



Lippis Report

White Paper

Increasing Corporate Value Through Integrated Networks and Applications A New Approach To IT Service Delivery Emerges For Branch Office Operations

by

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Abstract

Enterprise networks, especially branch office networks, have experienced a level of service integration over the past five years that has delivered lower acquisition and operational cost while increasing the number of services available to branch office employees. Branch office routers now include switching, WLANs, PoE, network security, WAN Optimization, VPN, unified communications and advanced routing which increase application performance over thin wide area network links. In this white paper we explain the next generation of branch office optimization, which is the integration of applications into the network fabric. The networking industry has started to open up its software in the form of SDKs and APIs. Cisco, Juniper, Extreme, 3Com and the open source routing initiatives are all allowing developers to write to defined router software interfaces. We explore its value proposition in detail and provide guidance to business and IT leaders who wish to exploit this new model for value creation and improved service delivering in branch office operations.

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Mega Business Trends

Recently Dr. Ben S. Bernanke, chairman of the Board of Governors of the Federal Reserve System, offered an observation of the world economy. Dr. Bernanke said, “Over the past several years, the world economy has expanded at its fastest pace in decades.” Clearly globalization of the world economy has had a large influence on business strategy, initiatives and plans. But the priority to expand business globally has resulted in increased IT complexity as much growth has been the result of mergers and acquisitions, which are accompanied by IT rationalization projects. At the same time, many IT leaders are deploying Web 2.0 technologies to improve collaboration among employees, partners and suppliers in an effort to increase productivity and customer experience.

As these trends of globalization, IT complexity management and Web 2.0 deployment work their way through businesses, many business and IT leaders have come to the conclusion that IT is a strategic asset versus an expense. This shift is evident in the fact that while current financial markets are unstable, IT spending remains strong, meaning that savvy business and IT leaders are investing in IT to gain strategic advantage during down markets. In addition to these strong market forces US business is catching up with Europe and the Rest of the World (RoW) by embracing green initiatives to lower energy consumption and decrease their carbon footprint while seeking solutions to facilitate the shift toward renewable and sustainable energy sources.

Trends in Branch Office Networking

Nowhere in business have these major trends influenced investment more than in branch office infrastructure, as business and IT leaders view branch office facilities as a window into the customer experience. These powerful economic and market forces have motivated business and IT leaders to re-distribute human and capital assets away from headquarter facilities toward branch offices and retail stores, putting assets closer to customers. Getting closer to customers and delivering a common brand experience across on-line plus brick and mortar facilities is a dominant business goal. In fact, 62% of corporations have added new branch offices, accounting for an 11% year over year growth in their deployments according to a recent Nemertes Research study. Further, the majority of new hires are now targeted to branch office staffing ranks. In fact, eight out of ten new hires are staffed into non-headquarter facilities.

Branch Office Constraints

With the labor pool increasingly being distributed into branch office locations, IT leaders have focused on finding solutions to branch office constraints. Branch offices, by definition, are distributed over large geographic areas and theaters of business operation. Therefore, finding a common wide area network service for all branch offices is seldom an option. Also, with branch offices located in rural areas, wide area bandwidth is often limited, constrained and inadequate to conduct business. The common approach is for IT architects to stitch together and manage a range of wide area network solutions such as DSL and cable broadband connections, 3G wireless services, frame relay or MPLS links, PSTN, slow speed private lines, etc., across multiple service providers. In addition, IT staff and support is often not available at the branch office level, but manage their IT branch infrastructure from afar through centralized management solutions. But even though wide area bandwidth and local IT support are limited, employees expect and demand the same IT experience as headquarter- staffed employees.

Application deployment and management in this environment is full of challenges too. Multiple servers, storage, networks and applications each deployed in thousands to tens of thousands of branch offices are difficult to maintain and manage. Even routine system management services such as patch management and application upgrades require careful planning with contingency plans developed well ahead of time. The pain of remote management of branch IT resources limits the footprint in which IT can operate under the current model.

The total cost of ownership associated with branch office IT infrastructure is dominated by facilities (wide area network cost) and operational (IT personnel) cost thanks to the sprawl associated with this infrastructure. It's clear

that the cost of wide area communications will increase with the number of geographically distributed branch offices. Operational cost increases too as remote management of multiple devices such as servers, storage, router, switch, firewall, WLAN, WAN accelerator, VPN, IP telephony, applications, fax machine, printer, voice recorder, etc., per geographically distributed branch office increases. In short, remote management of multiple devices from varying vendors offer limited operational efficacy for branch office infrastructure. Capital cost or the cost of all these devices usually represents less than 20% of a three-year total cost of ownership analysis.

To address these constraints, IT leaders have invested in wide area network acceleration and IT devices, which integrate multiple functions under one management umbrella to reduce operational cost and improve wide area network and application performance.

Four Phases of IT Branch Office Networking

Branch office IT infrastructure has progressed through four distinct phases of maturity. As with most investments, trends are difficult to predict, as significant demand is required to identify a trend. During the process of demand-to-trend both IT leaders and suppliers start to offer architected solutions, which become more sophisticated over time. The same is true for branch office infrastructure.

Phase One: Overlay

The first phase of solutions was an overlaying of services such as routing, switching, firewalls, servers, storage, applications, etc. There was little to no integration of devices and virtualization of services. Overlays quickly became too expensive as their multiple devices sourced from different suppliers distributed over thousands of branch offices drove up all aspects of total cost of ownership and became too complex to operate.

Phase Two: Integrated Networks

To control complexity and reduce TCO, the second phase of branch office IT infrastructure was the integrated network approach. The integrated network virtualized many network services such as routing, switching, firewall, Introduction Protection Systems (IPS), WLANs, VPN, WAN acceleration, IP telephony or Unified Communications, etc. This integrated approach significantly reduced TCO by integrating all of these network services into one device. The integrated approach also placed all network services under one management umbrella offering both IT operational efficiency and headroom so that additional branch offices could be deployed without adding more IT personnel.

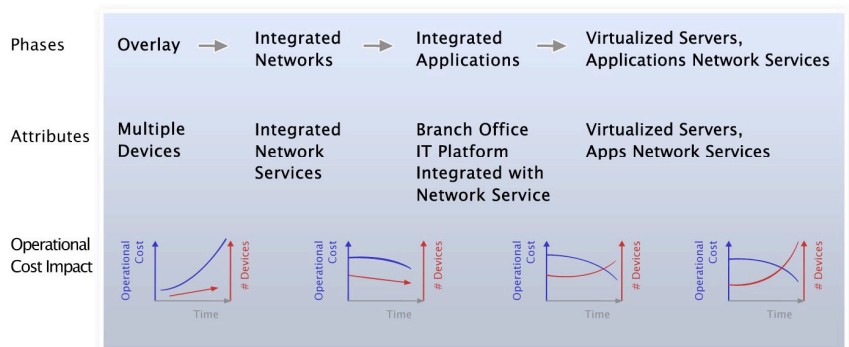
Studies have shown that IT operations were reduced by 50 to 70% as the integrated network approach was adopted. The integrated approach not only addressed TCO but offered branch office personnel additional services such as unified communications, mobility, application performance improvement and integrated security. Paradoxically survivability of branch office IT infrastructure increased as firms deployed the integrated network approach; the number of devices per branch were significantly reduced with a single high mean time between failure (MTBF) integrated device. Power requirements dropped as well, allowing the company to reduce its carbon footprint.

As a reference, there are over 5 million of Cisco's Integrated Services Routers (ISRs) that have shipped. This number can be viewed as market acceptance to this Phase Two approach.

Phase Three: Integrated Applications

The industry is starting to offer the third phase of branch office IT infrastructure. The third phase is the integration of applications and networks from a physical packaging plus application delivery and deployment point of view. One of the main drivers of the third phase is data center consolidation, which enables branch optimization through aggregation and consolidation of the branch IT footprint, further lowering TCO. Business and IT leaders who have

Branch Office IT Phases of Innovation



deployed the integrated network approach are now required to increase the manageability of their branch applications by moving some of their server-based applications onto the network platform.

To achieve the integrated application approach the networking industry has started to open up its software in the form of SDKs and APIs. Cisco, Juniper, Extreme, 3Com and the open source routing initiatives are allowing developers to write to well-defined router software interfaces. This is an important development as it provides a venue for increased innovation in networking and tighter linkage between applications and networks. But Cisco has taken this activity to a higher level by offering Linux and Windows platforms within its Integrated Services Router (ISR) and Wide Area Application Services (WAAS) products respectively, delivering on the network as a platform concept. Below is a discussion on the ISR-based solution with Shashi Kiran, Senior Manager Network Systems for Cisco Systems, who discusses this new trend in IT which takes integrated networking to the next level by integrating computing and applications into the network fabric, offering business and IT leaders a new approach to branch office value creation with Cisco's Application eXtension Platform (AXP).



A New Approach to Branch Office Value Creation Emerges

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Phase Four: Virtualized Applications and Services

The fourth phase of branch office IT infrastructure is to leverage integrated networks and applications in a virtualized context. The integrated network approach virtualized a wide range of network services so that they are available to users independent of physical location. The third phase will bring applications and networks closer so that application performance will improve, thanks to knowledge of specific network conditions such as link performance. The third phase will evolve into virtual machines residing in branch office networks, reducing the number of servers required and their power requirements while improving application delivery, security and management. For perspective, expect Phase Four to be a 2010 event while Phase Three has started with multiple IT suppliers providing solutions.

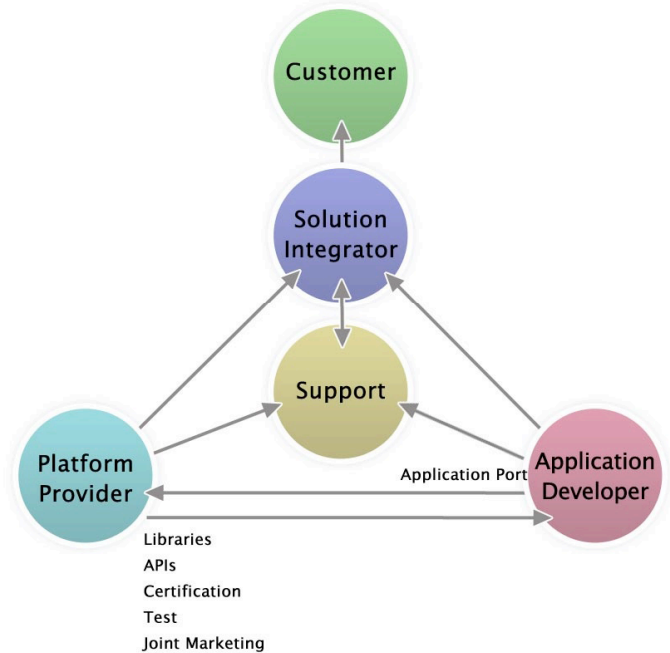
New IT Service Delivery Model

As business and IT leaders think through their next generation branch IT infrastructure many are reviewing their IT service delivery model, thanks to the third phase of integrated networks and applications. Strategies that leverage data center consolidation efforts, which minimize branch office IT footprint and TCO are favorable. Server centralization, virtualization and network consolidation are key aspects of next generation branch office IT infrastructure. Application deployment, integration and performance are key management focus areas as is branch survivability.

The integrated applications approach offers a new service delivery model where dedicated compute and storage capacity reside within a branch office router. This integration is a new application delivery platform offering several value points: 1) through an API branch applications gain network dynamic insights so that application performance is optimized; 2) networks, server and application consolidation in the branch; 3) both vertical and horizontal specific applications can be delivered via this platform; and 4) a new application delivery ecosystem is emerging, easing branch application deployment.

The integrated application platform enables independent software vendors (ISVs) to offer branch specific applications for targeted vertical industries such as healthcare, financial services, retail, transportation, et al. In addition ISVs are porting their software to this new platform to address horizontal or cross-industry branch office requirements. For a horizontal application example consider Sagem-Interstar, a global leader in advanced fax server solutions for IP networks. Sagem observed that legacy fax machine deployment is both expensive (they required dedicated analog circuits) and do not preserve privacy. Sagem realized that it could deploy its XMediusFAX Fax over IP (FoIP) technology on Cisco's AXP to virtualize fax functions into the Cisco ISR VoIP gateway. By doing so any desktop application could send/receive faxes; plus fax services could now be integrated into e-mail and mobile devices. Not only is cost reduced by running XMediusFAX on Cisco's AXP, but AXP improved resource utilization and provided audit trails for compliance requirements. Below Christian Larocque, Director for Sagem-Interstar and Shashi Kiran, Senior Manager Network Systems Solutions Marketing for Cisco Systems discuss the AXP as a development platform, the business value it creates and the realization of branch optimization.

New Service Delivery Model



Optimizing Branch Office Operations With Cisco's AXP

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This solution came together for H.I.G Capital. H.I.G. Capital is a leading global private investment firm with over \$7.5 billion of capital under management. H.I.G created value and optimized its remote office operations through Cisco's AXP business platform, which tightly links applications and networks. Below Luis Suarez, Director of IT at H.I.G. Capital explains how H.I.G. used AXP along with Sagem-Interstar's XMediusFAX application to displace both an old world analog fax network plus web-based fax services, while integrating fax services into its unified communications environment extending fax services to all H.I.G end-points and in the process speeding up business process and deal flow.



H.I.G puts Cisco's AXP to Work and Creates Business Value in the Process

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In the above H.I.G and Sagem examples, H.I.G. was able to remove all fax machines and their associated maintenance contracts, and improve service for company professionals without the need to add new equipment to their branch offices. The FoIP service was delivered by IPCoIT, a Sagem and Cisco partner.

In addition to ISVs and application providers porting their applications to the branch application platform, in-house IT development departments such as those in the financial services industry are writing custom applications, which



increase application performance or add features to management tools. Integrated application branch platforms offer APIs in which developers can write their own applications to add value to their branch office IT infrastructure.

Approaches to Integrated Applications

There are multiple approaches being offered by various vendors to the integrated application approach. For example, 3Com offers its Open Network, Juniper Network has Open JUNOS, Cisco offers AXP (mentioned above), while Extreme Networks launched its Widget Central. These efforts mostly offer restricted access to the network operating system such as monitoring and management feature sets. For example, Extreme has created an ecosystem around the development of application widgets by exposing features and providing software developers with access to its ExtremeXOS. Most widgets offer views and management assist for Extreme customers. Cisco differs from the above suppliers in that the AXP is a dedicated Linux server with dedicated hard-disk and memory. It resides as a service module within its ISR routers for branch offices. The AXP is equipped with an API, which exposes certain routing features such as packet monitoring, event trigger allowing applications to react to router events, IOS configuration allowing applications to dynamically change router configuration, information API providing information available via command line interface and SNMP agents, etc. Application developers can access routing features through the AXP's APIs and host their applications on the router. The AXP also supports virtualization of applications in completely self-contained contexts, allowing the ability to host multiple applications on the same service module in a secure manner. In addition to AXP, Cisco also offers a Windows Server platform within its Wide Area Application Services (WAAS) product.

There are open source approaches as well, such as eXtensible Open Router Platform (XORP), Zebra/Quagga and Vyatta. XORP and Quagga are research projects in open routing with little traction in enterprise computing. Vyatta is similar to Red Hat in that they offer open source routing code and charge for software subscriptions, network interfaces, hardware appliances, professional services and training.

What will determine success in the integrated application approach to branch office IT infrastructure will be the scale of the implementation or market share, solution economics, feature attributes, size of partner and developer ecosystem plus go to market strategy. As a point of comparison, there have been a few hundred thousand downloads of Vyatta's Vyatta Community Edition 4.0 routing code versus 5 million Cisco ISR routers in production.

For a vertical industry example consider NICE Systems. NICE provides solutions for voice recording, monitoring, and managing customer interactions for organizations with multiple branches. NICE has teamed up with Cisco to deliver their Network Embedded VoIP logger on top of Cisco's AXP. The NICE Network Embedded VoIP logger captures voice packets traversing the ISR and supports SRST (Survivable Remote Site Telephony) providing local audio storage with offsite archiving. There is no additional hardware for this solution, just an ISR with AXP. This solution allows business and IT leaders to address the growing trend of more personalized customer interaction requirements and increased regulation to journal customer interactions across many industries around the globe such as Base II in the US, MiFiD in Europe, FSA in the UK and JSOX in Japan. By embedding voice recording in the network, network optimization is achieved, recording servers are eliminated and application survivability ensured.

Below Mr. Nadav Doron, Director of Branch Solutions for NICE Systems discusses the AXP as a development platform, the business value it creates and the realization of branch optimization for financial services.



NICE Adds Voice Recording Solution to Cisco AXP Branch Platform

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Integrated Application Value Proposition

The value proposition for the integrated application approach to branch office IT infrastructure is significant as it leverages data center consolidation while increasing IT services at lower TCO. The integrated application approach increases branch office IT infrastructure attributes thanks to a new application delivery model that lowers branch office IT footprint by consolidating networks, servers and applications onto one platform reducing the IT operational cost.

Lower TCO: Depending on the number of branch applications, multiple servers may be needed, but their total number will reduce in this model. The highest cost components of branch office IT TCO (operations and facilities) are reduced with a common management model for networks, servers and applications. Maintenance is reduced by the displacement of devices such as fax machines, voice recorders and some servers while WAN performance is optimized by the interaction between network code and applications plus WAN application acceleration.

The following four findings from a recent study compared application development of in-branch offices appliances/ standalone servers versus the integrated application approach.

Quicker Application Development Time: Application development cost is significantly reduced when developers utilize an integrated application branch platform versus an in-branch server. Because the network is being utilized as a platform, there are savings in terms of time and development costs thanks to integrated services plus libraries and APIs, to which developers have access. The application is able to work directly with the network and leverage its APIs, as described above. Time required for development of new features in an integrated application scenario accounts for approximately one-third of development costs. The integrated application approach reduces this development time by approximately half.

Lower Integration Cost: Integration cost represents time involved in configuring and integrating the application server, security device, branch office router, etc. It is the cost of bringing together a heterogeneous environment to allow transparent operation to achieve business goals. In the integrated application scenario integration consumes approximately one-fourth of the effort to own and operate an integrated application branch platform versus appliance or separate branch office server.

Lower Maintenance and Energy Consumption: Maintenance includes the time and costs related to implementing patches, upgrades and updates which grows in time, cost and complexity as the number of devices in the branch increase. The integrated application approach reduced maintenance cost by over 50%. Power and cooling cost are also lowered by some 50% thanks to the integration of networkings, computing and storage in one package.

Faster Business: As servers are resident in the network and applications have visibility into network dynamics via APIs, faster deployments are achieved for new applications. New applications can be deployed without the procurement, configuration and operations of a new server, reducing the time required to launch a new branch office service. As more applications are layered on top of the integrated branch server platform, the time and cost associated with maintenance is reduced as well. This quicker pace of application deployment and efficient maintenance allows an organization to respond quicker to market dynamics and/or customer demands/concerns.

Survivability: There are specific network attributes gained through new design options afforded by the integrated application approach. In particular applications become network aware. For example, if the LAN link is performing sub-optimally, the application platform can sense this and dynamically alter some of the router settings based upon business load so that sensitive applications stay within performance tolerances. In the wide area, a failure of a primary or secondary link can be mitigated by configuring the two in a load-balancing manner that leverages performance routing and increases application survivability and performance.

Network Smart Proxy: Many branch applications are hosted in a data center and accessed over the branch office network. Some applications provide proxies in the branch office to increase survivability. There is a continual process of checking status between the integrated application platform and its clients plus the central application to detect a network failure and if one occurs to assume the role of proxy, assuring business continuity. As discussed

above data center consolidation allows IT leaders to centralize complexity and deploy application proxies into branch office locations. That is, the application resides in the data center and the proxy could be running in the Cisco AXP; for example, in the event of a link failure or disaster the application platform could keep the proxy running until such time as access is available to the data center, transferring control back to the central entity.

Network and Application Awareness: Not only is the application aware of the network, but the network is aware of the applications. Seems intuitive, but this awareness between networks and applications allow both to behave respectfully of each other so that performance and survivability are improved. This awareness improves disaster recovery and business continuity as the network and applications have a view into and some control over each other allowing quicker response to both man-made and natural disasters. In addition most IT organizations are split into application and network groups. With awareness between networks and applications, IT is able to view the service delivery, acquisition and performance optimization more holistically.

A tight linkage between the application environment and wide area network offer additional performance and disaster recovery attributes. For example, application performance over the wide area is improved as it has a view into router status and network dynamics, which it can manipulate based upon business rules. Applications can avoid network-based delays such as shifting application traffic from a heavy traffic WAN link to one less occupied. Not only can applications shift their transport based upon performance, but also failed links are avoided. As mentioned above application driven router reconfiguration allows application to modify network behavior to maintain performance. IT leaders may centralize most application support and create a very thin or thick branch application footprint, depending upon their business needs. The integrated application approach affords optimization of both models yielding great control over IT complexity.

One of the most important attributes afforded by the integrated application approach to branch office IT infrastructure is the speed of response to market conditions and the dynamics it offers to IT leaders. As executives seek to capitalize on globalization opportunities, manage IT complexity, become greener and deploy Web 2.0-based collaboration, the integrated application approach is an enabler of these important initiatives. As business and IT leaders re-distribute human and capital assets away from headquarter facilities toward branch offices the integrated application approach allows IT leaders to manage this shift in business operations.

How To Get Started

The new industry model of application delivery in the branch office is three-fold. First, networking and IT firms offer a platform upon which developers write applications. The IT firms offer platform service such as libraries, APIs and access to specific networking information. The more libraries and deeper APIs the quicker developers can write applications. Second, developers, ISVs or firms who offer solutions on standard hardware can port their service on top of this platform. The platform provider and ISV offer certification and support services to solution integrators. Third, solutions are being delivered to market through solution integrators that envision, design, sell, implement and support the solution. In the case of H.I.G Capital, IComIT was the solution integrator while Sagem was the ISV and Cisco the integrated application platform provider via its AXP.

We offer a six-step process for getting started with Integrated Application.

Step One - Review Branch Office Applications and Service Needs: The first step is to review all the application and service needs of your branch offices. Applications may include the need for voice recording, eliminating fax machines but increasing fax service, a new payment terminal, healthcare telematics, etc.

Step Two - Review Integrated Application Platforms: Review the various approaches to integrated applications and their associated platforms to ascertain their effectiveness for your organization. Evaluate ability to virtualize application contexts securely.

Step Three - Map Branch Office Needs to Platform: This is the opportunity to make sure that the integrated application platform meets your branch office needs by reviewing computing, storage and network utilization for all the applications and services required. This is the time to start working with a solution integrator who has an understanding of the platform capabilities and limitations.

Step Four - Select Platform: With branch office needs identified use this list as a guide to select the platform provider. There should be a good match between your branch office needs and the partners in the platform ecosystem.

Step Five - Identify Applications and Services: With platform selected and branch needs identified, it's time to select the applications and services that will be deployed on the integrated application platform. Clearly this will be a short list at first as the IT organization needs to understand how the new platform and its service delivery model work.

Step Six - Test and Implement: With the first application or service identified and designed it's time to test the implementation, make appropriate changes and continue on to full implementation.

Once around this six-step process, new application delivery will be more streamlined as the platform is in place and can be leveraged while organizational knowledge is gained. The six-step process reduces to three with the platform selection process removed.

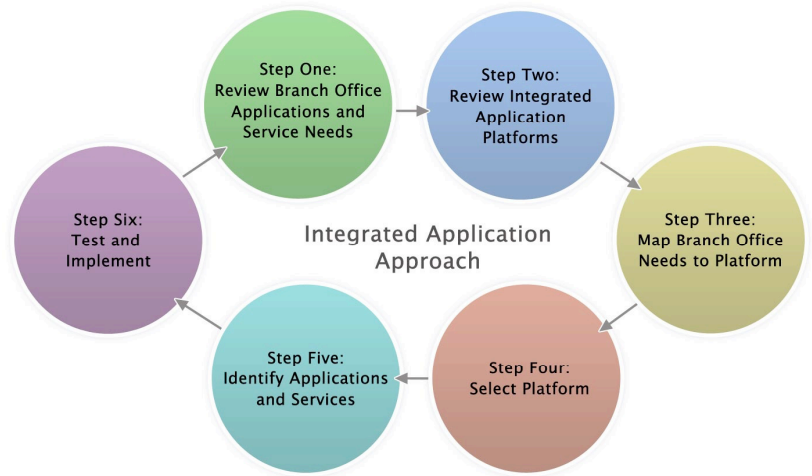
Industry Recommendations

Based upon the above, we offer the following five recommendations:

To deliver more business value at lower TCO consider the integrated applications approach for branch office deployments.

Consider platform suppliers with large market share/footprint and financial resources to sustain a healthy ecosystem. This is a critical consideration as ecosystem development is an expensive commitment that requires a business and technical architecture to be managed and optimized so that value is being delivered to market. In addition a certification, test and support program are important ecosystem attributes; make sure your platform provider has these partner aspects in place.

Consider platforms that deliver bi-directional network and application awareness to deliver lower TCO, higher application optimization and increased business continuity. The best platforms will have a deep library of services, which developers can access, and APIs to specific network information and control, which will create a rapid development environment of feature rich applications.



Consider leveraging integrated applications as one aspect to the network as a business platform to address the trends outlined above. To meet this end, look for platforms that offer developers access to routing, switching, firewall, IPS, unified communications, VPN and other network services in their libraries and APIs. This will allow applications to have multiple touch-points into the branch network so that it may respond and optimize its performance.

Consider adding integrated applications to all top down application deployments which impact branch office operations.

About Nick Lippis



Nicholas J. Lippis III is a world-renowned authority on advanced IP networks, communications and their benefits to business objectives. He is the publisher of the Lippis Report, a resource for network and IT business decision leaders to which over 40,000 business and IT executive leaders subscribe. Its Lippis Report podcasts have been downloaded over 50,000 times; i-Tunes reports that listeners also download the Wall Street Journal's Money Matters, Business Week's Climbing the Ladder, The Economist and The Harvard Business Review's IdeaCast. Mr. Lippis is currently working with clients to transform their converged networks into a business platform.

He has advised numerous Global 2000 firms on network architecture, design, implementation, vendor selection and budgeting, with clients including Barclays Bank, Microsoft, Kaiser Permanente, Sprint, Worldcom, Cigitel, Cisco Systems, Nortel Networks, Lucent Technologies, 3Com, Avaya, Eastman Kodak Company, Federal Deposit Insurance Corporation (FDIC), Hughes Aerospace, Liberty Mutual, Schering-Plough, Camp Dresser McKee and many others. He works exclusively with CIOs and their direct reports. Mr. Lippis possesses a unique perspective of market forces and trends occurring within the computer networking industry derived from his experience with both supply and demand side clients.

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