GRIDTALK
POWER UTILITIES COMMUNICATIONS E-ZINE

IP MIGRATION FOR UTILITIES - MANAGING CHANGE FOR SMARTER OPERATIONS

The global power industry is facing rapid change. In the face of increasing power demand, more stringent regulations governing carbon emissions and the need to manage distributed generation from renewables, utilities every-where are turning to intelligent electric transmission and distribution systems enabled by IP. Yet as with any major transition, power providers need to plan their migration carefully to avoid pitfalls and assure maximum success – especially in a largely regulated industry where strategic CAPEX timelines typically can run 20 years into the future.

Thanks to its capability of dynamically sup-porting multiple mission-critical services in a single converged network, IP/MPLS has become the technology of choice for utilities implementing these converged smart grid communications networks. As a utility-grade communications network architecture, it sup-ports the flexibility and scalability of IP, while maintaining the reliability and predictability of traditional, mission-critical TDM networks, including the most critical and latency-sensitive utility applications such as teleprotection.

The widespread adoption of IP-based communications networks will impact on all stakeholders – from government and power providers to the consumers they serve. Regulation will evolve to address the new paradigm, and utilities will have to be involved in educating and guiding the local, regional and national agencies that oversee the sector. Financial planning, project management, operational processes, employment profiles and business models will change as well, with new efficiencies and additional revenue opportunities coming to the fore. Consumers will need to adapt to new pricing structures and energy consumption incentives, in some cases generating electricity themselves. All will take a greater, more interactive role in the energy ecosystem.

In this issue of GridTalk, four experts provide their valuable perspectives on the economic, social and technical considerations for utilities planning and embarking on that all-important transition to smart communications systems based on IP/MPLS. They identify the key challenges, highlight the experiences and success stories of those that have prospered.

SOCIAL VIEW

MANAGING THE IP EVOLUTION WITHIN AND OUTSIDE OF THE ORGANIZATION

The steady modernization of the electric transmission and distribution system based on IP will have social impact on ...

>

ECONOMIC VIEW

INVESTING IN IP TECHNOLOGY: 10 KEY STRATEGIES FOR VALUE

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>

CUSTOMER VIEW

CREOS LUXEMBOURG: LEARNING TO GET THE MOST FROM IP/MPLS

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>

EXPERT VIEW

PLANNING THE PATH TO IP SUCCESS: RELIABILITY, SECURITY AND EFFICIENCY

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>

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MANAGING THE IP EVOLUTION WITHIN AND OUTSIDE OF THE ORGANIZATION

WITH RAUL KATZ, PH.D., DIRECTOR OF BUSINESS STRATEGY RESEARCH, COLUMBIA INSTITUTE FOR TELE-INFORMATION; ADJUNCT PROFESSOR, DIVISION OF FINANCE AND ECONOMICS, COLUMBIA UNIVERSITY BUSINESS SCHOOL

HIGHLIGHTS

- Achieving the benefits of IP is tied to the social challenge of fully assimilating the new technology which can take three to five years.
- Big data will be a critical tool for utilities looking to better understand consumer behavior, allowing them to tailor better products to specific segments of the population.
- In planning and executing new IP investments, it important for the seller and the buyer of the technology to be trusted partners.

The steady modernization of the electric transmission and distribution system based on IP will have social impact on all stakeholders, from government and power providers to the consumers they serve.

"The effect of information and communications technology (ICT) on large business has been felt since the mid-1990s," says Raul Katz, Ph.D., Director of Business Strategy Research, Columbia Institute for Tele-Information; Columbia University Business School. "While previously its boost to productivity has been most prevalent in industries such as financial services, telecommunications and transportation, we now will start to see other sectors, such as electric power, benefiting much more. In its case, the focus of the main ICT impact will shift from internal business operations to smart grid and customer support.

However, Katz says that achieving these benefits isn't simply about buying the latest equipment, but more significantly is tied to the social challenge of fully assimilating the new technology. "Changing the business processes, training employees, adapting your organization and operations to the benefit you can derive from technology – in economics this is called the accumulation of intangible capital – means that once you purchase the systems it will take you some time to get to that point, especially in large companies. It's called the lag effect. We've typically seen this take three to five years, because you're dealing with human beings and social systems."

Katz notes that the experience of a corporate leader in a particular sector can have great influence. "In any given industry you might have one company – say a Citibank or a company such as Oklahoma Gas & Electric – that has been an early adopter in assimilating new technology. Behind that leader the rest of the sector tends comes along, and that's what ultimately makes the blip on the radar."

He adds that in order to speed up adoption of ICT innovations, large companies need to implement change management programs and training. "The workforce understands how technology has improved the operational environment and sees how it fits in. In many cases, the programs need to be combined with incentives – not necessarily material – to adopt the new modes of operation. These could range from recognition to additional training activities."

MELDING CORPORATE CULTURES

Successful technology assimilation takes careful planning with attention to human capital. As power providers increasingly migrate from proprietary networks to new architectures and services, the need for IP experts in the workforce will grow tremendously while increasing in value. Yet depending solely upon those experts won't be enough, according to Katz, who has served as a management consultant to the telecommunications industry for the past 25 years. Instead, he says, successful management requires a fully integrated approach to the melding of the new-generation ICT and core business processes.

"When managing in these situations, you cannot segment. You must have senior business unit managers who are completely fluent and conversant with the new technology and all of its implications," he says. "I think the biggest problems that I've seen have been where management doesn't understand technology and they believe that they can rely on those internal "techies" to translate it to what they need. That creates a gap. They lose time, and they lose response capability to competitive pressures. In that situation they need to

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either recycle themselves, learning and assimilating, or they have to create the space for younger generations who grew up in those new environments to assume leadership positions."

BIG DATA AND CONSUMER BEHAVIOR

Looking outside of the organization, it's clear that big data will be a critical tool for utilities looking to better understand consumer behavior, allowing them to tailor better products to specific segments of the population. "The consumption of electricity, while being a universal good, has been seen as pretty uniform, whether you live in the middle of a city or the countryside," Katz says. "But everyone has their own power consumption patterns that may be particular to their lifestyle or business, with their own essential needs. And with telecommuting, the dramatic differences between offices and residences are eroding because so many more people are working at home."

This leads to new consumer requirements and services that can be tailored to those. "In such cases your computer is essential – it can't go down. So in the event of an overall power failure, you need to consider what utility can prevent this from happening – for example, a backup power system that is maintained to provide assured continuity." Katz says that implementing these are the kinds of outside-the-box ideas will now be possible with advanced ICT.

MOTIVATING COMSUMER ADOPTION

A key part of the success equation for power utilities migrating to new technologies means motivating consumers to embrace innovations such as smart metering, dynamic demand pricing and overall energy conservation. With rates becoming more segmented and complicated, the consumer education challenge itself will become more complex. This means using all the tools available, including big data and social media – anything that will help build and activate an engaged, educated community of customers.

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"Education is critical," Katz says. "If you were to tell your customers that they have to consume less electricity because that has an impact on climate change, you're going to get less of a following than if you perhaps say 'You know something? You're consuming 50 percent more power than your neighbors.' In a case such as this, the actual names would not be revealed, but data could be provided in a form such as 'In your neighborhood, here's the mean, the high and the low and here is where you fit in.' When you introduce that level of comparison of your behavior relative to those surrounding you, the social pressure is a key element."

Thinking out of the box – and out of the industry – also can be effective, especially when you start with the consumer's needs in mind. "One of my students at Columbia developed this system where he used reward coupons from a major coffee chain to give to his startup customers if they could demonstrate that through recycling they were actually contributing to the environment in a certain way," Katz explains. "He expanded the idea, getting a lot of cooperation from socially responsible companies that realized it was also good for business, and he was successfully soliciting change from his consumers because they were getting a little something extra for doing something good for the environment.

CHALLENGE, RISK AND PARTNERSHIP

Given the rate at which technology is changing, moving to new systems creates challenges and risks for any company. "The challenge is addressing the question 'How am I going to choose the right solution – something that will boost productivity – the way we deliver our output – and what

are those technologies?'," Katz explains. "Secondly, how fast can we assimilate them, considering the necessary retraining required?"

When considering these critical issues, Katz believes it is important for the seller and the buyer of the technology to be trusted partners. "One party holding the other at arm's length could be dangerous," he says. "I need to have the best possible visibility as to what's going on from a development standpoint. I have to consider the provider of my technology as my partner – one who understands what my business is, what my needs are, and at the same time has a window on the future of research and development – the things to come. I need someone who can creatively sit down at the planning table with me and help me make the right decisions."

THE MOST IMPORTANT ADVICE

What is the most important piece of advice Katz would give to power providers in terms of socially managing technology transitions? "Get close to where the innovation cycle is; try to avoid being insular in terms of coming up with solutions only within the mindset of the industry," he advises.

Katz notes that there is a great debate about whether large companies actually can innovate. "Can big companies incubate? I think they can, but they have to change in the way they are being managed and how porous they can become to trends in their environment. We need to find a way in which large companies can become better innovators through training and encouraging greater creativity on the part of the employees. They need to innovate beyond just keeping the lights on day in and day out."