

White Paper Abstract:

In this white paper Alliant Technologies' Senior Network Architect, Mr. Ron Darling describes the business and technical considerations for companies migrating to IP-based telephony systems.

Introduction

The following white paper provides the IT manager with a checklist of migration considerations which Alliant Technologies' engineers use to approach complex IP telephony (IPT) conversions. Alliant has a proven approach for tackling complex projects – the ADIS Methodology, or Analysis, Design, Implementation and Support. For IP telephony, Alliant uses the same ADIS program to align business goals with technical requirements, and deliver outstanding results.

Analysis

Business Requirements

Alliant Business Analysts start projects with a clear understanding of the business drivers for the migration to IPT. Once the business drivers are understood, the IT manager can set parameters for measuring project success.

Why is the company considering a migration to IPT?

- Will it eliminate expensive PBX maintenance contracts?
- Reduce the need for voice contractors?
- Save on toll calls between company sites?
- Retire out of date PBXs and key systems?
- Provide a voice services for new locations?
- Improve employee productivity?
- Is it a way to more closely integrate disparate subsidiaries?

Financial Review

All major business decisions have financial impacts. The purpose of the financial review is to compare current budgets and costs against the investment in a new system and the costs of operating the new system. This comparison provides a Return on Investment (ROI) analysis that will be shared with upper management.

Current System

- IT Organizational Support Costs & Resources
- Current PBX depreciation situation
- Budget cycle
- Operational expenses
 - Software licensing
 - Telecommunications circuits
 - Equipment maintenance
 - Voice services administration
 - Projected equipment expansion costs
 - Personnel costs

Proposed System

- Start Up Costs
 - Analysis, assessment, pilot tests
 - Design & implementation costs
 - Deployment, testing, troubleshooting
 - Capital Costs (equipment, etc)
- Operational expenses
 - Software licensing
 - Telecommunications circuits and services

- Equipment maintenance
- Service management
- Voice services administration
- Personnel costs

Cost vs. Risk

- Risk Tolerance
- Cost of Downtime/Revenue Impact
- Cost of status quo

Return on Investment (ROI) Analysis

The typical savings areas for an IPT migration include:

- Voice/Data network administration
 - Only one network to manage and user list to administer
- Circuit efficiency
 - IPT solutions typically reduce the quantity of POTs lines and T1 circuits required at each site
- Toll Bypass
 - Free on-net calls between IPT sites
 - Free on-net conference calls between IPT sites
- Video Conferencing
 - Companies can use their new converged WAN to carry internal video conferences and eliminate carrier service charges
- Handset costs
 - End users have the option to use an integrated SoftPhone on their PCs with a headset
- PBX maintenance expenses
 - No longer require voice contractors with experience in multiple voice platforms
 - Will no longer need to pay high maintenance costs for old PBX systems
- Real estate costs
 - IPT equipment takes up a smaller footprint, and is usually co-located with data equipment
- Wiring costs
 - For new installations, only one wiring run is required per desk
- Reduced international charges
 - Clients have the option of also using VoIP in the network for sending overseas calls via the internet vs. PSTN
- Personnel savings
 - IPT is centralized and can be managed by fewer people
 - Fewer receptionists can cover calls for multiple sites
- MAC costs
 - IPT significantly reduces moves, adds, changes as clients can log in anywhere on the network, or change desks at will without administrator support.

Technical Assessment

Alliant engineers work closely with the technical leaders supporting voice services to understand the legacy environment and expectations for the new system.

Network Readiness

One of the most difficult aspects of moving to IPT from the TDM world is preparing the LAN and WAN backbones to support IP-based voice traffic. Beyond additional capacity for the voice and video traffic, a solid QoS (Quality of Service) routing design is critical for effective voice packet delivery.

IT managers should work closely with both its IP-PBX vendor and WAN vendor to agree on a suitable design for the new IPT solution.

WAN Assessment:

- WAN technologies (e.g., IP VPN, Frame, Private Line, etc)
- Router inventory and configuration
- WAN link utilization, performance, and throughput
- QOS-enablement (if any)
- Network diagram including all networking equipment (routers, etc), from all sites

LAN Assessment:

- LAN switch infrastructure: inventory, topology, network operating system
- Email platform
- DHCP and DNS service
- Number of users
- Cat5 Verification/Structured Cabling
- Quality of Service (QoS) measures for voice over IP
 - Latency – the time needed for a packet to traverse the network
 - Packet Loss – the percentage of packets lost while transiting the network
 - Jitter – a measure of the variation in arrival delay for a series of packets.

Telephony Assessment

What is the current telephony environment?

- PBXs
 - Phone System models, versions, age
 - Number of Users and User Groups
 - Phone System Features required for each User Group
- Voice Mail systems
 - Models
 - Features
 - Storage requirements
- Phone System Support Model
 - 3rd party maintenance
 - On-site employee
 - Part-time consultant
- Telephone Service Circuit Inventory at each site
 - POTS Lines
 - T1/PRIs
 - Fax lines
 - Modem banks
 - Toll-free numbers (ANI/DNIS/Advanced Features)
- Growth requirements
 - Account for organic or inorganic corporate expansion
- Voice traffic volumes
 - Spikes and busy-hours by day or season
- Voice call quality assessment
 - MOS (Mean Opinion Score) measure for human voice transmission quality
 - ITU-T G.107 standard
 - ETSI 101329-5 Annex E standard
 - Current bandwidth allowance per call

Technology concerns

- Are IPT “open” systems are really open?
- Is the IPT system extensible to legacy equipment?
- Can I maintain security with voice over VPN connections?
- How do I ensure reliability & redundancy for voice services?
- Where should the IPT equipment be housed? On-prem or at a public data center?
- Can the system provide real-time status, trend reporting, and execute updates in real-time?

Design

Design Blueprint

Once the company’s objectives and its technical and functional “current state” are fully defined, the design process begins. Some of the considerations include:

- Physical & Logical Topology Diagrams
 - LAN, WAN, bandwidth, locations, hardware placement
- LAN Design
 - VLAN design
 - PoE capabilities
 - Wiring updates
 - QoS Design
 - Spanning Tree protocols
 - IEEE 802.1q VLAN tagging and IEEE 802.1p QoS settings
- Systems Design
 - Parts List (Hardware, Software, Manufacturer Maintenance)
 - Email Server & Active Directory integration
 - Web Server integration
- WAN Design
 - IP circuits
 - Telecom circuits
 - MPLS design
 - QoS design
 - Traffic classification
 - Traffic shaping
- Scalability Plan
 - Prepare architecture to manage planned growth
- Security Plan, including remote access and authentication
- DR and Redundancy Plan
 - Meet end user reliability requirements

Operations Impact

New systems require new methods and procedures for the operations team.

- Methods & Procedures Changes
 - MAC/Ds (Moves, Adds, Changes, Disconnects)
- Staffing Skill Sets & Training
- Monitoring, Management & Admin Tools
 - Fault management
 - Patch management
 - Capacity management

Implementation

Migration Planning

Alliant prefers a customized approach to IPT, based on budget, current infrastructure, risk aversion, and the technical resources available. Most customers, however, fall into two basic migration modes:

- Flash Cut, which is a complete change-over to new hardware and apps. This is best for smaller clients, green field situations (i.e., new branch offices), or sites that can be out of service for at up to 48 hours.
- Phased Approach, which moves sites or applications one by one. This is the most popular method, and works well with medium to large clients that cannot afford downtime.

Project Management

Project managers must keep the lines of communication open between the installation team, business leaders and the end user community. They will track:

- Cutover dates
- Responsibility lists
- Project Plan
- Common file database for configurations, dial plans, feature plans, phone and circuit inventories per site, contact lists, etc.
- Status updates

Infrastructure Upgrade

- WAN equipment
- LAN equipment

System Build

- IP telephony equipment
- Voice mail
- Other servers

Beta Site Trial

Cutover & System Testing

The implementation team should develop a common test plan for all sites to provide consistency and ensure that all aspects of the system are working according to specifications.

- User stations
- Voice circuits
- Key features (911, incoming call patterns, automated attendant, etc.)
- Failover testing

Training

- End users, receptionists, executives, operational and technical staff
- Phones
- Applications
- Administration
- Technical monitoring & maintenance

Support

Post Cut Support

- “Day 2” IPT support
 - Technical
 - Administrative
 - End-User Support

Performance Optimization

Once installed, all aspects of the system are tested and measured for effectiveness, and adjusted for optimum performance.

- Equipment
- Network
- Applications

Management & Monitoring

- Implement new systems and procedures, or outsourced management and monitoring

Measuring & Reporting Success

- Financial Metrics
- Business Process Metrics

Summary

The checklist above is a starting point for IT managers who are planning a migration to IP-based telephony. By starting with an understanding of the business drivers for an IPT conversion, IT managers can plan for and meet the company’s requirement for financial, technical and operational performance of IP-based voice services.

Alliant Technologies, based in Morristown, NJ, provides a full range of Smooth IP™ Telephony Solutions, based on industry-leading Cisco technology, including: Small Office and Enterprise IP Telephony Solutions, and the fully managed, subscription-based, Enterprise Managed IPT Service. For more information visit us at, or call 973-267-5236.

Written by:
Ron Darling
Senior Network Architect
Alliant Technologies