



Cisco Expo 2009

Zero-Touch



Автоматично инсталиране на крайни клиенти

Ясен Спасов

ЗЛАТНИ ПАРТНЬОРИ



СРЕБЪРНИ ПАРТНЬОРИ



Commonly Used Acronyms

Acronym	Description
IOS	Cisco Internetwork Operating System
CCE	Cisco Configuration Engine
CNS Agent	Cisco Networking Services. IOS embedded agent on the used to communicate with CCE
CNR	Cisco Network Registrar
CPE	Customer Premise Equipment
ACE	Application Control Engine
EEM	Embedded Event Manager
SDP	Secure Device Provisioning
CX	Cisco Configuration Express
TFTP	Trivial File Transfer Protocol
DHCP	Dynamic Host Configuration Protocol
AI	AutoInstall – an IOS Embedded feature

Zero Touch Deployment Models

Cisco True Zero Touch

The router has the smarts to **auto configure** without human intervention

Primary components include

- AutoInstall – a Cisco IOS software feature/component
- CNS Agent in Cisco CPEs
- CCE Server to manage/administer the CPE configuration templates
- Cisco Network Registrar to provide the TFTP and DHCP functionality
- For HA, Redundancy and Load Balancing of the CCE servers are used

Validated Model

Cisco Near Zero Touch

Requires some degree of **manual** intervention

- eToken: a USB-based smartcard device;
- CX: Cisco Configuration Express;
- Cisco EEM: Cisco Embedded Event Manager
- Cisco SDP: Secure Device Provisioning

True Zero Touch

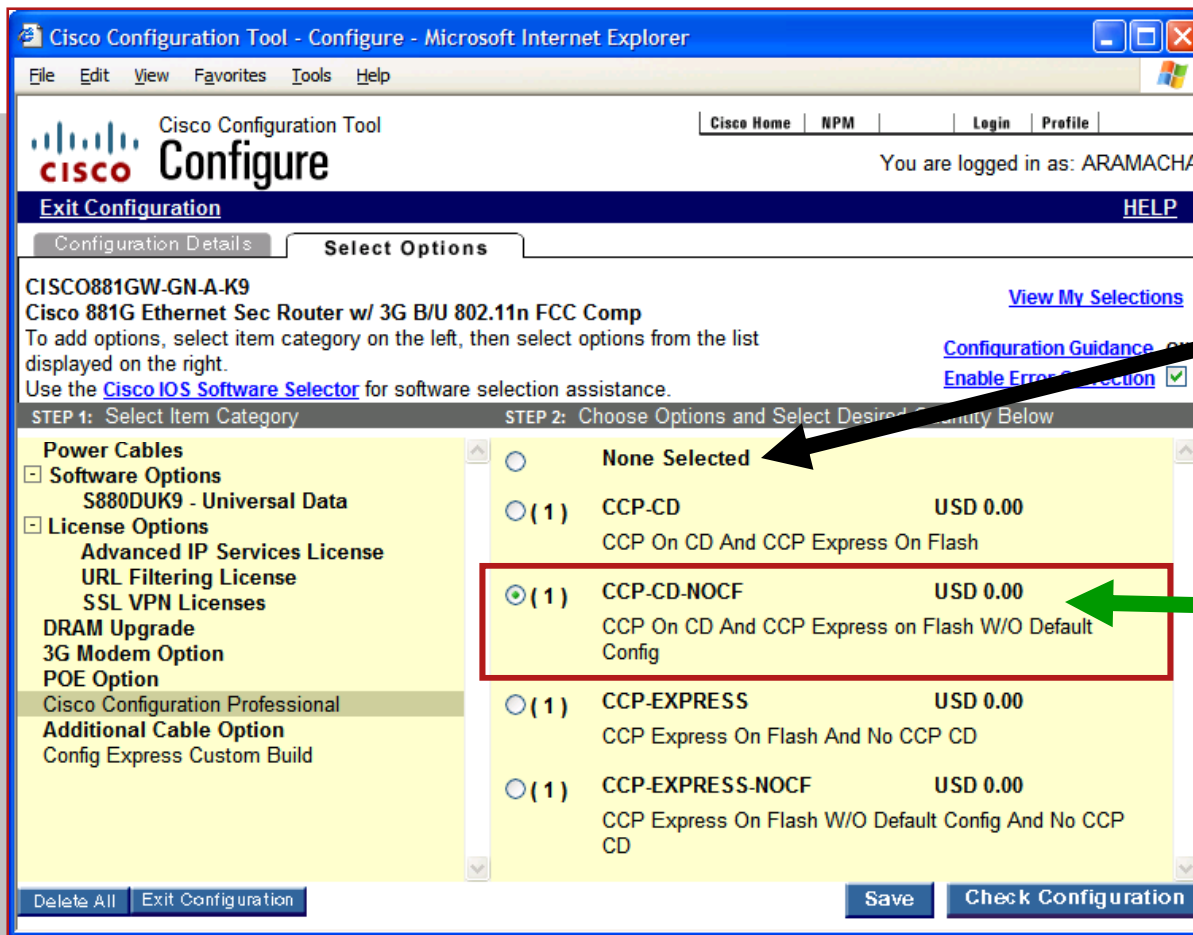
Solution Highlights... (contd)

- Uses common network protocols for **automatic** CPE deployment
- CPE connectivity to SP network is done automatically via Autoinstall
- **High volume** of CPE deployment automatically using **template** based configurations
- CNS agents on CPEs allow for further automation capabilities when used with CCE
 - **IOS** image **upgrades**, **Configuration** changes
- Solution enables **managed connectivity** and additionally facilitates rollout of **managed services** like FW, VPN, CME etc on the CPE.
- CCE provides CPE management (i.e. Moves, Adds, Changes) as well as configuration template management
- Integration with CCE provides Day-1 and Day-2 services capabilities

Solution Tested

CCO Ordering Process

Enabling AI on the ISRs shipped from factory



For Autoinstall to work, there must be **NO** configuration in the NVRAM

Ordering process **defaults** to this option. CCP is installed by default on all ISRs shipped out of factory i.e. CCP in Flash and NVRAM

Select "**CCP-CD-NOCF**" option. During configuration of the ISRs, the customer **must select the option highlighted** in order to enable Zero touch on the ISRs out of the box

PS: Hitting the reset button on the 8xx series ISR routers, results in the default config being copied from Flash to NVRAM. This will break Zero Touch deployed configuration in the field. See Troubleshooting section for manual override steps

Solution Tested

True Zero Touch

Solution Components

1. Embedded Cisco IOS Auto Install feature (AI)
2. Cisco CCE
Linux/Solaris based deployment
3. Embedded CNS Agent in Cisco IOS
4. Cisco Network Registrar (CNR)
Provides DNS, DHCP and TFTP services
5. LDAP Server
6. ACE Load Balancer
7. Hardware/Software Matrix

Solution Tested

True Zero Touch Solution Components

1. Auto Install Underlying Pre-requisites

- **No configuration file** resides in NVRAM on the CPE device (See next slide #21))
 - i.e. Cisco Configuration Professional (CCP) is **NOT** present on the device
- A DHCP server/services is available on the network to provide IP addresses to the CPE
- CPE device is powered on and WAN interface* (Eth) is physically connected to the network
- The network has the IP connectivity necessary to permit the CPE networking device to load the configuration files from the TFTP server during the Autoinstall process.
- The default/generic configuration file, and where necessary host specific config files to be loaded on the devices resides on a TFTP server that is available on the network

* List of validated ISR WAN interfaces for ZT

	In ZT Solution	Auto Install Support
Ethernet	Y	Y
Cable Interface	N	Y
WIC-1DSU-T1-V2	N	Y
VWIC2-1MFT-T1/E1	N	N
HWIC-1T1	N	N
VWIC2-2MFT-T1/E1	N	N
NM-1CE1T1-PRI	N	N
NM-2CE1T1-PRI	N	N
V.35 Serial	N	N

Solution Tested

Step 1: Staging of CPE



Set up device in Cisco Configuration Engine before device deployment

- Add Cisco Network Services ID: Unique device identifier
- Cisco Network Services ID can be hostname, IP address, MAC address, hardware serial number, unique device identifier (UDI), or any string
- Associate configuration template with device

Step 2: Load Bootstrap Configuration on CPE

- Bootstrap configuration is initial set of dynamic startup configuration commands

Specific to the customer

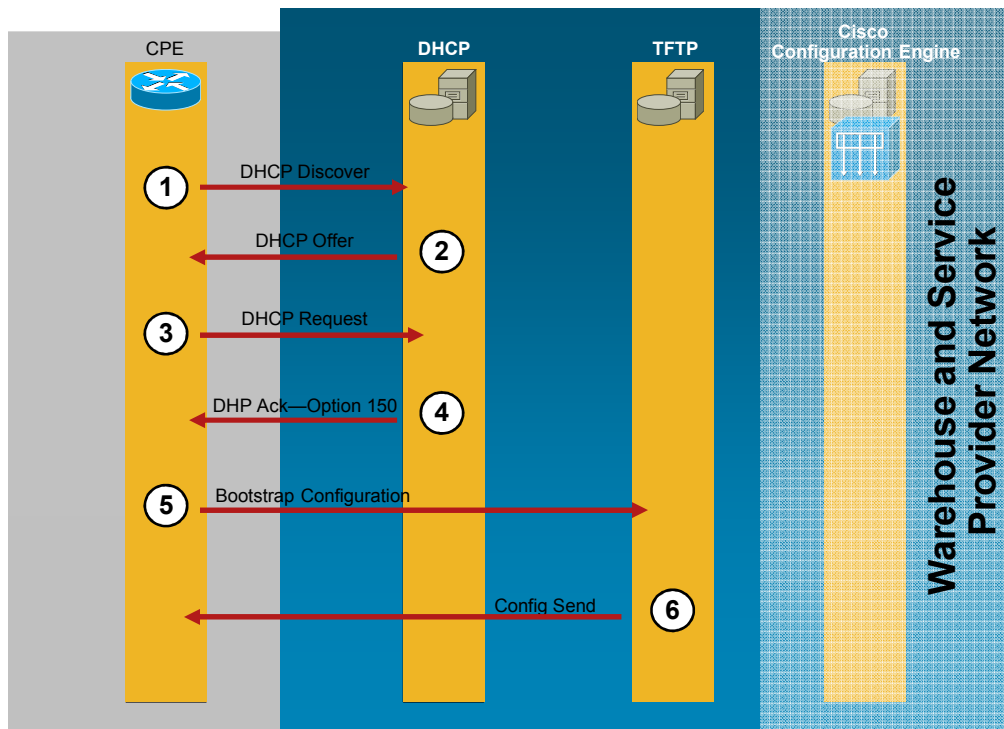
Service, location, etc., agnostic

- Few lines of IOS Cisco Network Services agent commands to execute the one-time initial configuration download
- Could point to a Virtual IP address on load balancer instead of actual CCE host
- Several mechanisms to get bootstrap on CPE

```
Router # ip host cns-ce 10.1.3.99
Router # cns config initial 10.1.3.99 80
Router # cns config partial 10.1.3.99 80
Router # cns id hardware-serial
Router # cns id hardware-serial event
Router # cns id hardware-serial image
Router # cns event cns-ce 11011 keepalive 60 3
Router # cns exec 80
```

Step 2: contd

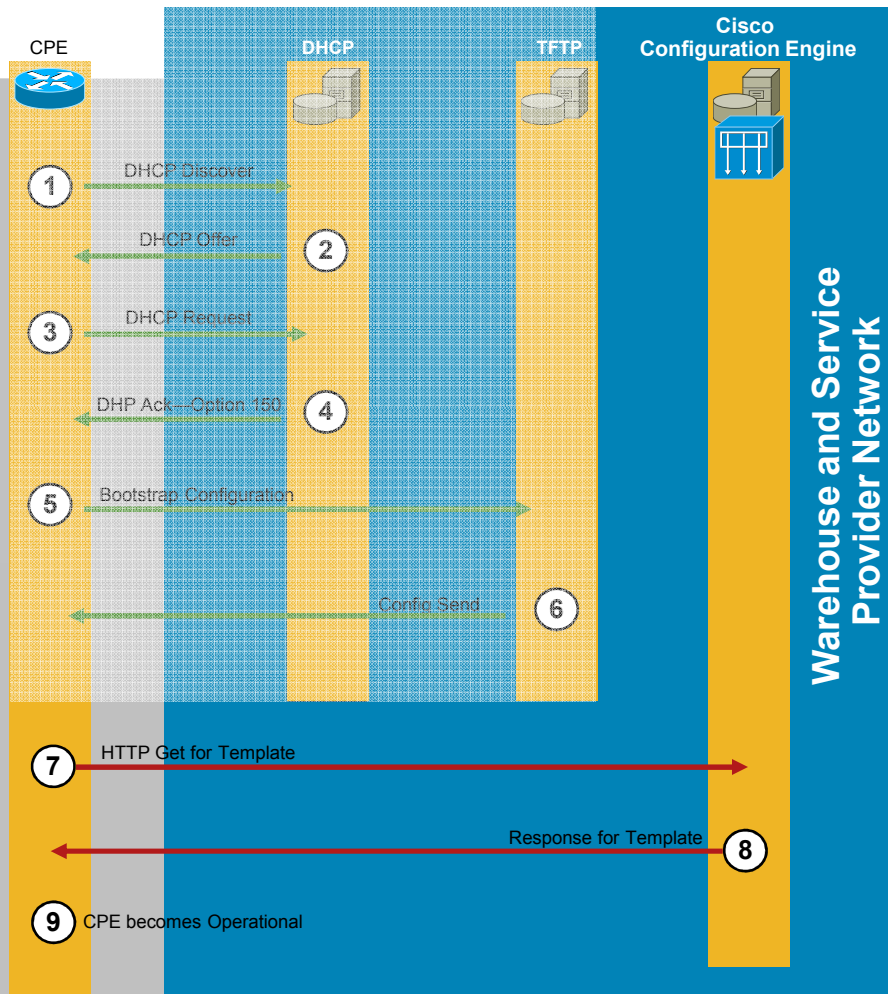
Bootstrap Options: AutoInstall* Call flows



1. CPE sends Dynamic Host Configuration Protocol (DHCP) Discover
2. DHCP server replies with Offer
3. CPE sends DHCP Request
4. DHCP server replies with Option 150
5. CPE requests bootstrap file over TFTP
6. TFTP server sends CPE bootstrap file

*Requires **CCP NOCF** SKUs during ordering process

Post Bootstrap Call flows



1. CPE sends Dynamic Host Configuration Protocol

2.

3.

4.

5.

6.

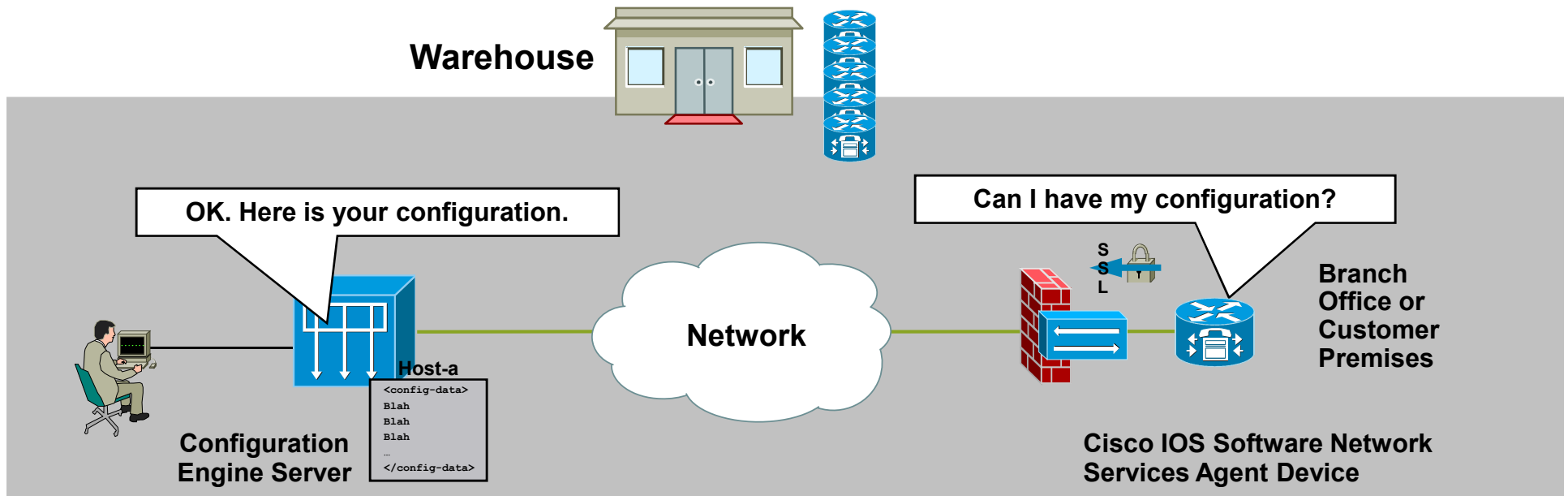
7. CPE requests config template

8. CE responds with the template

9. CPE is operational

Zero-Touch Deployment Illustration

(view in presentation mode)



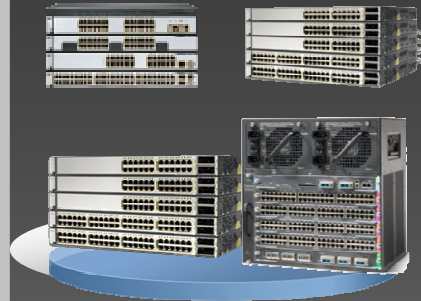
1. Device (CPE-A) is selected from warehouse and loaded without configuration
2. CNS ID and template for CPE-A is entered in the configuration engine
3. CPE-A is shipped to the customer premises or branch office
4. CPE-A powers up and calls home to the DHCP/TFTP/Configuration Engine
5. Upon authentication, configuration engine sends configuration to CPE-A
6. CPE-A applies configuration and becomes operational

Access Routers



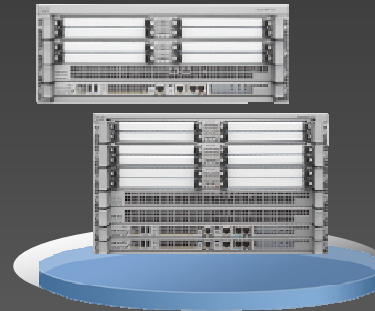
- 800 Series
- 1800 Series
- 2800 Series
- 3200 Series
- 3800 Series
- SOHO 70/90
- 1700 Series
- 2600 Series
- 3600 Series
- 3700 Series
- UC-500 Series
- SR-500 Series

Access/Metro Switches



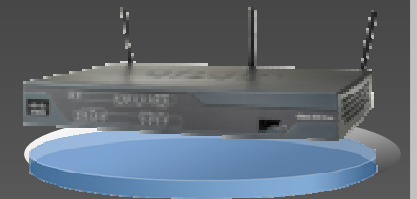
- Catalyst 2950
- Catalyst 2960
- Catalyst 3550
- Catalyst 3560/-E
- Catalyst 3750/-E
- Catalyst 4500
- ME 3400/E Series
- ME 4900 Series

Aggregation Routers



- 7200 Series
- 7300 Series
- 7500 Series
- ASR 1000 Series
- 7600 Series
- 10000 Series
- 10700 Series
- 12000 Series

Voice/Wireless Routers

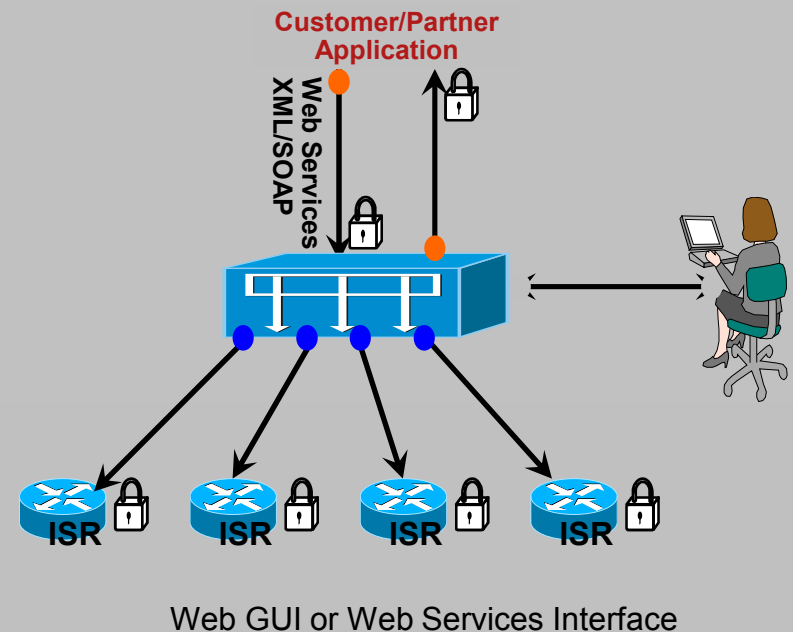


- AS5300 Series
- AS5400 Series
- AS5800 Series
- IAD2400 Series
- IAD880 Series
- MWR 1900
- MWR 2900

CCE – Day 2 Services

Configuration and Image Services

- Configuration Changes
 - Secure configuration updates to 1000's of devices in minutes
 - Secure distribution of service configuration (Voice, VPN, Security)
- Image Distribution
 - Cisco IOS Images, Cisco CatIOS Images, Intrusion Protection Signature (IPS) Files, Security Device Manager (SDM) Files, IP Phone Images, Music On Hold (MOH) files, Interactive Voice Response (TCL IVR) Files and more
- Image Activation – Any File - Anywhere
 - Cisco IOS and CatIOS Images can be activated and the device reloaded and verified.
 - Configuration commands can be applied immediately prior to activating an image.



Linux CE 3.0 Characterization

Adding 5k devices	<ul style="list-style-type: none">▪ CPU temporarily spikes to 30%
Config updates to 2000 devices	<ul style="list-style-type: none">▪ CPU temporarily spikes to 25-30%
Time taken to send Config updates to 2000 devices	<ul style="list-style-type: none">▪ 100 secs
Memory Consumption	<ul style="list-style-type: none">▪ Stable memory – pegged at 3.5GB regardless number of devices added between 5k to 20k
Maximum device connections	<ul style="list-style-type: none">▪ 20,000

Solution Tested

True Zero Touch Solution Components

3. CNS Agent

- **Embedded** feature within Cisco IOS
- **Maintains TCP connection** between the IOS Event Agent and CCE's Event Gateway for communications management
- **Integrates with CCE** for device events, configuration events, device inventory and image updates
- Offers **programmable functionalities** to further enhance Cisco CPE deployments

Solution Tested

True Zero Touch Solution Components

4. CNR Server

- CNR provides the **DNS, DHCP** and **TFTP** functionality for the true Zero Touch solution
 - An existing/functional CNR can be configured to provide functionality for the true Zero Touch solution
- Although the True Zero Touch solution **uses a single CNR server**, it supports an active and standby server configuration for redundancy.
- Provides a **central location** for CPE configuration file management for the bootstrap configuration file
- Allows for **custom option definitions** to enable other IP networking services

CNR Hardware Platform Specs

- Solaris 9
- Sunfire V240
- 2 CPUs @ 1.5GHz
- 4 GB RAM
- 72 GB HD

A note on CNR Redundancy:

- First, the backup server honors DHCP Renewal requests from clients regardless of the state of the main server
- The main server frequently updates the backup server with the state of its lease database
- When the main server updates the backup with the state of each lease, it extends the backup server's perception of the lease time by a factor of 1.5

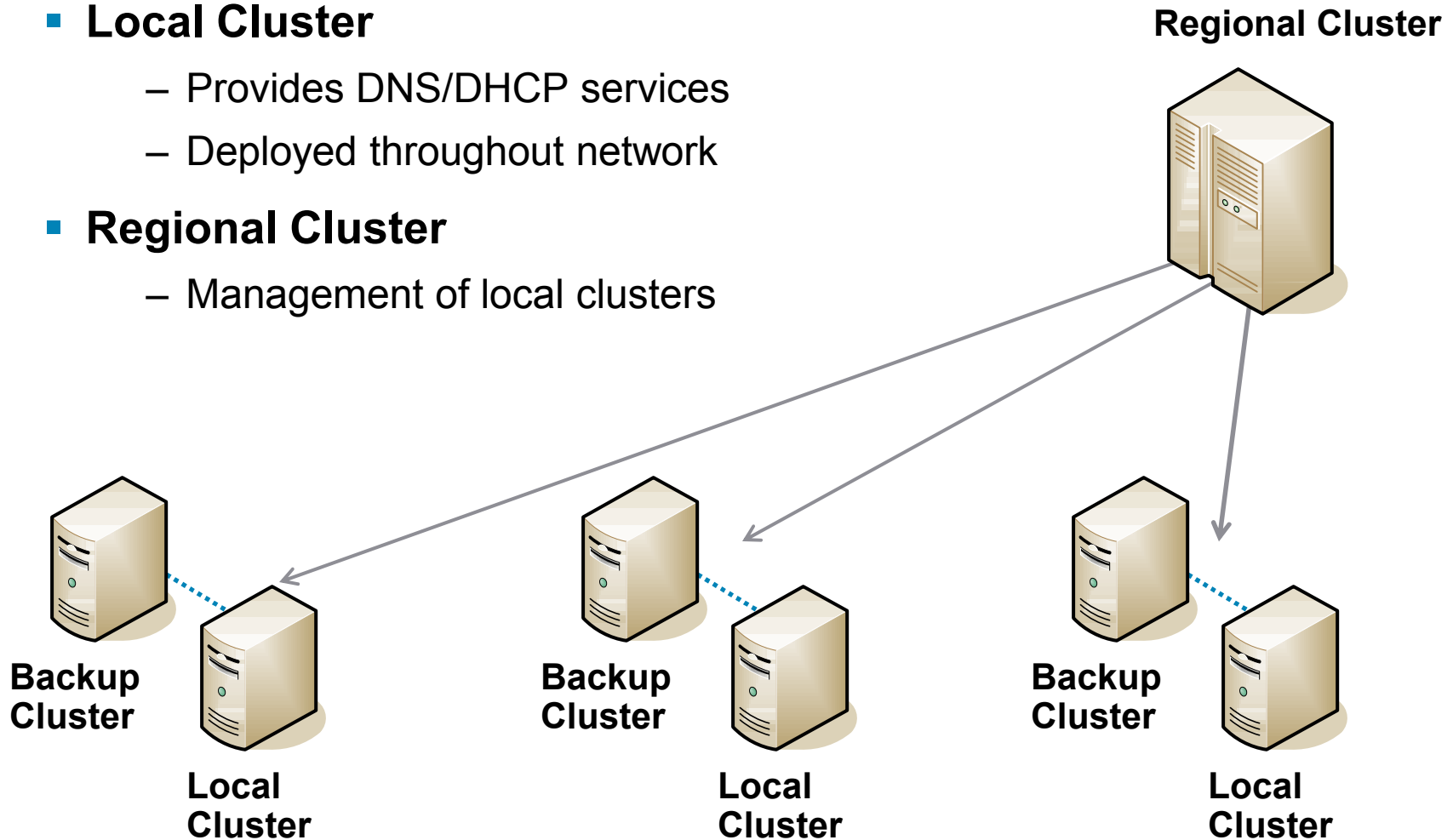
Solution Tested

CNR Overview

- A high-performance DHCP, DNS and TFTP server
Scalable, Reliable and Extensible
- Successfully deployed in Service Provider, Enterprise and Government networks
- Standards compliant
- A basis for numerous network applications:
 - VoIP
 - Metro Ethernet
 - Wireless
 - ...

CNR Deployment Architecture

- **Local Cluster**
 - Provides DNS/DHCP services
 - Deployed throughout network
- **Regional Cluster**
 - Management of local clusters



Centralized IP Address Mgmt

View Unified Address Space

Select VPN [none] ▾

Address/Mask [*]	Type	Owner	Region	Address Type	Description	
<input type="text"/> / 24 ▾	Address Block ▾	[none] ▾	[none] ▾	[none] ▾	<input type="text"/>	
<input type="button" value="Add Address Block"/>						
Address/Mask	Type	Owner	Region	Address Type	Current Usage	Description
1 2 3 4 5 6 7 8 9 10 <input type="button" value="All"/>						
▾ 192.168.50.0/24	Address Block	[none]	[ncne]	[none]	0	
192.168.50.0/24	Subnet	[none]	[ncne]	[none]	0	
▣ 192.168.60.0/24	Address Block	[none]	[ncne]	[none]	0	
▾ 192.168.60.64/26	Address Block	[none]	[ncne]	[none]	0	
192.168.60.64/26	Subnet	[none]	[ncne]	[none]	0	
192.168.60.128/26	Address Block	[none]	[ncne]	[none]	0	
192.168.70.0/24	Address Block	[none]	[ncne]	[none]	0	
<input type="button" value="Home"/> <input type="button" value="Back"/> <input type="button" value="Forward"/> <input type="button" value="Refresh"/>	<input type="text"/> / 24 ▾	<input type="button" value="Search"/>	[Subnet]		10	<input type="button" value="Change Page Size"/>
<input type="button" value="Show Current Utilization for All Subnets"/>						

View Current Utilization Report for: 192.168.50.0/24

Utilization Detail	Type	Active Dynamic	Free Dynamic
1 2 3 4 5 6 7 8 9 10 <input type="button" value="All"/>			
192.168.50.0/24	Address Block	0	100
▾ 192.168.50.0/24	Address Block	0	100
example-scope	Scope	0	100
<input type="button" value="Home"/> <input type="button" value="Back"/> <input type="button" value="Forward"/> <input type="button" value="Refresh"/>			10 <input type="button" value="Change Page Size"/>
<input type="button" value="OK"/>			

Basic and Advanced Configuration Menus

The image shows two overlapping screenshots of a configuration web interface. The top screenshot displays the 'Basic' configuration menu, and the bottom screenshot displays the 'Advanced' configuration menu.

Basic Configuration Menu:

- [Set up this CNR Server](#)
Select the services and configuration
- [Administration](#)
Use these pages to manage licenses
- [Servers](#)
Use these pages to manage protocol
- [Clusters](#)
Use these pages to manage remote
- [Manage Scopes](#)
Use these pages to manage scopes
- [Manage Zones](#)
Use these pages to manage zones in
- [Go to Advanced CNR Configuration](#)
Exit basic pages, and go to advanced

Advanced Configuration Menu:

- [Administration](#)
Use these pages to manage licenses, administrators, administrator groups and roles, encryption keys and access control lists, owners and regions, and to view the datastore change logs.
- [Servers](#)
Use these pages to manage protocol servers on this cluster.
- [Clusters](#)
Use these pages to manage remote clusters.
- [Routers](#)
Use these pages to manage routers and router interfaces.
- [DHCP](#)
Use these pages to manage the Cisco Network Registrar DHCP server. This includes management of scopes and associated ranges, reservations and leases, policies and associated options, and client and client-class entries.
- [DNS](#)
Use these pages to manage the lists of zones, reverse zones and secondary zones, and their resource records. Also manage zone templates, secondary servers, and zone distribution.
- [Hosts](#)
Use these pages to manage hosts, assigning them a DNS name and one or more IP addresses.
- [Address Space](#)
Use these pages to view the unified address space tree, and to manage address blocks, subnets and static IP ranges.
- [Go to Basic CNR Configuration](#)
Go to basic CNR configuration pages.

Session Settings:

- [-] Show Roles for User admin
- [-] Session Settings
 - Scope:
 - Synchronous:
 - Advanced:
 - Set Scope Edit Mode
 - Set Zone Edit Mode
 - Set WebUI Mode
- [-] WebUI Debug Settings
- [-] Server Debug Settings
- [-] Change Password

CNR 7.0.1 DHCP Performance

Figure 1: Maximum DHCPv4 Leasing Performance

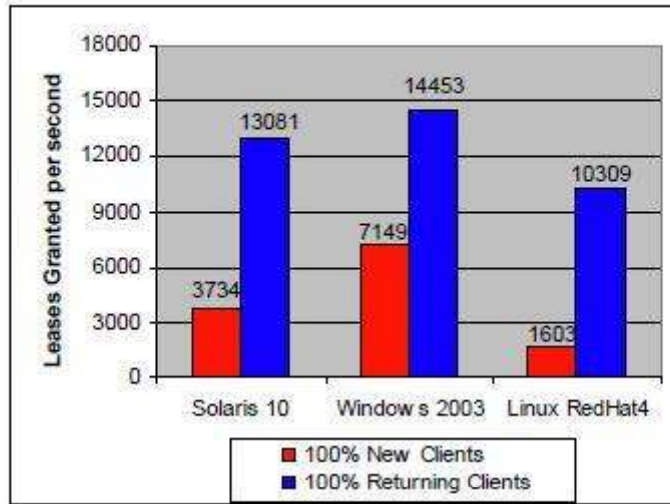


Table 1: Server Hardware Configurations

Model	OS	CPU	Disks	Memory
Sun T5220	Solaris 10	8x1.2 GHz	SCSI 10k rpm disk array	32 GB
HP DL360	Windows 2003	4x3.8 GHz	SCSI 15k rpm	3.5 GB
HP DL360	Linux RH4	4x2.8 GHz	SCSI 10k rpm	8 GB

Figure 2: Maximum DHCPv6 Leasing Performance

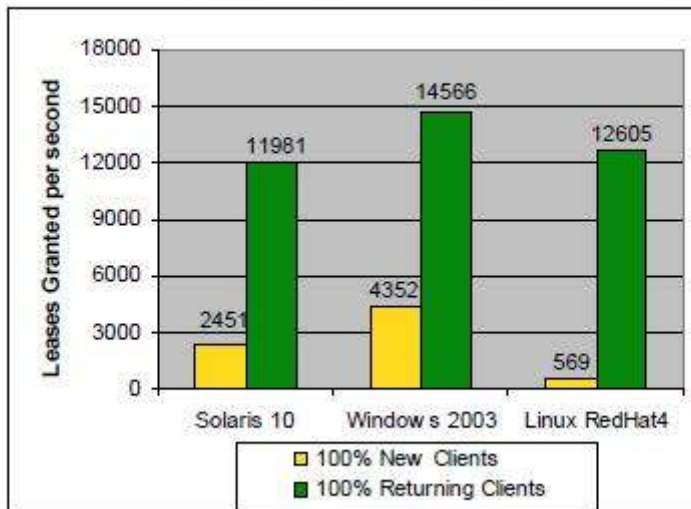


Table 2: Client Hardware Configurations

Model	OS	CPU	Disks	Memory
Intel PC	Linux RH4	2x2.4 GHz	7200 rpm	4 GB
Intel PC	Linux RH4	2x2.4 GHz	7200 rpm	4 GB
Intel PC	Linux RH4	2x3.0 GHz	7200 rpm	512 MB
Intel PC	Linux RH4	2x3.0 GHz	7200 rpm	1 GB
Intel PC	Linux RH4	2x2.4 GHz	7200 rpm	4 GB
Intel PC	Linux RH4	2x3.0 GHz	7200 rpm	1 GB

Agenda

- Executive Summary

-

- Case Study

-

-

1. Case Study – EU Incumbent SP

Customer - Project	<ul style="list-style-type: none">▪ Provide managed security & voice services on ISRs to Enterprise and SMB customers
Objective	<ul style="list-style-type: none">▪ Provide IP VPN connectivity, managed FW, managed voice services to customers
Challenges	<ul style="list-style-type: none">▪ Massive configuration updates to several thousands of CPEs simultaneously▪ Massive image upgrades to several thousands of CPEs at a time
Solution	<ul style="list-style-type: none">▪ Seven (7) Config Engines deployed integrated with in-house OSS▪ Uses IMGW to provision all types of CPEs
Achievements	<ul style="list-style-type: none">▪ 50,000 sites deployed to date, planning to expand to 100,000▪ Reduces Day-2 operational expenses via Config Engine▪ Improves operational cash flow from 5-weeks to 5-days▪ Tight integration of provisioning, monitoring and management of CPEs between Configuration Engine and in-house OSS via SDK/CE APIs

2. Case Study – US Service Provider

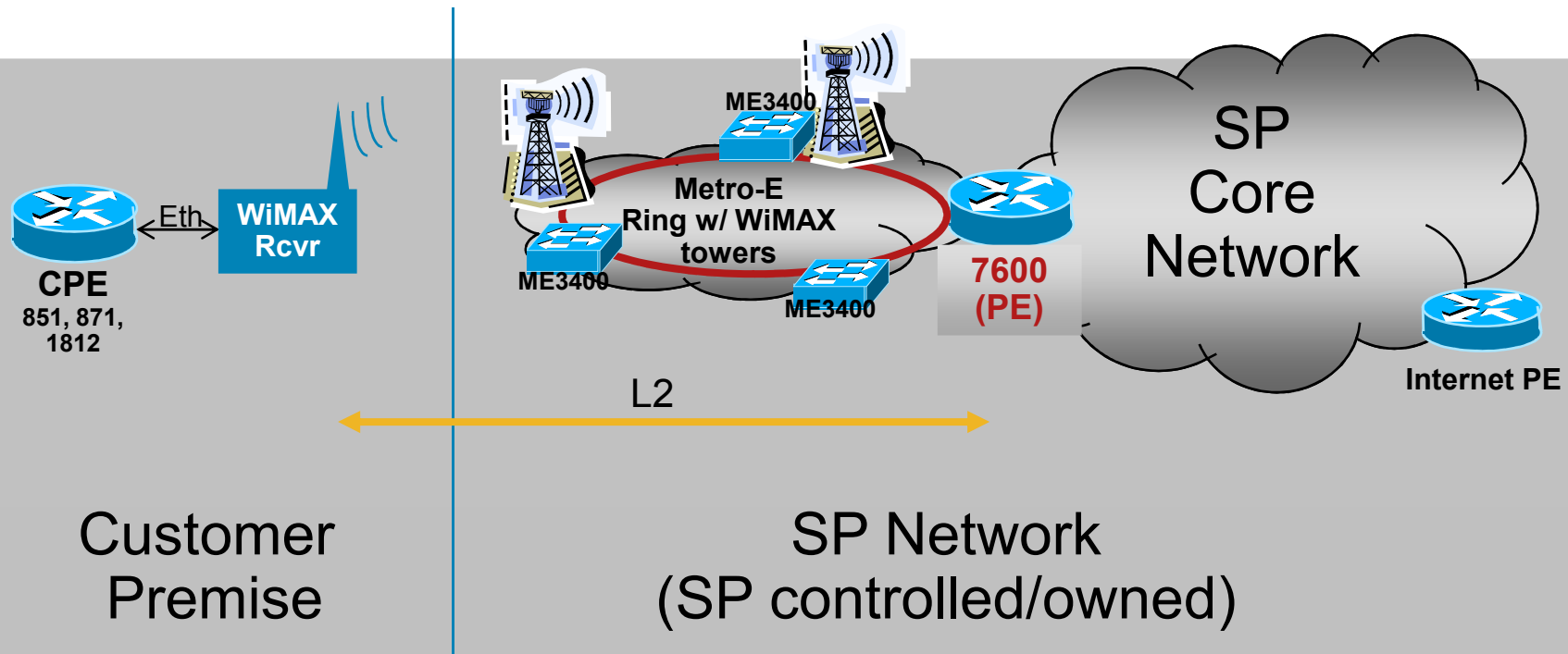
Customer - Project	<ul style="list-style-type: none">▪ Provide host static ip services to SMB customers
Objective	<ul style="list-style-type: none">▪ Provide IP connectivity to connected customers
Challenges	<ul style="list-style-type: none">▪ Configuration updates to several thousands of CPEs at a time▪ Image upgrades to several thousands of CPEs concurrently
Solution	<ul style="list-style-type: none">▪ Two (2) Config Engines integrated with in-house OSS to manage 25K devices▪ Uses CNS Agent to provision all types of CPEs
Achievements	<ul style="list-style-type: none">▪ 25,000 sites deployed to date, planning to expand to 40,000, adding ~350 ISRs/wk▪ Reduces Day-2 operational expenses via Config Engine▪ Tight integration of provisioning, monitoring and management of CPEs between Configuration Engine and in-house OSS.

3. Case Study – Cisco IT

Customer - Project	Cisco IT – Enterprise Class Teleworker – Employee’s home offices
Objective	Provide IPSec VPN CPE, managed FW, managed wireless and managed unified communications to Cisco Employee Teleworkers, connected via local SPs broadband internet access
Challenges	<ul style="list-style-type: none">▪ Unsecure & unreliable management connectivity to CPE▪ Dynamic IP address assignment (by local SP) to CPE
Solution	<ul style="list-style-type: none">▪ Config Engine integrated with Cisco Security Manager▪ CPE Identification via CNS
Achievements	<ul style="list-style-type: none">▪ 13000 sites deployed to date expanding to 30000+ sites worldwide▪ Reliable & secure deployment via Config Engine▪ Fully managed CPE model (config change considered security breach)

4. Case Study – Large SP Customer

ZT Deployment for Access (ISRs) & Aggregation/Infra. (ME3400)



True Zero Touch Deployment

- Being used to rollout & maintain **access** infrastructure at Cell Sites (ME3400)
- Deployment of routers on **premise** (behind WiMax receiver) – ISR Ethernet WAN for managed connectivity & basic security services

True Zero Touch Advantages/Disadvantages

Advantages

- Auto configure without human intervention
- Eliminate truck rolls deployment
- Enable SP managed service adoption and CPE deployment at low cost
- Facilitate scalable, cost effect CPE-based managed service offerings administered from a central location
- Provides CPE management (moves, adds, changes) of single or bulk configurations
- Support for large scale deployment with loadbalancing and redundancy
- Uses existing off-the-shelf Cisco software and hardware components
- Autoinstall + CCE is the most flexible implementation
- Allows for custom provisioning of CPEs
- SSL and encryption between CPE and CCE

Disadvantages

- Deploying multiple servers require the use of external server as internal multiple database do not sync with each other
- Need to develop application based on CCE SDK for monitoring status of CPEs being managed
- No encryption in Autoinstall initial request (DHCP request and offers are not encrypted)
- No encryption in tftp requests
- Image Upgrade requires manual intervention

Solution Tested

Agenda

- Executive Summary
-
-
- Other Deployment Models
-

Near Zero Touch Deployment Models

Aladdin eToken

- CPE Day-1 uses an encrypted USB key with the appropriate IOS image

Configuration Express

- Cisco Ordering Tool used to simplify the processes of router configuration and deployment

IOS Embedded Event Manager

- Embedded Event Manager in conjunction with Tcl scripts can deliver a near touch solution at very low cost

Secure Device Provisioning

- Uses Secure Device Provisioning, Cisco Security Manager and CNS Config Engine to deliver a near Zero Touch deployment

POC Tested Effort

Embedded Event Manager



POC Tested Effort

What is Embedded Event Manager (EEM)?

- An extremely flexible and very powerful subsystem within Cisco IOS Software

Using EEM you can:

Write programs that run on the router or switch

- What can EEM be leveraged for?

It's about automation - onboard automation

Automate troubleshooting

Automate commands

Program automatic actions based on events

Only limited by your imagination

POC Tested Effort

EEM Basic Architecture

* All within Cisco IOS

- Event Detectors

“watch for events of interest”

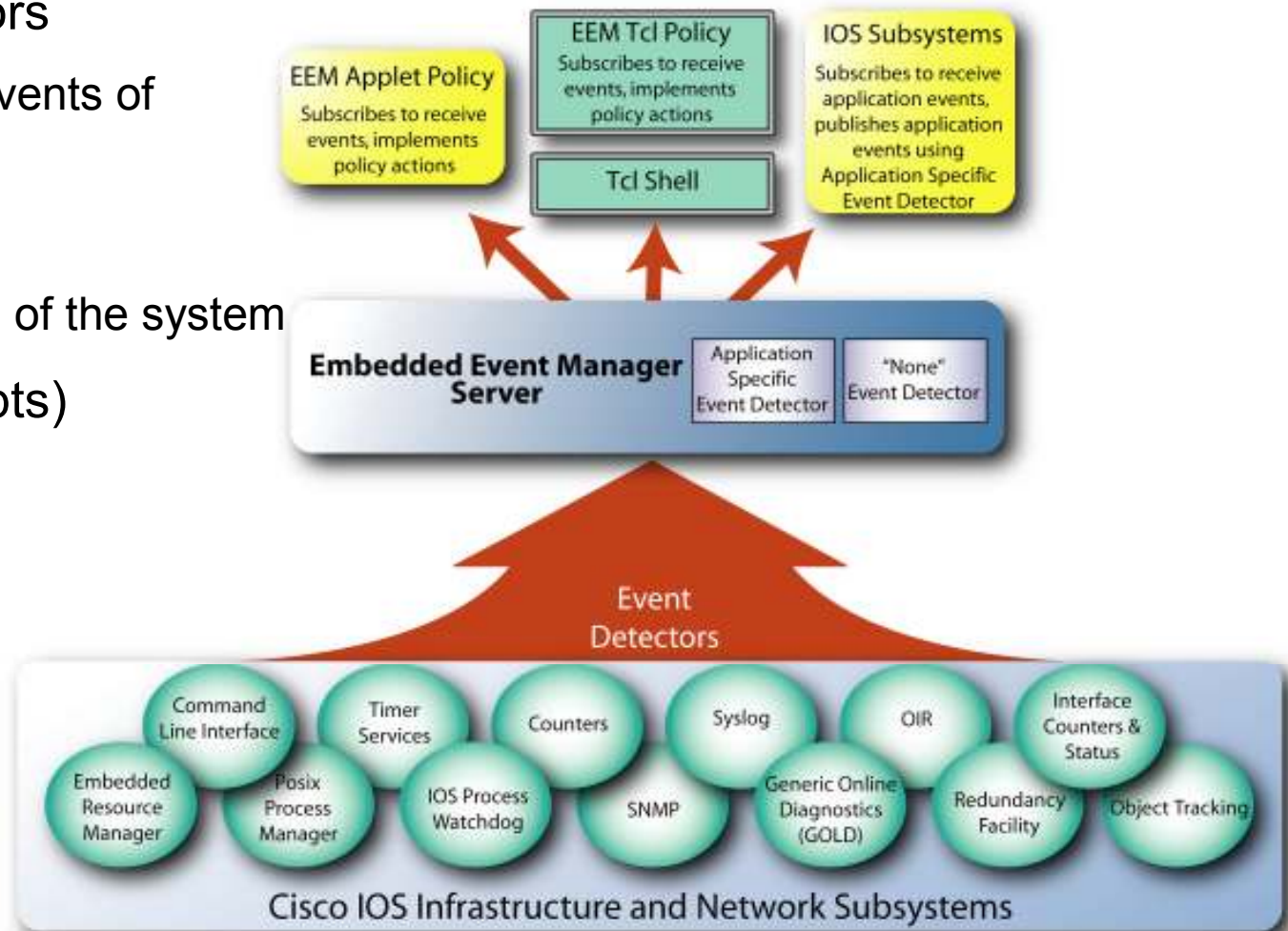
- EEM Server

The “brains” of the system

- Policies (Scripts)

Applets

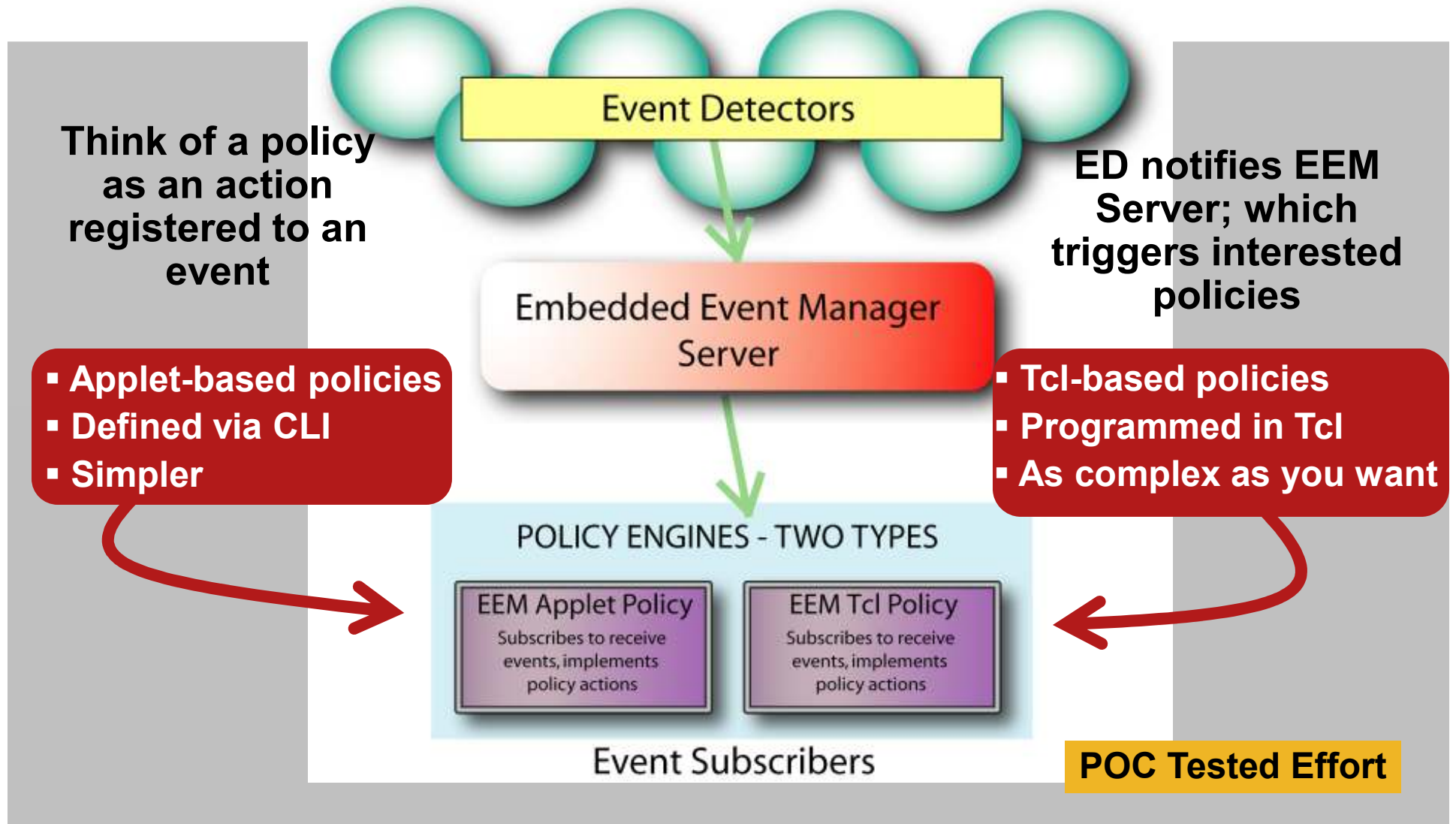
Tcl-based



POC Tested Effort

EEM Event Detectors and EEM Policies

All of this is internal to Cisco IOS



Using EEM for Zero Touch Deployment

- EEM, with the help of scripts, facilitates automation of tasks such as a bringing up a CPE or provisioning and deploying the CPE.
- In cases where the customer is unable able to deploy CNS-Configuration Engine, the next best option is to use EEM.
- While it does require the user to load a tcl script in the CPE, EEM streamlines and automates the near Zero-Touch process in the CPEs.
- The Tcl scripts are loaded at the factory via Configuration Express or at the service provider's staging center

POC Tested Effort

EEM: Advantages/Disadvantages

Advantages	Disadvantages
<ul style="list-style-type: none">▪ Highly intelligent and customizable scripts to automate operational tasks▪ Powerful tool for device and system management▪ Programmable actions to receive notifications of successful/failed router operations▪ Automate IOS Image version verification and download▪ Reduce operational expense▪ CX may be leveraged to load scripts to a device	<ul style="list-style-type: none">▪ Scripts must be written by the end-customer▪ No Cisco support for Tcl scripts▪ Thorough testing is required before deployment of devices▪ May require staging for scripts to be loaded onto device▪ Scripts are stored onto FLASH, which may become corrupt or deleted <p data-bbox="1495 1409 1940 1474">POC Tested Effort</p>

EEM Case Study: NTTPC Communications



- Auto-Configuration Project Overview

POC Tested Effort

EEM: Auto-Configuration Project Overview

- Auto-Configuration was highly required to win back Japanese small CPE market for commercial/Enterprise customer.
- Project goal: creating high value- added Managed CPE service with SP Carriers.

Back Ground

- In Japanese market, domestic products like Yamaha, NEC are very competitive and very successful in Japanese CPE market because of their performance and price. (Their products are inexpensive and have IPsec high performance.)
- Cisco was forced to compete on performance & price.



As a countermeasure, we must create a new value-added managed service like Auto-configuration which is related to decrease their deployment cost.

Challenge : win back the small CPE market share.

Benefit of Auto-Config

Reduce the cost of installation

Save the trouble of installation and operation

POC Tested Effort

Business Results

- NTTPC's implementation of Auto Configuration using EEM enables near zero touch deployment of the Cisco 1800 CPEs, significantly reducing the installation and troubleshooting costs for NTTPC and dramatically improving the overall ISR deployment experience for its end customers.

NTTPC is benefiting from:

- Over 50% acceleration of service activation time
- Over 20% reduction of connection verification time
- Quick and easy recovery in the event of initial mis-configuration

As the result of these benefits, NTTPC's customers are enjoying:

- Over 30% lower initial cost
- Over 50% reduction of router installation time
- Over 60% reduction of overall deployment time

NTTPC Communications. Corp Overview

Name: NTTPC Communications, Inc.



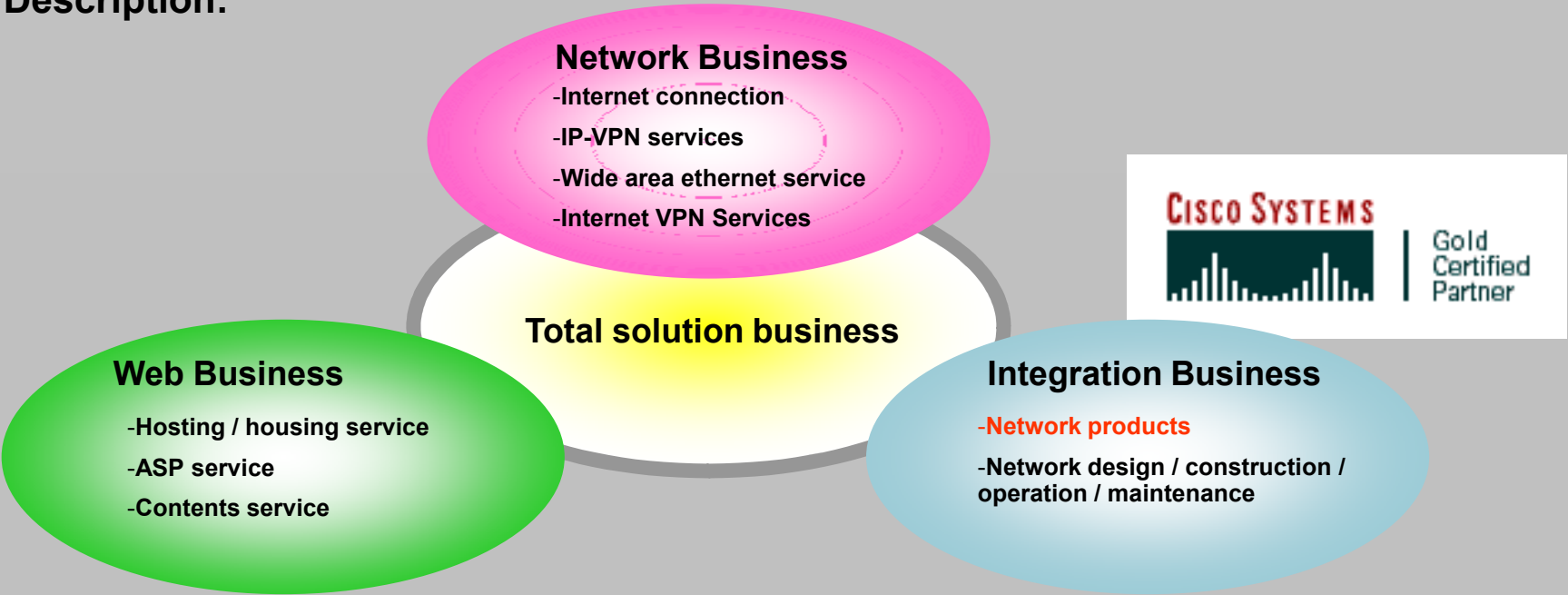
Established: September 4, 1985

Capital: 4 billion yen

Shareholder: [NTT Communications Corporation](#)

Business: Telecommunication business

Description:



POC Tested Effort

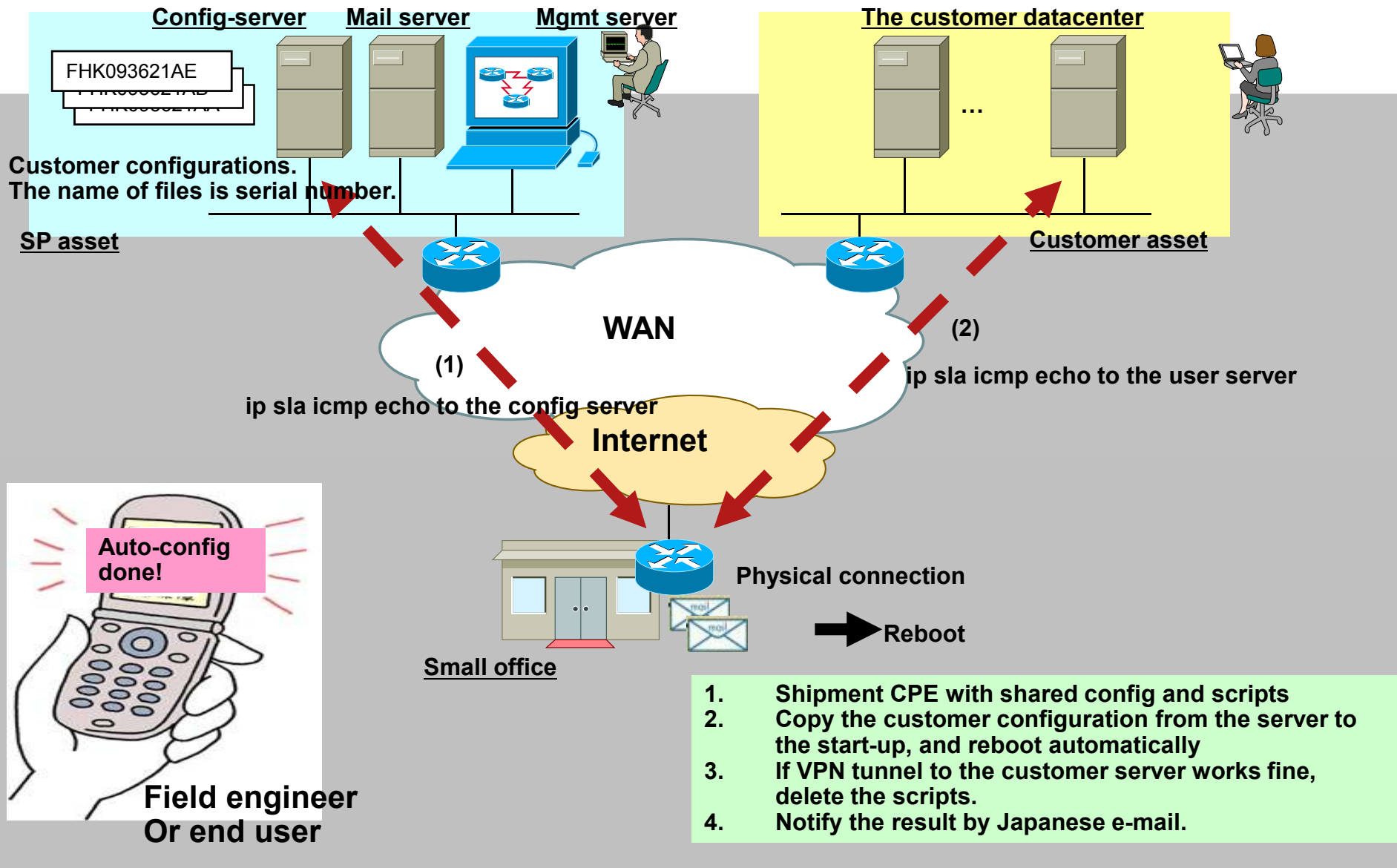
Challenge

- Beat domestic product (Yamaha / NEC etc...)
 - The Japanese boxes were their standard products in small CPE managed service because of costs.
- Win back CPE market share
- Auto-configuration with EEM, without expensive NMS.

POC Tested Effort

SP Managed Service CPE Auto Configuration Specification Overview

POC Tested Effort



1. Shipment CPE with shared config and scripts
2. Copy the customer configuration from the server to the start-up, and reboot automatically
3. If VPN tunnel to the customer server works fine, delete the scripts.
4. Notify the result by Japanese e-mail.

EEM/Tcl Auto Configuration Scripts

IOS: 12.4(6)T2



startup-config: initial-config (All routers have same initial configuration)
 The router has six scripts in the flash.
 -Boot01.tcl -> Initial Script
 -Copy01.tcl -> Copy configuration form server
 -Reboot01.tcl -> Reload the router if server is not unreachable
 -2ndBoot01.tcl -> 2nd Script
 -VPNSuccess01.tcl -> Confirm the customer pppoe and VPN
 -VPNFail01.tcl -> Back to Boot01.tcl if customer VPN does not work

- 1) Physical connection
- 2) Power-on

Register Boot01.tcl

3) "RESTART" Syslog detection

Register Copy01.tcl

Register Reboot01.tcl

- 4) Track 10 (reachability -> Up) : ip sla icmp echo to the config server
- 5) Get serial number of the router
- 6) erase startup-config
- 7) Copy the customer configuration from the server to the start-up
- 8) Un-register Copy01.tcl and Reboot01.tcl
- 9) Reload the router, and the router will boot up with 2ndBoot01.tcl

- 4') Wait 90sec, detect IF-MIB status is up. -> Tracking seems fail because of timeout.
- 5') Reload the router

Register 2ndBoot01.tcl

10) "RESTART" Syslog detection

Register VPNSuccess01.tcl

Register VPNFail01.tcl

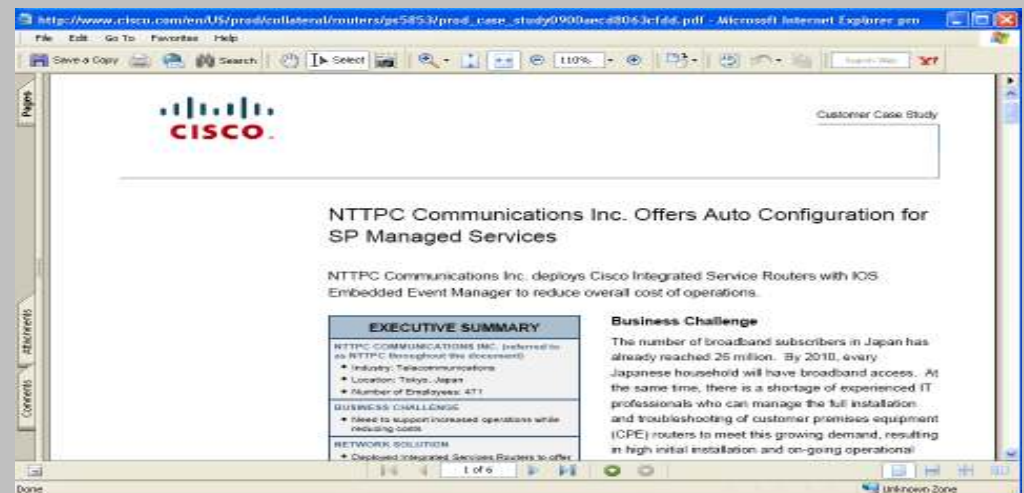
- 11) Track 11 (reachability -> Up) : ip sla icmp echo to the user server
- 12) Delete Copy01.tcl, Reboot01.tcl, VPNSuccess01.tcl and VPNFail01.tcl
- 13) Un-register VPNSuccess01.tcl and VPNFail01.tcl

- 11') Wait 90sec, detect IF-MIB status is up. -> Tracking seems fail because of timeout.
- 12') Un-register 2ndBoot01.tcl and register Boot01.tcl
- 13') Copy run start
- 14') Reload the router

Auto-Configuration done!

Customer Win

- They has released their new service with Cisco 1812 as their standard box and EEM/DMVPN feature. Case Study URL:
http://www.cisco.com/en/US/prod/collateral/routers/ps5853/prod_case_study0900aecd8063cfdd.pdf
- The release has great impact on Japanese managed CPE market targeting for Commercial/Mid-Enterprise.
- They are very satisfied with EEM powerful and flexible potentiality, and they are planning next step with it.



Agenda

- Executive Summary

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- Conclusions

Near Zero Touch Summary

- In situations when deploying true Zero-Touch connectivity is not feasible, eToken, CX, EEM, SDP can provide a near Zero-Touch Solution
- All of the near Zero-Touch models require some degree of manual intervention
- Some near Zero-Touch models only support managed connectivity, while others support managed connectivity and ongoing managed services as well
- CCE may be integrated with any of the near Zero-Touch solutions to provide ongoing managed services
- There is no perfect near Zero-Touch model, based on technical and business needs one may be preferred over the other

POC Tested Effort

Conclusion

- Zero Touch solution enables SP managed service adoption & rapid CPE deployment at low cost
- SPs can deploy Cisco CPE (routers & switches) at end customer sites in a scalable manner
- SPs can drop ship CPEs at remote customer sites and administer them in a truly automated manner*
- Solution can be deployed globally
- Solution is available for mass deployment without pre-provisioning
- Automation of Day 2 functions (post install) for MACD (moves, adds, changes, & deletes)
- Establish the foundation that Cisco can uniquely add value differentiation for all revenue and non-revenue generating SP services/applications

* Exceptions apply

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