

Eclipse-based Applications: Java on the Desktop Revisited

EclipseCon - Rich Client Platform Track
Tuesday, February 3rd, 3:45pm-4:30pm

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- **Part I – When and Why to Use Eclipse as an Application Framework**
- **Part II – Case Study: Building an Eclipse-based Product**
- **Part III – RCP: A Big Step Forward**
- **Part IV – Questions and Answers**

- **When to Use Thin Clients**
 - **Large, Distributed User Base**
 - No Installation Required
 - Functional Updates are Automatic
 - **No Control Over Runtime Environment**
 - Browsers Run on All Business Platforms
 - **Need High Learnability – No Training Provided**
 - Fill Out Forms, Click Links
 - Singular, Static View of Information
 - Desired Interaction Model Fits Browser Paradigm
 - Applications are for Occasional Use

- **When to Use Rich Clients**

- **Usability is Key**

- High-demand Productivity / Data Entry Applications
- Use Local Caching to Minimize Server Interaction
- Background Server Operations to Hide Latency
- Multiple, Simultaneous Views

- **High Degree of User Acceptance**

- Behaves Like a Desktop Application (Drag and Drop)
- Client Has Full Access to All Local Capabilities

- **Extensibility and Flexibility are Important**

- Effectively Anything is Possible

- **Current Issues With Desktop Java**
 - **User's Don't Embrace 'Almost Native' UI's**
 - Don't adapt to new UI skins
 - **User Interaction Slower than with Native Apps**
 - **Large Resource Requirements**
 - **Developers Must Build Their Own Infrastructure**
 - Development is Expensive and Time-Consuming
 - Dearth of Well-Supported Java Application Frameworks

- **Advantages of Frameworks**
 - **Accelerate Development**
 - Provides an Implementation of an Architecture
 - Provides Blueprints to Follow
 - Allows Focus on Business Functionality
 - **Decrease Development Costs**
 - Requires a Smaller Team
 - Infrastructure May Be 80% of the Total Effort
 - **Increase Reliability and Maintainability**
 - Facilitates Uniform Development Across the Application
 - Hides Complexity from Developers
 - Decreases the Code You Must Test and Maintain

- **Advantages To Using Eclipse**
 - **Built By Companies With Framework Experience**
 - **Implements a Clear, Cohesive Architecture**
 - **Support For All Major Desktop Platforms**
 - **Native UI Look & Feel**
 - **Good 3rd Party UI Design Tool Support**
 - **Large Set of Standard and Extended Widgets**
 - **Extensive Text Processing Support**
 - **User Configuration and Preferences**
 - **Platform-specific Features (OLE, ActiveX)**
 - **Discovery and Installation of Updates**
 - **Internationalization and Localization**
 - **Integrated Help System**
 - **Books and Training Readily Available**

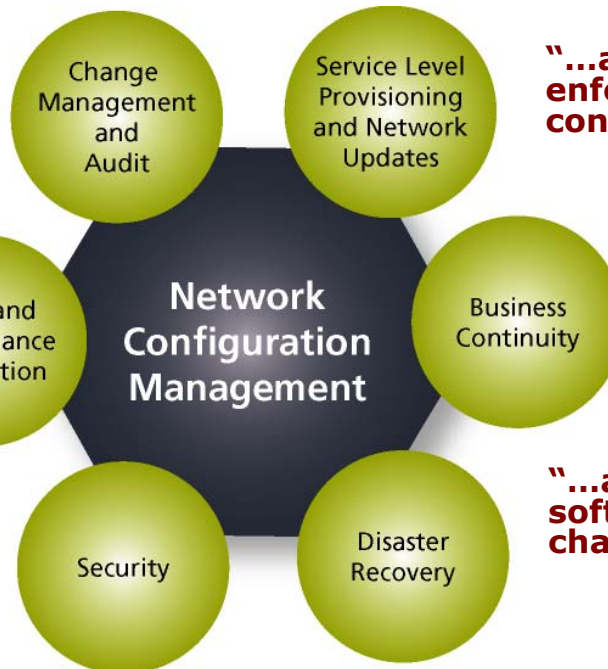
Part II

Case Study: Building an Eclipse-based Product

AlterPoint Overview

The leading provider and innovator of Multi-vendor, Network Configuration Management (NCM) solutions

"...tracking of who is performing which configuration changes."



"...automated workflow enforcing best practice configuration changes."

"...rapid identification of an outage caused by an invalid configuration change."

"...verification that the appropriate changes were made..."

"...association of hardware, software & configuration changes."

The Network Engineer's Desktop Today

The screenshot displays a Windows XP desktop environment with several open applications:

- Microsoft Excel - test.xls:** A spreadsheet with columns for IP Address and Hostname (optional). The data includes:

IP Address	Hostname (optional)
10.10.1.49	VANGUARD 320
10.10.10.1	Cisco 2621-A
10.10.10.12	Cisco 2501-B
10.10.10.13	WellFleet ARN-A
10.10.10.14	F5 - Rio-IP
- Microsoft Internet Explorer:** Opened to a page titled "Beginner's Guide to CGI Scripting with Perl". The page content includes a "Contents" section with links to:
 - Introduction
 - Running "Hello, world"
 - Running "Hello, world"
 - Running a form-to-em
 - Running a onesthank
- Microsoft Telnet Client:** A window titled "Welcome to Microsoft Telnet Client" showing the prompt "Microsoft Telnet>".
- Command Prompt (cmd.exe):** Shows the execution of a ping command:

```
C:\Documents and Settings\rshopp>ping 10.10.10.1

Pinging 10.10.10.1 with 32 bytes of data:

Reply from 10.10.10.1: bytes=32 time=1ms TTL=253
Reply from 10.10.10.1: bytes=32 time=1ms TTL=253
Reply from 10.10.10.1: bytes=32 time=1ms TTL=253
Reply from 10.10.10.1: bytes=32 time=1ms TTL=253

Ping statistics for 10.10.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Documents and Settings\rshopp>
```

The taskbar at the bottom shows the Start button, several open windows, and the system tray with the time 6:27 PM and 100% battery level.

The Resulting Business Problem

Manual, unintegrated process for activities like device updates and problem diagnosis

- **Error-prone**
- **Inefficient**

Corporate assets are decentralized (scripts, inventory lists, configuration files).

- **Security risk**
- **Prevents knowledge sharing**

Initial Goals of the Project

- **Introduce unified platform that integrates the network engineer's tools for managing device configurations.**
- **Automate the network engineer's most common and painful activities – e.g., making changes to devices.**
 - Example – OS upgrade for certain Cisco devices:**
 - Search for all Cisco devices with a specific OS version and add them to target list
 - Automatically check for pre-requisites on target list
 - Execute the OS update
 - View real-time interactive feedback to ensure success of the change
- **Make the platform open and extensible so tools can be easily snapped in.**

Integrated Network Environment (INE)

The screenshot displays the 'Update for DeviceAuthority' application window, which is connected to a network device at 10.10.10.1. The interface is divided into several panes:

- Inventory Pane:** Shows a hierarchical tree of network devices. A context menu is open over the '10.10.10.1 - TESTENV-2621' device, with options like 'Refresh', 'Tools', 'Run', 'Script...', 'Trace Route', 'Ping', and 'NS Lookup'.
- Terminal Pane:** Displays a command-line interface for the connected device. The prompt is 'TESTENV-2621(config)#'. The output shows 'Testing for install 106' and 'Access Verification'.
- Configuration Pane:** Shows the running configuration for the device, including version 12.3, hostname 'TESTENV-2621', logging settings, and user accounts like 'testlab', 'wayne', and 'alterpoint'.
- Web Browser Pane:** Displays the Cisco Systems homepage with a search bar and navigation links.
- Properties Pane:** Located at the bottom left, it shows a table of backup properties.

Property	Value
Backup S...	
Backup	Backup Succeeded
Comm...	
Enabl...	true
Last ...	Wed Dec 31 08:5...
Last ...	Tue Dec 30 19:53...
Status	Ready for Back Up

Configuration Search

The image shows a 'Search' dialog box with a blue title bar and a close button (X) in the top right corner. The dialog has three tabs: 'Devices', 'Configurations', and 'Help Search'. The 'Configurations' tab is selected. Below the tabs, there is a section labeled 'Containing text:' with a text input field containing 'access-list 117' and a dropdown arrow. Below this is a legend: '(* = any string, ? = any character, "" = phrase, AND, OR, NOT = boolean operators)'. There are two sections for filtering: 'Configuration Type' with checkboxes for 'Current' (checked) and 'Draft' (unchecked); and 'Inventory Scope' with a dropdown for 'Inventory Source' and radio buttons for 'All Categories' (selected) and 'Category'. The 'Category' section includes a text field with 'Uncategorized', a 'Select...' button, and a 'Clear' button. At the bottom of the dialog are three buttons: 'Customize...', 'Search', and 'Cancel'.

Search

Devices Configurations Help Search

Containing text:
access-list 117

(* = any string, ? = any character, "" = phrase,
AND, OR, NOT = boolean operators)

Configuration Type

Current
 Draft

Inventory Scope

Inventory Source:

All Categories
 Category

Uncategorized Select... Clear

Customize... Search Cancel

Creating a Change Script with AutoScriptor

The screenshot displays the DeviceAuthority Update Module interface, connected to 10.10.10.23. The interface is divided into several sections:

- Inventory:** A tree view on the left showing a list of devices, including 10.10.10.2 - CS-500, 10.10.10.9 - austin-gw 1-364, 10.10.10.13 - NewYork-04-2, 10.10.10.16 - cisco-2621-B, 10.10.10.23 - Cisco-4000, 10.10.10.34 - Nortel ARN-B, 10.10.10.35 - Jeremiah Was, 10.10.10.51 - LucentCajun, 10.10.10.56 - Summit24, 10.10.15.11 - PIX501-CONF, 10.10.15.13 - cisco3005.insid, 10.10.15.15 - HP4000M, 10.10.15.18 - netscreen-Sxp, 10.10.16.12 - Pipe50-A, 10.10.16.14 - LocDir416, 10.10.16.15 - 1720-Uname-o, 10.10.16.17 - WellFleet AN-B, 10.10.16.18 - CONFIG-A, 10.10.16.25 - LD415, 10.10.16.26 - Catalyst 6000, 10.10.16.27 - Bay ARN-C, 10.10.16.29 - PIX520CONFIG, 10.10.17.11 - Cat 4000 - Swi, 10.10.17.12 - TACACS_Enabl, 10.10.17.14 - Bay 450-C, 10.10.17.15 - labrap, 10.10.17.17 - 350T, 10.10.17.18 - AP340, and 10.10.17.22 - AP1200-f4e73.
- Terminal Window:** A window titled "*Connected to 10.10.10.23" showing the following output:

```
Connected to 10.10.10.23 on port 23 at 11:12:52 AM CST
ROM: System Bootstrap, Version 4.14(3.2), SOFTWARE

Cisco-4000 uptime is 1 week, 2 days, 23 hours, 30 minutes
System restarted by reload
System image file is "c4000-i-mz.112-26d.bin", booted via flash

cisco 4000 (68030) processor (revision 0xA0) with 16384K/1024K bytes of memory.
Processor board ID 5008965
G.703/E1 software, Version 1.0.
Bridging software.
K.25 software, Version 2.0, NET2, BFE and GOSIP compliant.
2 Ethernet/IEEE 802.3 interface(s)
2 Serial network interface(s)
128K bytes of non-volatile configuration memory.
4096K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

Cisco-4000#
```
- Script Editor:** A window showing a JavaScript function:

```
function main()
{
    var telnet = Alterpoint.newTelnet();
    var device = Alterpoint.getDevice();

    telnet.setInactivityTimeoutSeconds(180);

    /*
```
- Search Results:** A search window titled "Search ('Configuration [access]' - 4 Occurrences in DA (DeviceAuthority))" showing the following results:
 - 10.10.10.16 Cisco 2621 running operating system version 12.1(17), - startup-config (February 2, 2004 11:15:43 AM CST)
 - 10.10.10.23 Cisco 4000 running operating system version 11.2(26d), - startup-config (February 2, 2004 11:14:49 AM CST)
 - 10.10.10.35 Nortel 1200 running operating system version 2.1.6.1 - running-config (February 2, 2004 11:15:55 AM CST)
 - 10.10.10.9 Cisco 3640 running operating system version 12.2(2)T, - startup-config (February 2, 2004 11:15:35 AM CST)
- Properties Window:** A window titled "Properties" showing the following information:

Property	Value
Backup Status	
Backup	Backup Succ...
Comments	
Enabled For ...	true
Last Accessed	Fri Jan 16 11...
Last Change...	Fri Jan 16 11...
Status	Ready for Ba...
Device	
Administrati...	10.10.10.23

Creating an Update Template

Specify the Update Process and Validation Scripts
(Optional) Specify what scripts need to be run before the device updates begin and after they complete. Additionally, specify if notification emails should be sent during the update process.

	Script		On Failure	Notify On Success	Notify On Failure
At the start of the update run:		...	Exit	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Before each device update run:	Ping.js	...	Skip	<input type="checkbox"/>	<input checked="" type="checkbox"/>
After each device update run:	Backup.js	...	Exit	<input type="checkbox"/>	<input checked="" type="checkbox"/>
At the end of the update run:		...	Exit	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Summary | Devices | Update Script | Workflow and Validation | Notification | Schedule

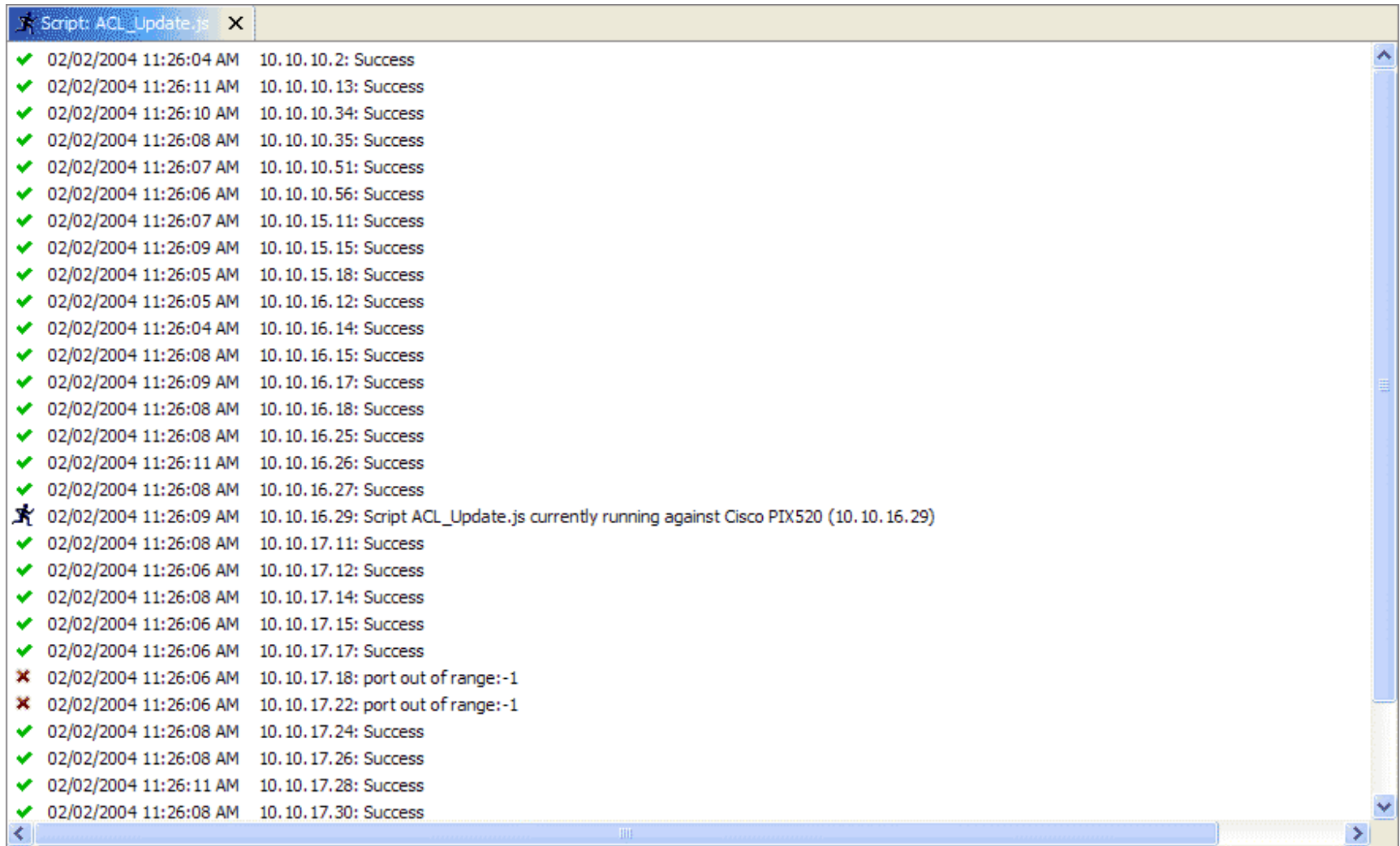
Inventory | Scripts | Updates

Properties

Property	Value
Info	
Created By	Admin
Created On	Sat Dec 27 15:27:06 CST.
Description	This update changes pas.
Modified On	Sat Dec 27 12:45:02 CST.
Modified By	Admin
Name	CatIOS Password Update

Search | Web Browser | Historical Updates

Real-Time Feedback on Job Results



Icon	Date/Time	IP Address	Status
✓	02/02/2004 11:26:04 AM	10.10.10.2	Success
✓	02/02/2004 11:26:11 AM	10.10.10.13	Success
✓	02/02/2004 11:26:10 AM	10.10.10.34	Success
✓	02/02/2004 11:26:08 AM	10.10.10.35	Success
✓	02/02/2004 11:26:07 AM	10.10.10.51	Success
✓	02/02/2004 11:26:06 AM	10.10.10.56	Success
✓	02/02/2004 11:26:07 AM	10.10.15.11	Success
✓	02/02/2004 11:26:09 AM	10.10.15.15	Success
✓	02/02/2004 11:26:05 AM	10.10.15.18	Success
✓	02/02/2004 11:26:05 AM	10.10.16.12	Success
✓	02/02/2004 11:26:04 AM	10.10.16.14	Success
✓	02/02/2004 11:26:08 AM	10.10.16.15	Success
✓	02/02/2004 11:26:09 AM	10.10.16.17	Success
✓	02/02/2004 11:26:08 AM	10.10.16.18	Success
✓	02/02/2004 11:26:08 AM	10.10.16.25	Success
✓	02/02/2004 11:26:11 AM	10.10.16.26	Success
✓	02/02/2004 11:26:08 AM	10.10.16.27	Success
⚠	02/02/2004 11:26:09 AM	Script ACL_Update.js currently running against Cisco PIX520 (10.10.16.29)	
✓	02/02/2004 11:26:08 AM	10.10.17.11	Success
✓	02/02/2004 11:26:06 AM	10.10.17.12	Success
✓	02/02/2004 11:26:08 AM	10.10.17.14	Success
✓	02/02/2004 11:26:06 AM	10.10.17.15	Success
✓	02/02/2004 11:26:06 AM	10.10.17.17	Success
✗	02/02/2004 11:26:06 AM	10.10.17.18	port out of range:-1
✗	02/02/2004 11:26:06 AM	10.10.17.22	port out of range:-1
✓	02/02/2004 11:26:08 AM	10.10.17.24	Success
✓	02/02/2004 11:26:08 AM	10.10.17.26	Success
✓	02/02/2004 11:26:11 AM	10.10.17.28	Success
✓	02/02/2004 11:26:08 AM	10.10.17.30	Success

Lessons Learned – What Worked

- **The IDE to INE paradigm.**
- **Extensive functionality: Decorators, contribution model, workspace, search, perspectives, rich-editor support, preferences, property sheets, etc.**
- **Plug-in model for building a platform of integrated tools for the network practitioner.**
- **Usability and responsiveness of native platform widgets.**
- **Multi-platform support.**
- **Partnership with Genuitec.**

Lessons Learned...Challenges We Faced

- **Platform has strong ties to the file system. Problem for remote Java objects accessed from an app server.**
- **Assumes your building an IDE. Required removal of some base Eclipse plugins (e.g., Build menu)**
- **Significant learning curve due to size of the platform.**
- **Difficulty in testing an integrated set of tools as opposed to a specific application workflow.**
- **Market education – “Why should we used a rich-client (non-web) interface?”**

Next Steps

Add additional applications on top of the platform

- **Enforcement**
- **Grammar/syntax checking**

Extend the ecosystem through integrations with third party solutions

Examples:

- **Fault/performance monitoring (MIB browsing)**
- **Vulnerability remediation**
- **Configuration analysis (security, routing, etc.)**

Integrate with other inventory sources

Part III

RCP: A Big Step Forward

- **Enhancements Over Eclipse 2.1**
 - **IDE Decoupled from Workbench Platform**
 - No Code Edits to Excise IDE Functionality
 - Still Based On Perspectives, Views, Editors
 - **Enhanced UI Configurability**
 - Policy Support: i.e. Toolbar for Workbench Window?
 - Menu Management is Fully Dynamic
 - More Branding Support
 - **SWT/Swing Interoperability** ([Enhancement #37724](#))
 - Portions in Place, More Coming
 - **Tabular & Tree Data** ([Enhancement #37998](#))
 - Greatly Increased Capacity and Capability
 - **Much More – See the Other RCP Track Presentations**

- **Remaining Challenges**
 - **Eclipse Frameworks are Still Complex**
 - Steep Learning Curve
 - Books, Training, and Consulting are Available
 - **Physical Resource Requirements** ([Enhancement #37723](#))
 - No Support for Editors/Markers on Logical Resources
 - **No Built-in Security Model** ([Enhancement #37692](#))
 - User / Group / Capability Management
 - Hard to Tailor UI Presentation By Role
 - **No SWT Charting Capabilities**
 - But Embedded Browser Can Be Used for Graphics
 - **Work In Progress Until June 2004**

Part IV

Questions and Answers

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References

[The Case For Using Eclipse Technology in General Purpose Applications, Todd Williams & Marc Erickson, July 2002](#)