

Creating a Fit for Purpose Network Architecture

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INTRODUCTION

Today's enterprise network needs to be a highly focused resource capable of providing a mobile and diverse workforce with efficient, effective access to the tools and applications that drive productivity. Because traditional, general purpose network architectures were not designed to cost-effectively address this new world of Unified Communications, new network strategies are needed. Avaya is meeting the challenge with Fit for Purpose infrastructure capabilities that combine performance on the most demanding real-time applications with compelling economics.

1. THE NEW ENVIRONMENT FOR ENTERPRISE NETWORKS

A sea change is taking place in enterprise networks. The growing use of the network for real-time communications and collaboration—Unified Communications—requires a dramatic change in network architecture.

A FIT FOR PURPOSE NETWORK FOR THE WHOLE WORLD TO SEE

Perhaps the most significant and high profile example of a Fit for Purpose network was the one Avaya delivered for the 2010 Olympic and Paralympic Winter Games in Vancouver, Canada—the first all IP network in Olympic history.

Like the 5,000 Olympic athletes—each one a world competitor with years of training in his or her sport—Avaya (as the Official Converged Network Equipment Supplier) brought its in-depth experience in real-time communications to the design and implementation of an end-to-end network for 15 Games venues and numerous non-competition sites. These included two data centers, two media centers, two athlete villages, two ceremonial sites and the Games headquarters. The network had to meet Olympic requirements for 100% uptime in a converged voice/data, wired/WiFi solution that ultimately handled:

- 4.9B bytes of data traversing the Internet— a 20% increase over the 2008 Summer Games
- 1.1 trillion web page downloads
- 10Gb of bandwidth to every venue—a 200% increase over the 2008 Summer Games
- 1.1B data packets over Bell's network
- 30,000,000 MB: Total mobile data count
- 65,000,000 mobile text messages sent and received
- 750,000 calls made from 6,000 landline VoIP phones

The scalability challenge: The Avaya network for the Vancouver 2010 Olympic and Paralympic Games demonstrated the unprecedented scalability challenges facing IT managers as more real-time communications and applications are brought on to the network:

- The Avaya network was designed for unanticipated surge capabilities equivalent to roughly three Super Bowl Sundays per day for 17 days.
- Overall, in the 1.5 years between the 2008 Summer Olympic Games and the 2010 Winter Games, the bandwidth requirements grew twenty fold.

- The data output by digital devices, such as PCs, servers, mobile phones, scanners, supercomputers, and cameras, is growing exponentially. In 2008 alone, according to the research firm IDC, the world created 487 billion gigabytes of information, up 73% from 2007. The research firm estimates that the size of the digital universe will double every 18 months.¹
- A huge part of the increase in network traffic is the result of real-time applications—VoIP, personal videoconferencing, WiFi—that are critical to enterprise performance.²
- All of this—data, applications, presence capabilities, etc.—must be made available to a workforce that is now estimated to be more than 40 percent mobile.³

This transition to Unified Communications is not taking place in a vacuum.

A host of other changes are also transforming the environment in which enterprise networks operate:

- IT departments are under greater pressure to account for ROI in their expenditures—a trend that accelerated dramatically with the economic downturn in 2008.
- There is a greater recognition of the economic cost and environmental impact of IT energy consumption. IT solutions that are energy efficient are here to stay.
- A huge generational shift is taking place in today's workforce: as the Baby Boomers retire, their generational successors (often referred to in the media as Generation X, Y and Z) are bringing new expectations concerning IT availability, performance and flexibility. In particular, anyone born since 1980 has enjoyed a life-long association with technology, particularly real-time ("instant") communications. This is the cohort that will usher in a quantum shift from the traditional network to one driven by and built for real-time, multimedia, always-on, omnipresent, multi-platform communications.

Individually, any one of these trends would have a major impact on network strategy.

Collectively, they represent a significant shift in today's enterprise network operating environment. Adapting to this new environment is the primary challenge facing IT today.

¹ IDC, "As the Economy Contracts, the Digital Universe Expands", 2009

² IDC, Worldwide Telecom Services Database, 2H09; Wainhouse, Rich Media Conferencing 2009, Volume 2, Enterprise Videoconferencing Endpoints and Infrastructure, December 2009; Dell'Oro, Wireless LAN Report: Five Year Forecast 2010-2014, January 2010.

³ Defined as a worker away from the office at least 20 percent of the time: Yankee Group, Accelerating Unified Communications with an Enterprise-Wide Architecture, 2009

2. THE CHALLENGE FACING GENERAL PURPOSE ENTERPRISE NETWORKS

Because today's general purpose network architectures were not designed for the demands of Unified Communications, the traditional tactics for enhancing network performance—adding more hardware, upgrading to faster processors, increasing bandwidth—can actually intensify problems, such as “server creep” and “configuration drift.”

- Resiliency is achieved on traditional networks, but only through the addition of large numbers of under-utilized links, equipment, and even entire “architectural tiers.” Sorting through these connections in the event of a failure can cause an unacceptable break in performance for real-time applications.
- Network management is possible—but only through the proliferation of multiple, incompatible management platforms that do not permit a single-pane, end-to-end view of network performance.
- Wireless LAN structures are extended—but at the cost of additional hardware and management expense and, ultimately, serious scalability limitations that will limit the ability to take full advantage of real time voice and video traffic over the WLAN.

The net effect of these and other issues is higher network TCO (Total Cost of Ownership). Taking an inherently inefficient, over-engineered approach to network challenges absorbs more resources, delivering less and less performance while incurring more and more expense. Enterprises that continue to rely on these general purpose architectures will find themselves at a competitive disadvantage to enterprises that have made the shift to what Avaya calls Fit for Purpose networks—networks designed for the realities of today's distributed, collaborative enterprise.

3. THE FIT FOR PURPOSE ENTERPRISE NETWORK

A Fit for Purpose solution is one that identifies the most critical performance requirements and delivers the best possible solution to meet those requirements.

In today's environment, a Fit for Purpose network infrastructure is one that is designed to address the specific individual needs of today's distributed, collaborative workforce, meeting the challenge of delivering real-time access to communications tools, information and applications.

A Fit for Purpose network infrastructure vs. a traditional general purpose infrastructure is like the difference between a line of performance racing cars and a line of sporty, economical sub-compacts designed for everyday consumers. Both, for example, have an engine, wheels, brakes and a steering mechanism. Both are designed with aerodynamic efficiency in mind. However, the racing car is designed above all to achieve speed. Everything about it, not just the performance of the engine but the ease with which faulty components can be swapped out or refueling take place, is purpose built to save precious seconds in a competitive environment. The sporty subcompact, on the other hand, is designed to optimize its appeal to a market segment—speed is just one factor (and, given speed limits, not a major one.) A wide range of vendor-driven and market-driven factors influence the design of the sporty compact, not the least of which is to repurpose other off-the-shelf components from the manufacturer's product line.

In the case of today's enterprise networks, most vendors, in effect, take the sporty compact approach: they start out with a set of basic building blocks and meet specific market needs (e.g., real time communications) by layering on more architectures and protocols. What results are solutions that sacrifice simplicity and flexibility and, ultimately, TCO.

In contrast, Avaya has identified what it sees as the most critical performance requirements for today's networks—resiliency, efficiency and scalability—and made solving those specific challenges the driving force behind its portfolio of Fit for Purpose enterprise network solutions.

4. COMPONENTS OF A FIT FOR PURPOSE NETWORK ARCHITECTURE

Because there is no single solution to the challenge of network resiliency, efficiency and scalability, Avaya addresses each characteristic uniquely. But what truly sets Avaya apart—and makes its solutions truly Fit for Purpose—is that Avaya delivers a comprehensive network infrastructure that excels at all three simultaneously.

Here is a quick look at some of the key architectural elements of the Avaya Fit for Purpose network infrastructure:

INTEGRATED, IMMERSIVE LEARNING ENVIRONMENTS

Leading colleges and universities are doing everything possible today to offer sophisticated, technology-rich environments that allow students to immerse themselves anywhere, anytime in interactive learning experiences. For the University of Connecticut School of Business and Coppin State University in Baltimore, a Fit for Purpose Network from Avaya is making it possible.

At the University of Connecticut School of Business, it means an infrastructure that can support essentially every application its student will use in business—from accounting programs, to all the major financial packages to a mock trading room. The school now has the scalability it needs for seven years, and achieved immediate savings in hardware costs, energy, backend updating and maintenance. According to Michael Vertefeuille, Chief Operating and Technology Officer at the school, Avaya was chosen because when the decision had to be made “no other network could do what we needed.”

At Coppin State University in Baltimore, the school's cutting edge IT program goal—which is occurring in real time today—is to make it as easy for a working mother of four to review class lectures on her iPod touch as it is for a serviceman in Iraq to complete the coursework and tests needed for his degree, working from his barracks in Baghdad. Coppin's technology strategy has won it numerous awards and plaudits from U.S. News and World Report, Network World, EDUCAUSE and others.

Bringing Resiliency to a New Level

Avaya's Fit for Purpose approach to resiliency is based on its Switch Clustering technology and also by more effectively managing routine maintenance operations as well as unplanned outages. These and other capabilities enable Avaya to deliver up to seven times better resiliency than the market share leader, providing uncompromising end-to-end availability for real-time applications such as VoIP.⁴

- **Switch clustering:** This technology and architecture, pioneered by Avaya, essentially virtualizes the network core. Far superior to the one-size-fits-all, spanning tree approach, switch clustering utilizes all network resources regardless of scale and provides sub-second failover. Any disruptions are virtually unnoticeable to the user—sessions do not fail and applications do not hang. This level of resiliency extends across the breadth of the enterprise network, ensuring that the same consistent model and level of service can be delivered to the branch as well as the head office. It's no longer a case of compromising either on service or value, or both.

- **Managing failures:** If a failure occurs, a failed unit can be disconnected without any loss of overall application availability. The Avaya Automatic Unit Replacement (AUR) process manages any necessary downloads and then brings the switch back online; all of this without any need for an engineer to provide configuration or management. Network operators can compartmentalize the network, making essential services even more resilient and allowing for individual components to be repaired in real time.

Efficient Network Performance

A good business is run just this side of 'lean and mean'; a Fit for Purpose network must be designed with the same sensibility. Avaya solutions are able to deliver up to 20 times better performance with one-third less equipment through an architecture designed to maximize all resources and investments, eliminating idle or underutilized links, equipment and even entire “architectural tiers.”⁵

⁴ <http://www.avaya.com/usa/topics/avaya-data-networking/>

⁵ Tolly Test Report: Avaya Data Network Solutions, Performance, Resiliency and TCO Comparison to Cisco/HP ProCurve Across Network Classes, March, 2010

A POWERPLAY IN MOBILE, MULTIMEDIA COMMUNICATIONS

Some of the greatest players in the history of the game have cut the ice at the Bell Centre in Quebec, home to the Montreal Canadiens. So when the stadium decided it needed better mobile, multimedia communications, it wanted a solution that was in its league: an Avaya Fit for Purpose voice and data network emerged as the standout choice. Now, thanks to the power and scalability of the Avaya WLAN, greeters can use wireless handheld scanners to validate tickets; food and beverage vendors can use WiFi point-of-sale devices; reporters and photographers can use the new wireless service to securely upload and update files. And there are numerous other benefits for fans, Canadiens staff and other stadium personnel: soon the public will even be able to locate specific facilities like concessions, boutiques, and fan zones with a positioning location agent on their smart phones, using the WiFi network. The bottom line: the team that has won more Stanley Cups than any other franchise now has a permanent power play when it comes to mobile, multimedia communications.

- **Consolidating services:** Where it makes sense, Avaya consolidates services. The Avaya Secure Router 4134 can integrate WAN routing, LAN switching, voice gateway and a full-featured Unified Communications applications suite in a single device. Delivering solutions that require fewer devices provides consistently higher levels of reliability, performance and efficiency, ultimately resulting in lower capital and operating costs. See TCO Comparison (Figure 1).

- **Energy efficiency:** Avaya's industry-leading energy efficiency delivers immediate operational savings by reducing the amount of power that is used to directly run a given set of equipment, and also indirectly due to the savings realized for reduced cooling requirements. See Power Consumption (Figure 2).

- **Efficient Management Platform:** Rather than relying on multiple management systems that create a dispersed approach, Avaya's network management consolidates voice, data, wired and wireless management systems in a single platform that allows network managers to troubleshoot up to four times faster.

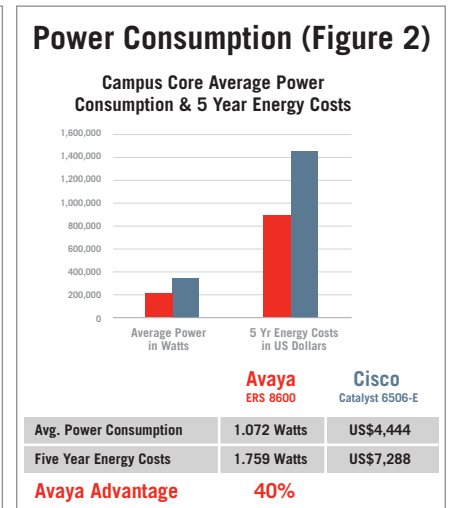
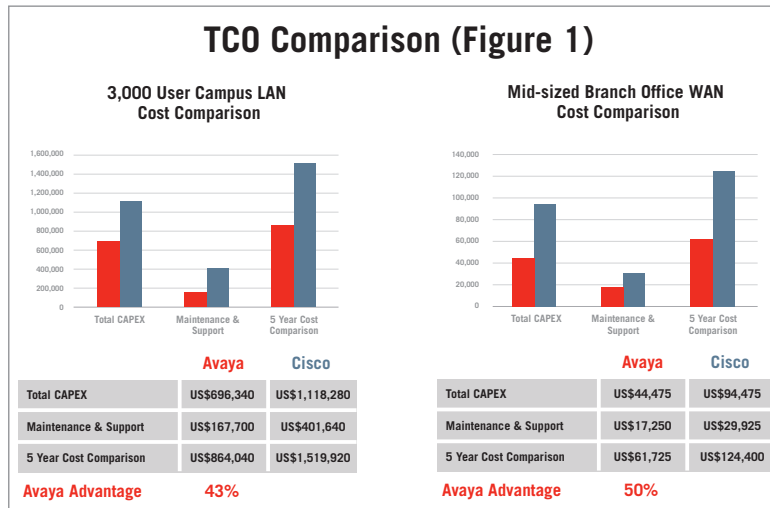
Scalability for Future-Readiness

No individual product can ever be cost-effectively future-proofed. Instead a Fit for Purpose network takes advantage of a variety of innovations—virtualized, multi-device platforms, streamlined architectures, automatic QoS and role-based security—to more effectively scale as business demands evolve and grow, maximizing capacity utilization, easily accommodating incremental growth and avoiding unnecessary and costly fork-lift upgrades.

- **Virtualized multi-device platforms:** Reducing the reliance on separate, dedicated platforms connected together in favor of a smaller number of multi-purpose hosts provides higher levels of capacity and throughput. The cost of premium, mission-specific hardware is avoided. New implementations are now simply software upgrades.

- **Pay-as-you-grow scalable capacity:** The Avaya approach overcomes the limitations and constraints facing other systems (such as Token Sharing/Passing systems or basic Cascading) and instead makes it possible to scale proportionally as new switches or ports are added and as the requirement for more bandwidth grows.
- **Automatic QoS:** Avaya Automatic Quality-of-Service (QoS) seamlessly calibrates performance on end user devices, servers, applications and Ethernet Switches, delivering consistent and optimized QoS that enables the network to better understand and respond to latency-sensitive, high-priority traffic in times of network congestion.

- WLAN:** Current WLAN architectures—whether “Distributed/Fat AP” implementations or “Centralized/Thin AP” configurations—are not adequate to support the expanded role WLANs will play in the overall enterprise network. Avaya unifies wireless and wired networks using a next-generation, split plane architecture that offers the best solution for supporting the new role of 802.11n-based WLANs and can achieve up to a 55% reduction in hardware costs compared to the market share leader.
- Role-based Access Control:** Many organizations have created a siloed security architecture with separate directory stores and policies for the wired network, WLAN, VPN, etc. Avaya simplifies network identity management across the enterprise, providing a consistent, centralized, role-based access that can be implemented and managed on a full network-wide basis.



Sources: Tolly Test Reports: Converged Data Network Solution, Evaluation of Energy Consumption and Projected Costs for a Converged LAN Campus, Data Center and WAN, March 2010; Avaya Secure Router 4134 vs. Cisco ISR 3845: WAN Router Performance, Power Consumption and TCO, February 2010

5. THE FUTURE OF FIT FOR PURPOSE NETWORKS

The era of real-time communications and collaboration is a game-changer in the world of enterprise network architecture. The lessons from existing networks—such as the Vancouver 2010 Olympic and Paralympic Winter Games, with its 20-fold increase in bandwidth requirements (Avaya was the Official Converged Network Equipment Supplier for the Games)—clearly show that the change is not simply incremental. The demands of resiliency, efficiency and scalability require a paradigm shift in network design. The need to carefully scrutinize data networking purchases to maximize ROI and limit TCO will only increase with the growing UC demand. Enterprises that are looking to cost-effectively leverage the latest innovations to drive ongoing productivity and competitive differentiation need to take account of the new environment.

In short, the time is now for networks that are truly Fit for Purpose.

Learn More

Avaya's vision for the enterprise—"plug & play communications"—calls for a new level of synergy between people; the collaborative, real-time applications that they use; and the underlying, enabling network. The goal is to deliver a consistent, enterprise-class experience, one that supports context-aware collaboration that is always-on, simplified and virtualized. A key building block for this vision is the Fit for Purpose network. As real-time communications continue the evolution to IP, the data network becomes totally integrated into the delivery of communications enabled business services, in addition to transporting non-real-time, critical business applications. For more information on the intelligent, cost-saving capabilities of Avaya Fit for Purpose network solutions, visit www.avaya.com.

About Avaya

Avaya is a global leader in enterprise communications systems. The company provides unified communications, contact centers, and related services directly and through its channel partners to leading businesses and organizations around the world. Enterprises of all sizes depend on Avaya for state-of-the-art communications that improve efficiency, collaboration, customer service and competitiveness. For more information please visit www.avaya.com.

The Avaya logo consists of the word "AVAYA" in a bold, red, sans-serif font. The letters are closely spaced and have a slight shadow effect.

INTELLIGENT COMMUNICATIONS

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References to Avaya include the Nortel Enterprise business, which was acquired as of December 18, 2009.

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