

## Enterprise Networking Solutions

### Optimizing Business Applications Performance

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#### Transitioning To A Converged Communications Network Infrastructure

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Member Firm



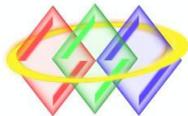
Society of Telecommunications Consultants

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Enterprises are faced with a number of business imperatives that are challenging from technology and financial perspectives. The business applications your enterprise relies on require a high-performance applications infrastructure. To gain or maintain their competitive edge, organizations are looking to roll-out applications in a reliable, secure, scalable and cost-effective environment.

A converged communications network infrastructure can meet these requirements and provide the ability to prioritize bandwidth by application, the potential for automatic redundancy, and the value of a fully-meshed network with less complexity and cost.

This report provides a high level overview of the technology, its application and transition issues involved with Virtual Private Network (VPN) infrastructures.

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## **Converged Applications Networking Overview**

Many businesses are realizing that a converged network applications strategy can improve the price/ performance of their operations. A converged communications infrastructure can support organizational performance with customers, suppliers and employees by increasing the agility of the enterprise, increasing management control and enhancing the organization's business continuity and security operations.

In a 2005 global survey of business executives, 45 percent of respondents considered convergence "important" or "critical" to achieving their strategic IT and business objectives, and 60 percent said they would deploy converged networks across most or all of their organizations by 2008.<sup>1</sup>

IT organizations are constantly being asked to support more end-user and customer services and capabilities within expense and capex constraints. A converged applications network strategy affords the opportunity to add value and agility on a scalable basis. There are four distinct areas of opportunity:

- IP-enabling networks with multi-protocol label switching (MPLS) and virtual private networks (VPN's);
- Transitioning typically separate networks, such as voice, video, conferencing and messaging services to IP-enabled services;
- Optimizing the current applications infrastructure to create an integrated environment increasing the economic feasibility of added services.
- Integrating network options for mobile, fixed access and business continuity

Each area represents opportunity and challenge. To neutralize and overcome the challenges and realize the positive impact of the transition to a converged environment, you must understand the steps required to make it a success, and carefully choose the right group of suppliers and technologies. Applications are prioritized by Quality of Service (QOS) which must be coordinated among router configurations and network suppliers.

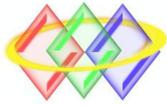
In moving to a new environment, you should also realize that there is method of managing it that enhances performance and control. You need to be sure that you have the right mix of people, processes and tools to accomplish this or engage a managed services provider who will do it for you. In a managed services environment, the supplier is responsible for daily operations of the network while your staff is free to develop enhancements to the environment to support your user community.

In any case, the development of Service Level Agreements (SLA's) and Service Level Objectives (SLO's) is important to assure end-to-end performance of the infrastructure and the applications.

An independent consulting firm, such as T.A. Wallace & Associates, Inc. can guide you through the maze of vendor claims and technologies and help you develop a solution that is customized to the requirements of your organization. Our consultants are unbiased, experienced professionals who operate solely in the best interest of your business.

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1. "Competing through Convergence," AT&T survey and white paper in cooperation with the Economist Intelligence Unit, Page 1. © 2005, AT&T



## VPN Technologies

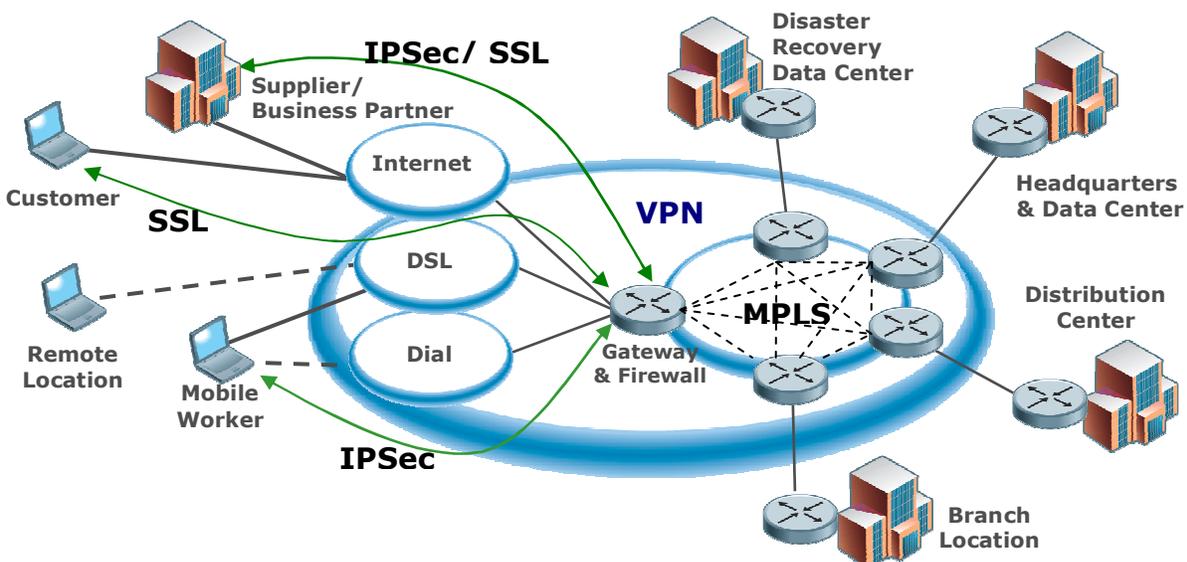
### Background

Telecommunications networks are evolving toward IP-enabled platforms replacing separate private line, remote dial access and frame relay data networks and traditional voice networks. These “converged networks”, or VPN’s (Virtual Private Network) are easier to manage, and should deliver high availability, network security, scalability and Quality of Service (QoS).

Three basic IP VPN technologies form the converged network architecture:

- Multi-Protocol Label Switching (MPLS): the baseline technology that supports a converged network, and provides its own built-in level of network security.
- IP Security (IPSec): a technology that has been adapted from a host-to-host and remote access technology to one that supports networking.
- Secure Socket Layer (SSL): a technique for providing “clientless” network access by allowing secure transactions through a web browser.

While these technologies can be individually deployed, they have been combined to support the needs of different classes of users in a unified network architecture as shown below.



### MPLS- The Core Enabling Technology

MPLS is a core enabling technology which supports the definition of a private IP routing domain on a packet switched network, i.e., a private secure network on a shared backbone. Each packet that travels across the MPLS network is labeled to identify its VPN membership, the destination, and the importance/ priority of the data.

Data prioritization is called Quality of Service (QoS), which packets associated with designated applications to be assigned a higher priority- assuring a higher level of performance. QoS assures that more demanding requirements of applications such as Voice over IP (VoIP), video and mission critical data are met.

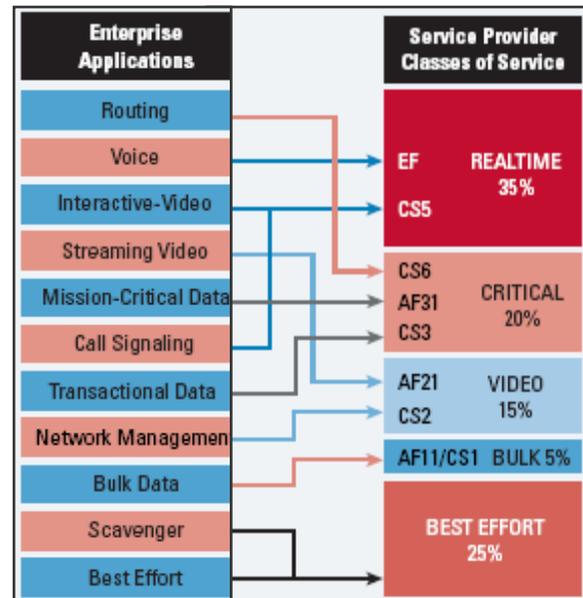
An MPLS network is a mesh structure, rather than a traditional hub-and-spoke design offering any-to-any connectivity- allowing for efficient data transfer and load balancing.



MPLS offers many advantages to an enterprise. It is relatively easy to manage, highly secure, flexible and scalable. It can deliver the QoS functionality that's needed to support a converged network of voice, video and data. MPLS will support a variety of access technologies and multiple network services the network infrastructure (such as Frame Relay, Ethernet and ATM). Different types of "IP-aware" devices can be integrated into the platform- making network expansion an uncomplicated exercise. Another advantage of MPLS is the enabling of disaster recovery/ business continuity without the need for duplicate network facilities.

With an MPLS infrastructure, enterprises need to work closely with their providers to understand how routing decisions will be made in the backbone and coordinate QoS priorities throughout the network.

As shown in the graphic<sup>2</sup> at the right, you want to be sure that application QoS priorities in your premises routers are consistent with the network provider's Classes of Service. When this is done, demanding applications like VoIP and Interactive Video will be assigned to the Realtime CoS while at the other end of the spectrum, internet browsing will be assigned to the low Best Effort COS.



MPLS has become the primary technology used for VPN infrastructures. It supports site-to-site, mesh-style connectivity and can handle converged traffic (data, voice, video). It is a good option for deploying value-added applications (multimedia, conferencing, collaboration) and business process applications (enterprise resource planning, customer relationship management). MPLS can allow a company to move toward IP-enabled call centers, enabling an improved customer experience and superior price/performance.

### ***IPSec: Secure Access for Business Partners and Out-of-Office Employees***

While IPSec can be used as a standalone VPN technology, in this environment it complements MPLS VPN technologies. IPSec is a technology for defining encrypted and authenticated flows across a packet switched network. IPSec is often considered to be a security technique, but in fact, it is a networking technology.

In a converged infrastructure, the advantage of IPSec is that it provides a secure VPN connection through the Internet. IPSec can be used to extend access to the MPLS VPN for remote users and supply chain partners. It can also provide added security to the MPLS VPN through encryption and authentication (with some added management complexity).

IPSec is a good choice for enterprises that:

- Need additional security measures beyond MPLS traffic separation;
- Communicate primarily through hub-and-spoke topologies;
- Are looking to deploy a solution across an existing network without VoIP or video;
- Need access to geographically disbursed employees.

2. "QoS Design for MPLS VPN Subscribers" © 2005, Cisco Systems



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## ***SSL: Encrypting e-Commerce and Customer Transactions***

SSL is a way to provide secure communications through a web browser. It authenticates and encrypts traffic between users. It is typically used as an e-commerce security technique and is not really a networking technology.

The chief advantage of SSL is its ability to establish a secure connection in a "client-less" environment (no special software on the user's PC). This is important for people who to connect to corporate networks from Internet cafes or remote kiosks or private computers (such as customers' computers). Enterprises can limit access to specific Web pages or internal resources, providing entry to only specific information the user should view.

While SSL complements an enterprise VPN by allowing secure transactions to a broad base of users, it has its limitations it is very server resource intensive.

## **Converged Network Infrastructure- What Are the Benefits?**

People ask themselves- why migrate an existing network that is working fine? There are potential cost savings available by migrating to converged IP VPN, the ability to prioritize applications, inherent redundancy/disaster recovery capability, and reduced complexity.

Our experience with a national pharmacy chain that deployed a converged MPLS-based VPN demonstrates these points. They saved over \$60K/month on disaster recovery. When they decided to roll out a photo processing application (upload digital photos to website, pick-up pictures in any of 6000 stores) to gain a competitive edge, the network was updated (not upgraded), a network based firewall was deployed and the application was functioning in less than two months. The result: minimal capex, resources focused on application issues instead of the network circuit upgrades and the overall photo application category went from break-even to \$1.8M in profit after the first year. Due to proper capacity planning and QoS, there was no impact on mission critical applications performance.

MPLS-based converged VPN's are network-based and use a service provider's routers and MPLS-based routing to communicate between locations in the network. The carrier's core routers create the VPN, not the client's.

Cost savings and TCO benefits are realized by:

- *Combining multiple networks into one infrastructure.* It is less expensive to deploy and operate one infrastructure rather than two or more single purpose networks. This applies to facilities and capacity, equipment and IT staff resources.
- *Shifting backbone equipment and routing responsibilities to the carrier.* Capex, staff and operations expense savings are realized.
- *Enabling more efficient applications performance* without wholesale bandwidth upgrades.
- *Increasing applications agility.* When new applications are required, they can be deployed on the converged infrastructure more quickly and prioritized based on the business model without the cost of a wholesale network upgrade.
- *Using the built in redundancy for business continuity.* You avoid the cost and management complexity of physically re-pointing one or several networks to alternate sites.

It has been said that Site-to-Site VPN's which use the Internet as the core backbone are less expensive. However, the total cost of ownership (TCO) is actually higher due to high equipment and IT support costs. Additionally, the Internet's architecture was not designed for business-grade applications and requirements and does not offer strong service level agreements (SLA's) - so there is a performance risk for mission critical applications.



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## **Transitioning to a Converged Environment**

The goals of transitioning to a converged MPLS environment are to:

- Integrate applications across an enterprise.
- Deliver seamless it services to employees, customers, suppliers and business partners.
- Eliminate the cost of managing/maintaining disparate networking environments.
- Reduce operational costs through more efficient application performance management.
- Support on-demand and new business applications with full interoperability.

Planning for MPLS networks begins with a detailed analysis of which applications will use the network, how much bandwidth they will require and the usage patterns and enterprise locations the network must accommodate.

Secondly, elements of the organization's strategic business plan that will leverage the network infrastructure in the future should be included in the analysis. What applications need to be deployed to assure business success and what is the business impact of a timelier rollout.

Other initial considerations include provisions for redundancy and business continuity and understanding the kinds of edge devices and access technologies to be used.

### ***Key Focus Areas For Building Out A Converged Application Infrastructure***

The primary goal is to determine exactly where you are now with your network infrastructure and where you intend to be in the future. A baseline assessment is critical for understanding current applications traffic. Developing profiles of new applications- such as VoIP- is critical for determining capacity of the new network.

This list will provide insight into the planning tasks that are involved.

- Conduct a baseline network assessment to evaluate the existing infrastructure.
- Determine current number of IT staff devoted to voice, data, network management, and other relevant disciplines and project future requirements (personnel & skills inventory).
- In-depth review of current operations and goals for the future.
- Determine specific performance requirements for existing applications and end-users.
- Capacity plan for the integration of multiple networks, systems and applications.
- Uncover synergies that improve customer service and compete more effectively.
- Decide on the level of service you will require from your infrastructure.
- Determine how you will measure and manage performance.

In addition to having an adequate infrastructure, enterprises must be able to manage the performance of their applications and the infrastructure they run on. Application performance management (APM) requires real-time visibility across the network, servers and applications. This is information that IT managers must have to ensure that applications do what the business requires for success.

How much to invest in application infrastructure performance depends on how tightly your organization's success is linked to the performance of the business applications you use. Enterprises processing high volumes of transactions, those with a large number of applications to support and those with high demand for redundancy and data backup will be highly dependent on application performance, and want to invest accordingly.

It is advisable to engage an independent consultant to conduct the analysis and participate in developing the strategic network plan. This allows your staff to remain focused on supporting your current environment and will keep the project on track.



## **Considerations For A Managed Services Environment**

For a detailed understanding of application performance, you need the ability to track and report upon a wide range of application metrics. Particularly in a dynamic environment, having this end-to-end visibility across your networks, systems and applications is essential.

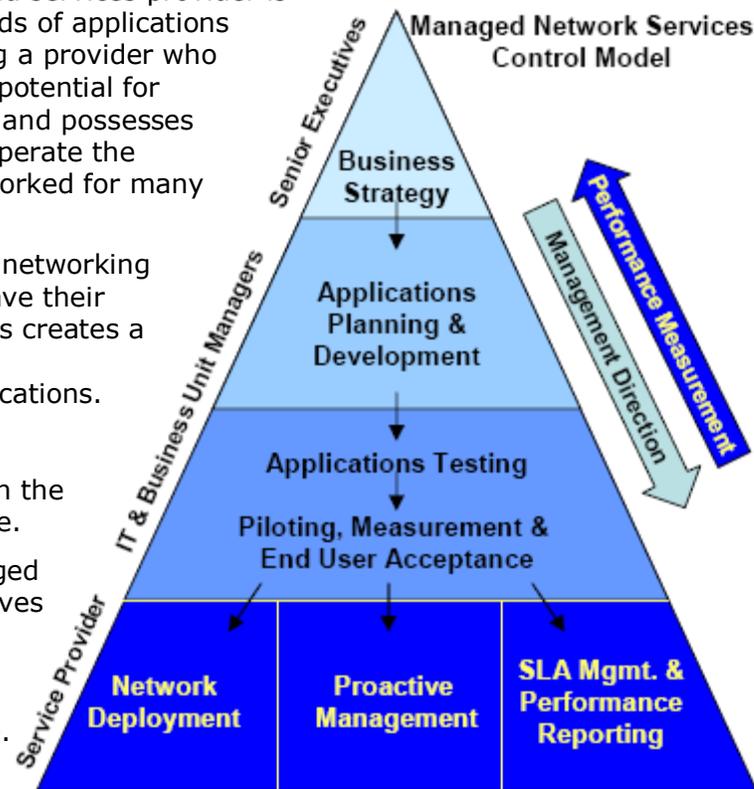
Your enterprise will need to have the underlying tools to correlate events and facilitate intelligence with real-time monitoring and notification of any service degradation. There is a requirement to adjust elements impacting performance. You will need to adopt a proactive approach to performance management – it is important to identify and resolve potential issues before they impact end-users.

Often times, teaming with a managed services provider is an effective way to meet the demands of applications performance management. Selecting a provider who understands your environment, the potential for emerging convergence technologies and possesses the people, processes and tools to operate the environment is a method that has worked for many organizations.

Companies can purchase integrated networking and hosting center resources and have their applications managed or hosted. This creates a comprehensive environment for the deployment of their networked applications. Buying the converged application infrastructure as a service also frees in-house resources to concentrate on the core competencies of their enterprise.

The availability of hosted and managed application infrastructure services gives you significant budgeting flexibility. You have the option to develop applications in-house, and then scale them up as a managed service.

As an alternative, you could maintain direct control of critical functions while letting an expert handle other services. The availability of managed application infrastructure services enables you to take advantage of the service provider's infrastructure investment without having to reproduce it.



"The key challenge of managing a converged network environment is getting a handle on all the changes it brings to network behavior and all the changes in the network that might be required to support it. Most organizations ... come to realize within 18 months that the tools they use to manage and monitor their networks prior to convergence will not handle the new environment sufficiently well. ... Better instead to plan for such a deployment from the outset, and to budget for it, too. ... Doing so will not only result in better performance, it will provide solid evidence of that improvement for use in securing budgets for further projects, and will speed the identification and resolution of problems in the converged network."<sup>3</sup>

3. "Managing Convergence: Challenges and Best Practices", By John E. Burke, Principal Research Analyst, Nemertes Research. © 2006, Nemertes Research



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## **About T.A. Wallace & Associates, Inc.**

### ***Our Practices***

#### **Strategic Consulting**

Integrate Network Technology Into Your Firm:

- Networked Applications Infrastructure Analysis & Design
- MPLS VPN Converged Network Services Analysis & Design
- Voice Over IP (VoIP) Assessment & Design
- Call Center And Contact Center Design
- Wireless Services Analysis
- RFP Development & Analysis
- Contract And Price Negotiations

#### **Network Infrastructure Analysis**

- Audit equipment and facilities to be sure your billing is correct
- Ensure that your bills reflect the rates and features in your contracts.
- Make recommendations for infrastructure improvement and cost savings in your network communications environment.

#### **Project Management Service**

- Augment your staff and manage the deployment of what we recommend. Accelerate benefit realization and measure results.
- Provide on-going staff support on a daily, monthly, quarterly or annual basis.

## **Comprehensive, Quality Consulting Services Supporting Your Business**

### **Experience & Competence**

Our Consultants and Project Managers have over 150 years of combined experience delivering customized networking solutions to clients. We have competency in Voice, Data, VoIP, Call Centers, Business Continuity/ Disaster Recovery and Managed (outsourced) Network Solutions. With T.A. Wallace, you always get the "A" Team- we have no junior associates here.

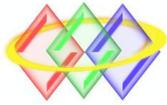
### **Technology Integration**

We integrate networking technology into your business processes and make it work the way you want it to.

We work with you to develop a strategic plan, design the solution, negotiate the best deal and then deploy and assure it. We ensure that you get the right technology at the right price.

### **Performance Assurance**

We develop and negotiate Service Level Agreements (SLA) and Service Level Objectives (SLO) across the entire solution so that it performs the way it has to. Mission critical applications require better than average performance characteristics, so SLA and SLO development and compliance is critical to your success.



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## **Knowledge Base**

Our experienced Consultants and Project Managers have worked across a broad base of client applications environments. We stay on top of new developments through the educational resources of the Society of Telecommunications Consultants (STC).

## **Strategic Partnerships**

We partner with other members of the STC and with specific strategic partners to deliver a complete solution. For example, we will employ Centech Solutions for Call Center performance improvement programs and customer care technology platforms to compliment the network design. We are also members of The W Group's Partner Program and are affiliated with Tangoe, Inc.

## **Objective Independent Analysis**

With the multitude of systems and services available, it is imperative that your consultant provide objective recommendations based upon your specific requirements. As STC consultants, we are independent of any connection that might be considered a conflict of interest. You are assured that objectivity will be maintained.

## **Proven Methodology**

While you have the opportunity to use networking technology to expand your business, determining the right solution can be confusing and even counter-productive.

We work for you and with your staff to navigate the communications environment. We have the resources and knowledge base to:

- Understand Your Goals and Business Objectives...
- Analyze Your Current Situation and Envisioned Environment...
- Develop A Benefit Analysis and A Transition Plan...
- Design The Solution, Issue RFP's and Select The Best Suppliers...
- Implement The Plan and Accelerate Benefit Realization...
- Measure The Results

## **Contact Information**

### **Thomas A. Wallace**

President

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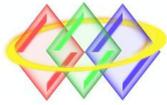
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## **Principal Profiles**

### **Thomas A. Wallace, President**



Tom Wallace has over thirty years of experience in telecommunications. His consulting clients include financial institutions, telecommunications companies, high tech firms, manufacturing companies, state government, law firms and health care providers. Tom has conducted engagements for AT&T Wireless Services, Analog Devices, 3-Com, CFX Bank, CVS, Motorola-Codex, Bank of New Hampshire, Blue Cross Blue Shield, Mintz Levin, Citizens Bank, Boston Red Sox, Expedia, Fleet Bank, Hewlett-Packard, Middlesex Savings Bank, Northeast Health Systems, Compass Bank, Brookline Savings Bank, PictureTel and others.

He founded T.A. Wallace & Associates, Inc. in 1995, a telecommunications consulting firm headquartered in Massachusetts. It is national in scope with large multi location clients located on each coast and specializes in Strategic Consulting on the selection of voice/data/IP networks, Project Management & Staff Augmentation Services and Auditing and Analysis of Network Billing.

Tom specializes in network premises equipment and facilities, call center design and overall project management. He is expert in the use of Centrex, PBX, private voice, digital data networking and Intelligent Call Routing for virtual call centers. His clients use some of the most sophisticated and complex intelligent voice and data networks in the market today, along with premises-based and network-based voice recognition systems.

Tom was formerly Director of Marketing at Aristonics Corporation and prior to that, spent twelve years with AT&T helping organizations like Fram Corporation, Textron and state governments manage their telecommunications networks.

He holds a Bachelor of Science degree in Business Management from the University of Massachusetts, Dartmouth. He resides in Mattapoisett, MA with his wife Carole and has two children.

View my profile on [LinkedIn](#)



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**David M. Paruti, Senior Consultant**



Dave Paruti has a proven track record in developing customized outsourced network applications that solve client business problems. He has significant experience in merging new solutions with business processes and integrating them into existing financial and technical infrastructures. Dave specializes in transitioning traditional networks to converged infrastructures. He has the requisite knowledge of financial, accounting and expense management principles and has demonstrated success in contract interpretation and negotiation.

He has supported clients in the financial services, healthcare, manufacturing, retail and government environments over the last thirty-five years. Dave has been successful in matrix managing diverse teams to “on-time, on-budget” results.

Prior to joining T.A. Wallace & Associates, Inc., Dave held several client-facing management positions with AT&T for thirty-five years.

His most recent engagements highlight the breadth of expertise that he brings to a project. He developed and enhanced a 6100 location managed network solution for a national retail pharmacy. This mission critical infrastructure solution provides a high speed backbone over which the client runs customer service, supply chain management and prescription and financial adjudication.

To assure availability, he developed and enforced Service Level Agreements (SLA’s) and Service Level Objectives (SLO’s) that were aligned with the client’s business requirements. He managed a team of resources from his firm and from four supplier companies to exceed the objectives of his client.

The services included Managed WAN Services, Managed VPN Services, Managed Network-based Firewall Services, Managed IP Remote Access Services, Managed Network-based Fax Service and integration with the client’s Help Desk. He also led the team responsible for developing and negotiating the contracts with the end user and the supplier organizations and adapting them to meet the client’s evolving business model.

In addition to his professional experience, Dave attended the College of the Holy Cross in Worcester, Massachusetts and received a Bachelor of Arts Degree in Political Science in 1973. He lives in Bridgewater, MA with his wife Jean and has three grown children.

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