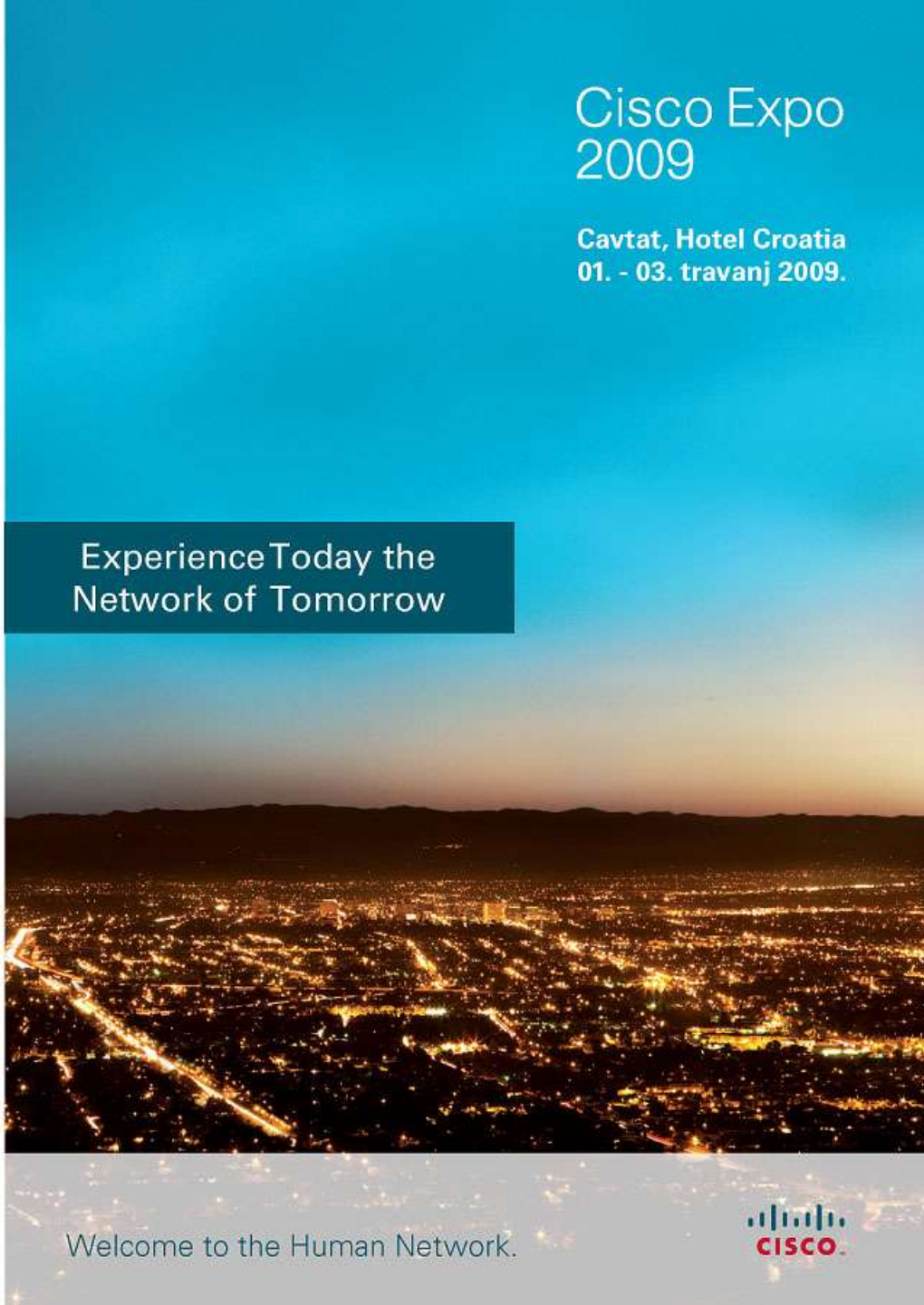
Running 3rd Party Applications on the Branch Routers

Denis Zotov



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Experience Today the Network of Tomorrow

Welcome to the Human Network.

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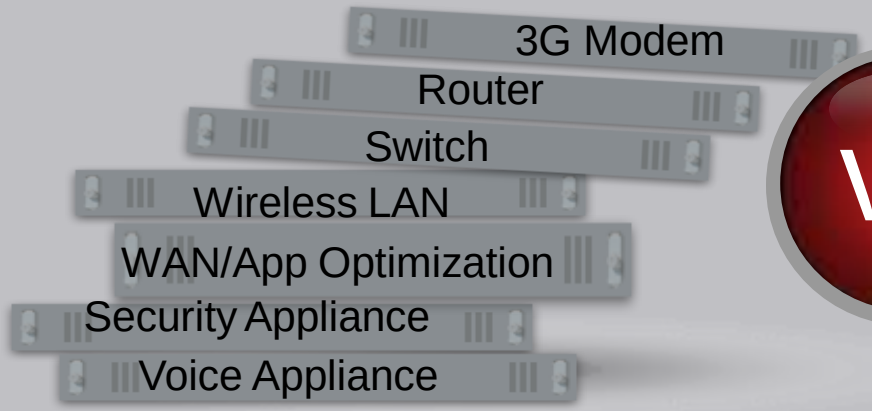
Agenda

1. AXP Architecture and Overview
2. Connecting Your Application to the Network
3. Packaging and Installation
4. How Can My Application Leverage the Network?
5. APIs
6. Customer Case Studies

The Value of Integration

Overlay Appliances



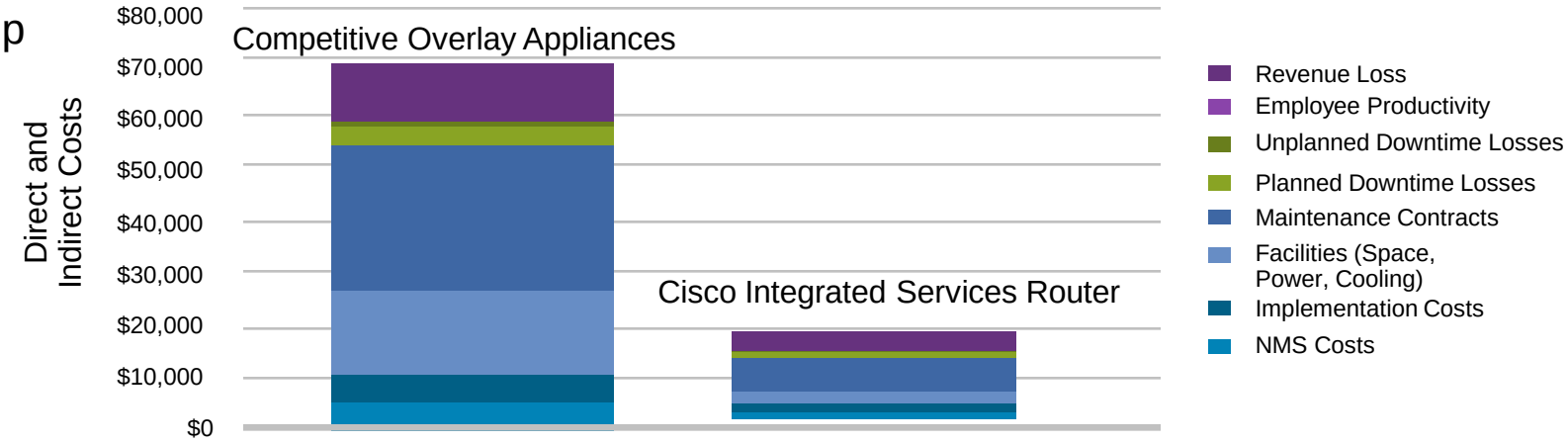
VS.

Integrated Services Router

Cisco ISR 3845 with integrated Voice, Wireless, Video, WAN Optimization and Switch

Over 70% OpEx Reduction

Total Cost of Ownership (assuming equal Capex)



The Network is the Platform

Operational Efficiency

A Few Years Ago

Multiple Overlay Products

Integrated Services Routers

- Service Integration
- Survivability
- 50–70% Opex reduction

Network Integration

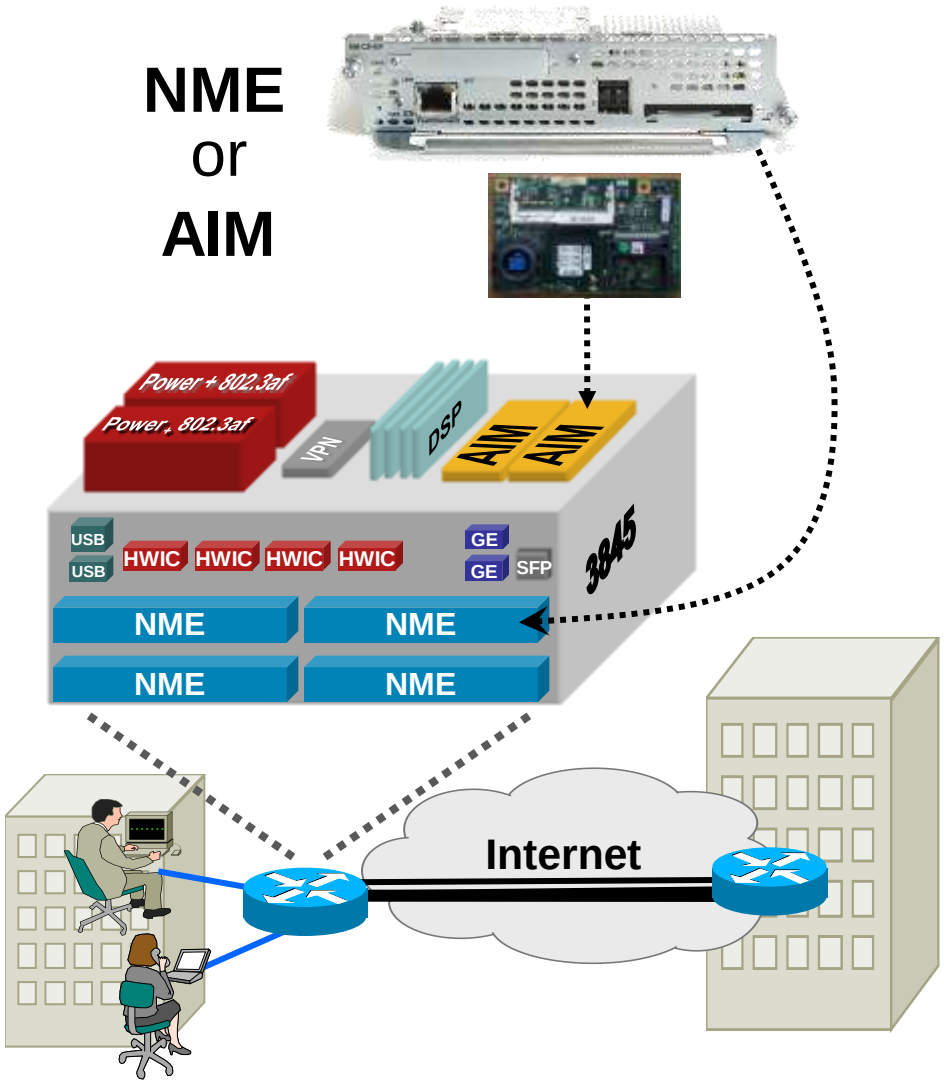
Integrated Application Platform

- Applications and network integration
- New business models
- Optimized branch footprint

App and Server Integration

AXP Architecture and Overview

Services Engine Overview



1. Router integration

   Direct router integration

2. Incremental system resources

   Additional CPU/RAM/ Storage

3. Common hardware

   Improved MTBF

   "Pay as you grow"

4. Lower total cost of ownership

   Simplifies deployment/ maintenance/management

Supported Hardware

1. **AIM-APPRE-102-K9**
   - CPU: 300 Mhz
   - Memory: 256 MB
   - Compact Flash: 1 GB
2. **NME-APPRE-302-K9**
   - CPU: 1.0 Ghz
   - Memory: 512 MB
   - Disk: 80 GB
3. **NME-APPRE-502-K9**
   - CPU: 1.0 Ghz
   - Memory: 1 GB
   - Disk: 120 GB
4. **NME-APPRE-522-K9**
   - CPU: 1.4 Ghz
   - Memory: 2 GB
   - Disk: 160 GB

ISR Router Support

	AIM 102	NME 302	NME 502	NME 522
1841	Y			
2801	Y			
2811	Y	Y	Y	
2821	Y	Y	Y	
2851	Y	Y	Y	
3825	Y	Y	Y	Y
3845	Y	Y	Y	Y

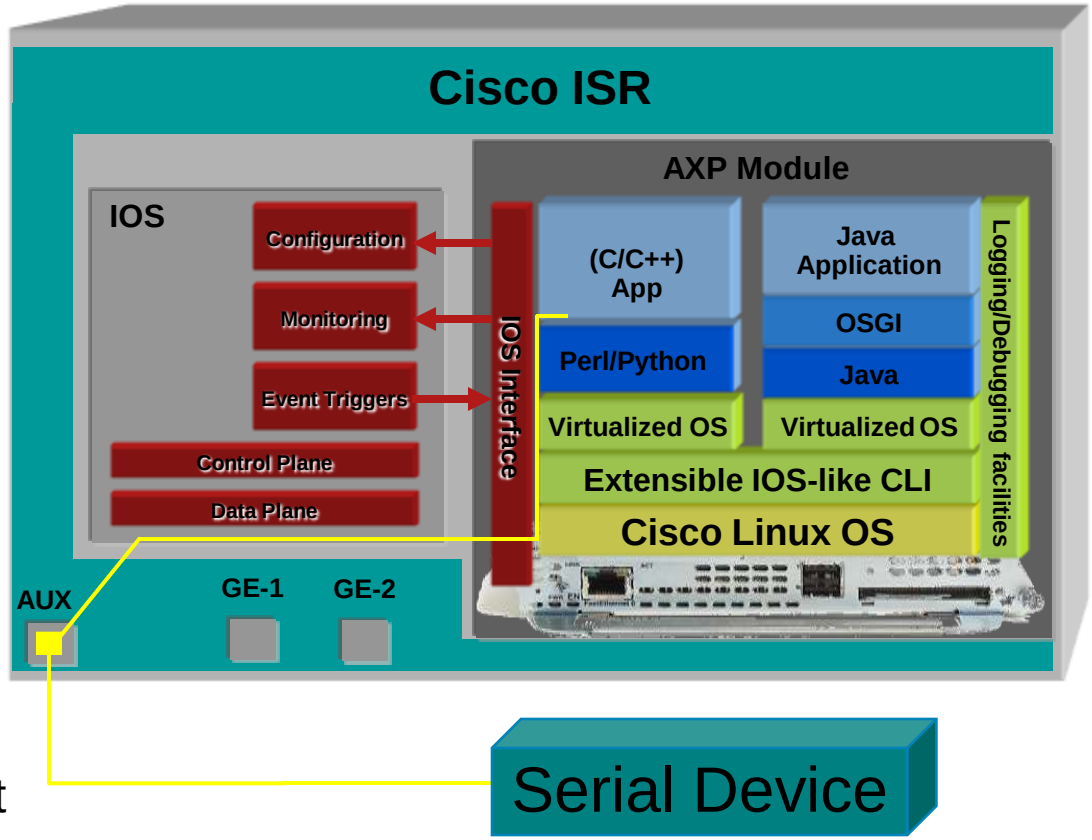
AXP Technical Overview

Dedicated Application resources

- CPU, Memory, Storage

Standards Based Hosting infrastructure

- Hardened Cisco Linux OS
- Linux Vserver “sandboxing”



Additional Features:

- Standard programming support
- ISR serial port virtualization
- Monitoring, Configuration, and EEM API’s

Application Environment

LSB (Linux Standard Base)

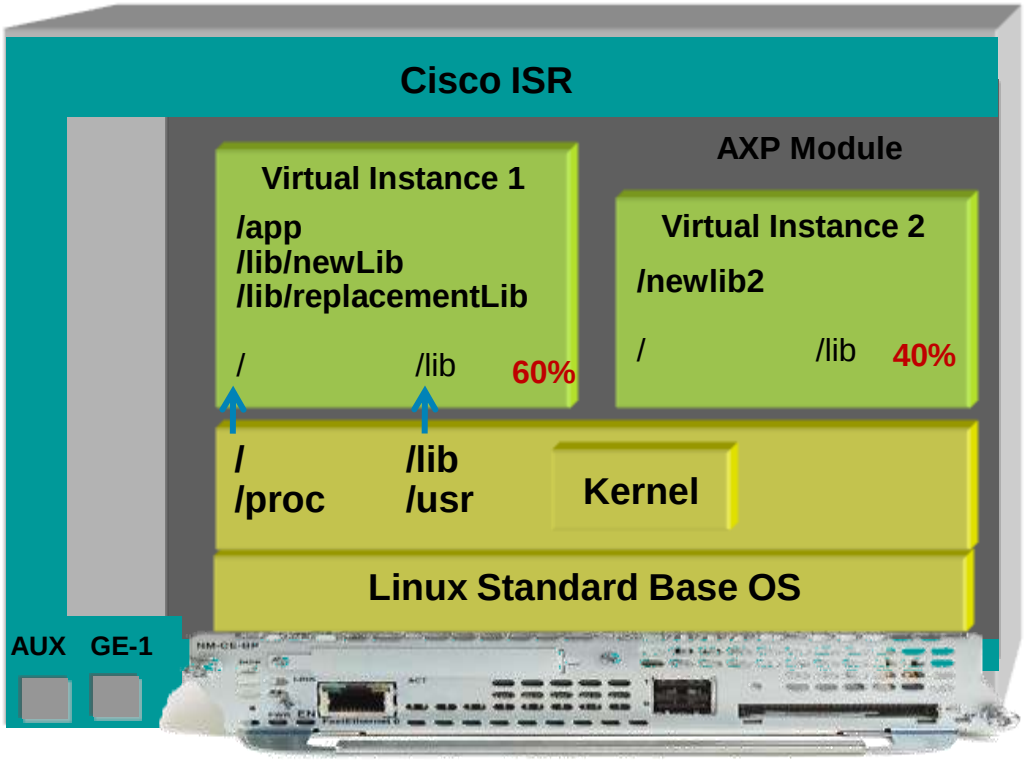
- http://www.linux-foundation.org/en/LSB: "currently all major distributions comply with LSB"

Linux V-Server

- Creates Virtual instances. Each virtual instance provides a full Linux OS

Expandable

- Additional Linux components can be packaged as part of the application

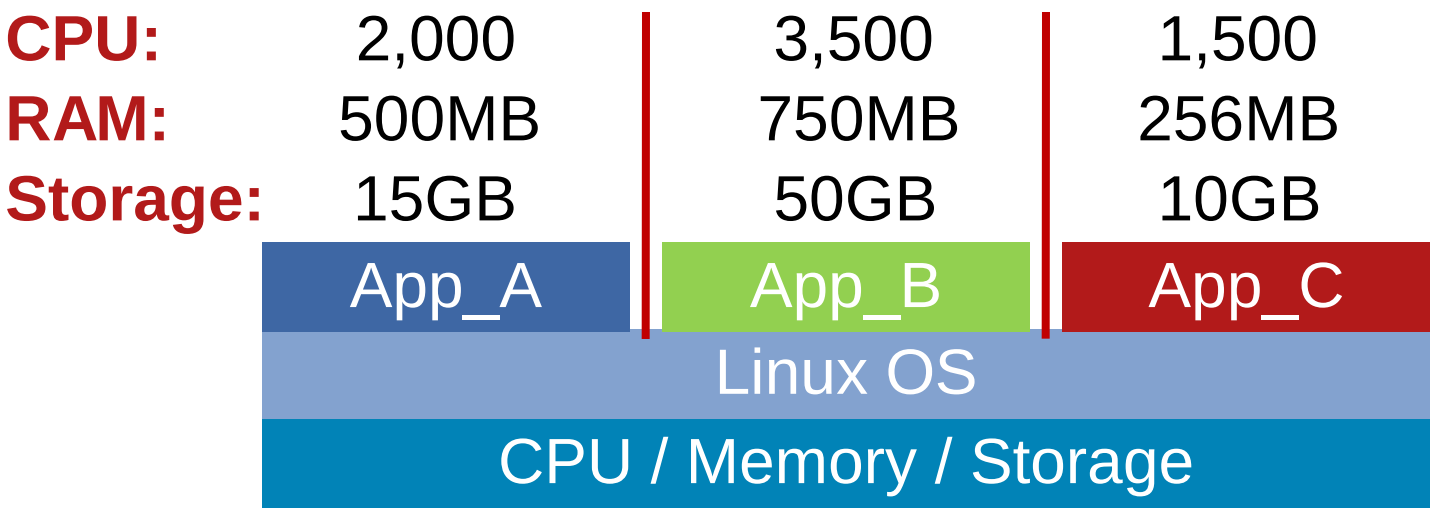


AXP

Sandboxing with Linux Vserver Technology

1. Multiple 3rd-Party applications running simultaneously on a single AXP blade
2. Each application runs its own virtual instance
3. Flexible network connectivity

Ex:



System Snapshot Monitoring (ex)

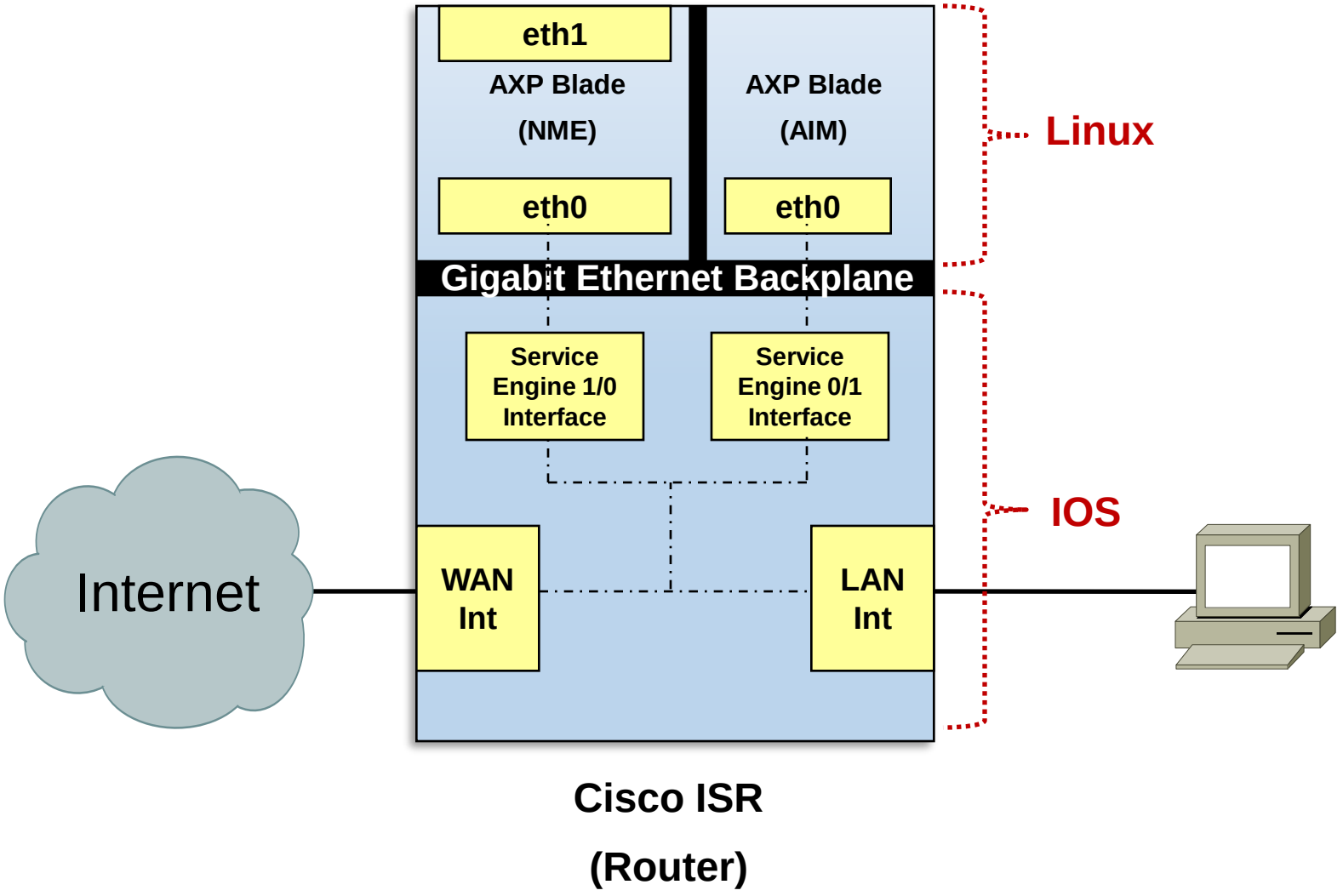
	State	Health	Meaning
Application A	Online	Initializing	Virtual instance running; Application_A is starting
Application B	Online	Alive	Virtual instance running; Application_B is running
Application C	Online	Down	Virtual instance running; Application_C is down
Application D	Offline	Down	Virtual instance down; Application_D down by default

AXP provides an API call for an application to report its health.

Multiple applications running on a single AXP service-module may be in different states

Connecting Your Application to the Network

Basic Connectivity of AXP Service-Module



Advanced AXP Network Support

Internal Interface Connects Blade to the Router

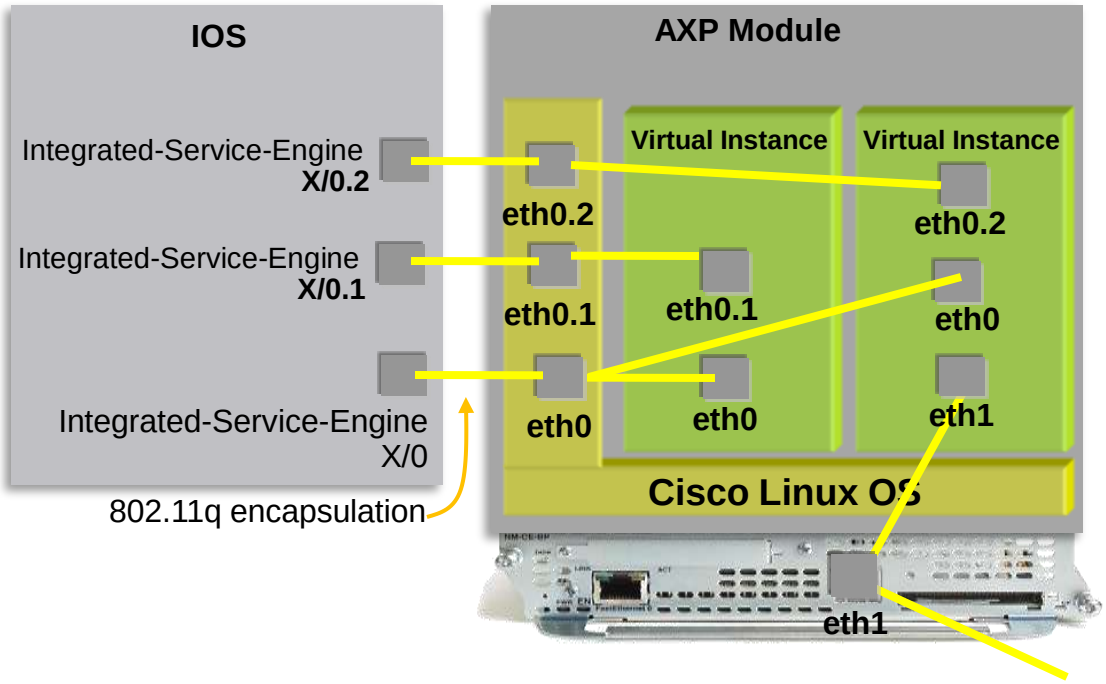
- Integrated-Service-Engine X/0 is the interface on IOS
- Eth0 is the interface on the Linux side

Virtual Interfaces "Bind" to Interface

- Flexible use of available interfaces
- Sub-interface support
- 802.1Q (VLAN) Encapsulation support

External (NME only)

- Interface exposed to Linux as Eth1
- Virtual instances optionally bind to interface



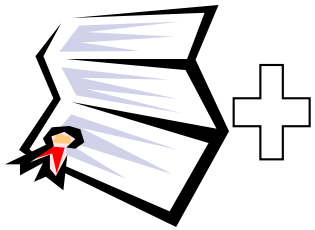
Flexibility means:

- Application migration easier
- Multiple applications afforded subnet separation
- Security per application instance

Packaging and Installation

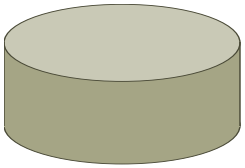
Application Packaging

Vendor's X.509 Certificate (includes public keys)

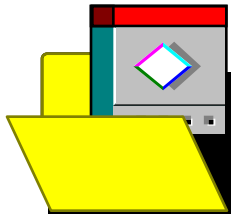


Checksum of Certificate Encrypted with AXP Private key

Vendor's Private Key

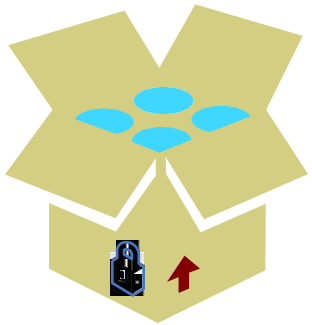


Application Files



Sign application files

Compress Application Files



Signed Application Bundle

Install / Update

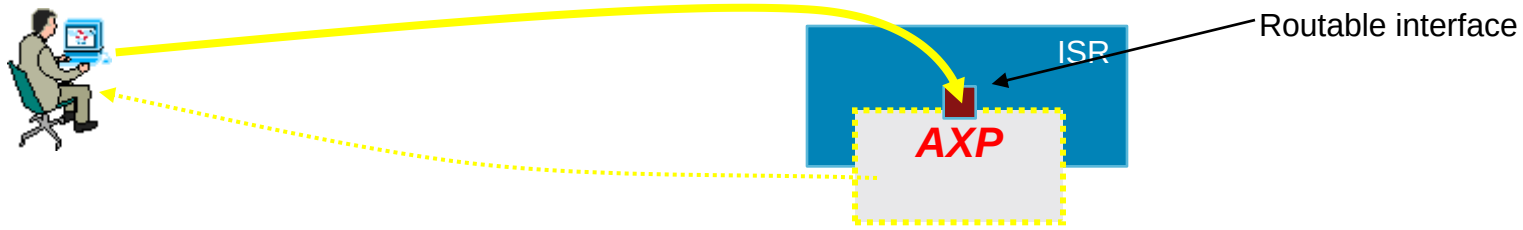
Security Enforcement Via Certificate

1. **Unauthorized software will not be allowed to be loaded into operating system**
   - Enforced through cryptographic signatures
   - Verify packages have been signed by Cisco
2. **Application vendors will not have access to private Cisco keys for package signing**
   - Need to manage their own public/private key pairs
3. **Managing permissions**
   - Cisco responsible for managing permissions to install software into AXP environment
   - Cisco will provide 3rd-party vendors a checksum of their X.509 certificate encrypted with AXP OS private key → key becomes authorization

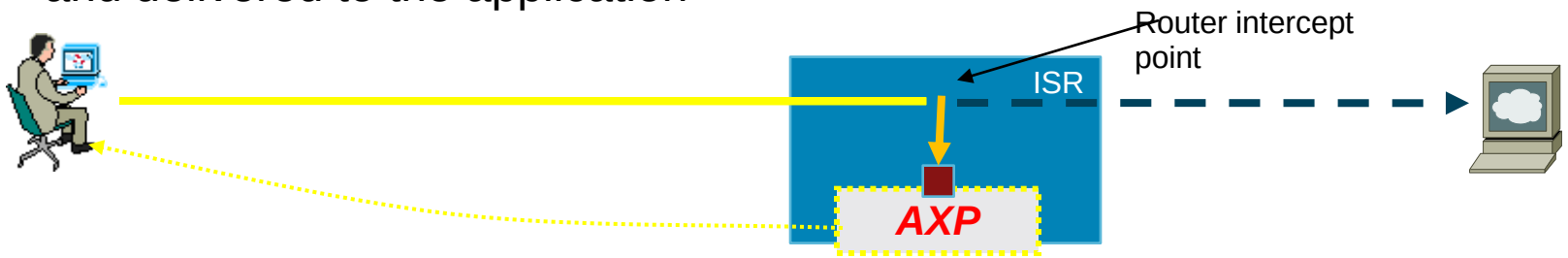
How Can My Application Leverage the Network?

Application Access Modes

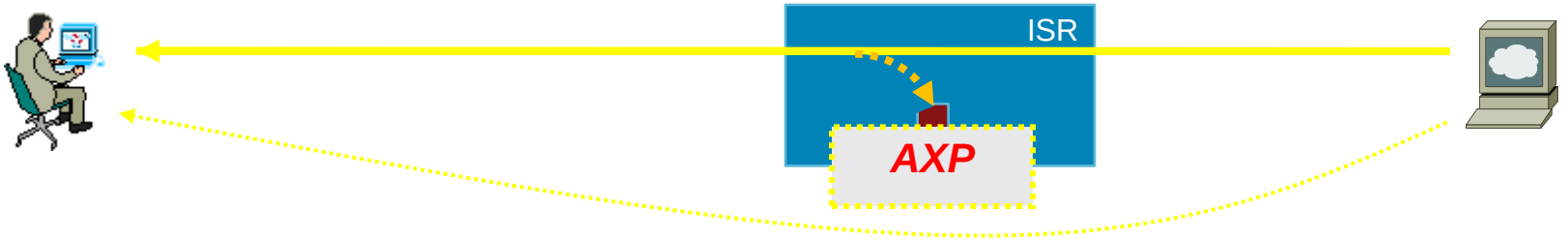
- Direct Access – Client sends traffic directly to application IP address (standard server model)



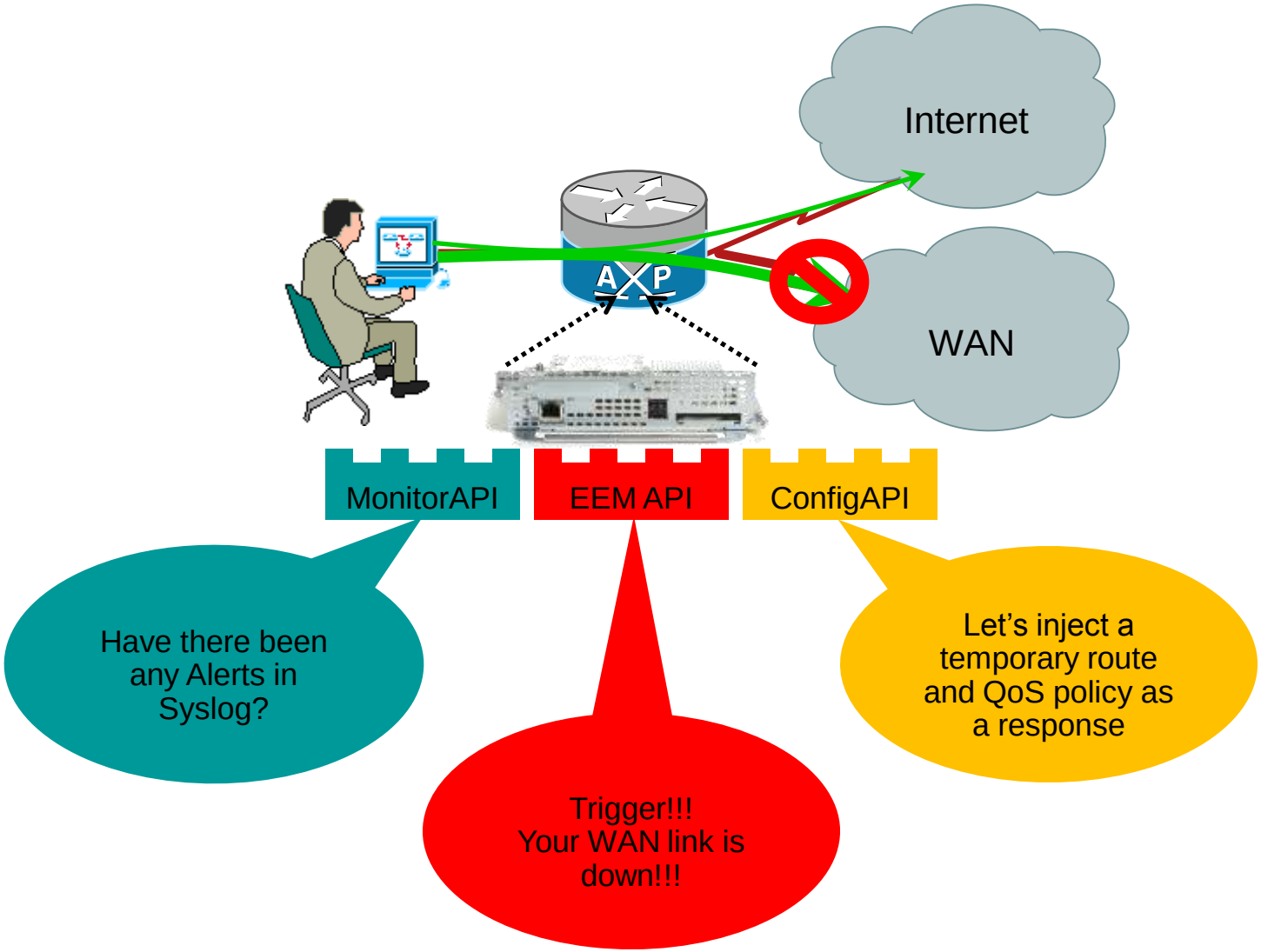
- Intercept – Traffic is sent to a remote host and is intercepted by the router and delivered to the application



- Promiscuous - A copy of each packet is sent to the module for monitoring/analysis. Flow of packet is unaffected

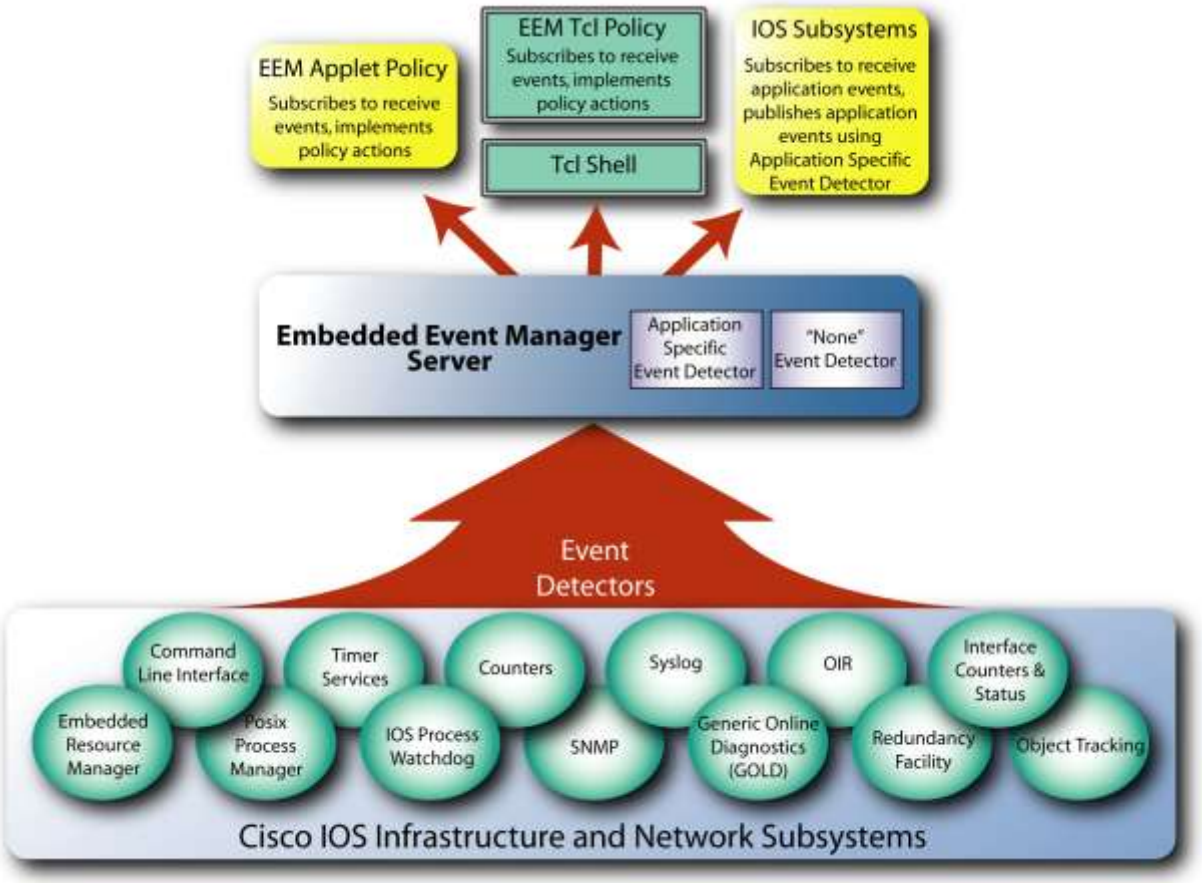


Integrating Your Application with the Network
API's



EEM (Embedded Event Manager)

AXP system includes an EEM API



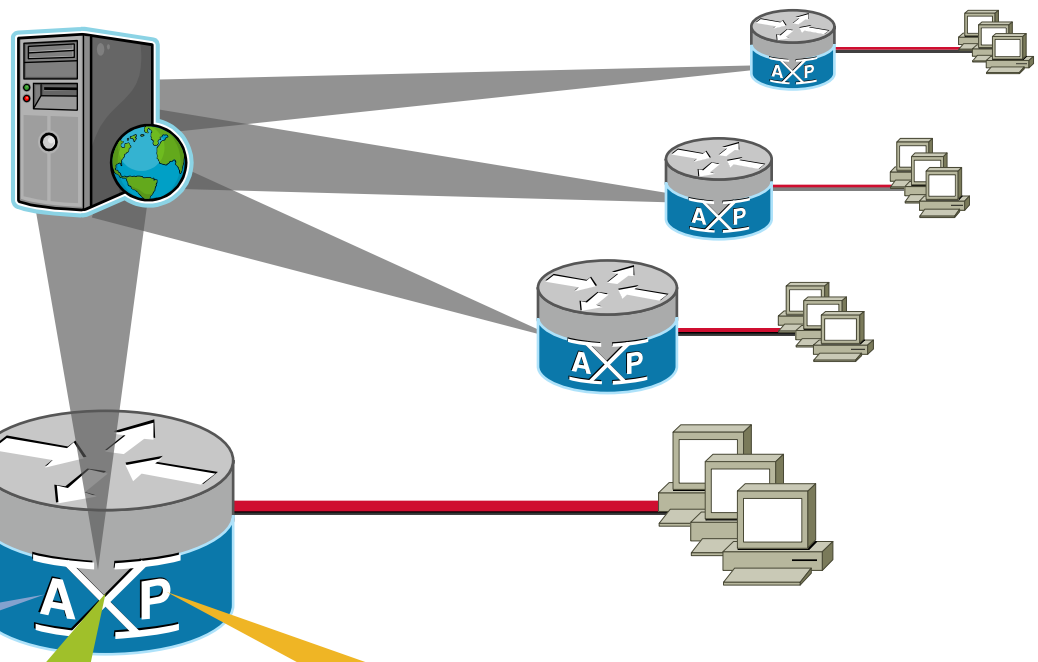
* All within Cisco IOS

AXP Use Cases—In a Nutshell

Integrating Business Value into Your Branch Router

AXP Central Management

1. Software Management (install, upgrade, patches)
2. Application/platform Configuration + monitoring
3. Extensible architecture to manage custom apps



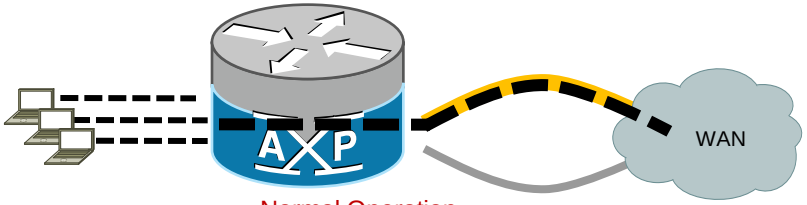
Network Services
AAA Server
DNS Server
NTP Services
File Services
Syslog Server

Home-Grown Utilities
Management Agents
Monitoring Tools
Custom Scripts
NetFlow Analysis

Applications
Business Applications
Vertical Applications
Telephone Applications
Software Mgmt Systems

Network-Aware Applications

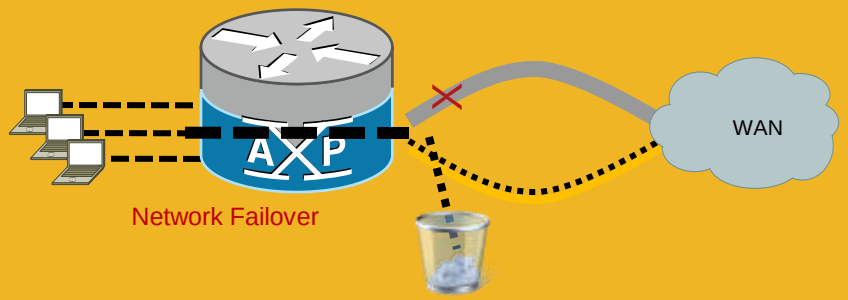
1. High-bandwidth link for primary, low-bandwidth link for failover
2. Application utilizes high-bandwidth link to provide services to local clients



Normal Operation

Network Failover with Non-Integrated Application

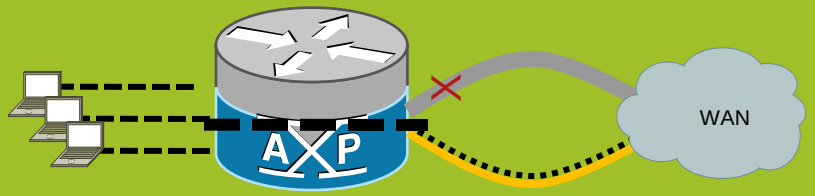
- Router fails over to low-bandwidth link
- Application is unaware of the drop in capacity
- Loss of service and unpredictable behavior occurs



Network Failover

AXP Network-aware Application

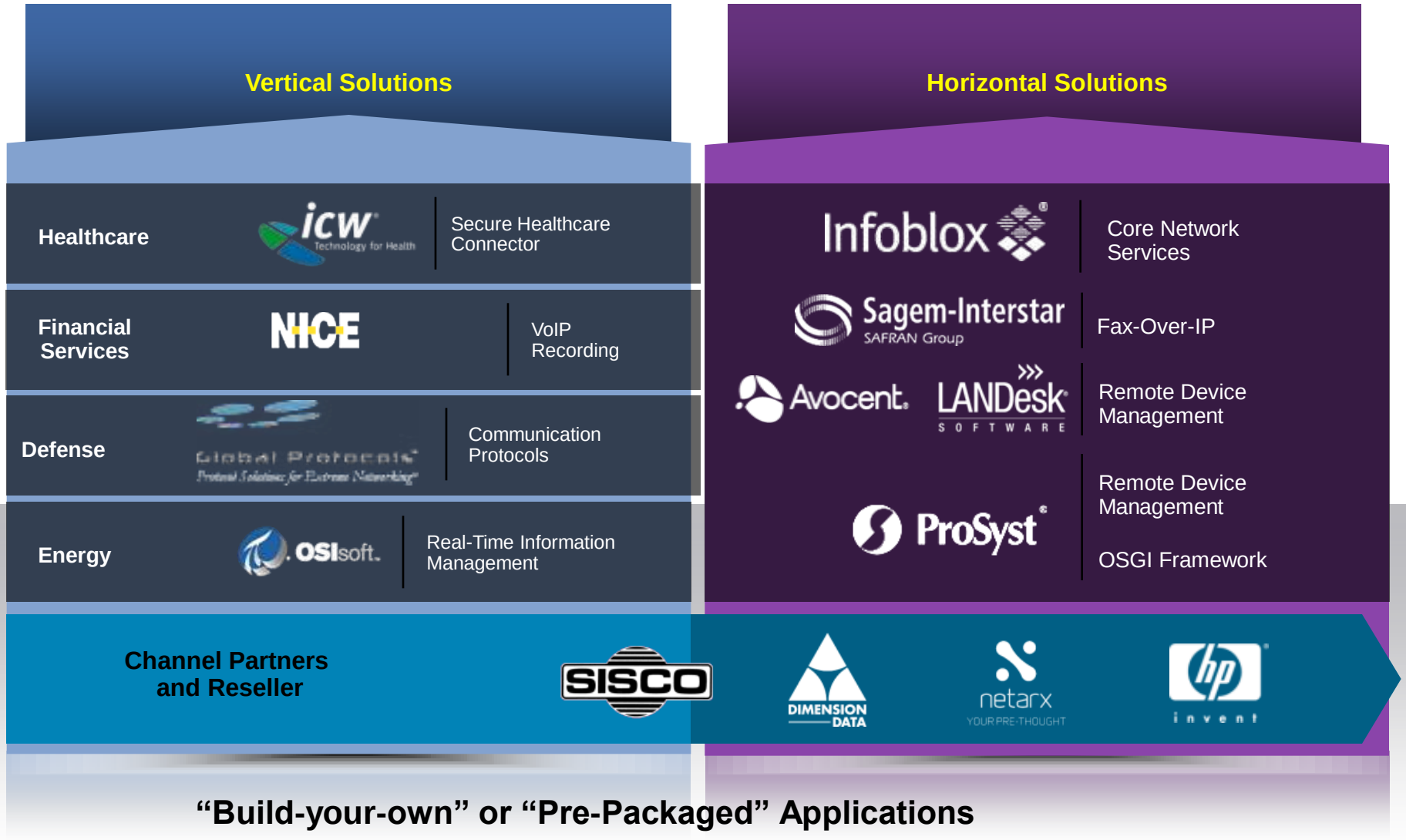
- Router notifies application of bandwidth change
- Application Dynamically alters router settings based on business rules.
- Application alters behavior based on new information



Network Failover w/ AXP App

Solution Case Studies

Cisco AXP— Major Solution Partners



“Build-your-own” or “Pre-Packaged” Applications

Desktop Mgmt—Avocent/LANDesk

Problem

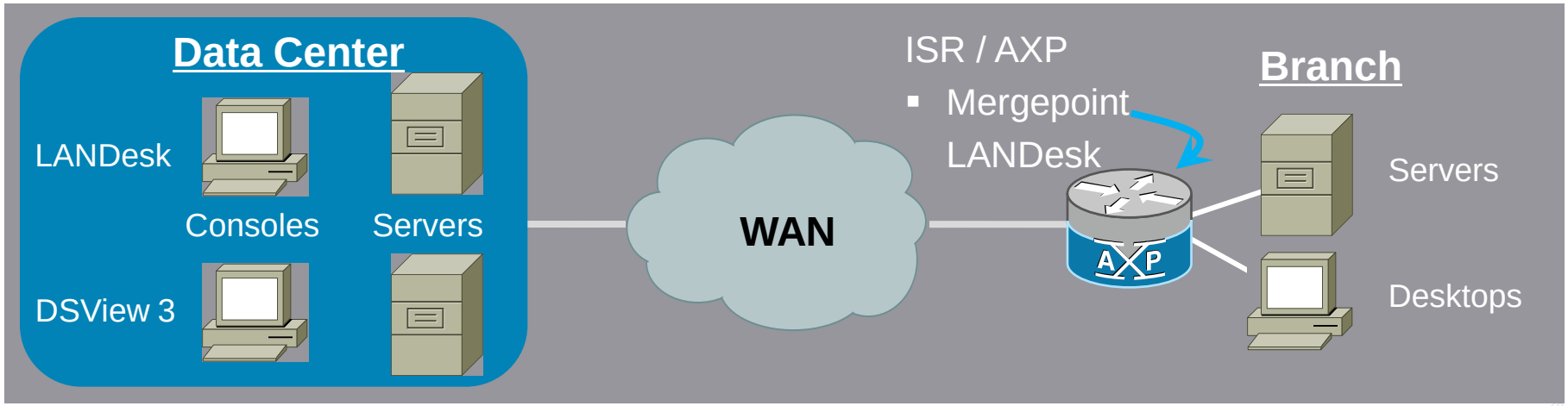
1. Branch desktop/server management too complex
2. Insecure, unmanaged/unpatched assets has regulatory impact
3. Lack of centralized views/reporting

Solution

1. Branch: ISR 28xx/38xx + AXP NME + Avocent MergePoint and/or LANDesk Software
2. Centralized: Server/User Interface for global management (DSView3 + LDMS UI)

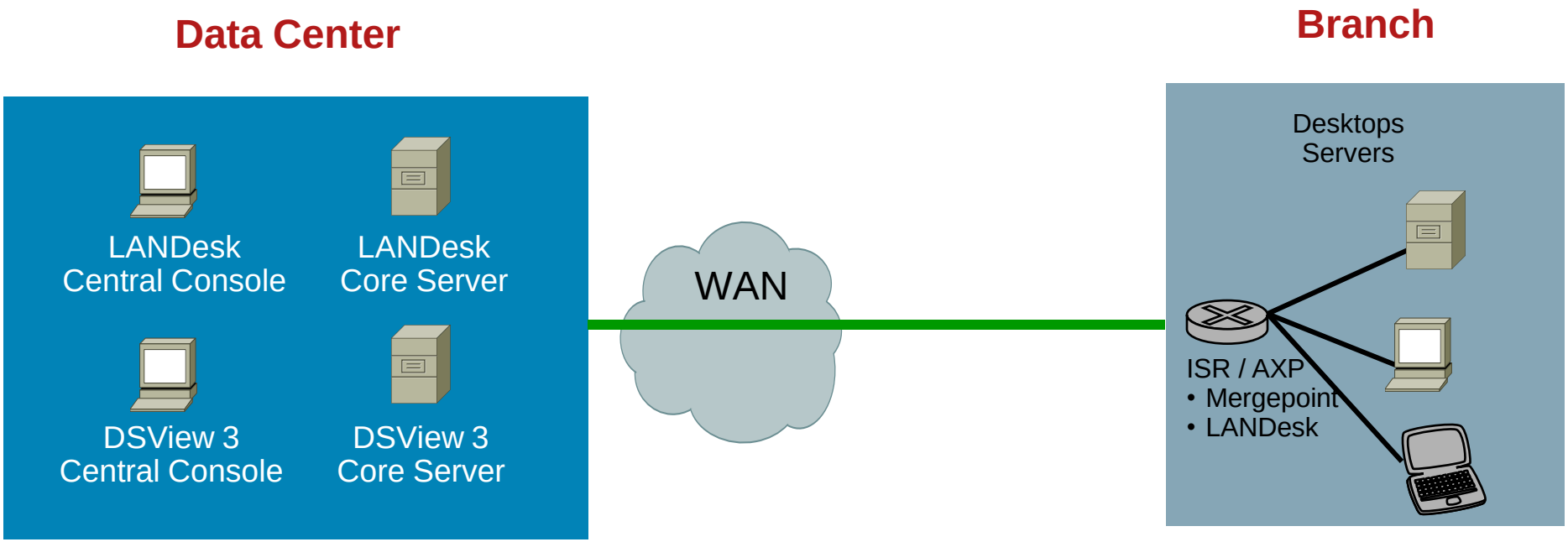
Benefits

1. Out-of-band management (KVM, embedded/onboard KVM, terminal servers) extended to the branch with minimal/no footprint
2. Desktop installation / configuration / patch management
3. End-to-end management from Data Center to Branch of all IT assets
4. Unique WAN optimization of management traffic



Avocent Solution Overview

1. Out-of-band server management via KVM/IP, Console Servers, and embedded service processors
2. In-band server and desktop management via LANDesk software suite



DSView3

- Global, enterprise view
- Interfaces
  - service processor (Mergepoint)
  - KVM/IP (DSR)
  - serial console (ACS)

Mergepoint / Service Processor

- KVM/IP
- Serial over LAN (Console)
- Monitoring (temp, fan)
- Power Management

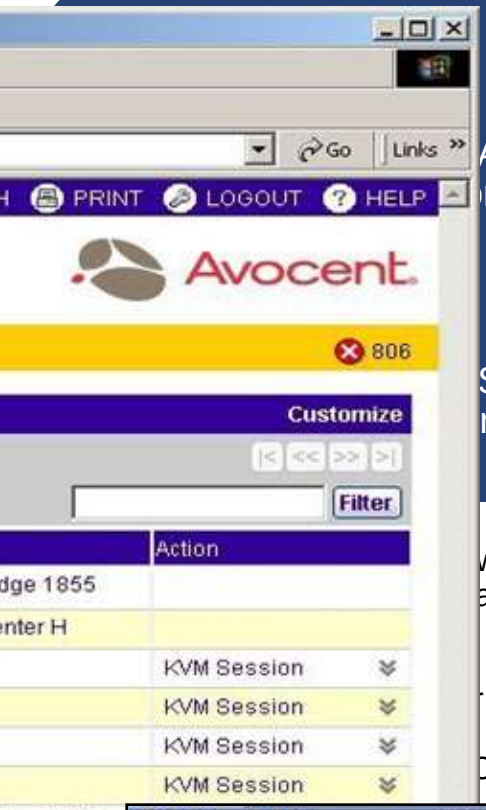
LANDesk Management Suite

- Asset management / inventory
- Software distribution / installation
- Patch management
- License tracking

Avocent Solution Overview

1. *Out-of-band server management via KVM/IP, Console Servers, and embedded service processors*
2. *In-band server and desktop management via LANDesk software suite*

Data Center



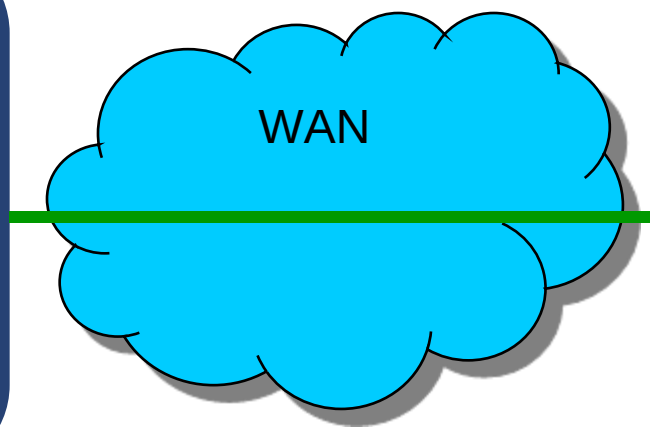
ANDesk
re Server

SView 3
re Server

w
admin control, monitoring, automation

(Mergepoint)

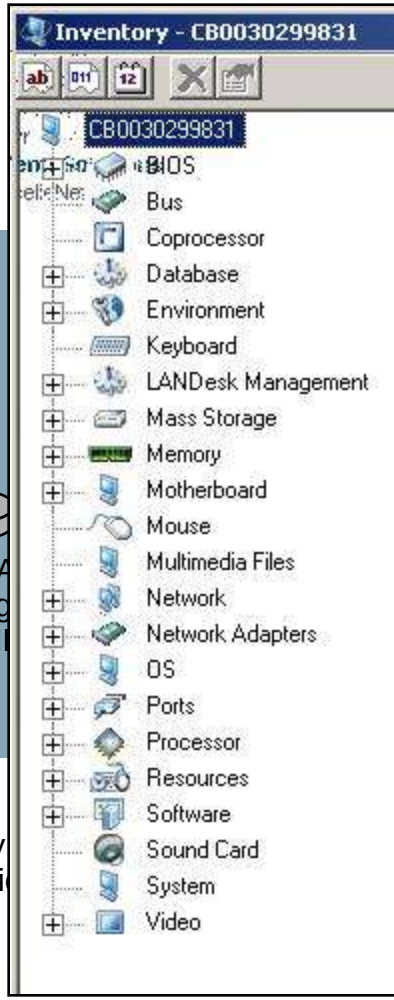
CS)



Mergepoint / Service Processor
- KVM/IP
- Serial over LAN (Console)
- Monitoring (temp, fan)
- Power Management

ISR / A
- Merg
- LAN

LANDesk Management Suite
- Asset management / inventory
- Software distribution / installati
- Patch management
- Configuration management



AXP Solution for Voice Recording in the Branch—NICE

Problem

1. Emerging compliance and corporate governance requirements and an emphasis on the branch have created a need for local recording
2. Customers typically have a strong preference to the vendor they use for centralized recording

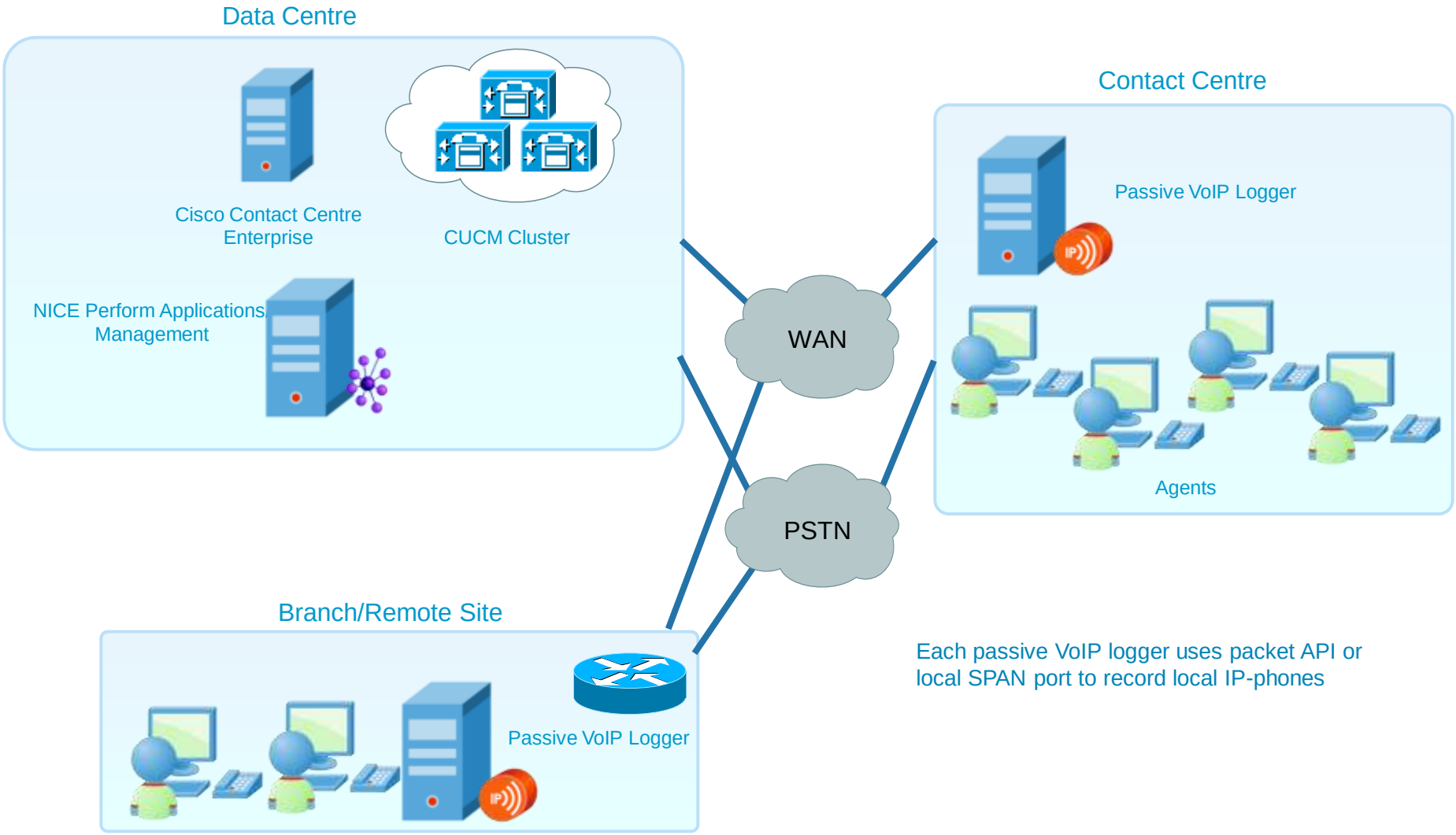
Solution

1. Provide survivable recording application hosted within the ISR on AXP
2. Concurrently announce and support market leading voice recording partners

Benefits

1. Eliminates the need for dedicated recording equipment at each branch

Branch Voice-Recording



Each passive VoIP logger uses packet API or local SPAN port to record local IP-phones

AXP Solution for Branch Fax Server Sagem Interstar X-Medius

Problem

1. Fax is still preferred legally binding method for transmitting critical, confidential information in the branch but lacks management and security
2. Emerging compliance and corporate governance requirements and an emphasis on branch have created a need for
3. Current OEM solutions use Dialogic cards and are Windows based

Solution

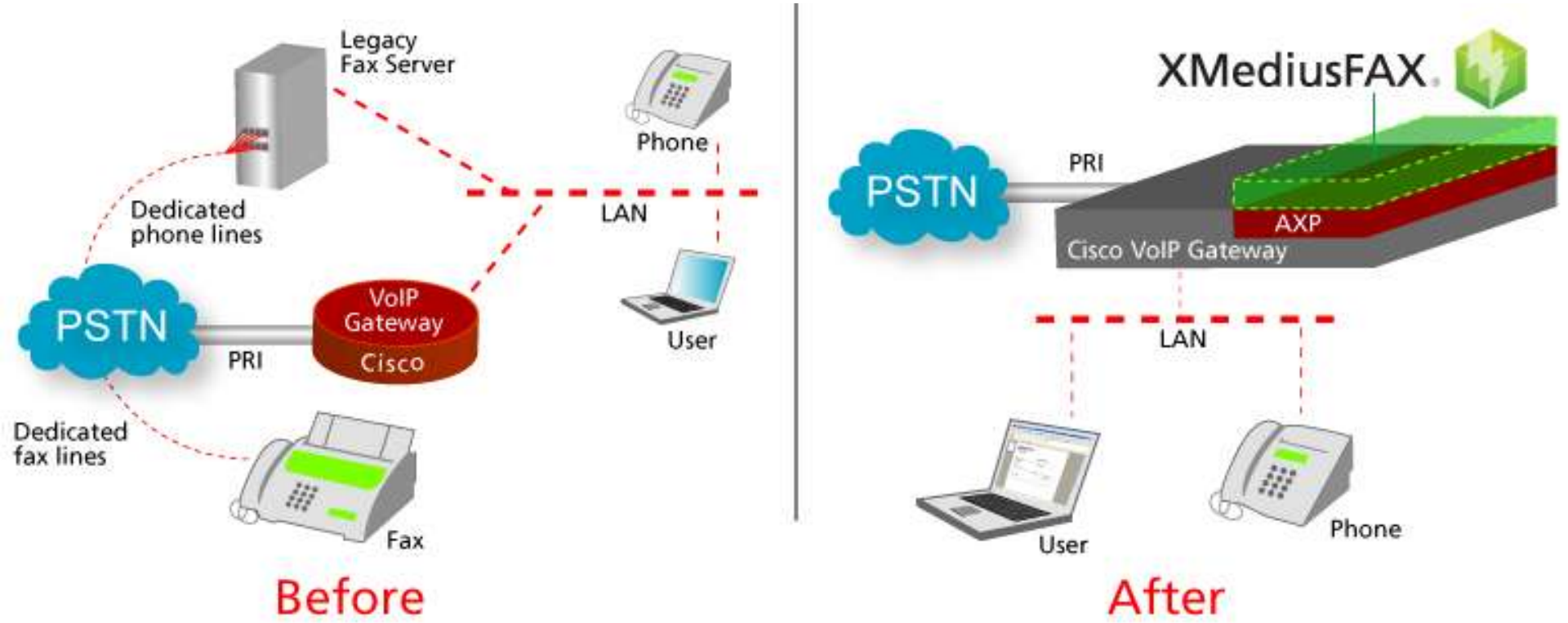
1. Offer integrated T.38 Fax Server capabilities with Sagem; market leader in FoIP

Benefits

1. Eliminates the need for extra servers; fax boards, rack space and reduces power consumption
2. Real time delivery, email integration, secure, reduced operational costs
3. FoIP promotes Cisco Intelligent Network infrastructure

Sagem-Interstar
SAFRAN Group

Branch Office Fax Server



Connected Healthcare—ICW

Problem

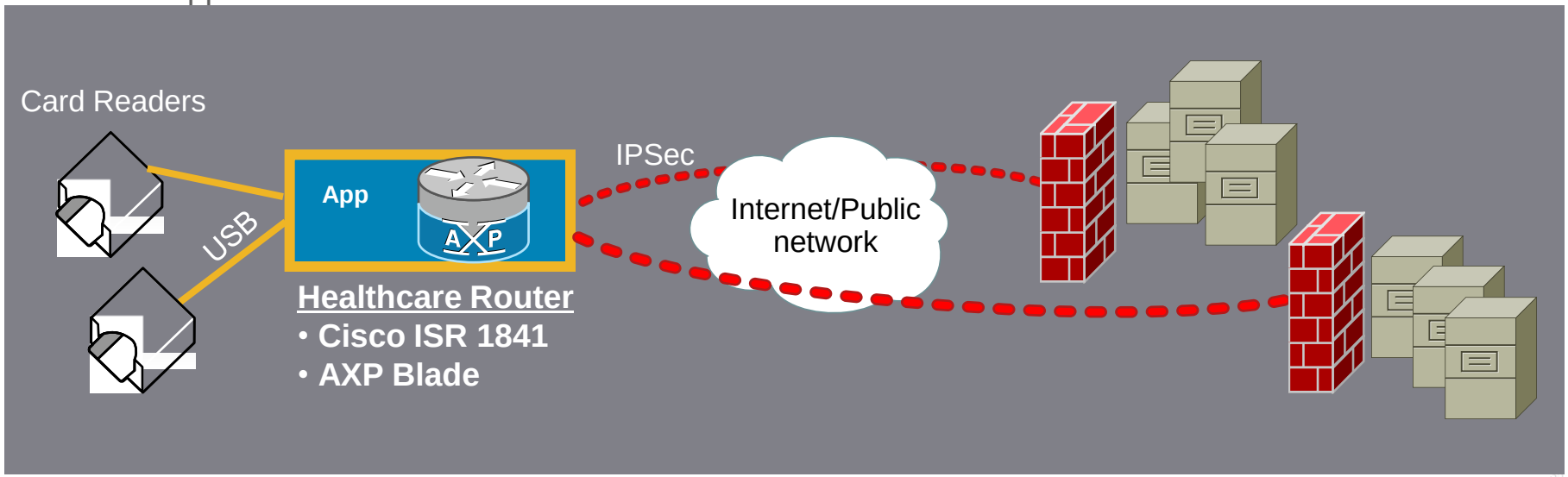
1. Doctors struggle to care for patients without knowledge of past treatments / illnesses
2. Dangerous medical mistakes, wrong prescriptions

Solution

1. Healthcare Connector Application
2. Cisco ISR 1841 w/ AXP AIM service-mod
3. USB support for card readers
4. Application controls VPN via API

Benefits

1. Meets stringent privacy and encryption standards for health record transmission
2. Fully-integrated solution (HW/SW platform) with utilization of ISR USB ports for integration of smart card readers
3. Easily managed for physician's office and health clinics
4. Low-cost



Utilities Monitoring—OSISoft

Problem

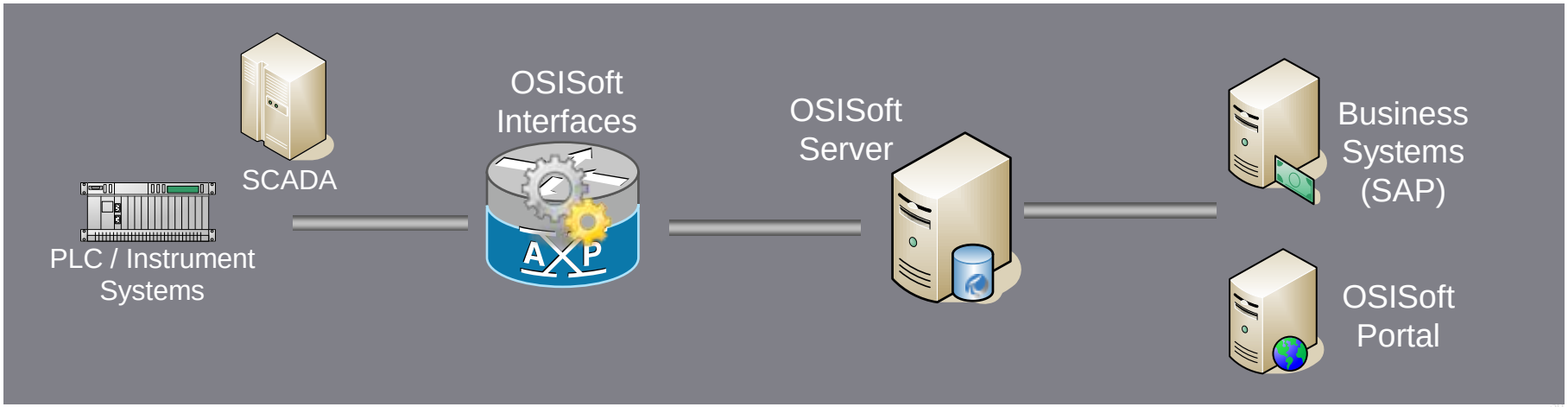
1. Multiple devices needed to communicate, collect and transmit (complexity)
2. Difficult to secure (regulatory compliance)
3. Business data losses due to comm failures
4. Low bandwidth from remote sites (restricting amount & quality of data)

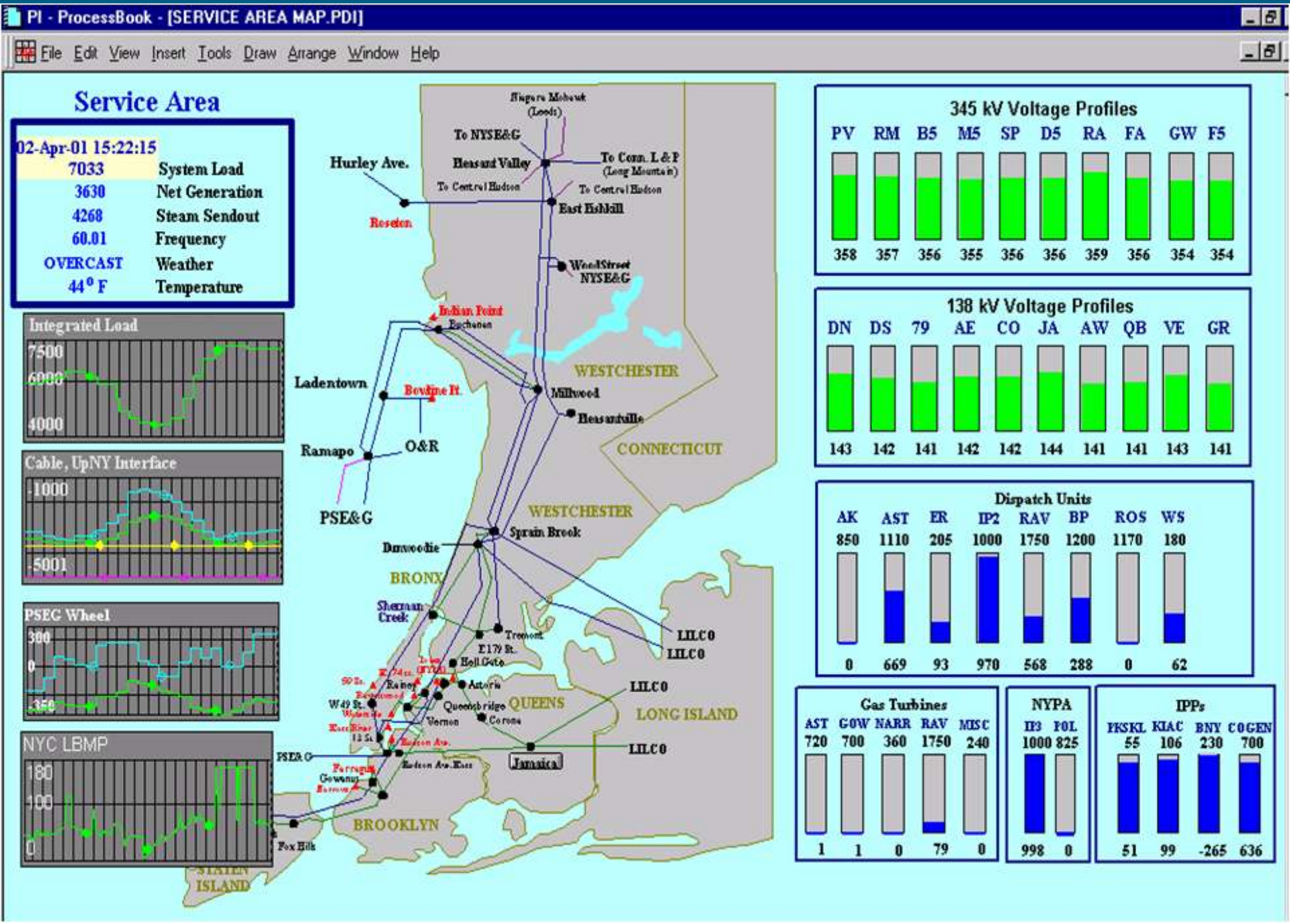
Benefits

1. Integration of IT + Operations data
2. Capex/opex savings (maintenance, deployment)
3. Security/Regulatory Compliance
4. Distributed and embedded architecture that is manageable (scalability, security, standards)

Solution

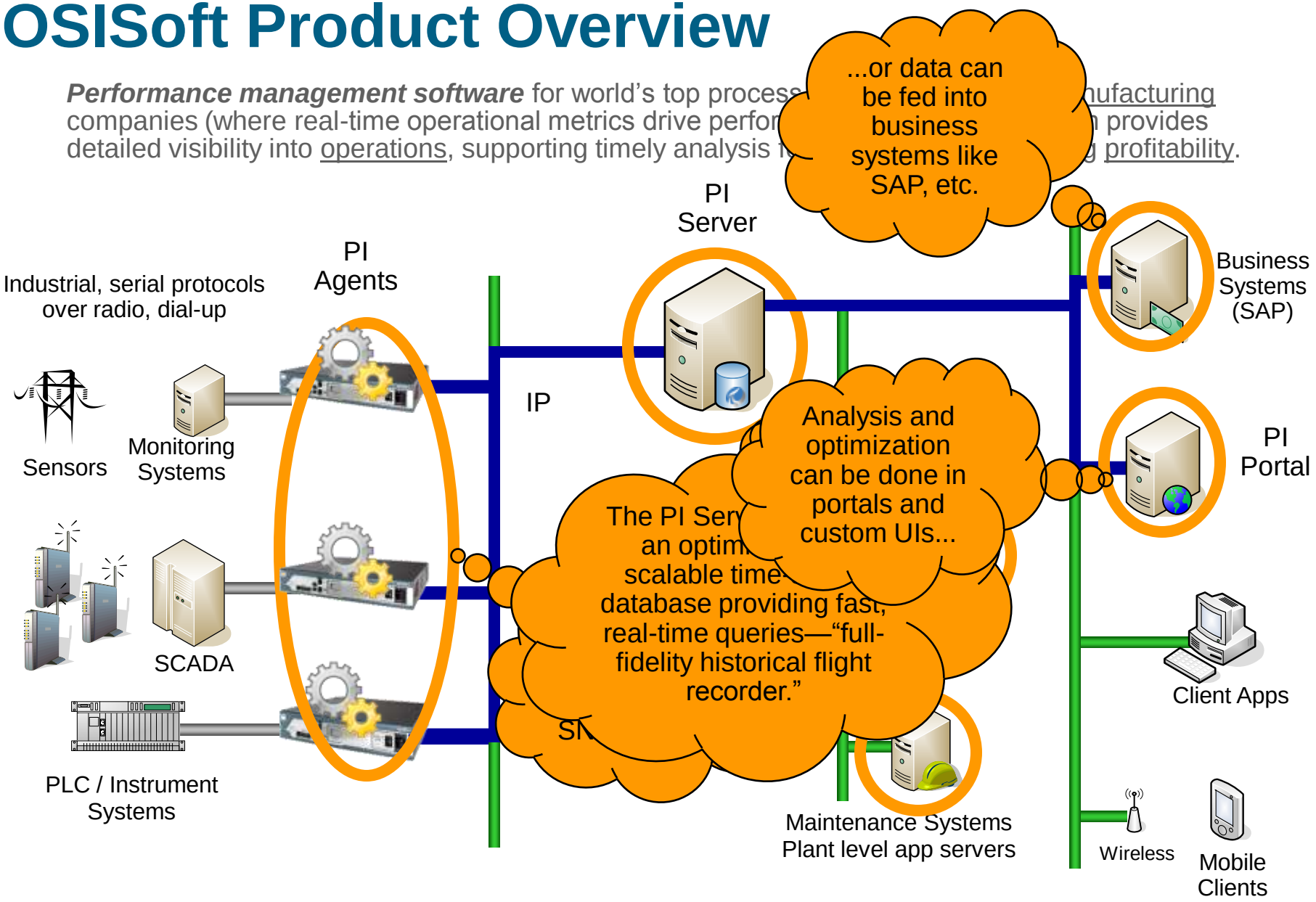
- Branch: OSISoft SW on AXP in ISR
- Centralized: OSISoft server/DB/UI + northbound integration into SAP, etc.





OSISoft Product Overview

Performance management software for world's top process… …nufacturing companies (where real-time operational metrics drive perfor… …n provides detailed visibility into operations, supporting timely analysis i… …g profitability.



Summary

Value in Running Applications in a Branch Router

Customers

- Branch Optimization
- Server Consolidation
- ‘Network as a platform’
- Standards compliance
- “Green”

Application Developers

- Leverage Cisco installed base and channel vehicles
- Cisco ISR provides security, Unified Communications, WAAS, mobility built-in
- Build competitive advantage

Channel/SI Partners

- New routes to revenue
- Higher margins
- Customer “stickiness” From product-centric to solution-centric
- Differentiation