

StatePointPlus Configuration Management

Harold Kopp

Commercial Nuclear Fuel Division
Westinghouse Information Systems
Westinghouse Electric Company

Assure that Critical Computing Components are Unchanged in a Dynamic Environment

- Provide evidence that computational capability is in a QA state
 - At any time
 - over a period of time
- Ensure that critical applications are unchanged
- Provide the ability to change system with low risk
- Enhance remote system management capabilities



Benefits - Problem Avoidance

- by ensuring that the target machines are configured to accommodate software that is being “rolled out”
 - reduce support calls
 - reduce user dissatisfaction
- by ensuring that platforms used for critical engineering calculations can demonstrate QA compliance
 - reduced audit costs
 - avoid costly penalties



Benefits - Problem Resolution

- Identify corrupted files
 - elimination of “sleuth” stage of problem resolution (moves many problems into the 5 -10 minute Help Desk window)
 - improved problem resolution by Help Desk reduces the number of trouble tickets passed to level 2 and 3 support (estimate a 35% reduction)



Capability

- Quickly Identify System Software Changes
- Is your software the same today as it was yesterday ?
 - you can waste a lot of time performing costly analysis in quality-critical environments before discovering your system has changed
 - system administrators and managers need to detect, diagnose, and resolve problems quickly and reliably

Why ? Product Quality

- Quality is key ! Considerable effort is expended in validating critical engineering software. Need to show that the current system is identical to the validation system.
- Need to demonstrate system configuration control in a distributed system to Nuclear Regulatory Commission
 - Operating System, Software, hardware
- Utility customers **DO NOT** have to independently validate the software if their system is identical to the Westinghouse system

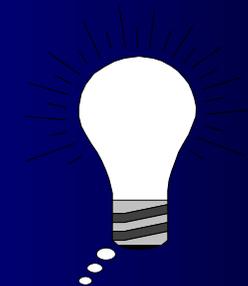


Why? System Support Cost

- Help Desk Overwhelmed responding to problems on > 10,000 PCs
- Software installed by Users or Administrators can disable existing applications
- Files deleted by Users or Administrators can disable existing applications

“Thumbprint” Concept

- Construct a “thumbprint” of the system
- Periodically check the system to see if the “thumbprint” has changed
- Manage the “thumbprint”



What is a “thumbprint” ?

- Platform attributes
- File attributes
- Processes
- Disk Utilization
- Differences in each attribute are assigned a “severity” (Ignore, Caution, Fail)

Building the “Thumbprint” When ?

- All at once
 - The system has been distributed in a controlled manner. Validations have been performed on a reference system.
 - Who knows how it grew, Just make sure changes don't hurt it
- Incrementally
 - Additions of tested products

Building the “thumbprint” What ?

- Scope
 - Operating System
 - Critical Applications for the Organization
 - CPU
 - Engineering UNIX™ systems = 42,000 files
 - Engineering Windows NT™ 4.0 Operating System = 3,000 files
- Cost to build the “thumbprint”
 - Varies considerably for each product
 - Varies depending upon objective and approach

Approach

- Utilize Engineering Experience obtained with UNIX Prototype during the last 6 years (on systems having < 50 nodes)
- Utilize Corporate IS Experience with Help Desk Operation for 1000s of nodes
- Combine Engineering and Corporate IS Resources to Develop and Test StatePointPlus

Objectives

- Provide time saving features on an enterprise scale
- Scalable from small system to enterprise
- Minimize effort of “thumbprint” Structuring and Management
- Minimize cost of monitoring
- Provide support for rapid change identification
- Portable between UNIX and Windows platforms
- Provide framework for extensions related to workstation operations issues

StatePointPlus System Elements

Monitoring Node
(e.g., Help Desk)



Monitored Node



Executables

product
thumbprints

Reference Node
Validations on this node

Repository Node
Stores “thumbprints”



Version 1.0 Development Focus

- Windows NT 4.0 on PCs
 - due to quantity(more than 10,000 monitored by Corporate Help Desk)
 - required to permit safety calculations
- HP-UX™ 10.20
 - production and development platform for the Engineering Group
 - deployed to many nuclear electric utility customers

Help Desk

GUI Administrative Support

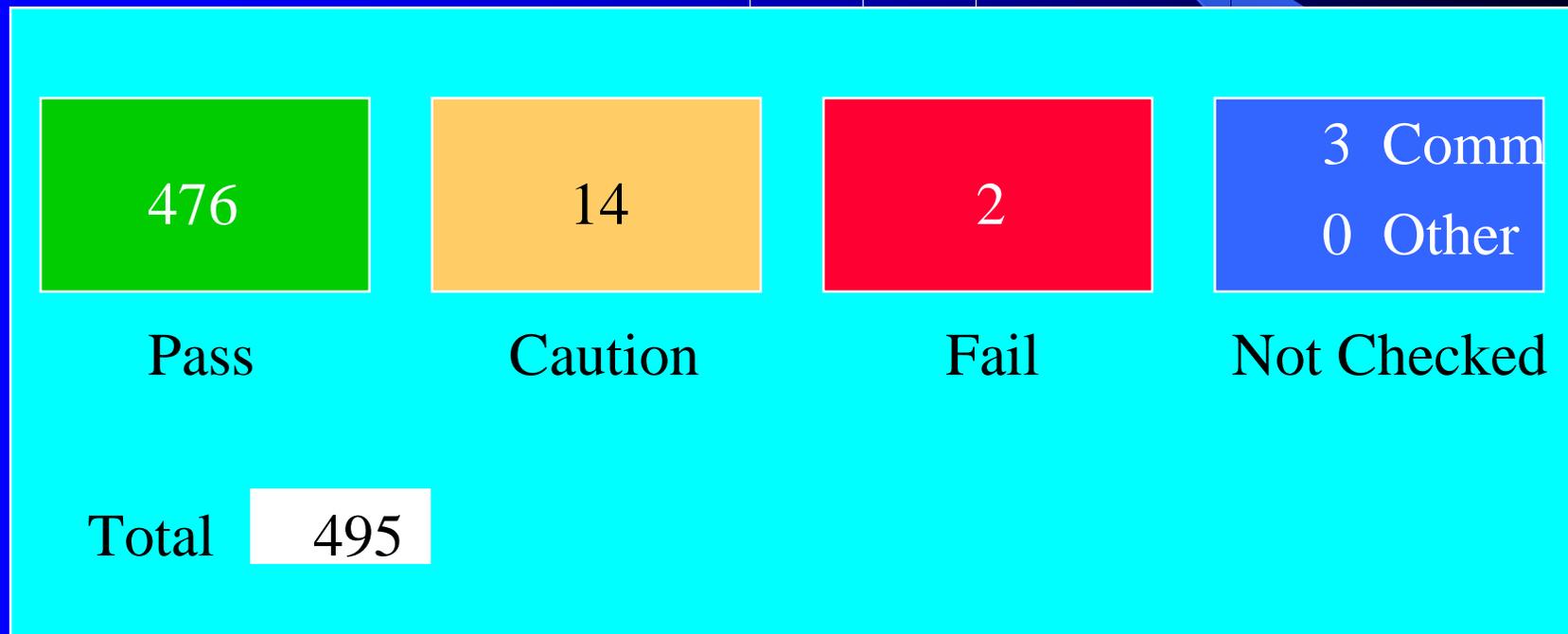
- Set controlled access to functions
- Addition and deletion of monitored nodes
- Set “thumbprint” checking schedule
- Set “Summary Report” and log condensation period
- View “thumbprint” and “state”
- Modify “thumbprint” and severity
- Set E-mail notification

Help Desk

GUI Network Monitoring Support

- Status of a group of nodes, Also E-mail from “Fail”
- Selection of a node (exclusive change access optional)
- Identification of state of each product on a node
- Display of differences from the “thumbprint”
- Modification of the “thumbprint”
- QA recording of changes (log for each product, log for node)
- Access to current state information
- Access to Summary Log Reports
- Display of available space on a disk
- Display of products potentially affected by shared libraries

Help Desk Node States Screen



Performance enhanced by concurrent collection from several nodes

Auditing

- Types
 - Internal
 - Customer
 - Regulatory
- Permanent Condensed QA Record of System Evolution
 - Trend Analysis
 - Regulatory Compliance



Experience

- Learned a great deal about NT 4.0 product “thumbprints”. Had previous knowledge about UNIX product “thumbprints”
- Reduction of administrative cost
 - large reduction in “rolling out” products
- Provides evidence that critical software components of a system have not been changed
 - enormous help in diagnosing problems

