model. Newer adoptions are towards centralization with a consolidated and virtualized model. Further we foresee strong adoption of service oriented architectures and cloud based models in future with a greater focus on automation. These changes along with audio and visual services such as video and voice applications are delivering modern users real-time collaboration services. The effect of this is greater end user smart devices such as tablets and smart phones. In addition, the rise of broadband based internet services across the world has brought the internet to everyone’s home. In future, the growth of internet will be fueled by the concept of enabling a wide variety of business end points with globally unique IP addresses. This is expected to open up a plethora of services in data access and processing, monitoring, alerting and management. Some of the solutions expected to become popular include IP smart objects, DOCSIS, 4G, smart grid, smart cities and building automation. These solutions will need a large chunk of IP addresses which can’t be addressed with current restrictions in IPV4 address space. The3G/4G end points require a unique global IP for each device it connects to internet. The growing internet will make an IPV4 organization access or provide IPv6 services at some point of time.

Summarizing the reasons behind the adoption of IPV6, it is obvious that the Internet requires scalability and organizations graduate to performing business operations online. These factors along with imminent IPV4 depletion will require IPV6 to be adopted by organizations across the globe as soon as possible.

**IPV6 – WHEN?**

So with the conclusion the adoption of IPV6 is inevitable, the next major question is when is it necessary to deploy IPV6? Is there a deadline or cut-off date for transition to IPv6?
There is no cut-off or target date for IPV6 transition. It all depends on when an organization feels the need for new globally unique IPs. But it is certain that, over time, organizations will end up with either only IPV6 addresses for their internet based services or a requirement for accessing IPV6 services. The need for allowing a mobile workforce using IPV6 to access IPV4 infrastructure is another possibility. In such a situation the adoption of IPV6 infrastructure is mandatory particularly with IPv4 address exhaustion in the near future. The deployment of IPV6 in the internet will continue to grow in the coming years, at a faster pace than previously. While the IPv4 will not vanish from Internet soon, it may only coexist with IPV6 for at least a decade till its use in the internet becomes insignificant. Having said this, we need the organizations to be prepared for the IPV6 transition as it creates lots of complexities due to lack of backward compatibility for IPv4 in IPV6. The entire stack of IT infrastructure right from clients, network, servers, operating systems, security and applications will require assessment for compatibility IPV6 deployment.

In summary, there is no fixed deadline for IPV6 transition, but it is inevitable and imminent. As a result, organizations may have to plan in advance for IPV6 transition.

IPV4 Solution Influence

Some of the future solution possibilities that depend on IPV6 adoption are:

- IPSO Alliance
- DOCSIS 3.0
- IEE SMARTGRID
- Smart Cities
- 4G
- Building Automation

IPV4 Solution Influence

USA Department of Defence
China NGI
CERNET - 2
IPV6 Transition Mechanisms

The three broad solutions for attaining interoperability between IPv4 and IPv6 systems are Dual-Stacking, Tunneling and Translation.

DUAL-STACK

In Dual-Stacking the infrastructure is capable of running both IPv4 and IPv6 protocols simultaneously. Although it is the best possible solution for IPv6 and IPv4 coexistence, the higher cost and down time associated are major constraints. Also in a scenario where IPv4 address is not available, Dualstacking doesn’t help.

TUNNELING

In Tunneling the IPv4 or IPv6 packets are tunneled between the source and destination networks or hosts through the other unsupported IP network. Typically it is IPv6 packets tunneled within IPv4 networks. Tunneling requires tunnel end points to have Public IPv4 and Global IPv6 addresses. Security issues are a concern. Automatic and Manual Tunneling are possibilities. Some of the tunneling options include Teredo, ISATAP, 6to4 and Tunnel Broker.

TRANSLATION

Translation mechanism uses Address translation or embedding of IPv4 address embedding with a Prefix within IPv6 header to enable IPv6 clients communicate with IPv4 servers. NAT64 and DNS64 are preferred solutions. Translation breaks end to end transparency and it can’t be a long term solution. However it provides quick way to enable IPv4 to IPv6 interoperation. NAT64 with DNS64 is a preferred translation solution. SIIT and Dual-stack lite are other possibilities.

IPV6 – HOW?

“How to transition to IPV6” remains a major customer conundrum. Where do I start the transition? How do I manage the transition without affecting business operations? How do I manage the newly acquired infrastructure? These questions need to be answered for complete IPV6 transition assurance.

Understand the requirement and form a solution: to derive the answers for transitioning to IPV6 we need to look at various scenarios that entail IPV6 deployment. Currently the Internet is operating on a mix of IPv4 and IPv6 networks. After IPv4 depletion, the new nodes that require connectivity to Internet will have only IPv6 addresses from ISPs. This will force the content provider and the user to adopt mechanisms that allow interoperability between the IPV6 and IPV4 systems. With an organization’s network termed as internal network or intranet and external public networks termed as internet, we get four distinct network types to be considered for interoperability. IPv4 Intranet, IPv4 Internet, IPV6 intranet and IPv6 Internet are the network segments to be analyzed for successful interoperability. RFC 6144 lists possible scenarios for interoperation between IPv4 and IPv6 networks. There are various IPV6 transition mechanisms available with three major variants called dual-stacking, tunneling and translation. Proper selection of these mechanisms will address the customer questions on how to transition to IPV6. Though this whitepaper does not attempt to detail the technical aspects of these solution possibilities, snapshots have been provided.

Validate the Gaps and Choose Infrastructure Partner: clear understanding of the customer environment, the near future IT infrastructure requirement and future business strategies are essential for developing and deploying a proper IPv6 transition plan. It requires expertise in consulting, system integration and infrastructure management to assure
customers of a smooth transition to IPv6 and BAU services. Resources with a good knowledge of IPv6 are essential for the migrating and managing IPv6 infrastructure. The lack of resources can be overcome by partnering with IPv6 infrastructure service providers.

**Form an approach for migration:** so where does an organization begin its IPv6 transition? First, create an IPv6 Transition assessment involving network, security, servers, server OS, IP based storage, applications, client operating systems and external service provider networks including WAN and Internet. The transition assessment shall provide the IPv6 compatibility of the existing systems in internal and external infrastructure. The transition assessment should involve gathering the current network architecture, IP scheme and network segmentation information.

**Design the architecture:** for IPv6 and IPv4 coexistence. The design should provide multiple phases beginning with IPv6 and IPv4 coexistence architecture and ending with pure IPv6 network architecture. Thus the design shall enable smoother transition from IPv4 to IPv6 in phases over a period of time.

**Develop an IPv6 migration plan:** taking the design output as the basis migration plan shall start with analyzing the IPv4 and IPv6 coexistence capabilities and ensure smoother transition over time to a pure IPv6 network. The transition mechanism should also take into account the customer cost and resource availability.

**IPv6 Deployment:** shall include testing the IPv6 functionality for critical services to be migrated to the platform in a test environment existing either internally within the organization or an external test facility. The inferences of testing and the required corrective action shall be incorporated in the final deployment.

With the approach for overall IPv6 migration spelt out, the typical deployment of IPv6 services will start from the internet edge of the organization and percolate deeper including the internal network.

**CONCLUSION**

IPv6 would have been the perfect panacea had the IPv4 backward compatibility issues been addressed in the design of the protocol. The lack of interoperability makes IPv6 a perplexing solution with various issues that need to be resolved. Yet IPv6 is the only choice for newer innovations and service growth. With proper planning and preparation organizations can face the IPv6 migration challenges easily.

From the interrogative analysis of IPv6 in the various sections of this document, we can conclude the following takeaways:

- IPv6 supports growth and innovation.
- IPv6 usage is inevitable.
- Lack of compatibility between IPv4 and IPv6 poses challenges.
- IPv4 and IPv6 will coexist for years together with IPv6 growing significantly in the near future.
- Organizations should prepare for IPv6 transition now and deploy it in the future when required.
- Organizations needing to deploy IPv6 now, can start with IPv4 and IPv6 coexistence and transition over the years to pure IPv6.
We hope you enjoyed reading “Global Infrastructure Services – The Review 2012”. We would love to hear your thoughts and suggestions towards making this journal a valuable knowledge sharing tool for Senior Executives like yourself. Please write to us at infrastructure.services@wipro.com