System Management Best Practices

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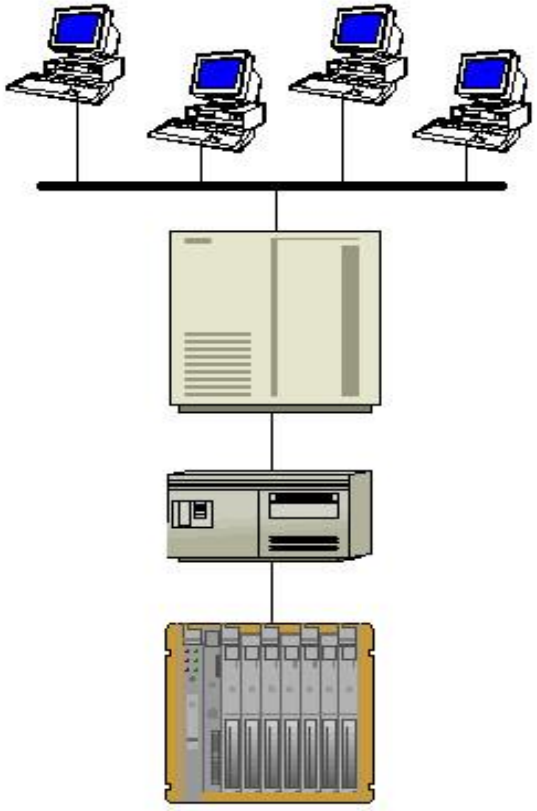
Richness & Reliability "Value Coefficients"

- Quality
  - Across operations and data systems
- Quantity
  - Across business needs and over time
- Utilization
  - Across enterprise and just in time

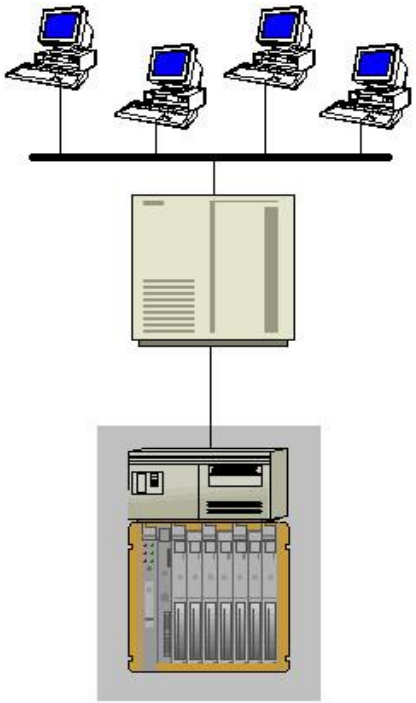
It all Starts with Great Software …and the Right Architecture



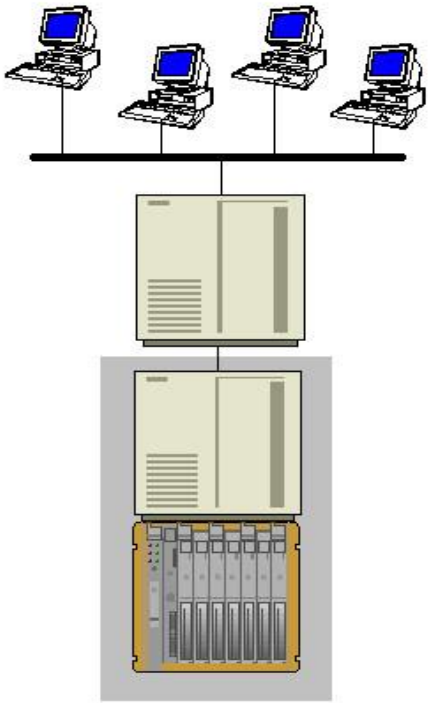
- Visualization Tools
- Availability
- Reliability
- Security

Integrated Data Collection

Proven:
Integrated Interface



Cutting Edge:
Embedded Historian



Embedded PI Historian

- Continuous Historian for DeltaV Application Station

  http://www.easydeltav.com/pd/PDS_ApplicationStation.pdf

- "56SAM" Historian for Allen-Bradley ControlLogix

  www.oldi.com

- **"Promoted"** Interface Node
- Also visit: www.echohistorian.com

Fault Tolerant vs Redundant

Incident	Tolerant	Redundant
Environment Fault	☺☺	☺☺☺
Hardware Fault	☺☺☺	☺☺
Software Fault	😐	☺
Administrative Error	☺😐	☺☺
Scheduled Down	😐	☺☺☺
“Smile” Points:	**15/30**	**22/30**

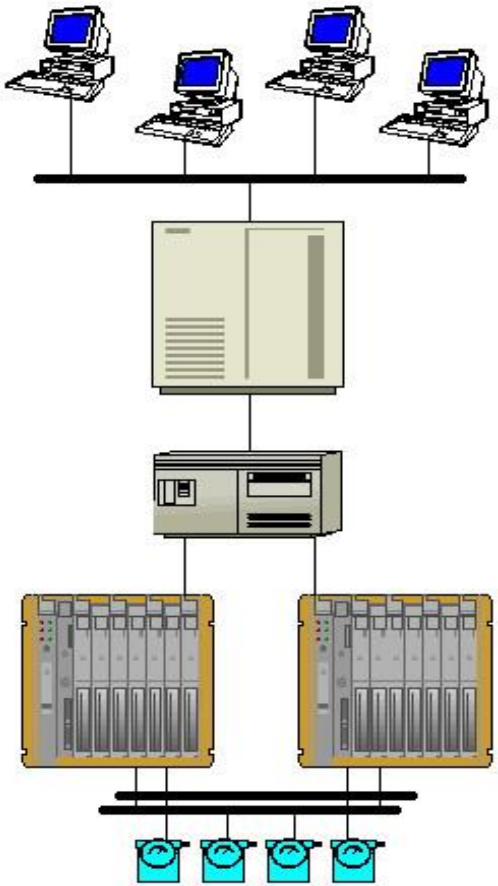
Redundant Architecture

- Reliability
  - Build from the Data Up
- Availability
  - Build from the Users Down

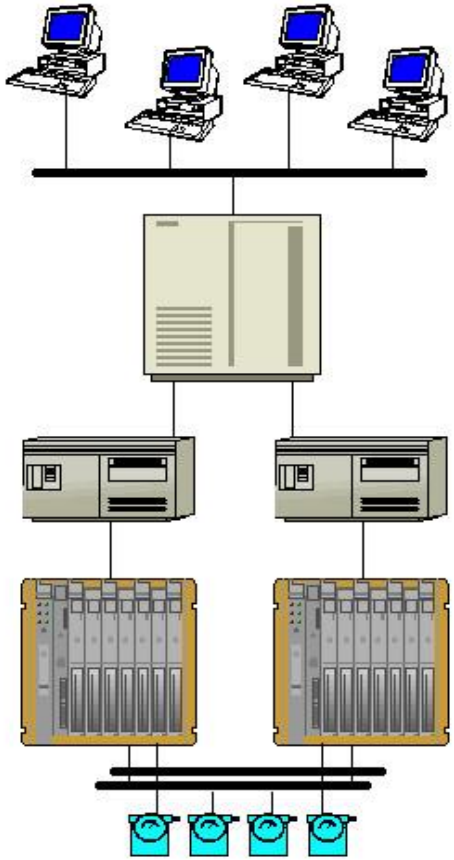
You decide what comes first!

Redundant Data Collection

Dual Gateways

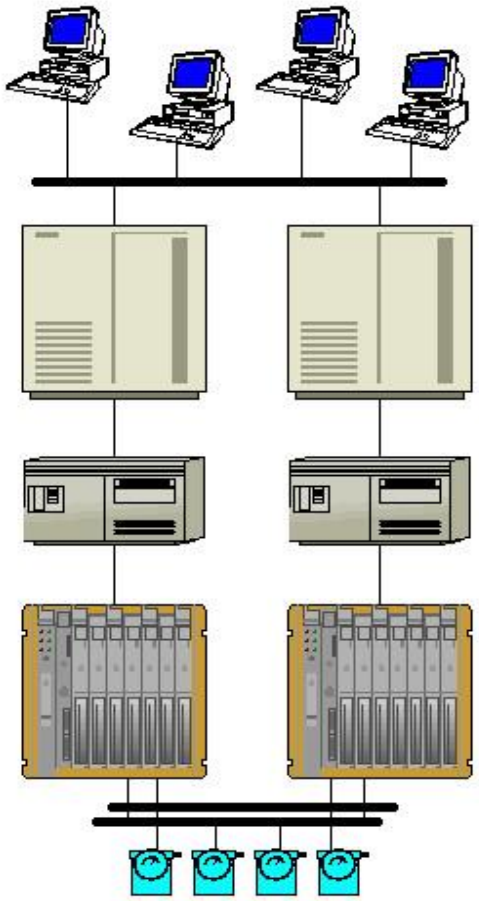


Interface Node Failover

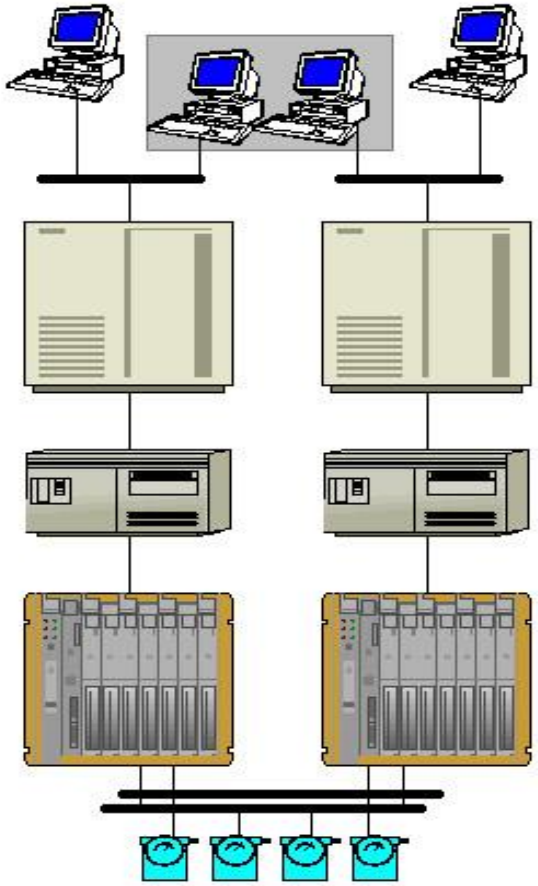


Redundant Data Service

Dual PI Servers



Dual PI Clients



Redundant Architecture

No single point of failure sounds great, what's the catch?

- Interface Support
- History Recovery
- Gap Filling
- Client Impact
- Fugitive Data

Fugitive Data Capture

Essential for rich content but…

1% of the data causes 99% perspiration!

- Manual Entry Systems
- Custom Applications
- Isolated Point to Point Links

Solution: Standard Interfaces / Flat Files

- Demo – Excel Entry Form

Secure Architecture

- Domain Membership
- Internet Access
- “Stateful” Firewall

PI Server Security White Paper:

http://www.osisoft.com/whitepapers.aspx

Domain Membership

Pro	***Con***
Shared resources and tools	MS client network protocol required
Central policy administration	Potential deployment conflict
Single logon support	PI trust authenticates w/ domain controller

Hint: Make friends with your domain admin!

RtPM Internet Access

Reliability:

- Documentation
- Online Updates
- Time Servers
- Remote Support

Richness:

- Fugitive Data
  - PI HTML Interface
- Data Replication
  - PItoPI Interface

Strategy:

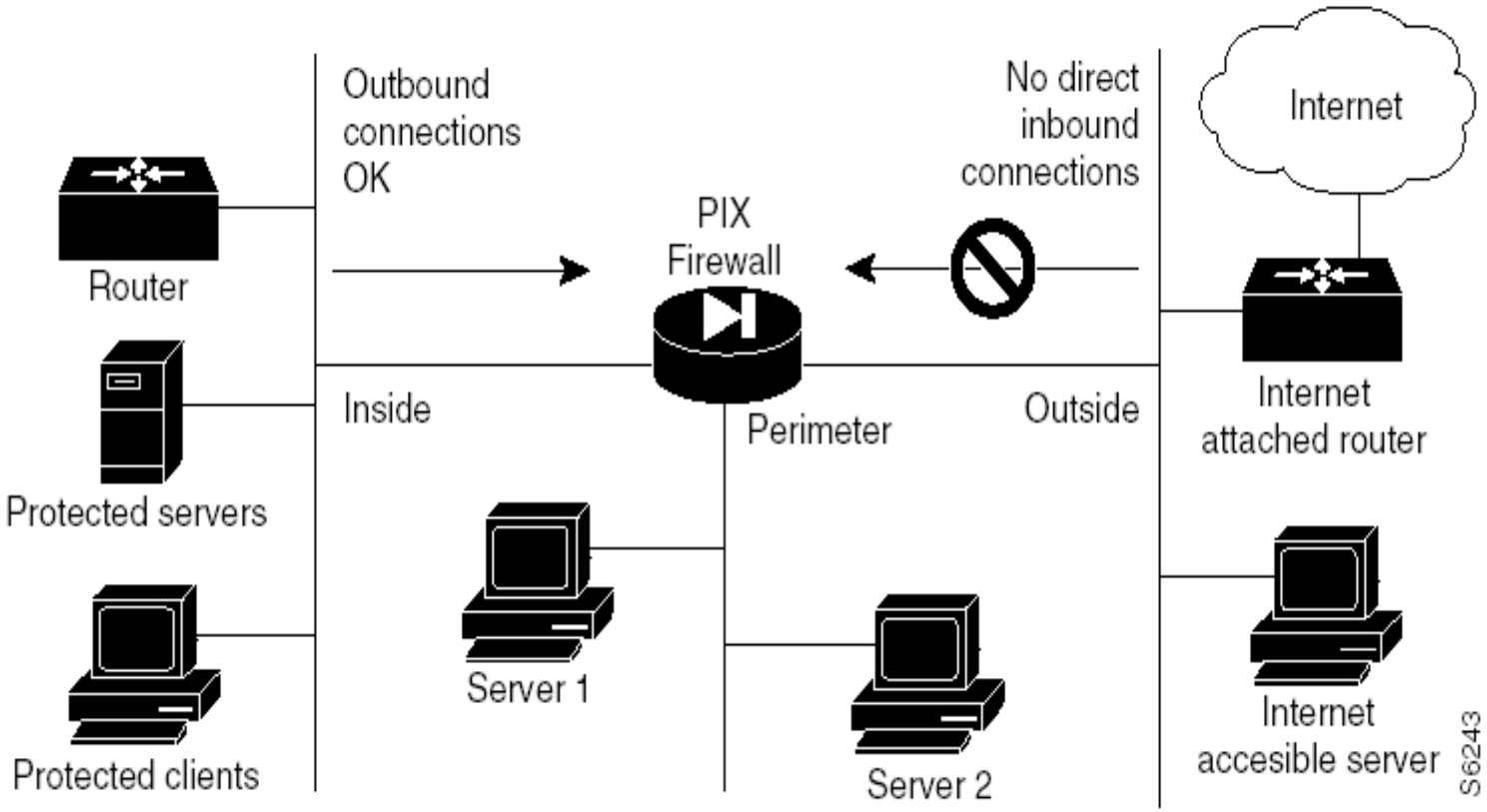
*Outbound internet connectivity for **administrators.***
*Bidirectional connectivity for **secure applications.***
*Interactive users over VPN, **intranet** or RtPortal.*

Internet Time Synchronization

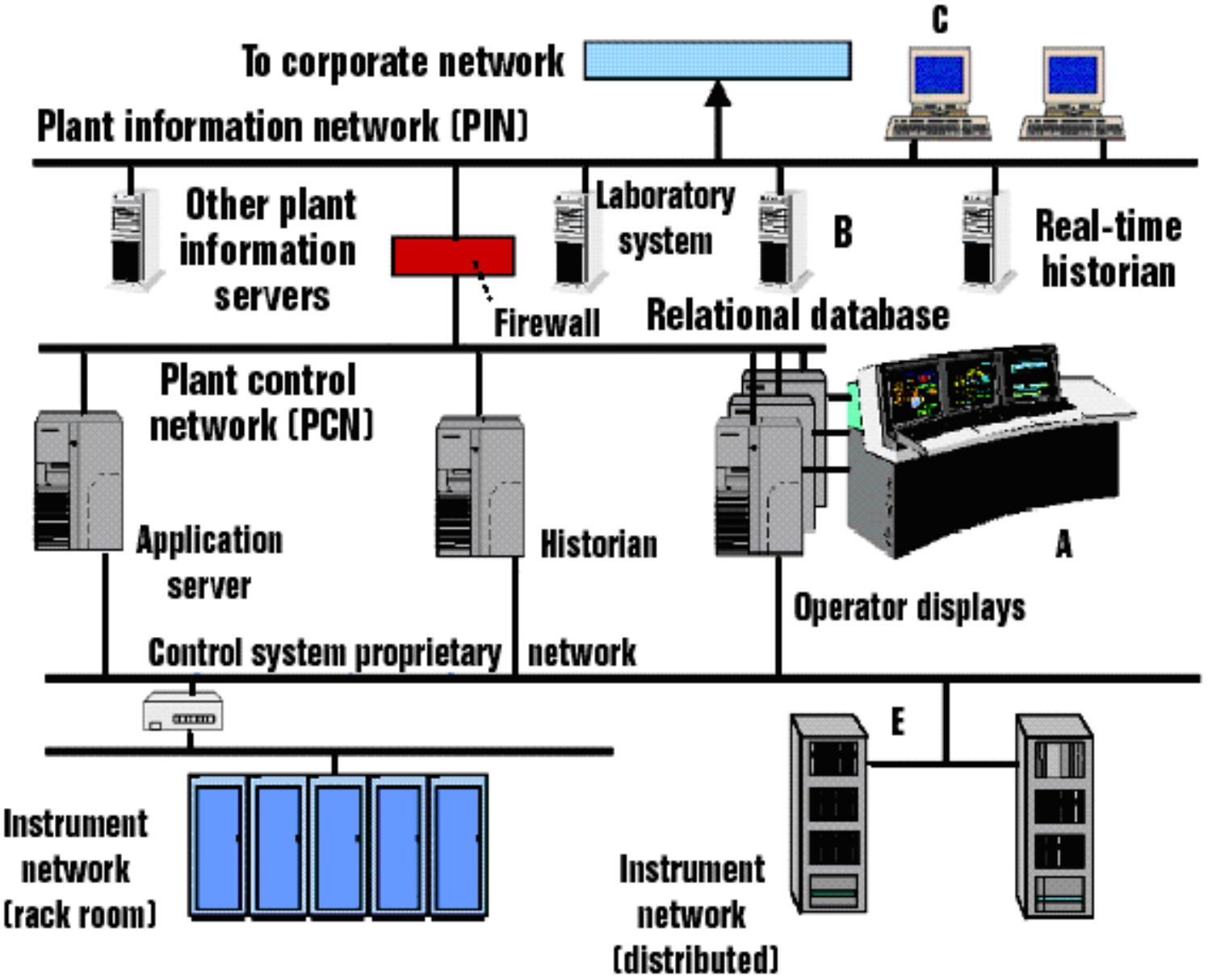
- At Least One Time Server on Inside
  - Default: AD Domain controller
  - Setup: gpedit.msc “Computer Configuration”
    - Browse Administrative Templates \System\Windows Time Service\Time Providers
    - Enable Windows NTP Client and/or Server
- Standalone Computers
  - NTP is most robust (n/a on W2K and NT)
    - Select “Internet Time” from Adjust Time Dialog
      - See MS KB ID 816043 for diagnostic help
  - SNTP from console (w32time.ini file on NT)
    - Net Time /SETSNTP:mytimeserver.com
      - Test W2K with W32TM –test –once –v

“Stateful” Firewall

Figure 1-1 The PIX Firewall in a Network



Source: Cisco PIX 6.3 Command Reference



*"Securing Control Systems: **WHAT YOU NEED TO KNOW**"*
By Jay Abshier and Joe Weiss www.controlmag.com February/2004

PI Trusts and Firewalls

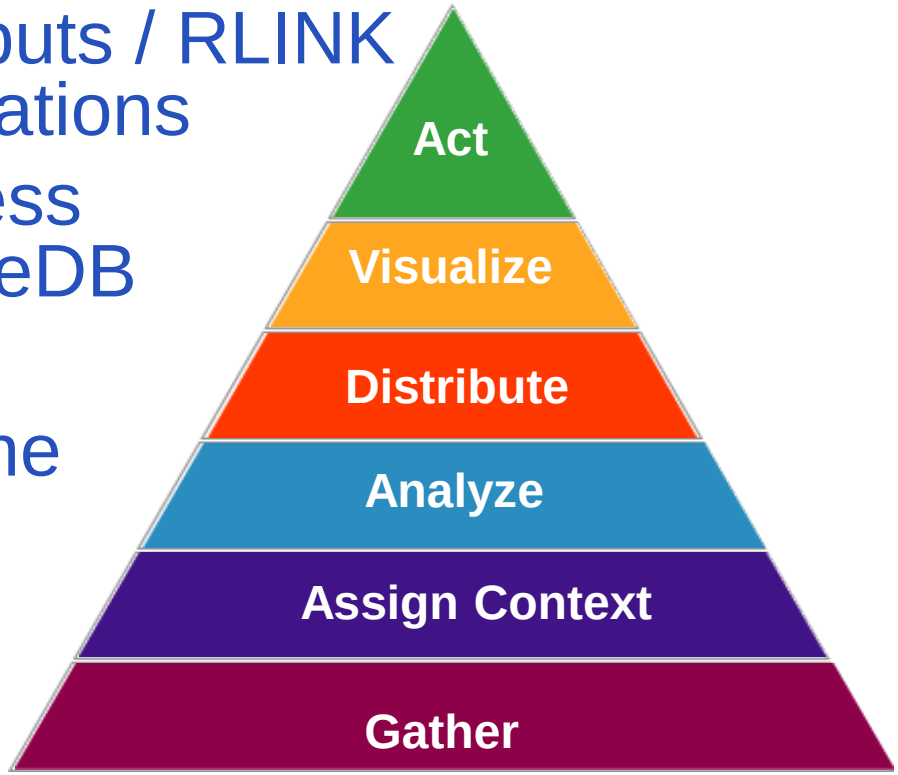
Multiple Trust Records are Required

- API Interface Node
  - -View credentials from PI server (netstat)
  1. Reverse name lookup (case sensitive)
  2. IP after firewall address translation
- SDK Interface Node
  - -View credentials from source (pidiag -host)
  3. Computer name
  4. IP bound to primary NIC

OPC Demo

2003 Enterprise Survey

- Triggered Outputs / RLINK Custom Applications
- RtSQC / Process Templates / OleDB PI-OPC HDA
- ACE / Sigmafine (RtAnalytics)
- Batch File
- PI-OPC INT



Highly valued RtPM application deployments.

Survey “MVPs”

- Processbook
  - Trending
  - Custom Applications
- Datalink
  - Analysis
  - Data Scrubbing

Best Practice:

Automate Displays and Reports.

Enterprise Scalability

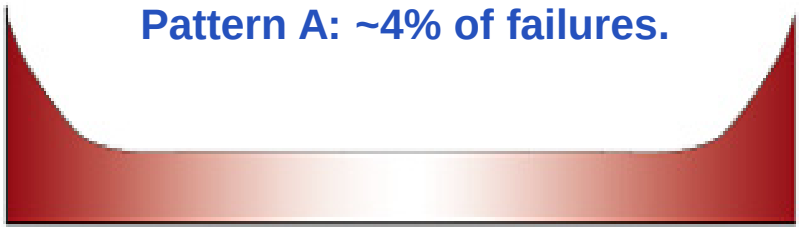
- Real Time Data
  - Local, Remote and Global!
- Diverse User Community
  - Desktop to Corporate “Nerve” Center
  - Mobile Experts and Support Centers
- *More Visualization Ergonomics too…*
  - *High Density Multi-Head workstations*
  - *Overhead “Big Picture” Displays*

Enterprise Deployment

Risk: *Deployment activities increase overall failure rate by introducing infant mortality back into otherwise stable systems.*

High incidence of infant mortality, followed by a constant probability of failure, then by a wear-out zone.

Pattern A: ~4% of failures.



High infant mortality, then constant or slowly decreasing probability of failure.

Pattern F: ~68% of failures.

*"Center On Reliability: **Space-Age Failure Patterns**"*
By Rich Merrit www.controlmag.com June/2003

Typical Maintenance Tasks

Class	*Activity*	*Period*	*Review*
"Hot"	Database Change	Daily	**Verify data before and after.**
"Warm"	Restart Service	Monthly	**Verify data flow before and after.**
"Cold"	Software Upgrade	Annual	**Perform acceptance test.**

Deployment Strategy

- Architecture (Minimize Scope)
  - Distributed and Redundant
- Standardization (Minimize Burn-In)
  - Technology and Procedures
- Scheduling Execution
  - Operations Stable **(Best Feedback)**
  - Down **(if Deployment > Burn-in)**
  - **Never on a Friday!**

Desktop Deployment Reliable Methods

Scope of Roll-Out:

- Individual
  - Organize media & downloads in proper order
- Small
  - Shared Media, customize “ini” files
- Medium
  - Active Directory Published Application
- Large
  - System Management Server (see white paper)

Shared Media Layout

A. Windows Components
   1-MDAC, 2-Scripting, 3-.NET Framework
B. OSISoft Components (ie Combo Pak)
   4. SDK – modify setup.ini answer file.
   5. DataLink
   6. ProcessBook
C. Custom Extras (readme.txt or script)
   7. Copy INI files, patches, add-ins
   8. Known server registry

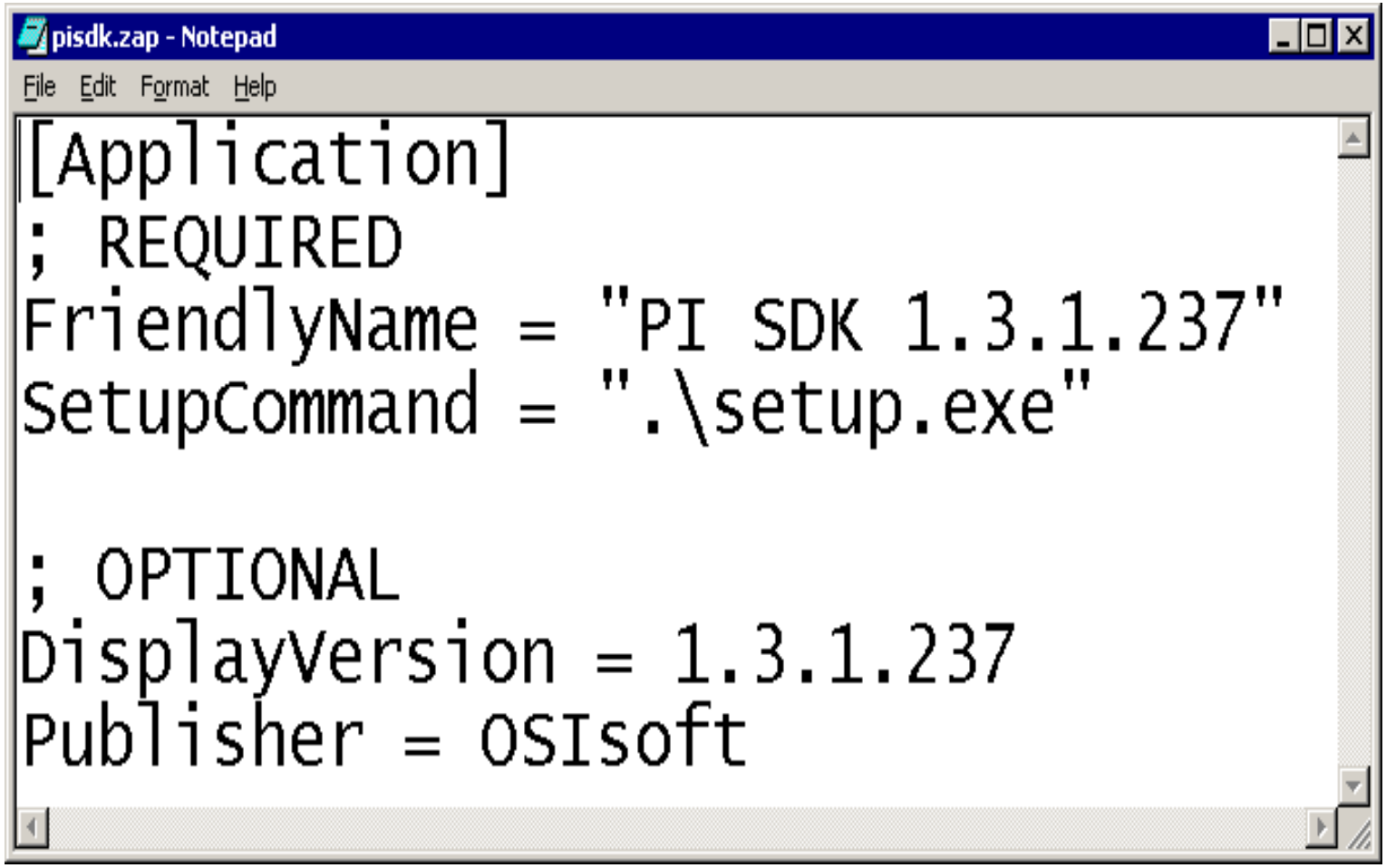
Strategy:

Installation by user, numbered shortcuts.
Install one at a time, reboot if required.

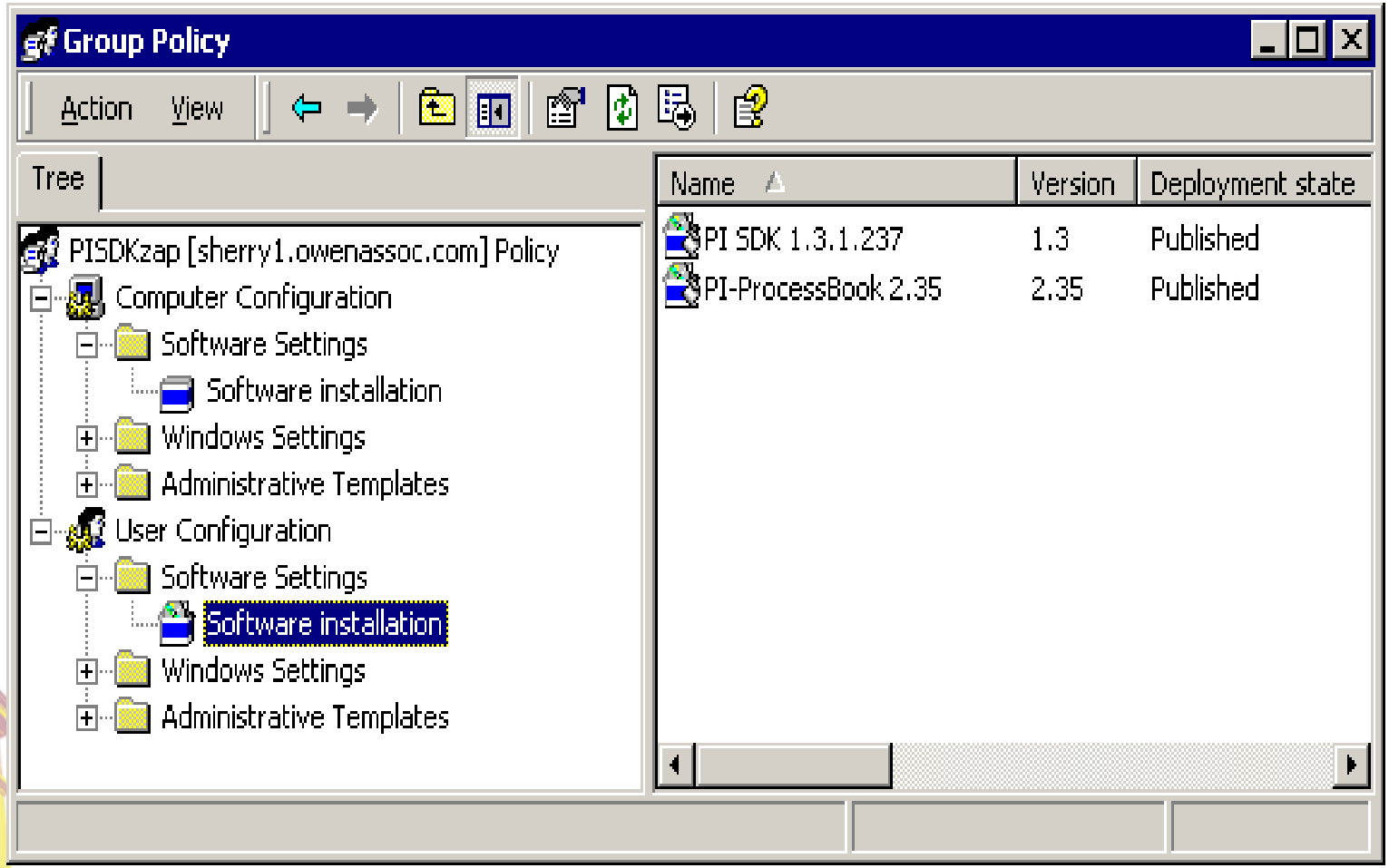
Active Directory “Publishing”

- Targets ZAP File or MSI
  - ZAP required as “setup.exe” wrapper
- “Published” Application
  - Appears in “Add/Remove Programs”
  - Installation is manual
    - Available after next logon, must have rights
- “Assigned” Application (MSI only)
  - Automatic install on boot or first use

“ZAP File”


pisdk.zap - Notepad
File Edit Format Help
[Application]
; REQUIRED
FriendlyName = "PI SDK 1.3.1.237"
SetupCommand = ".\setup.exe"
; OPTIONAL
DisplayVersion = 1.3.1.237
Publisher = OSIsoft

Group Policy for Software Installation Demo



Rich and Reliable RtPM Summary

- Redundancy works
- Be Secure
- Leverage domains and the internet
- Seek out and capture fugitive data
- Inspire action on the right data
- Automate reliable methods
- Use 80% to improve, 20% to sustain!