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Setting up IBM zAware
Step by Step

Garth Godfrey
IBM Poughkeepsie
ggodfrey@us.ibm.com

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SHARE in Boston

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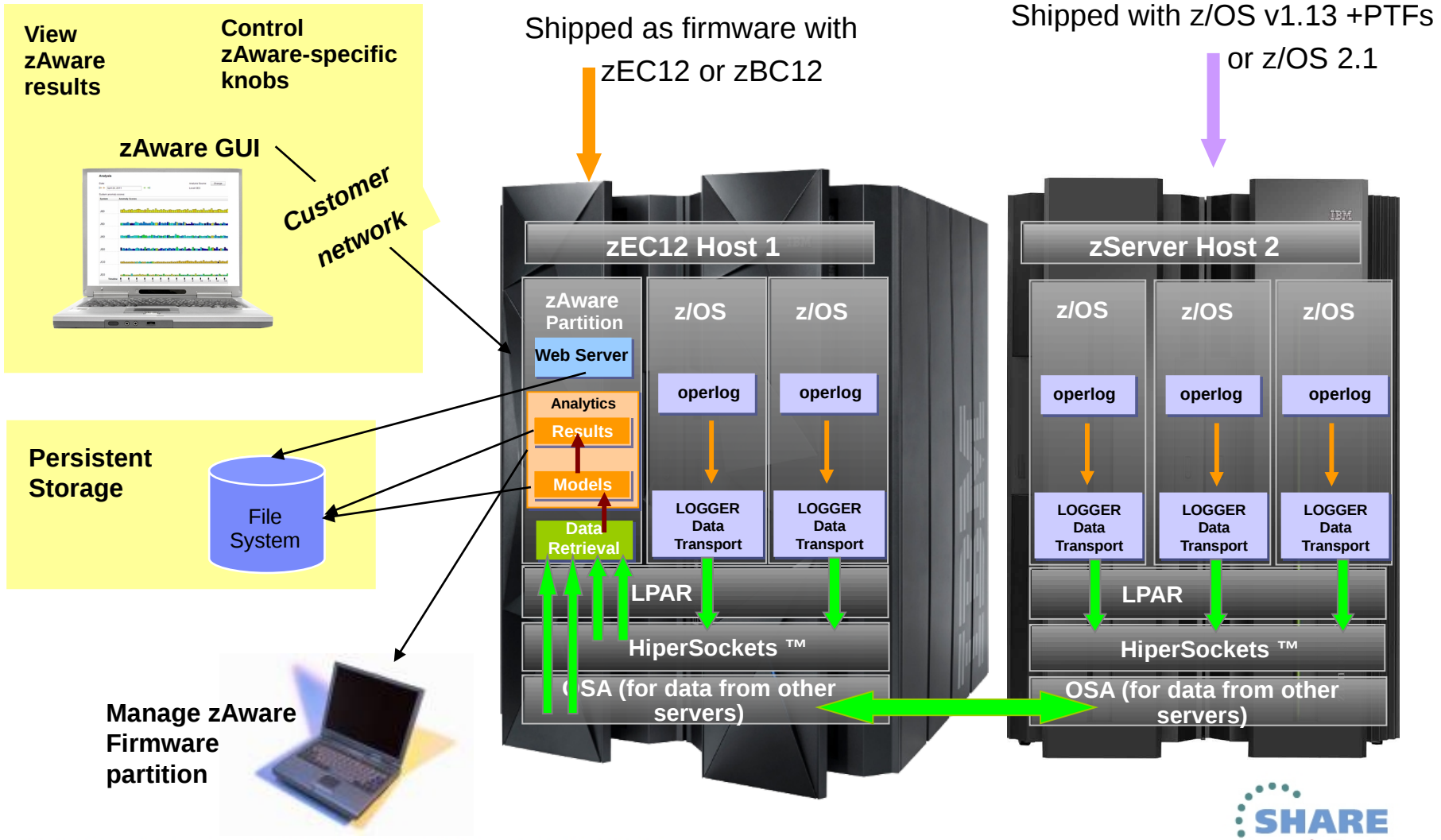
Agenda

- Definition of the zAware partition
- zAware GUI Configuration
  - DASD Storage assignment
  - Security set up
  - Analytics configuration
- z/OS setup for monitored systems
- Priming the zAware partition with existing data
  - z/OS
  - zAware GUI
  - Training a model
- Ongoing operations

IBM zAware –
IBM System z Advanced Workload Analysis Reporter

- Monitors z/OS OPERLOG including all messages written to z/OS console, including ISV and application generated messages
- Detects things typical monitoring systems miss due to:
  - Message suppression (message too common)
    Useful for long-term health issues
  - Uniqueness (message not common enough)
    Useful for real-time event diagnostics
- Color coded easy to use GUI via web browsers
- Output can be queued up to existing monitoring systems.
- Early detection and focused diagnosis can help improve time to recovery

Inside IBM zAware



Operating Requirements – IBM zAware Server

- Logical partition on a **zEC12 or zBC12** server
  - Runs on **IFL**s or general purpose **CP**s – may be dedicated or shared
  - Runs its own self-contained firmware stack
  - Recommended 2 partial engines
    - *Initial priming and training: 25-80% of 1 **zEC12** IFL (30-95% of 1 **zBC12** IFL)*
    - *Analysis: 20-40% of 1 IFL (zEC12 or zBC12)*
- Memory and DASD resources are dependent on the number of monitored clients, amount of message traffic, length of time data retained
  - Minimum Memory is **4 GB** for 6 clients with light message traffic (500 msgs/sec)
    For > 6 clients **+ 256 MB per client** required
  - Estimated DASD storage is ~ **500 GB** (ECKD)
- Network resources
  - HiperSockets or shareable OSA ports or IEDN
  - IP address for partition
- Browsers
  - Internet Explorer 9
  - Firefox ESR 10

zAware Partition Background & IOCDS Definition

- IBM zAware Partition, including I/O, is defined like any other partition. You can use Hardware Configuration Definition (HCD) / Hardware Configuration Management (HCM) or equivalent.
- Similar in many ways to Coupling Facility type partitions
- zAware application loaded from Support Element (SE)
- zAware application is firmware
  - Separate EC stream
  - Updated like all other firmware
    - Part of Support Element (SE) version 2.12.0
    - Hardware Management Console (HMC) support starting with HMC version 2.12.0
    - Concurrent Driver Upgrade (CDU)
    - EC Upgrade
    - MCFs/MCLs
- Prerequisites to defining a zAware partition: Purchase and install the zAware Feature Codes (FC)

Several ways to define the zAware Partition

- Web Services APIs
- User Interface (**Customize/Delete Activation Profile):**

Traditional Image Profile Customization

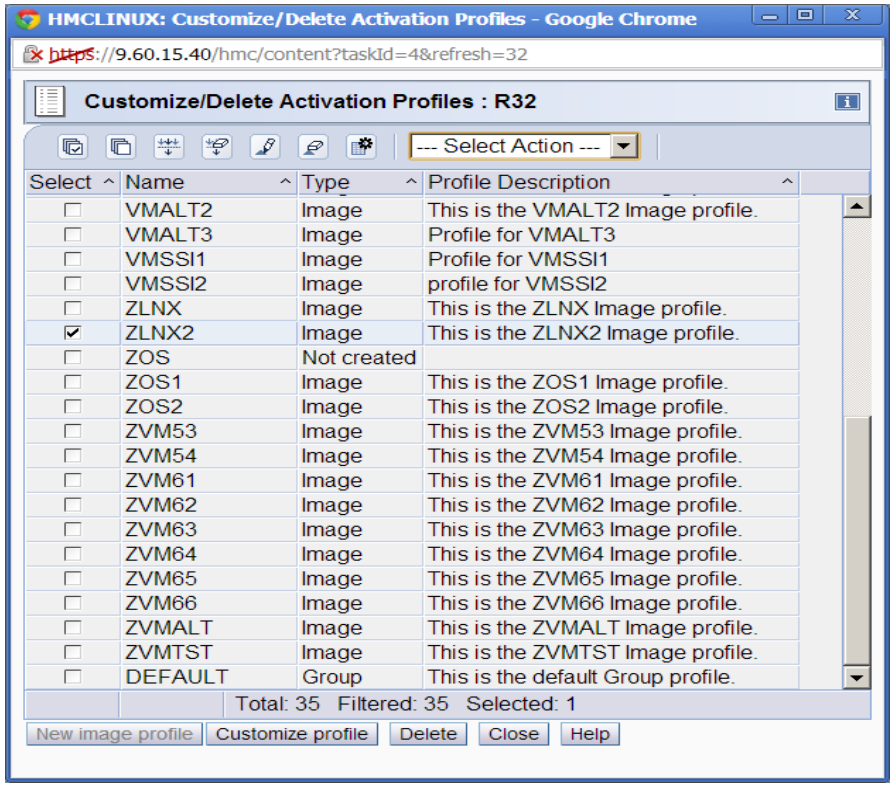
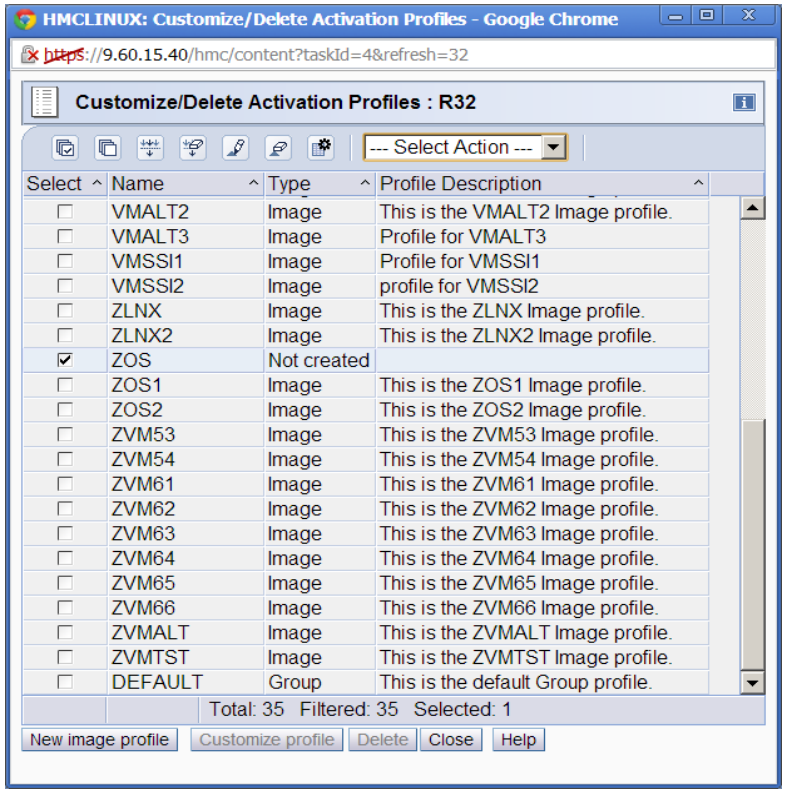
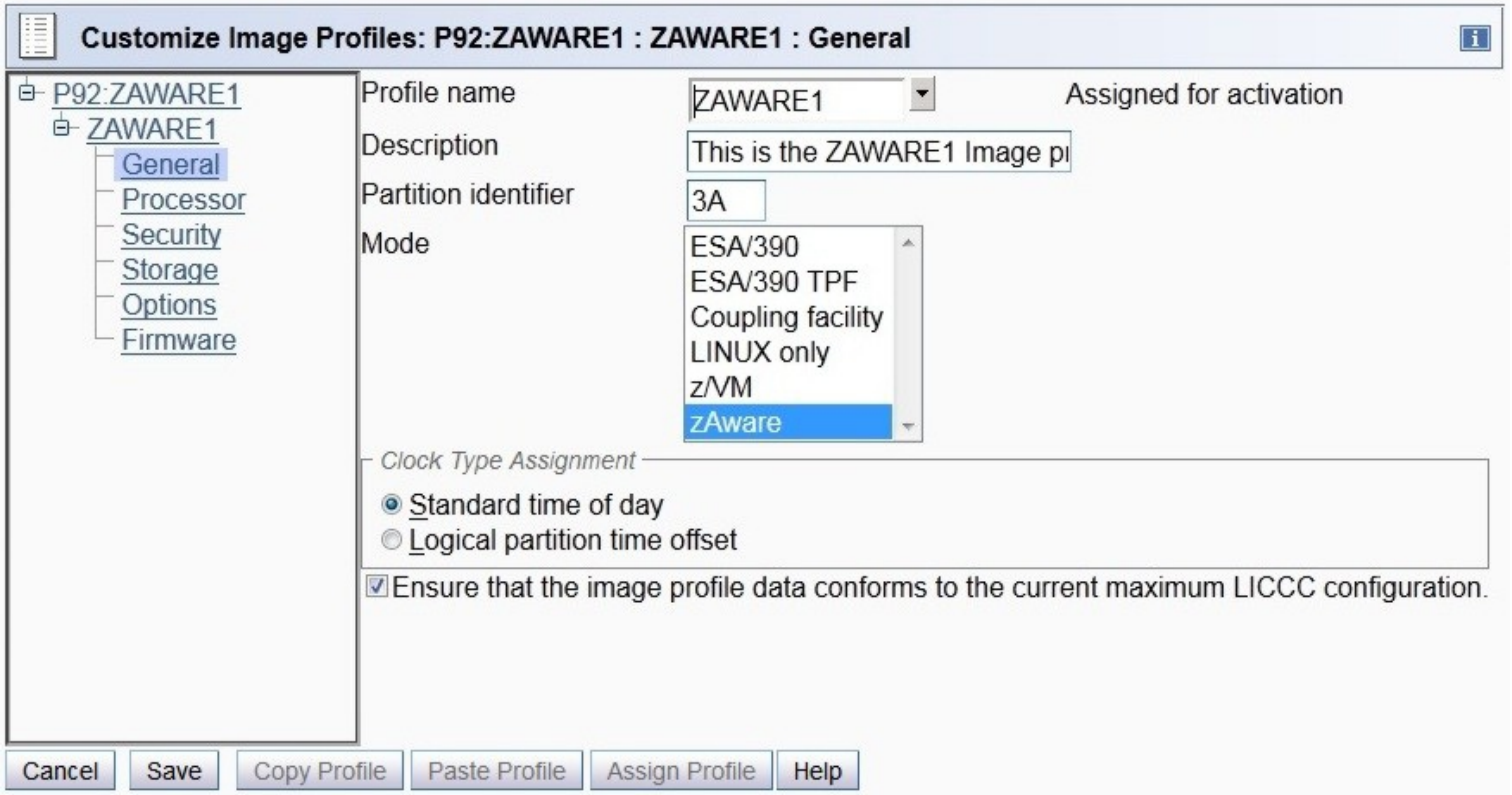


Image Profile Wizard



Defining the zAware Image Profile (Traditional) Setting the partition mode

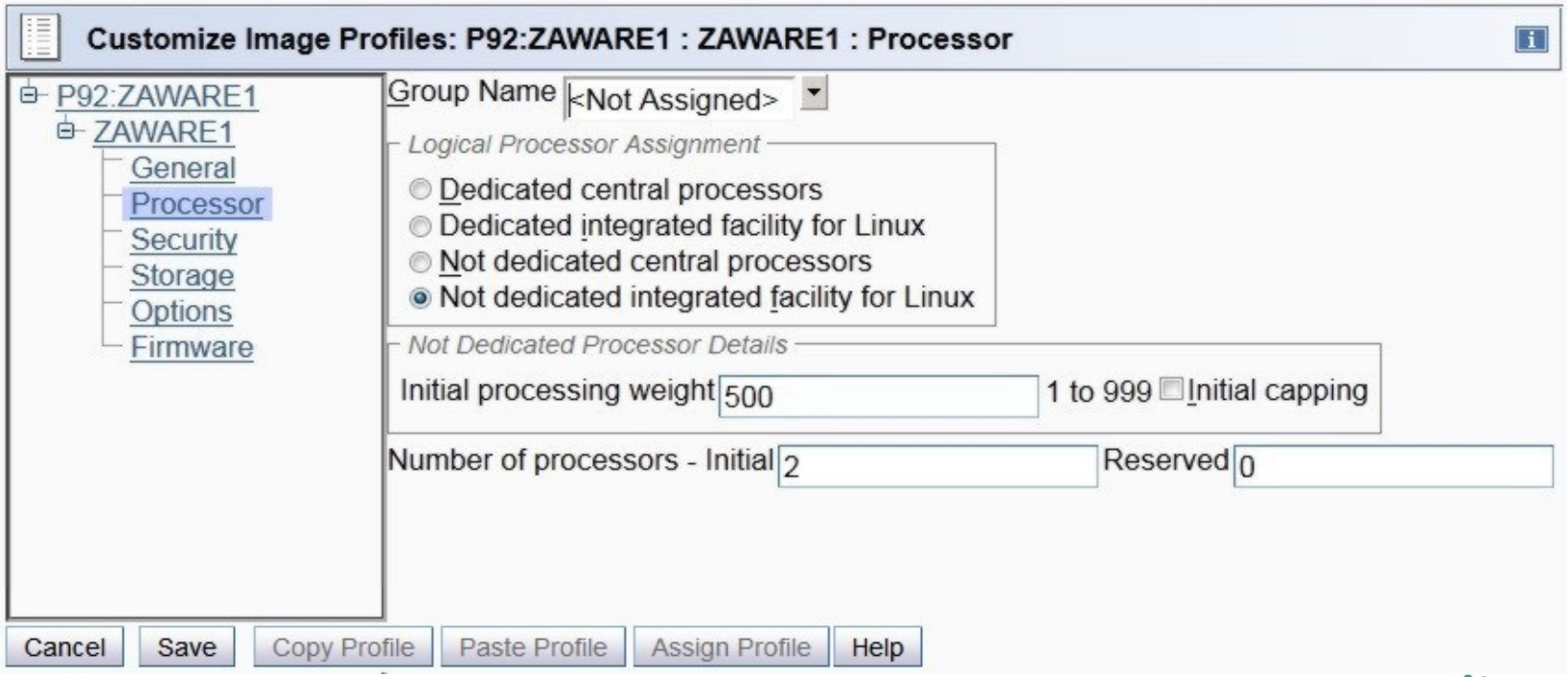
- Create or Modify an image profile for the defined partition.
- On the **General** tab, select “zAware” for the partition mode:



Notice no “Load” page; Again, zAware application loaded from SE's HDD

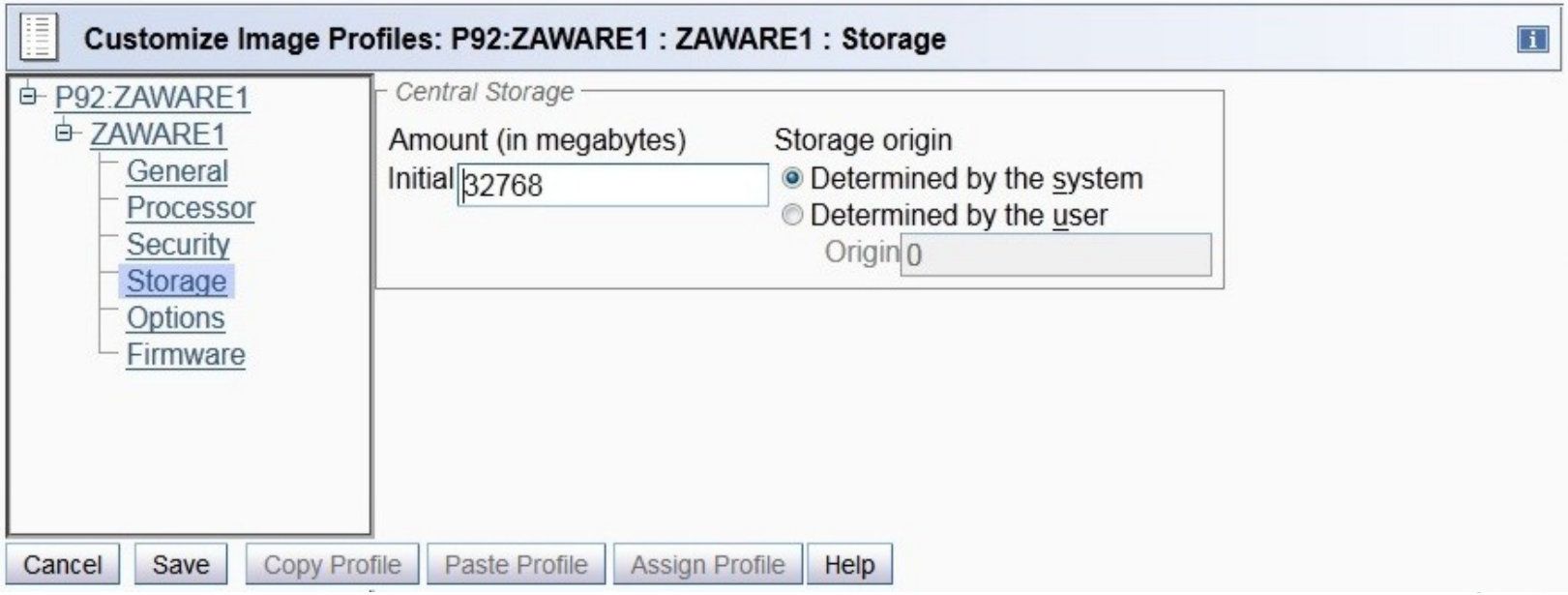
Defining the zAware Image Profile (Traditional) Setting the processors

- You can use central processors or IFL processors
- You can use dedicated or shared processors
- Assign 2 processors to support monitored clients with message traffic up to 1500 messages per second.

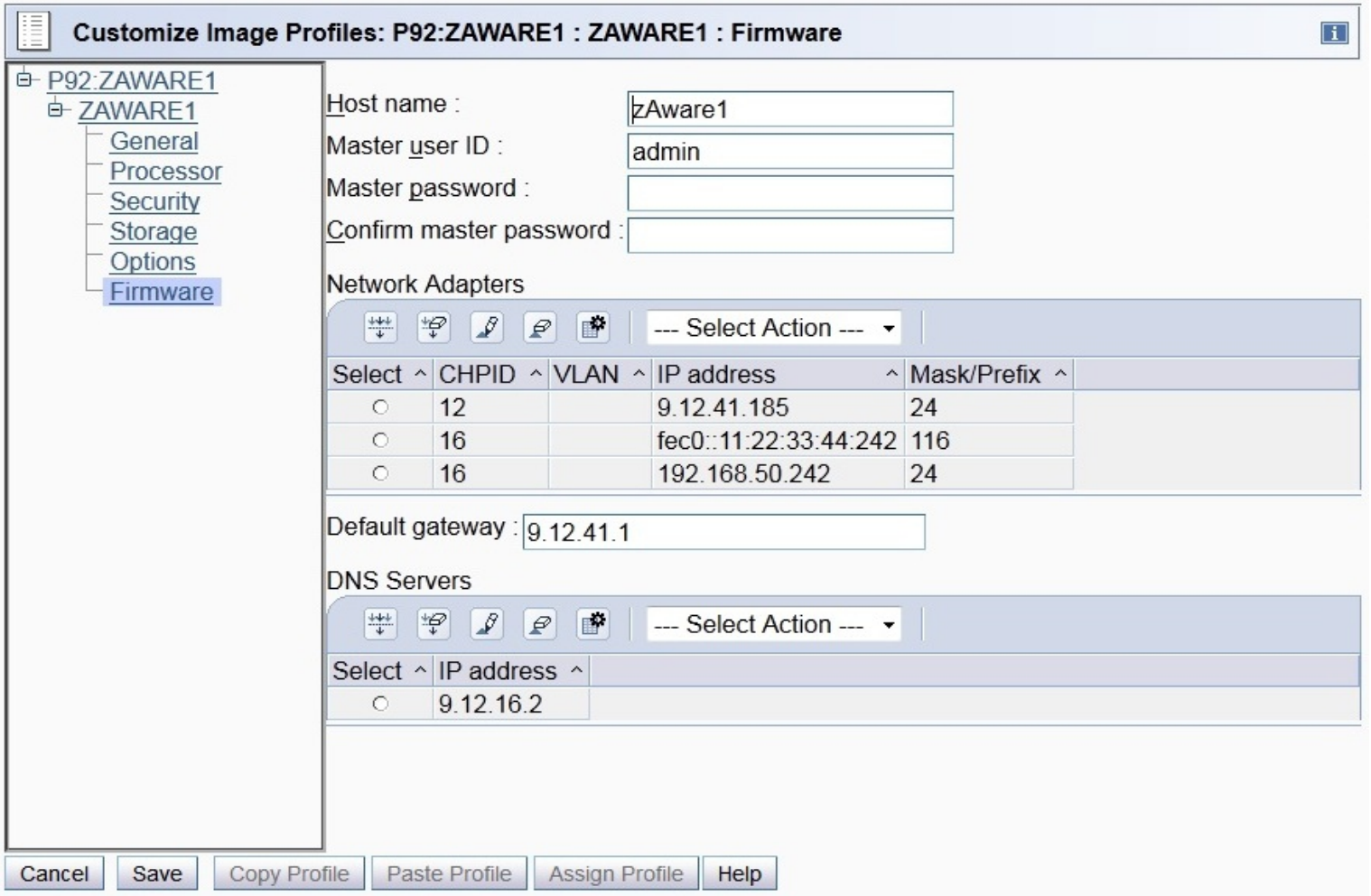


Defining the zAware Image Profile (Traditional) Setting the Storage size

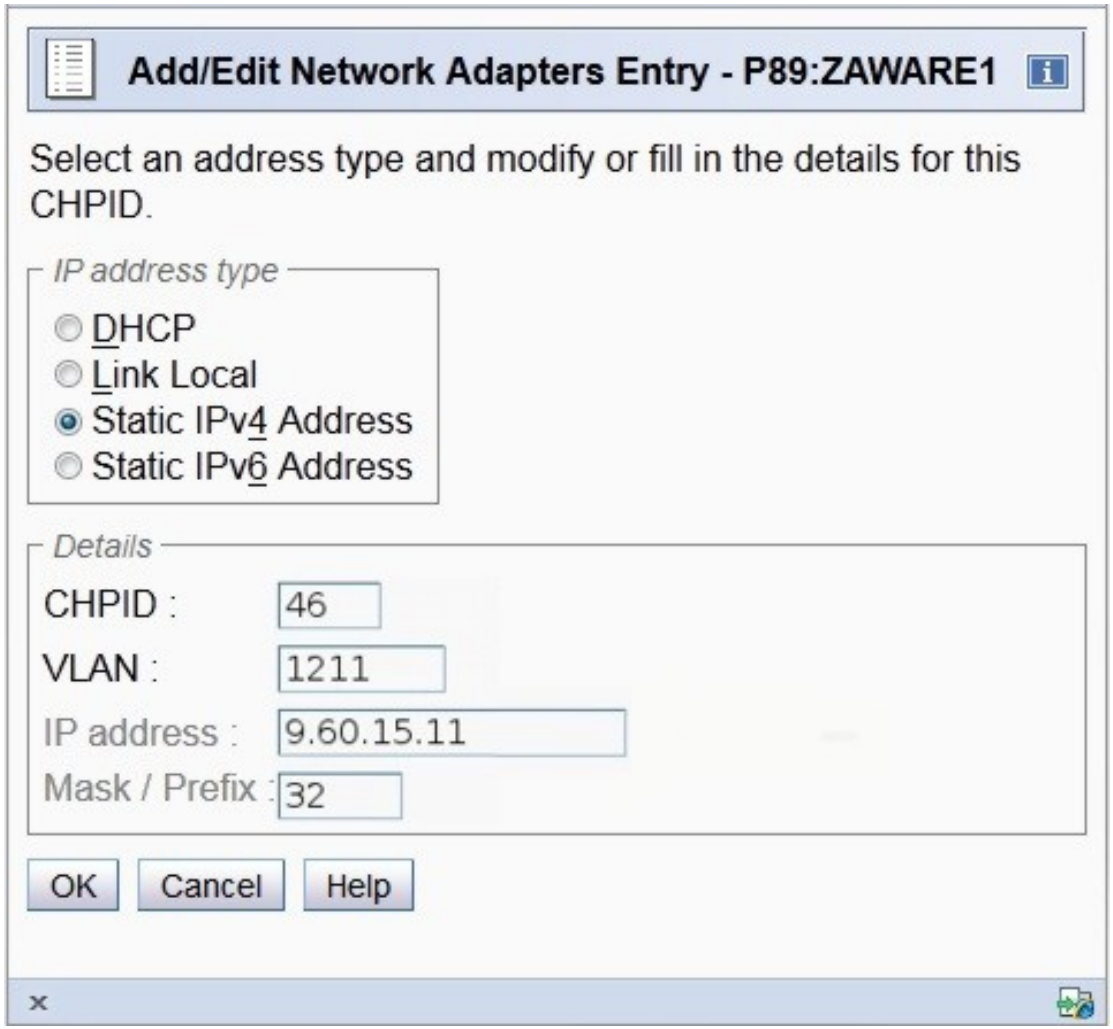
- Minimum storage for a zAware partition is 4096 MB (4 GB)
- 4096 MB (4 GB) is recommended for a small number of monitored clients (6 or less) with light message traffic (up to 500 messages/second)
- Add 256 MB per each additional client.
- Maximum is 32G
- As with all performance recommendations, you may be able to reduce or have to increase the memory footprint for your specific situation.



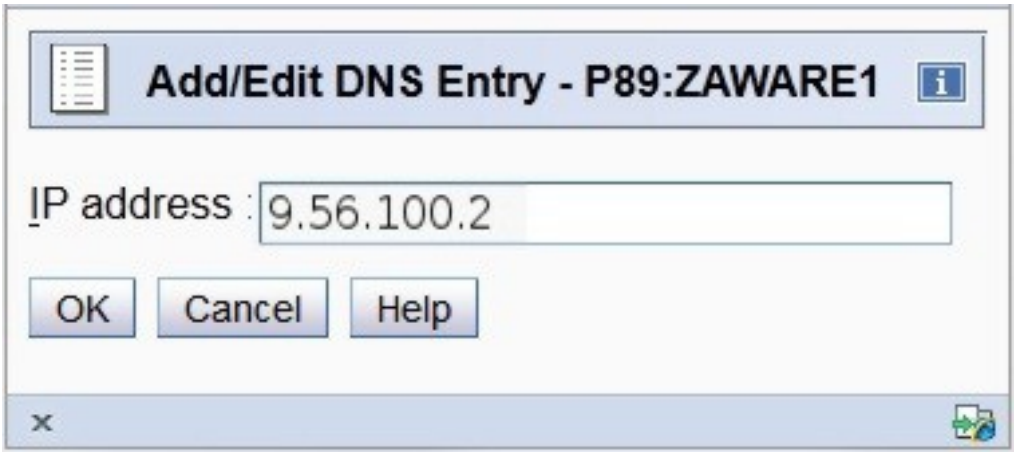
Use new tab to specify zAware-specific image profile parameters



Add new Network Adapter Entry

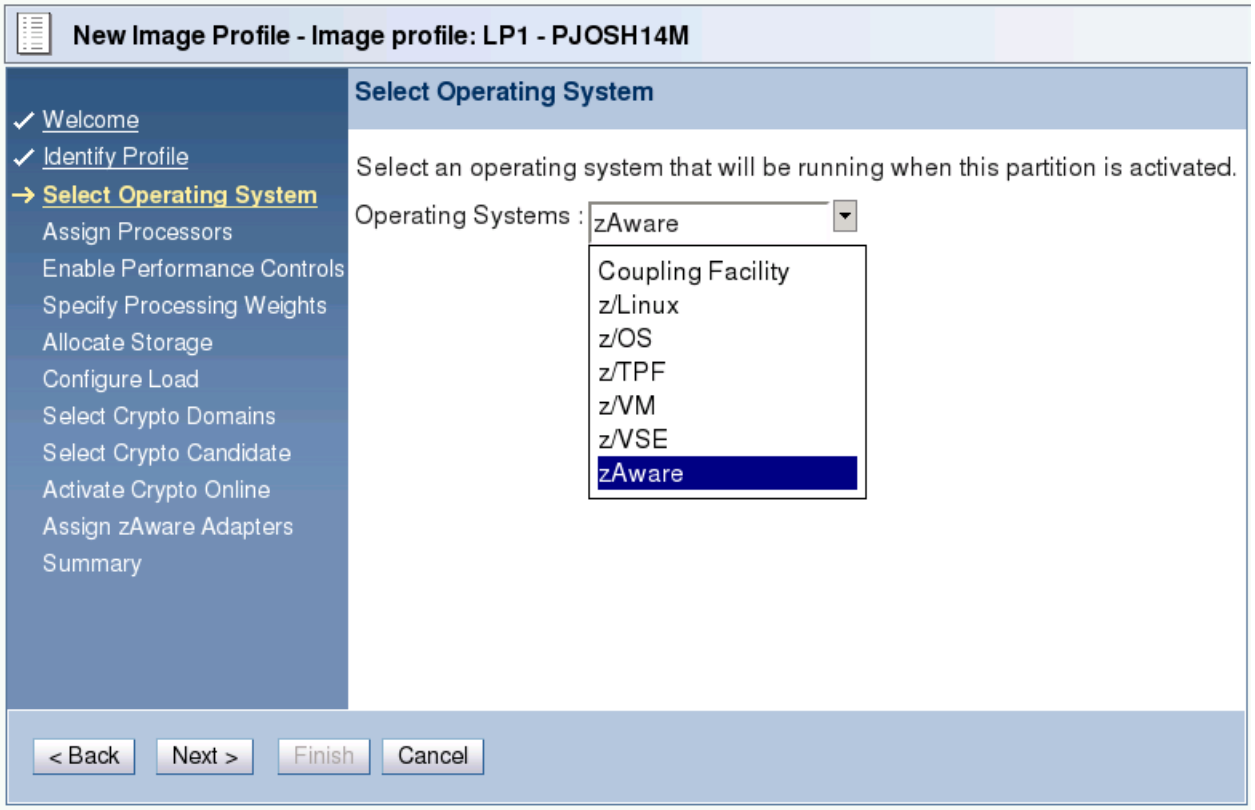


Add new DNS Entry



Defining the zAware Image Profile (Wizard) – Setting the Operating System type (partition mode)

- Create a new image profile
- Set the Operating System type to zAware



Defining the zAware Image Profile (Wizard) Setting the Processors

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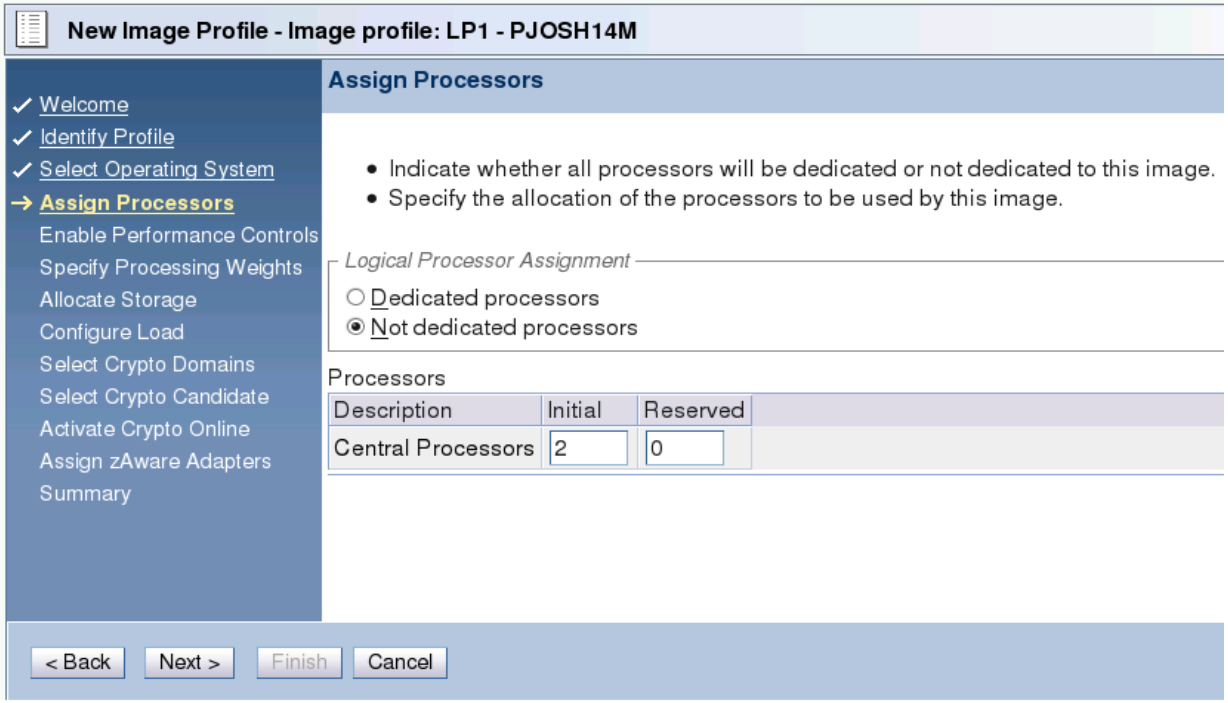

Defining the zAware Image Profile (Wizard) Setting the Storage

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- Add 256 MB per each additional client (up to 32G)
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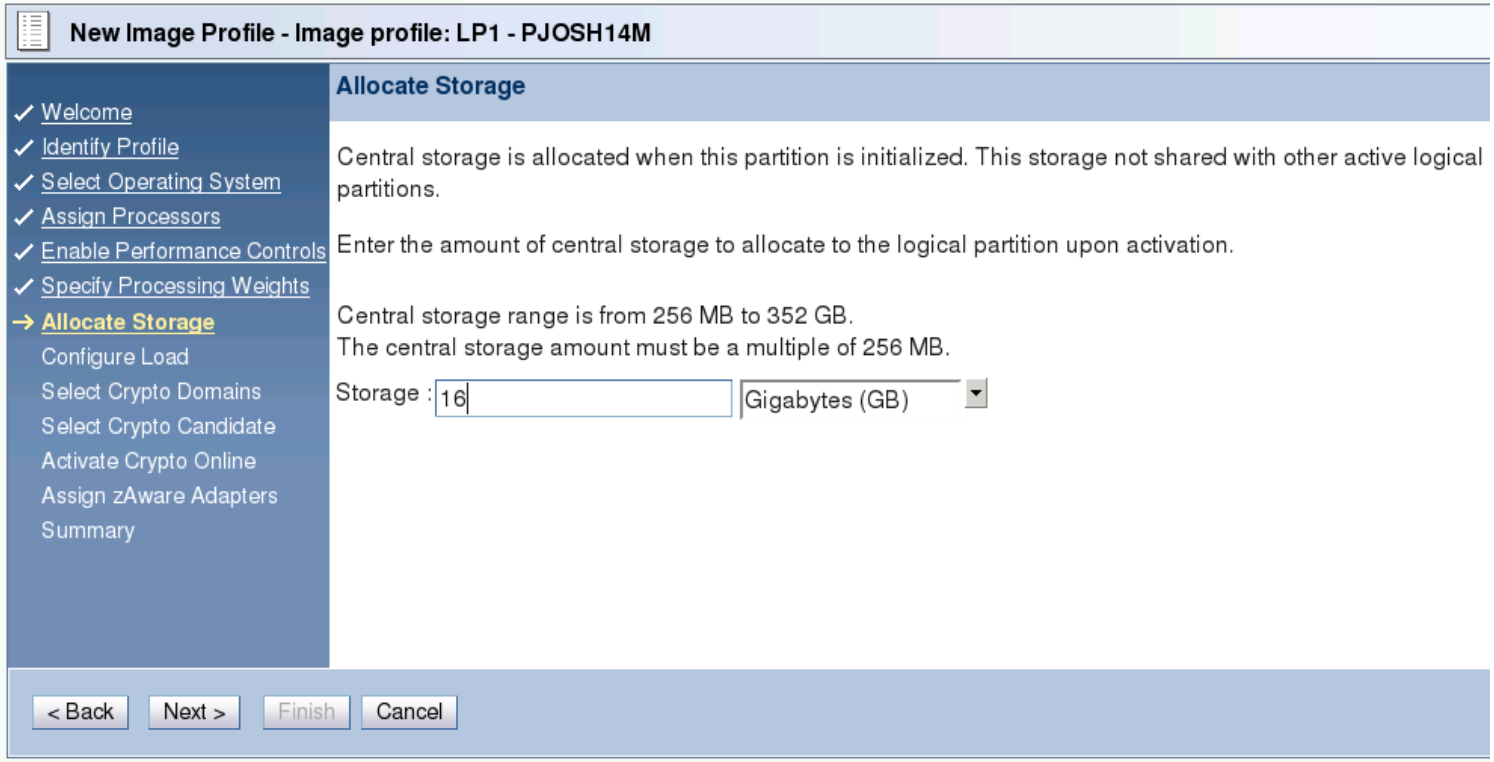
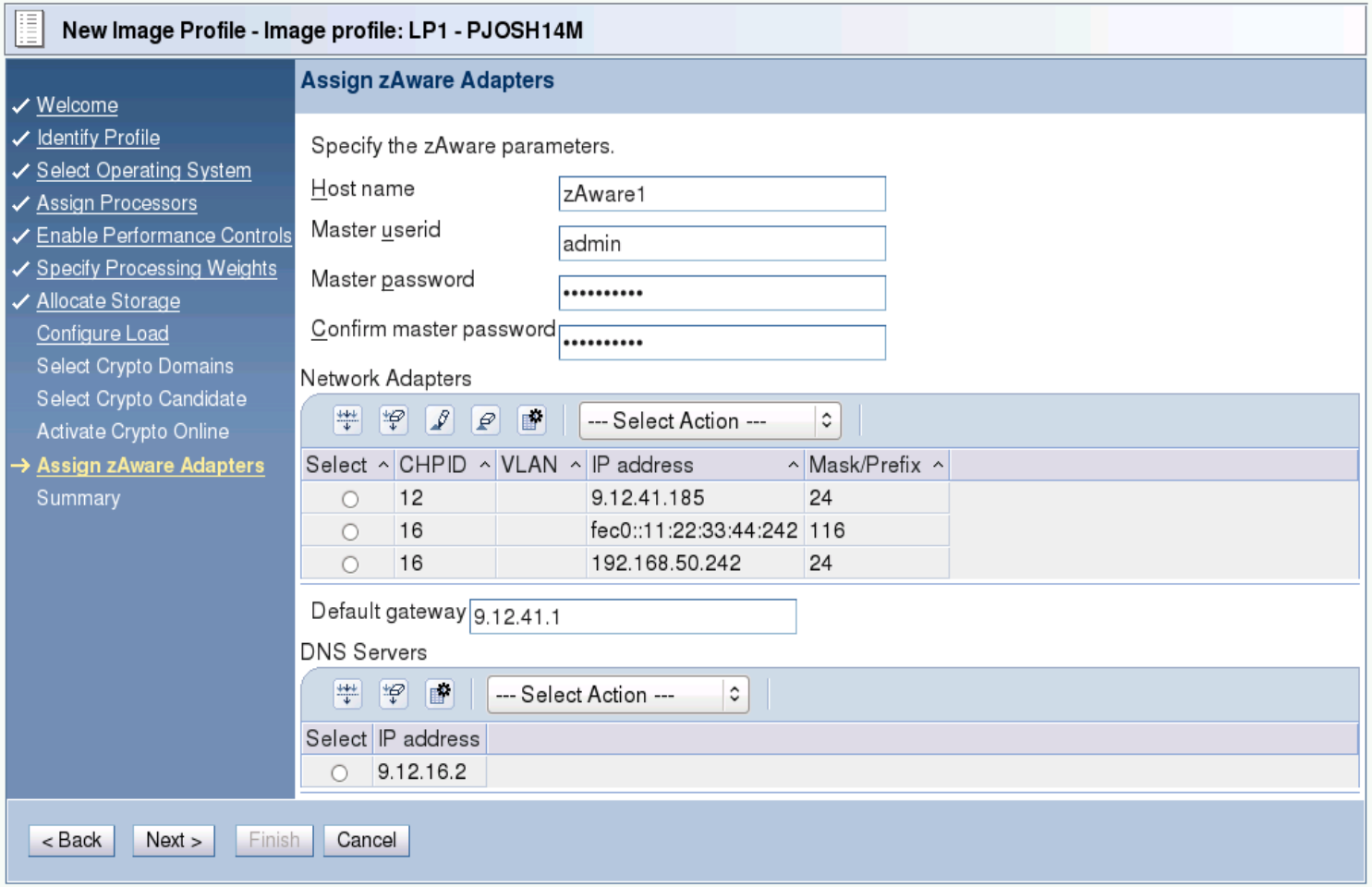
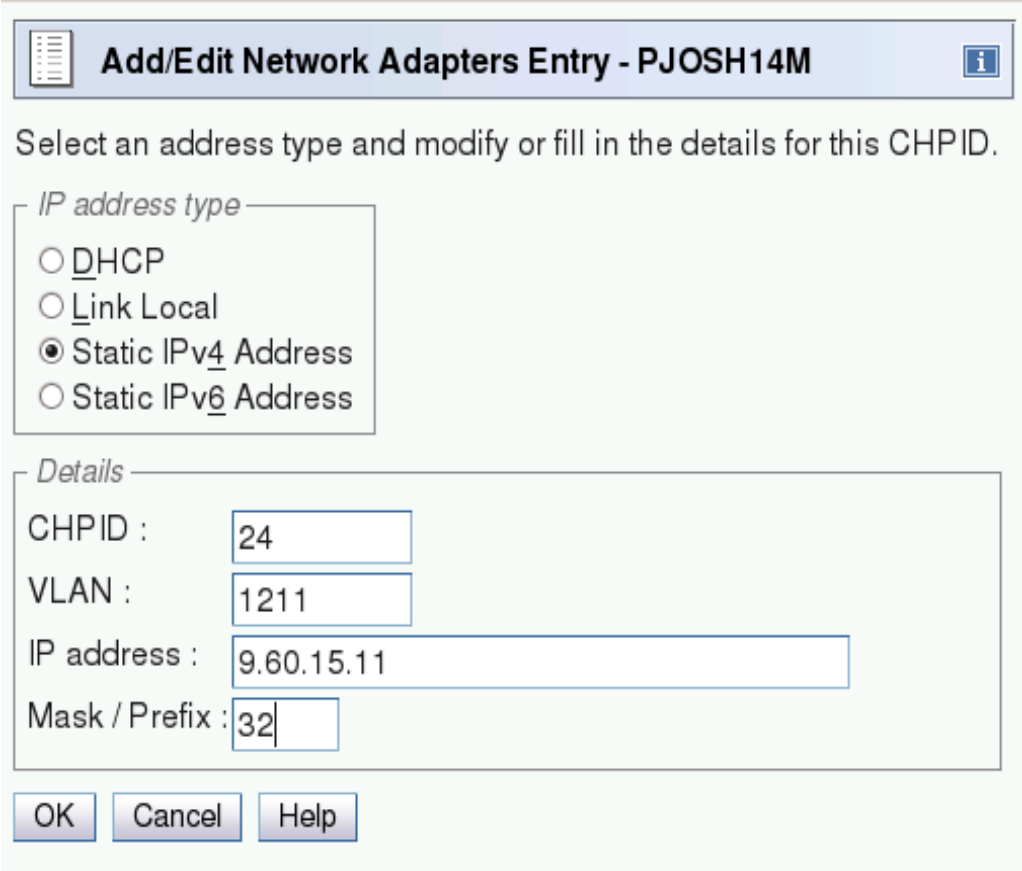


Defining the zAware Image Profile (Wizard) – zAware specific parameters



Add new Network Adapter Entry (Wizard)



Add new DNS Entry (Wizard)

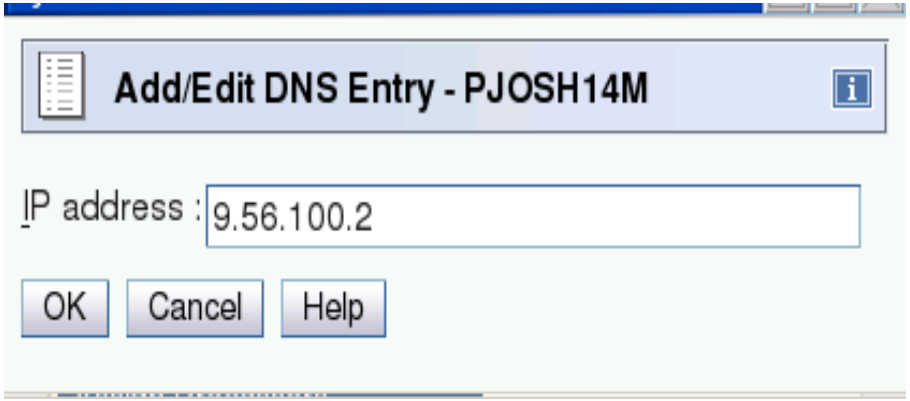
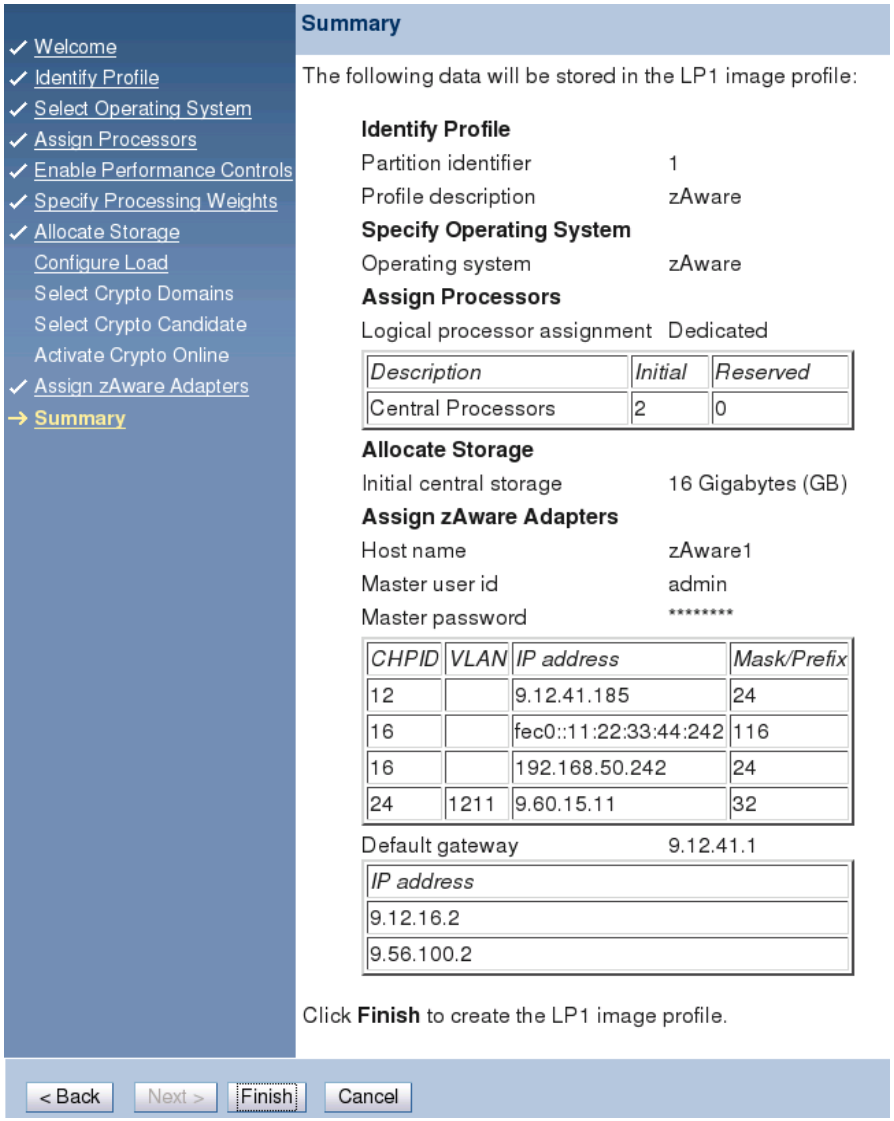


Image Profile Wizard Summary



- ✓ Welcome
- ✓ Identify Profile
- ✓ Select Operating System
- ✓ Assign Processors
- ✓ Enable Performance Controls
- ✓ Specify Processing Weights
- ✓ Allocate Storage
- Configure Load
- Select Crypto Domains
- Select Crypto Candidate
- Activate Crypto Online
- ✓ Assign zAware Adapters
- → Summary

Summary

The following data will be stored in the LP1 image profile:

Identify Profile

Partition identifier	1
Profile description	zAware

Specify Operating System

Operating system	zAware

Assign Processors

Logical processor assignment	Dedicated

Description	*Initial*	*Reserved*
Central Processors	2	0

Allocate Storage

Initial central storage	16 Gigabytes (GB)

Assign zAware Adapters

Host name	zAware1
Master user id	admin
Master password	********

CHPID	*VLAN*	*IP address*	*Mask/Prefix*
12		9.12.41.185	24
16		fec0::11:22:33:44:242	116
16		192.168.50.242	24
24	1211	9.60.15.11	32

Default gateway	9.12.41.1

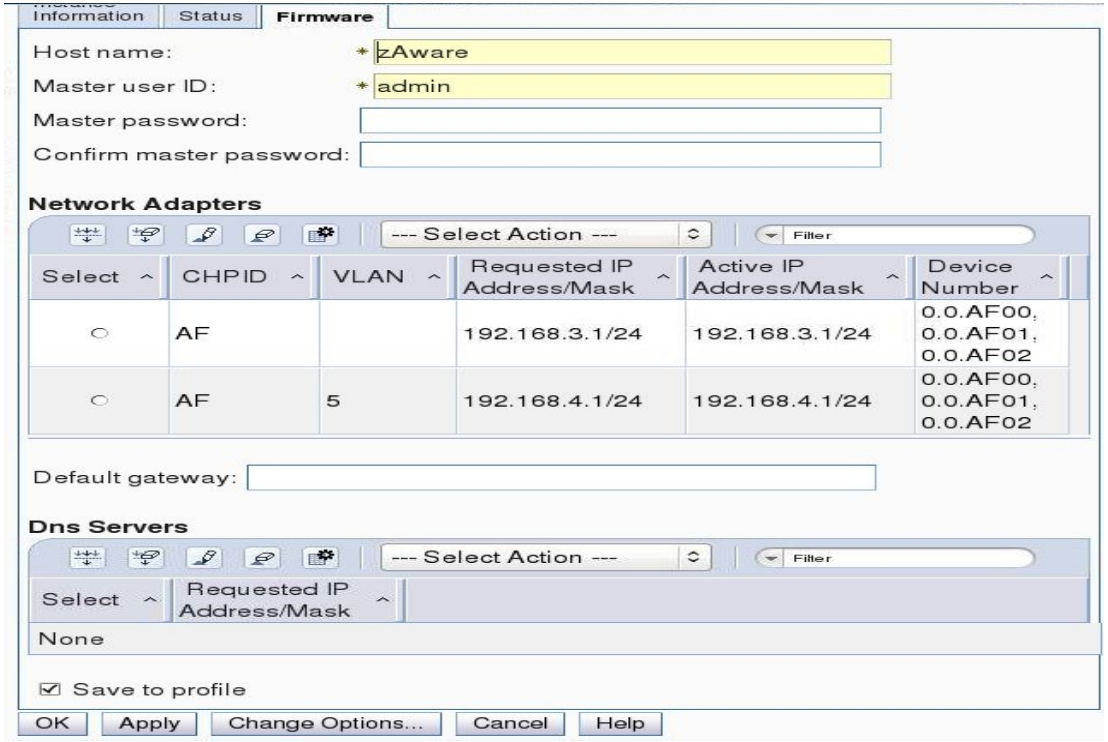
IP address
9.12.16.2
9.56.100.2

Click **Finish** to create the LP1 image profile.

< Back | Next > | Finish | Cancel

Activate the Partition / Dynamic Changes to the zAware configuration

- Activate the partition using the **Activate** task, just like all other partitions.
- Dynamic changes to the zAware partition can be made by using a new tab on the image details:



- Running system always updated
- Can also update the image profile or not ("Save to Profile" checkbox)
- If you just want to change just the image profile, you must use the **Customize Activation Profiles** Task or equivalent (such as WebServices APIs).

HMC APIs

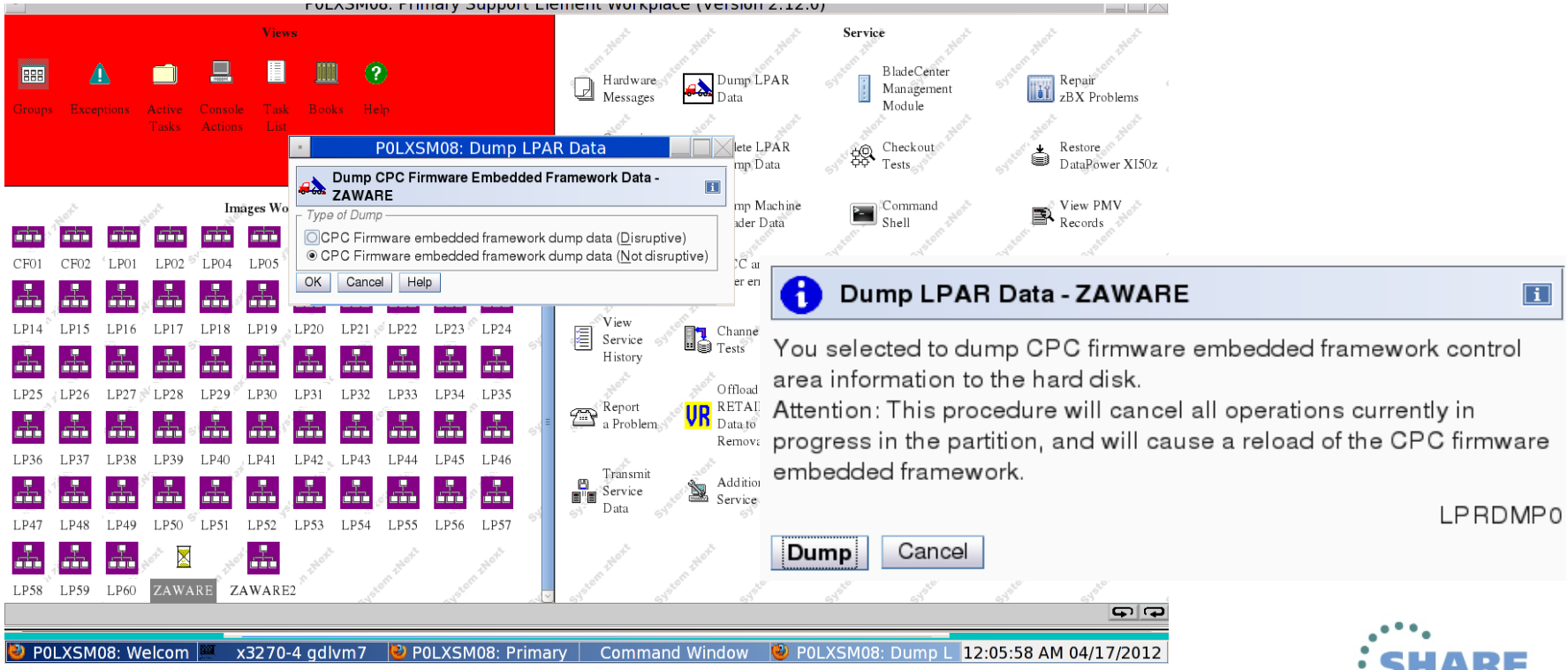
- API Support
  - HMC WebServices APIs updated to fully support IBM zAware
  - SNMP API only updated to handle new zAware mode
  - CIMOM API only updated to handle new zAware mode

Security Log Updated for new IBM zAware image profile parameters


```
Profile name[11KZAWAR]
Profile type[Image]
Profile description[This is the default Image profile.]
Host name[zAwareHost]
Master userid[zAware.User-Id]
Master password[********]
Network Adapters[CHPID 0x44  VLAN 1944  DHCP]
Network Adapters[CHPID 0x44  VLAN 1171  Link Local]
Network Adapters (New)[CHPID 0xA1  IP Address 9.60.15.111/28]
Network Adapters[CHPID 0xA2  VLAN 8001  IP Address e111:d123:c98a:4::0/128]
Network Adapters[CHPID 0x44  VLAN 1877  Link Local]
Network Adapters (Old)[CHPID 0xA1  IP Address 9.60.15.111/30]
Default gateway[9.60.15.255]
DNS[9.0.0.0]
DNS[e111:d123::ffff]
Load Parameter[        ]
Load Address[00000]
Load Type[Clear]
```

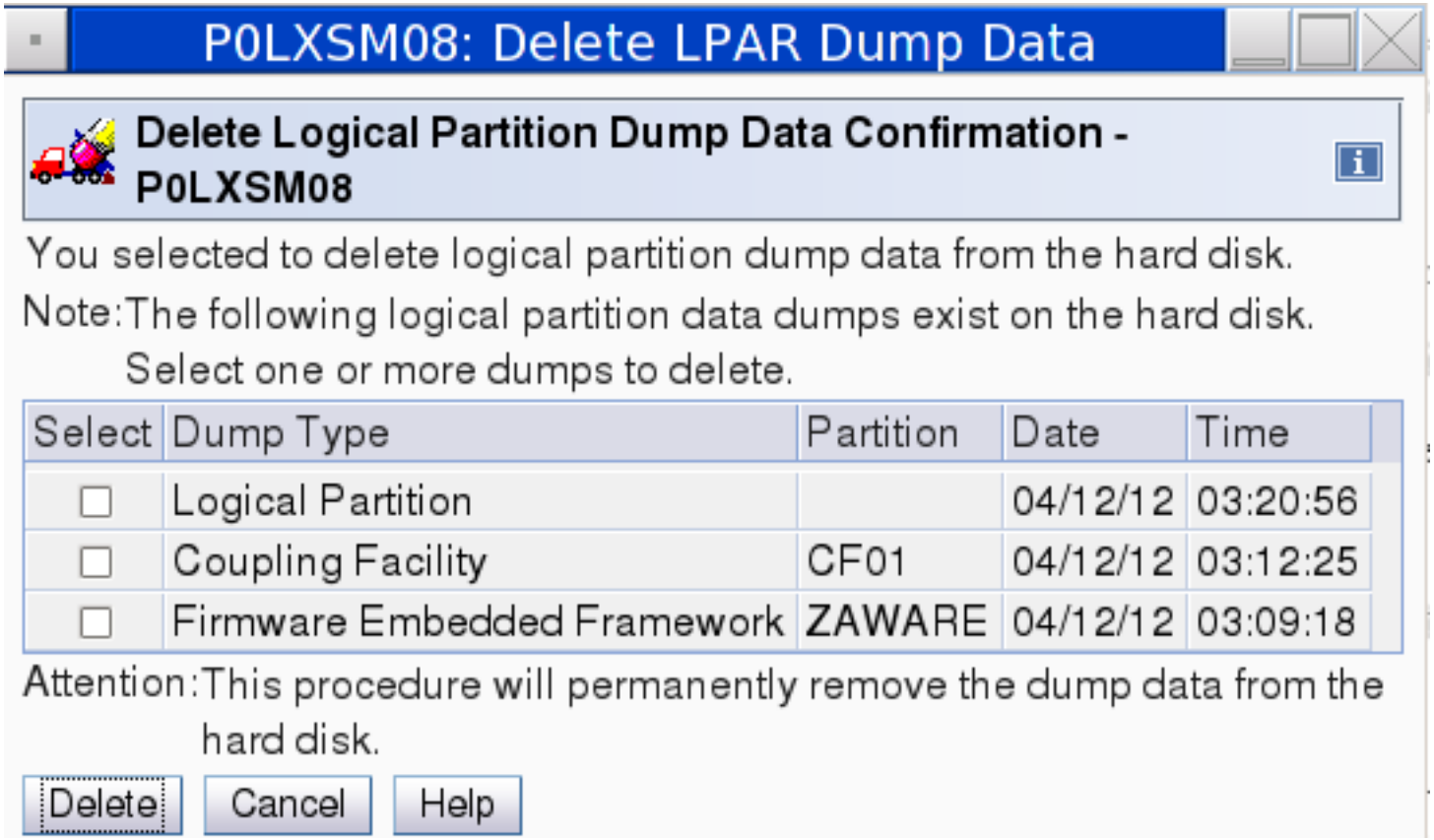
IBM zAware Dump

- Like a CF Dump, new zAware Dump support
- LPAR Dump Task
  - Concurrent
  - Disruptive



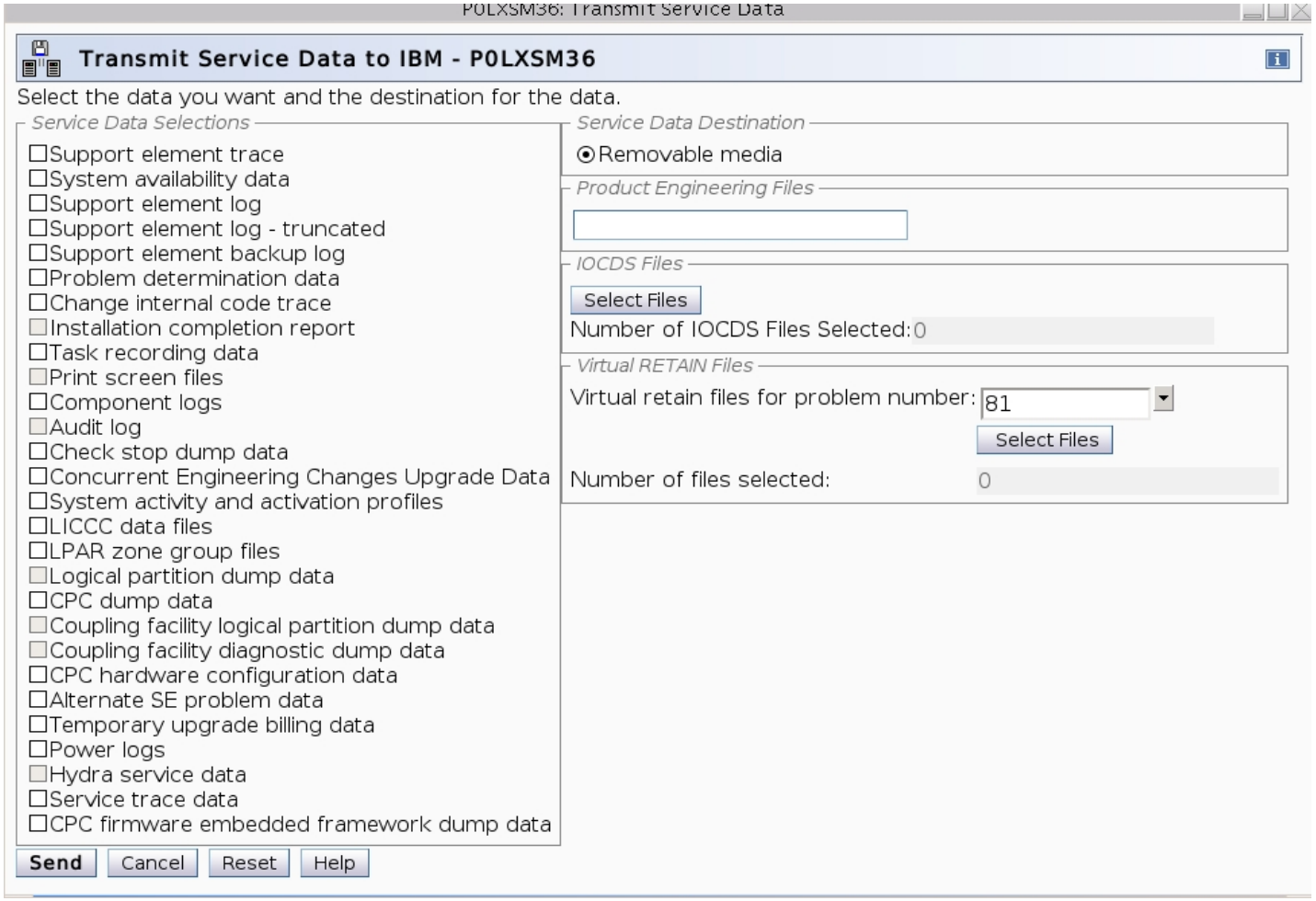
IBM zAware Dump

- Use the **Delete LPAR Dump Data** task to delete a zAware Dump



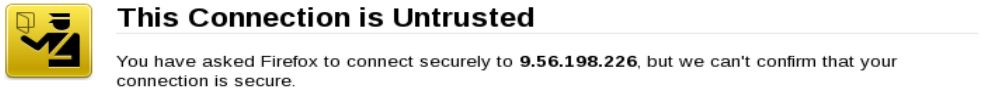
Transmit Service Data to IBM

- New Transmit Service Data to IBM (TSD) Task option to collect zAware Dump:
  Use the **CPC Firmware Embedded Framework Dump Data** option.

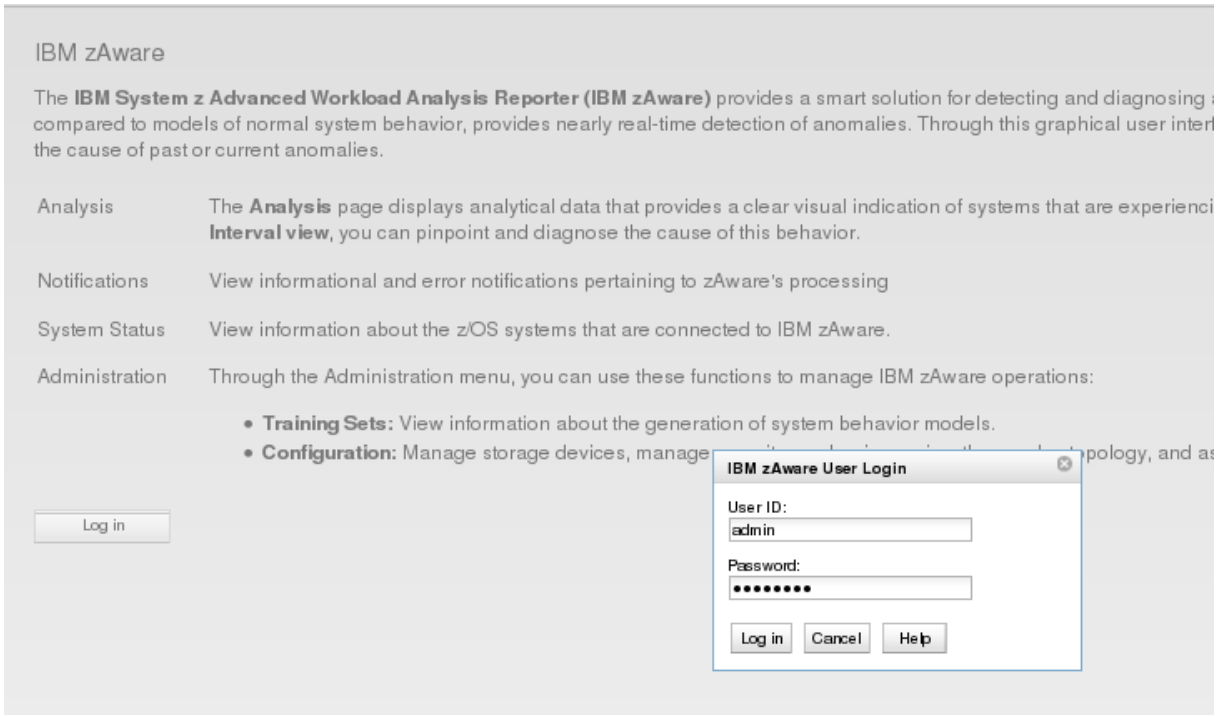


zAware Initial GUI login

- URL is https://*addr*/zAware
  - where *addr* is IP address from the image profile or hostname from the DNS entry
- If browser warns of the default SSL certificate, add a security exception

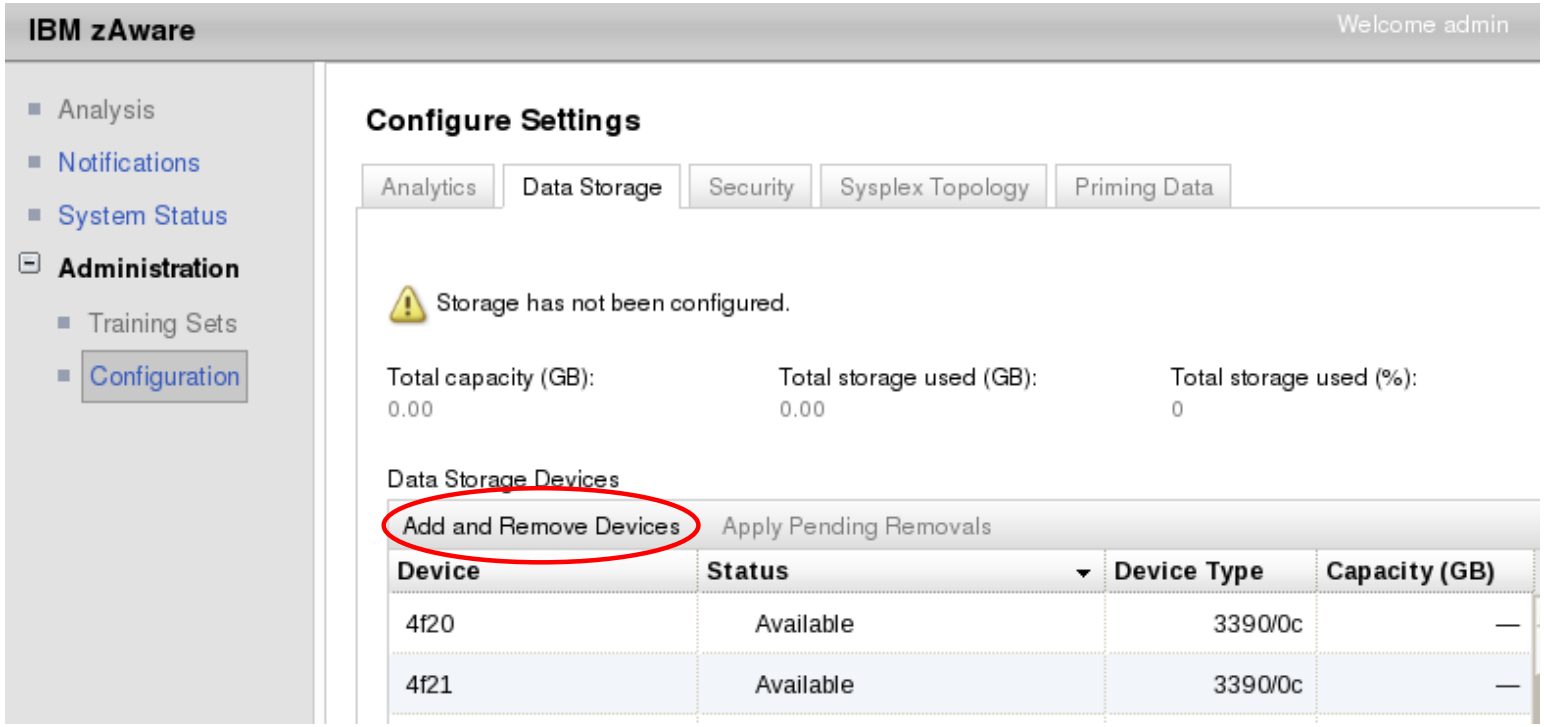


- Use default master userID and password

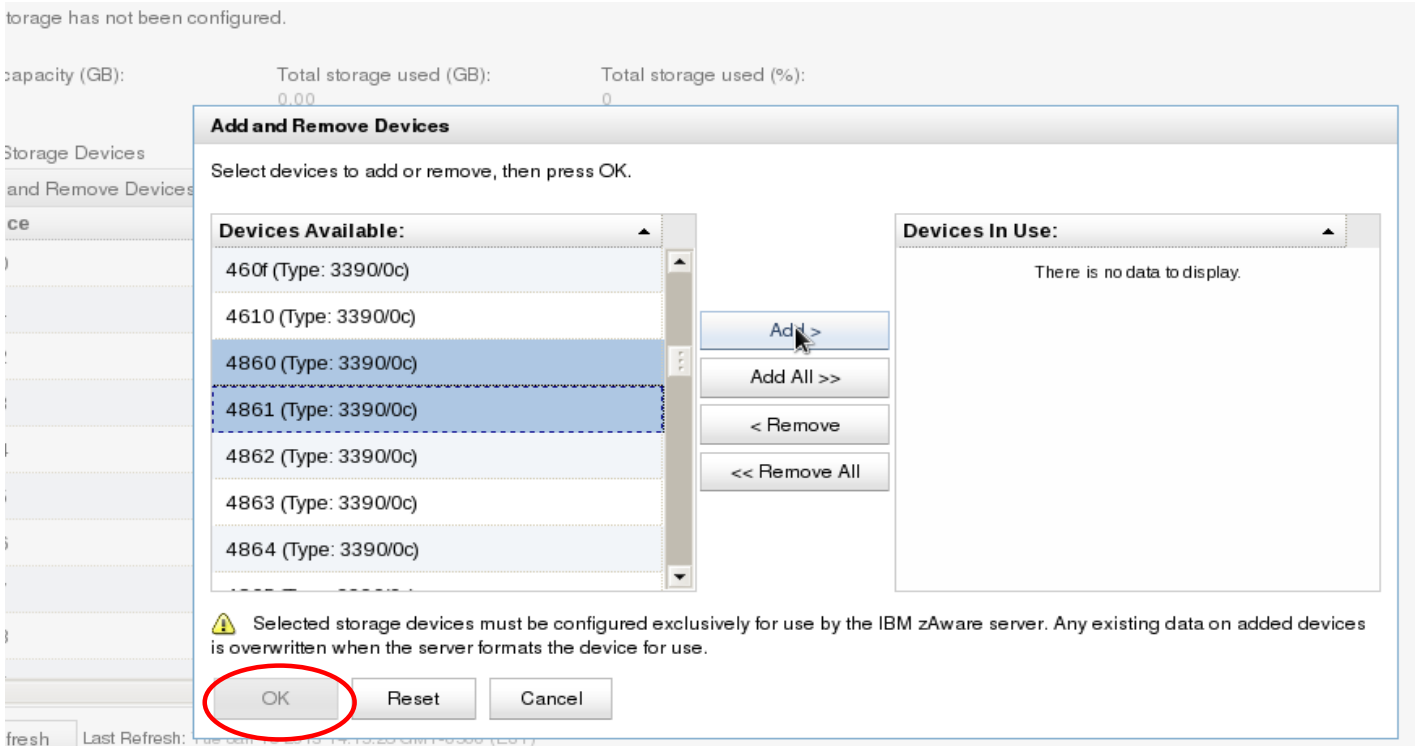


Storage assignment

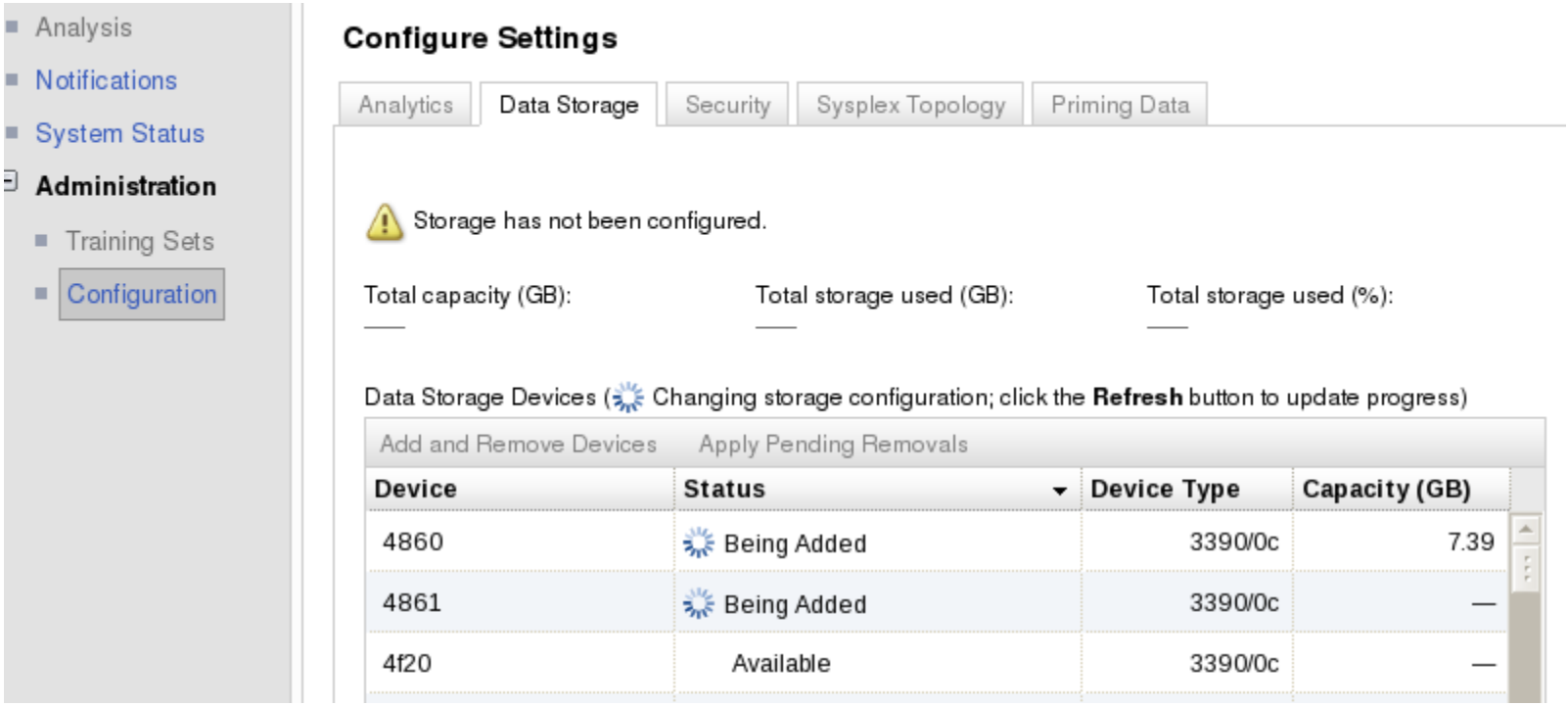
- ECKD DASD is required
- Add storage devices defined in the I/O configuration
- Devices must be exclusively for use by IBM zAware
  - Recommend use of **Explicit Device Candidate List** in HCD to restrict specific devices to the zAware partition



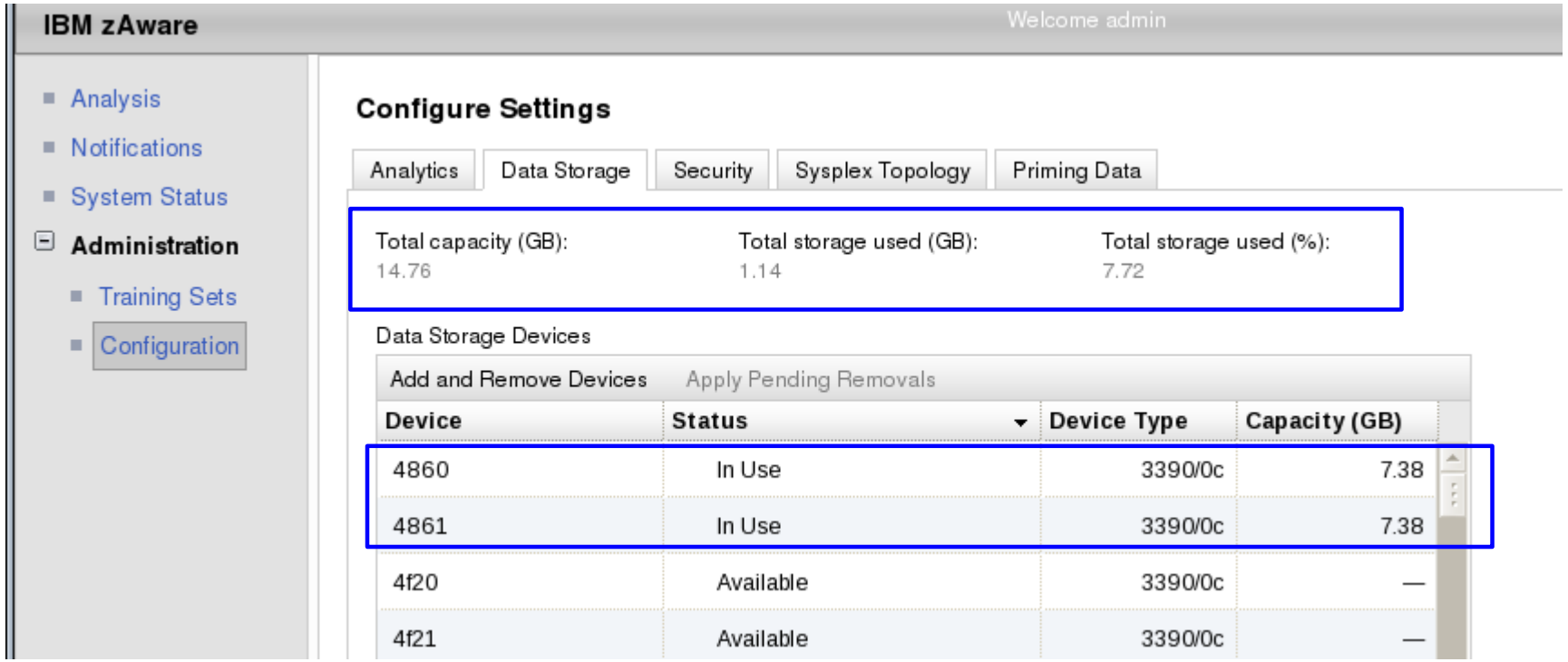
Storage assignment – add devices



Storage assignment – adding devices



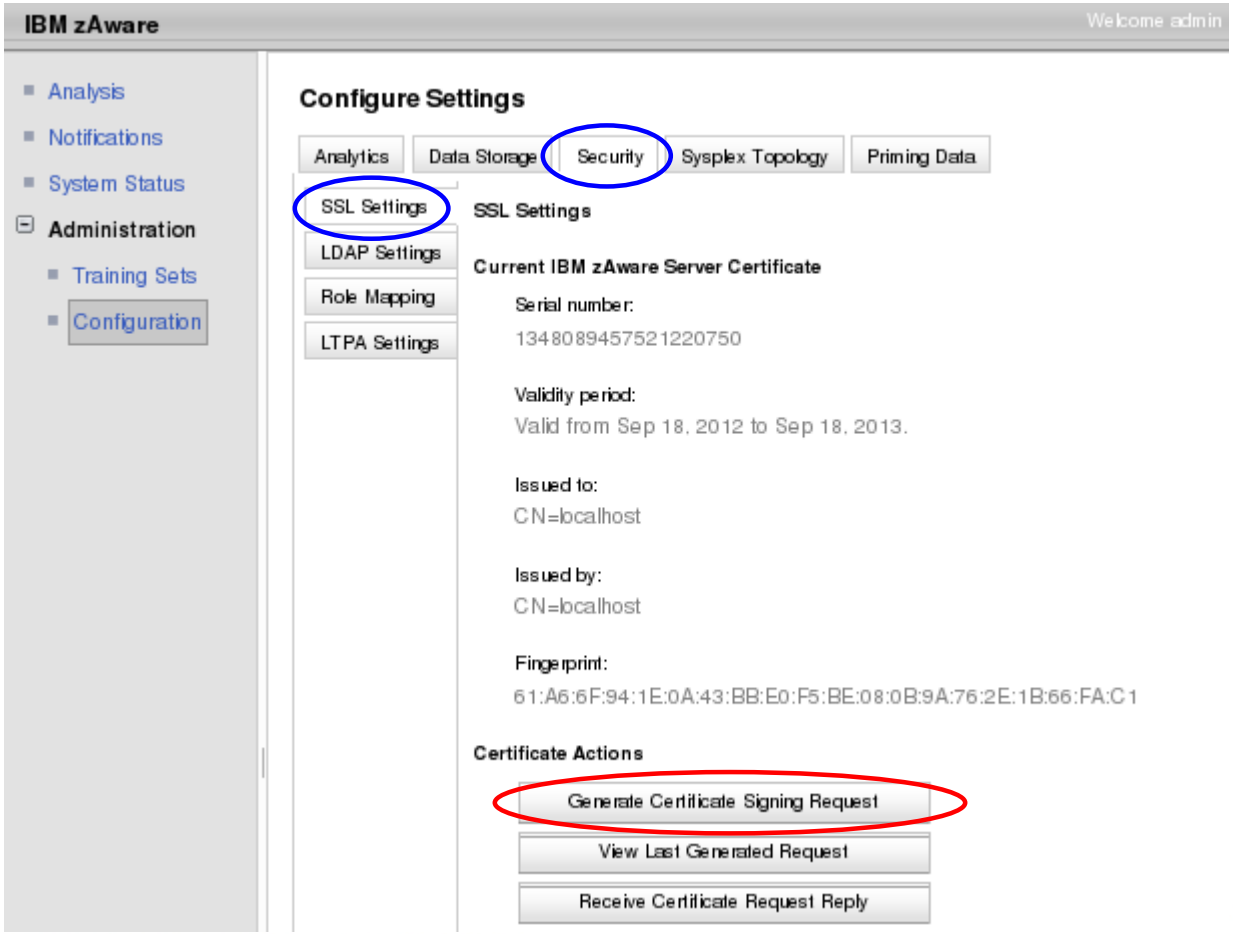
Storage assignment – complete



- Check the usage periodically and dynamically add additional devices if needed.
- Notifications are posted when zAware detects you are approaching DASD full

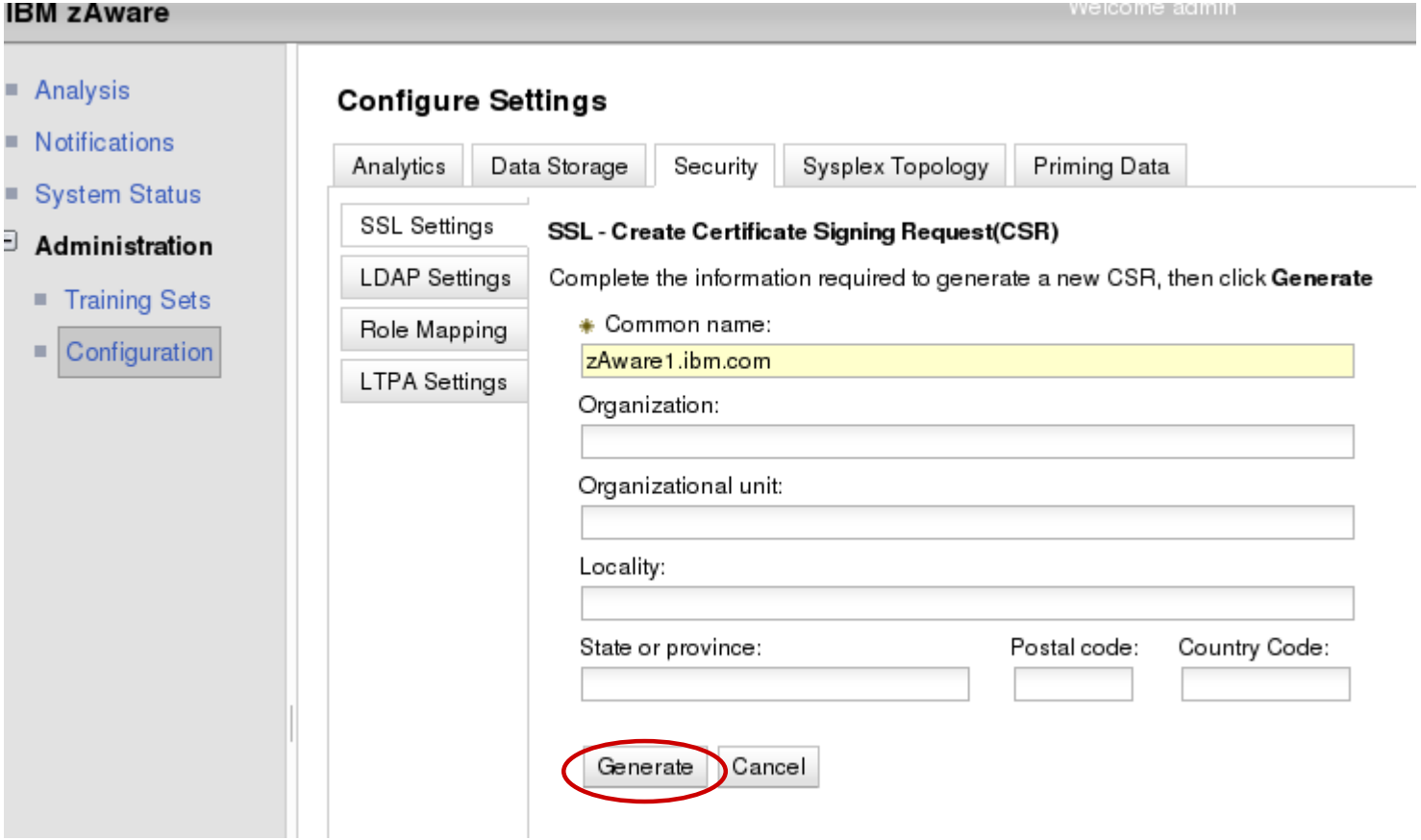
Security set up – SSL part 1

- To secure browser communication, request an SSL cert from a CA, and import it
- Generate Certificate Signing Request
- Copy CSR and send to the CA



Security set up – SSL part 2

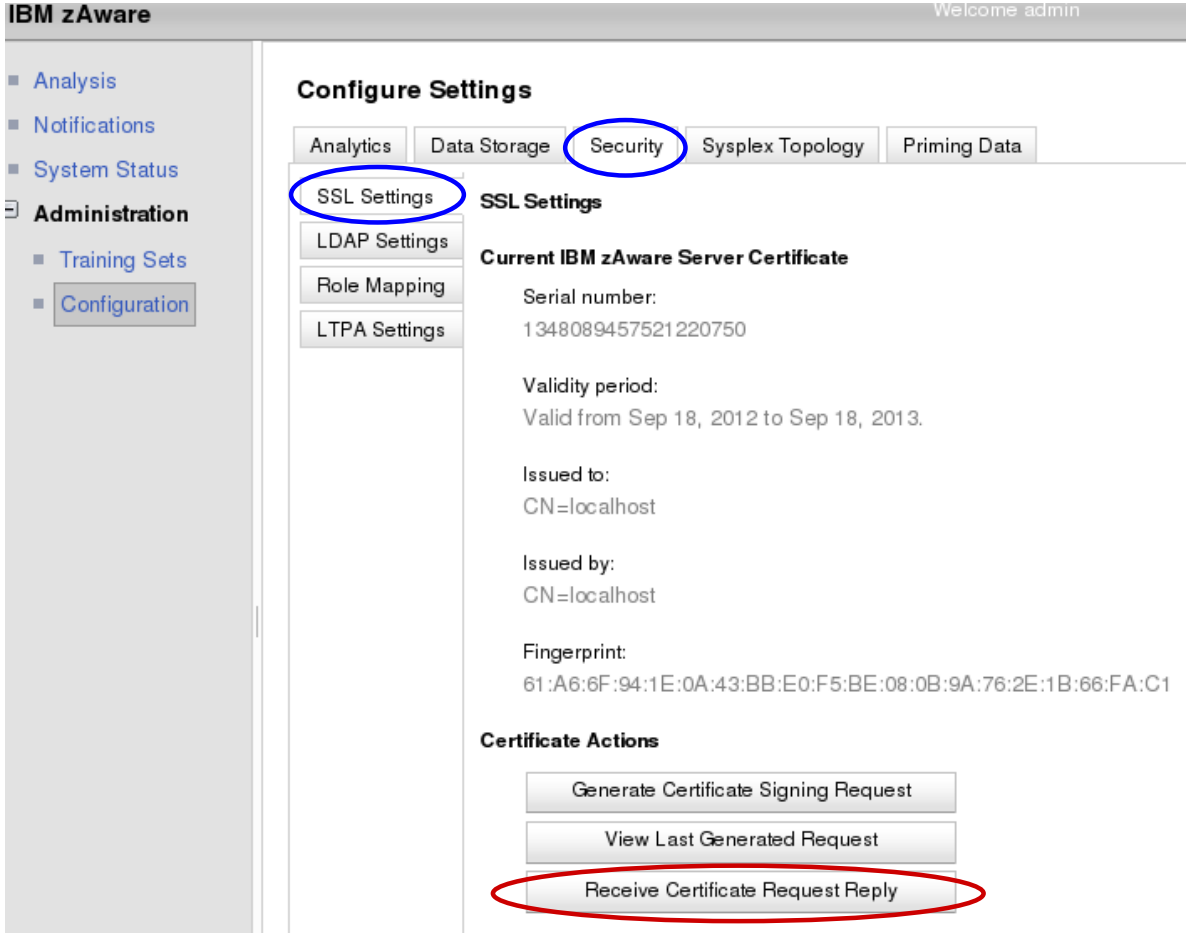
- Fill in the Common name with host name or IP addr of the zAware partition
- Use the **host name** or **IP address** from the image profile Firmware page



- **Copy** the generated CSR and **send** to the CA

Security set up – SSL part 3

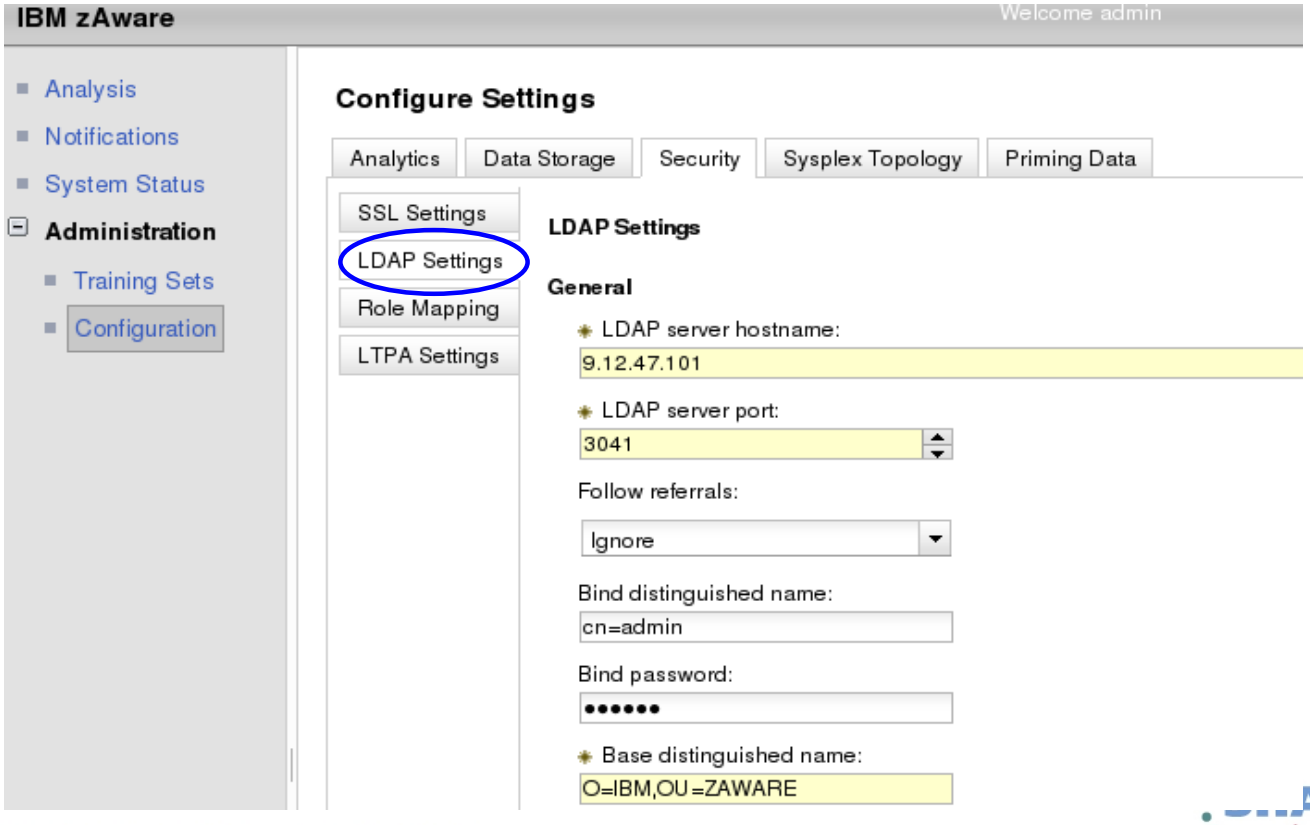
After the CA replies with a certificate, import it with Receive ...



- **Paste the reply** (include the entire chain) and click Receive

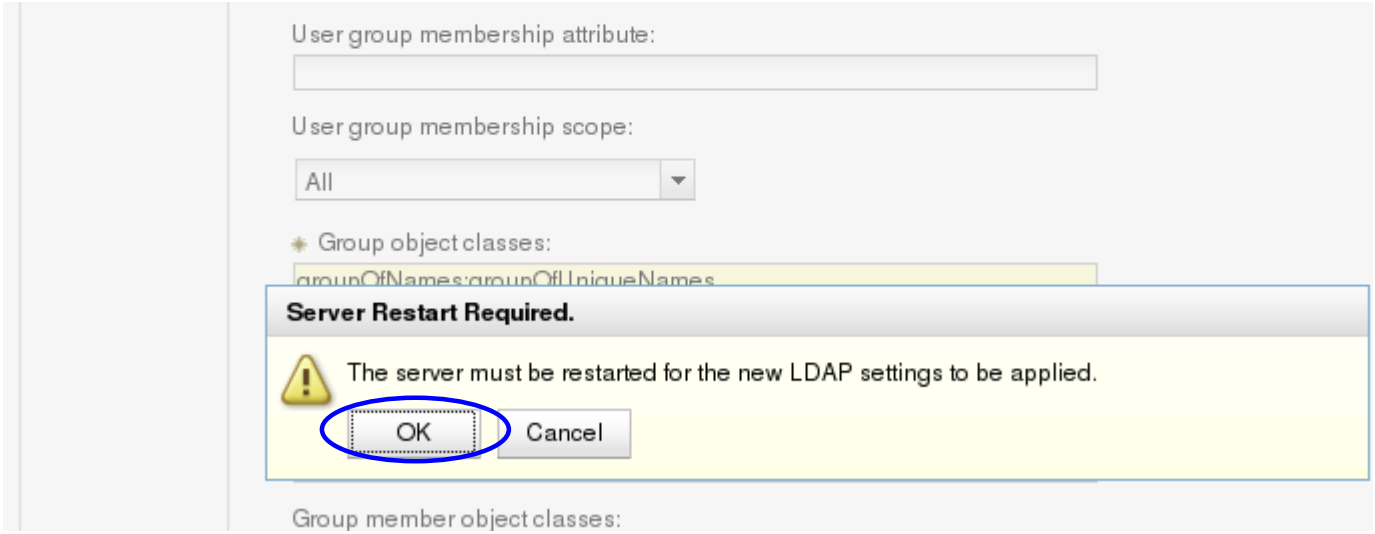
Security set up – LDAP

- User authentication via existing LDAP repository
  - Alternatively, use a local file-based repository
- General LDAP settings (from LDAP Admin)
- Group LDAP settings (from LDAP Admin)
- Apply



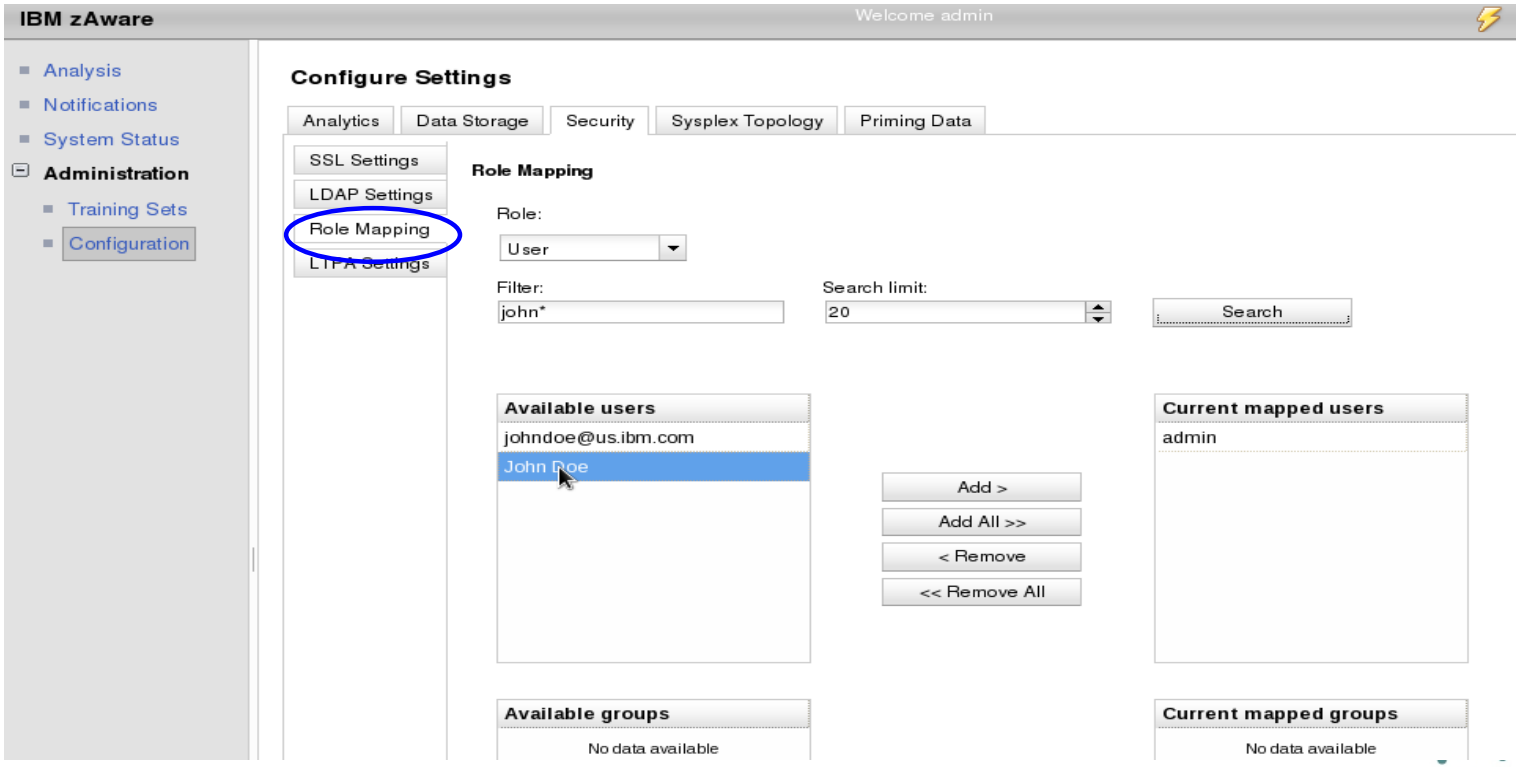
Security set up – LDAP

- Apply, then confirm zAware server restart
- The GUI will be unavailable while restarting



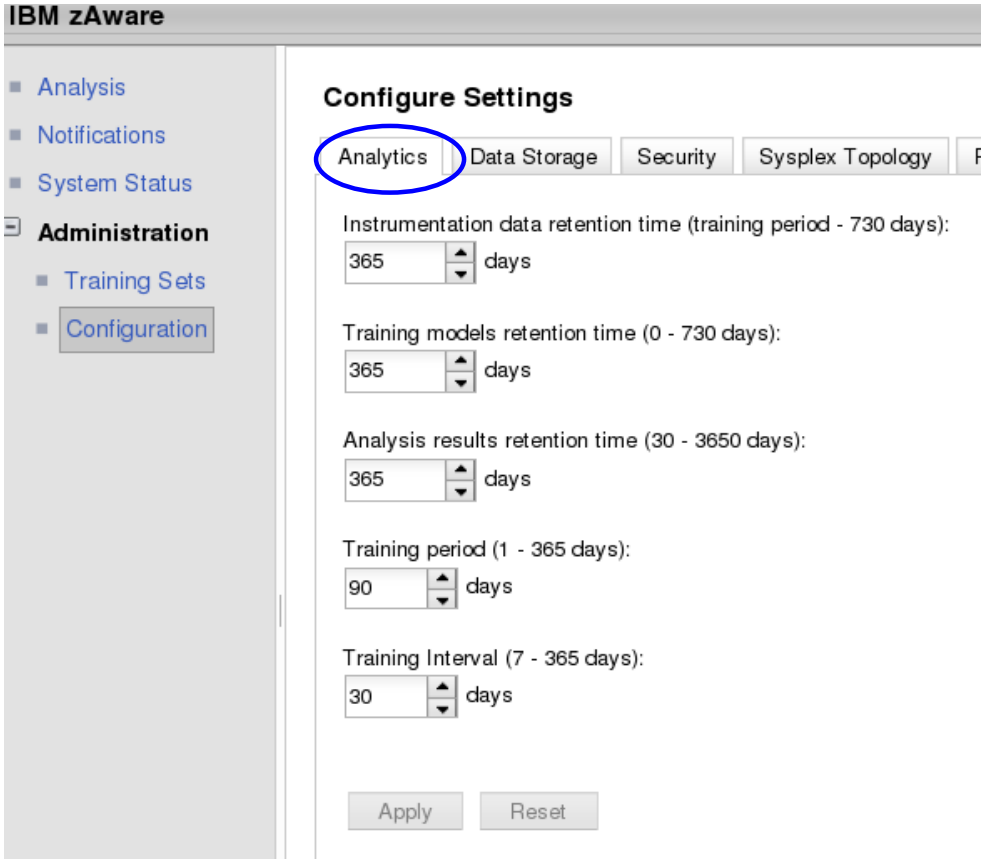
Security set up – Role Mapping

- Search
- Add users or groups to Admin or User role
- Apply
- Confirm zAware server restart



Analytics configuration

- Defaults should be good for most
- Retention times will affect DASD usage
  - Check the Data Storage capacity and usage periodically



Operating Requirements - z/OS Monitored Clients

- System z servers supported as IBM zAware monitored clients
  - *zEC12*
  - *zBC12*
  - *IBM zEnterprise™ 196 (z196) or z114,*
  - *IBM System z10™ EC or BC*
  - *Prior generations that meet the OS and configuration requirements*

- Running **z/OS 1.13 + PTFs** **or z/OS 2.1**
  - *APAR OA38747*
  - *APAR OA38613*
  - *APAR OA39256*
  - *APAR OA42095*
- System needs to be configured as a monoplex, system in a multisystem sysplex, or a member of a parallel sysplex
- Using operations log (**OPERLOG**) as the hardcopy medium
- Sysplex name + system name must uniquely identify system
- Requires an OSA or IEDN or HiperSocket for IP network connection
- z/OS zAware monitored client MIPs usage ~ 1%

z/OS monitored system set up

- Configure network connection to zAware
  - TCP/IP profile, DNS, Resolver, firewall settings
- **D XCF** to confirm MONOPLEX or MULTISYSTEM
- **D CONSOLES** to confirm OPERLOG hardcopy
  - set in CONSOLxx

- Configure z/OS logger to send data to zAware
  - Give IXGLOGR a z/OS UNIX segment for TCP/IP connectivity
    - ADDUSER IXGLOGR OMVS(UID(xxxx) HOME('/'))
  - From a user with SAF update access to IXGZAWARE_CLIENT resource in the FACILITY class
    - Create **IXGCNFxx** parmlib member for logger
    - Add **IXGCNF=xx** to IEASYSxx parmlib member

z/OS monitored system - logger config

- **IXGCNFxx** parmlib member contains system logger values

The **ZAI** statement contains parameters for IBM zAware

- **SERVER(***host_name***|***IP_address***)**

  Specifies the host name or IP address of IBM zAware server
- **PORT(***number***)**

  Port number IBM zAware server is using. Port must be 2001
- **LOGBUFMAX(***value***)**

  Maximum amount of storage buffers (GB) to be used by system logger to manage data that is being sent to the IBM zAware server
- **LOGBUFWARN(***nn***)**

  Percent of used buffer space to trigger warning message
- **LOGBUFFULL(MSG|QUIESCE)**

  Action system logger is to take when the log stream buffers are full

Sample in **SYS1.SAMPLIB(IXGCNFXX)**

- Update the OPERLOG log stream to add:
  - **ZAI(YES)**
  - **ZAIDATA('OPERLOG')**

z/OS monitored system - logger config

- **SET IXGCNF=xx** to dynamically pick up the logger settings
- **DISPLAY LOGGER,STATUS,ZAI,VERIFY** to verify the config

```
ZAI LOGSTREAM CLIENTS: AVAILABLE
BUFFERS IN USE: 00 GB 0000 MB
ZAI VERIFY INITIATED, CHECK FOR MESSAGES IXG37X, IXG38X
     ...
IXG380I ZAI LOGSTREAM CLIENT ESTABLISHED
FOR DISPLAY ZAI,VERIFY
```

- Start sending to zAware Also, defines the *plex.system* to zAware

SETLOGR FORCE,ZAICONNECT,LSNAME=SYSPLEX.OPERLOG

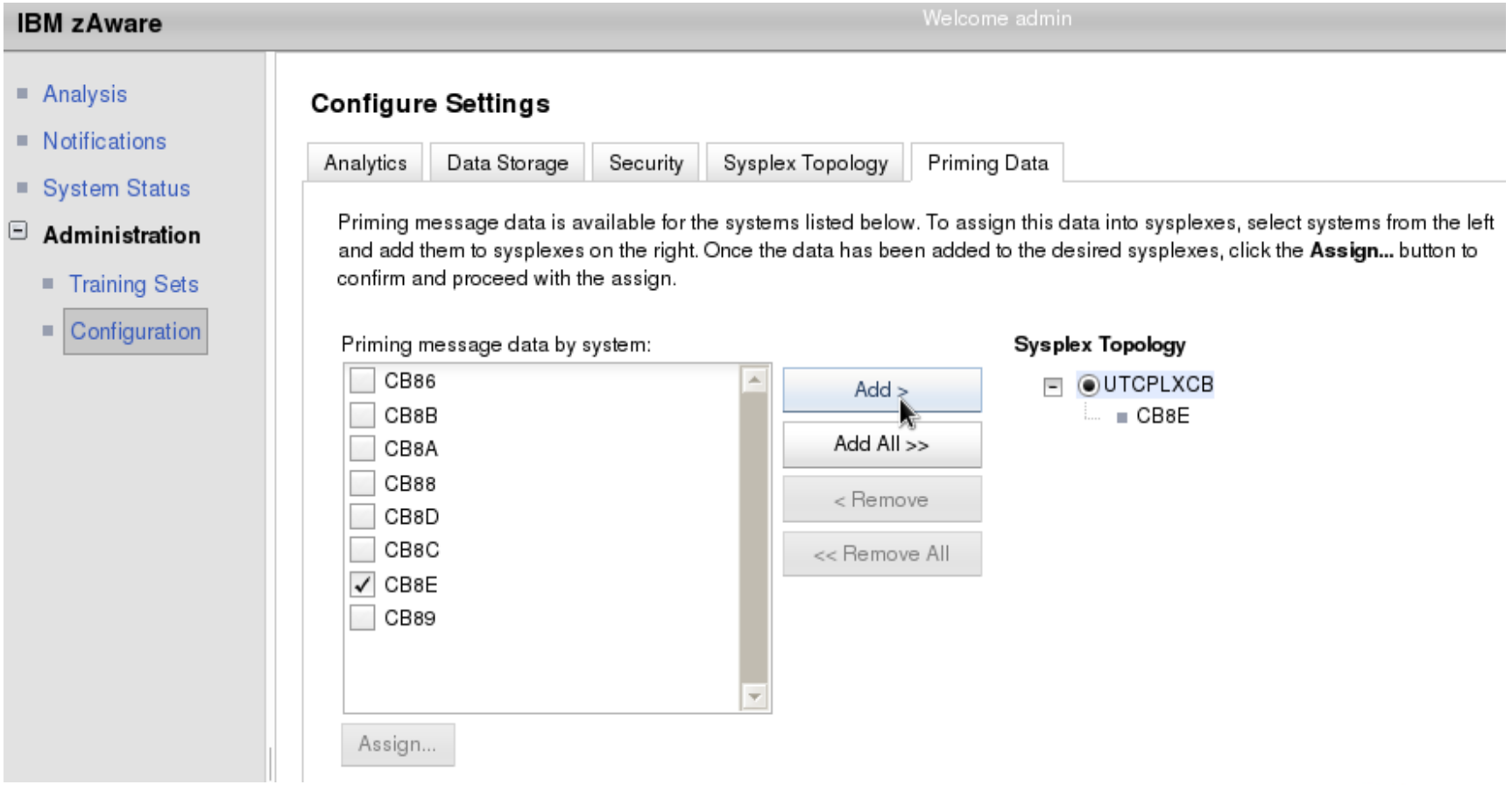
```
IXG651I SETLOGR FORCE ZAICONNECT COMMAND ACCEPTED FOR
  LOGSTREAM=SYSPLEX.OPERLOG
IXG386I ZAI LOGSTREAM CLIENT CONNECT ATTEMPT IN PROGRESS FOR LOGSTREAM
  SYSPLEX.OPERLOG
STATUS: ATTEMPTING SOCKET CREATE
       . . .
IXG380I ZAI LOGSTREAM CLIENT ESTABLISHED FOR LOGSTREAM SYSPLEX.OPERLOG
```

Priming zAware – Bulk Load from z/OS

- Prior SYSLOG data may be sent to IBM zAware
- Reduces the time to build a model, and begin analysis
- Data sets should not exceed 90 days earlier than today
- Bulk load may be run from any z/OS system configured for IBM zAware
- Copy SYS1.SAMPLIB(AIZBLK) JCL to your JCL and modify
  - See instructions in the file
- Copy SYS1.SAMPLIB(AIZBLKE) REXX to your SYSEXEC
- Run bulk load for a small set of data to verify config
- Run bulk load for one plex at time

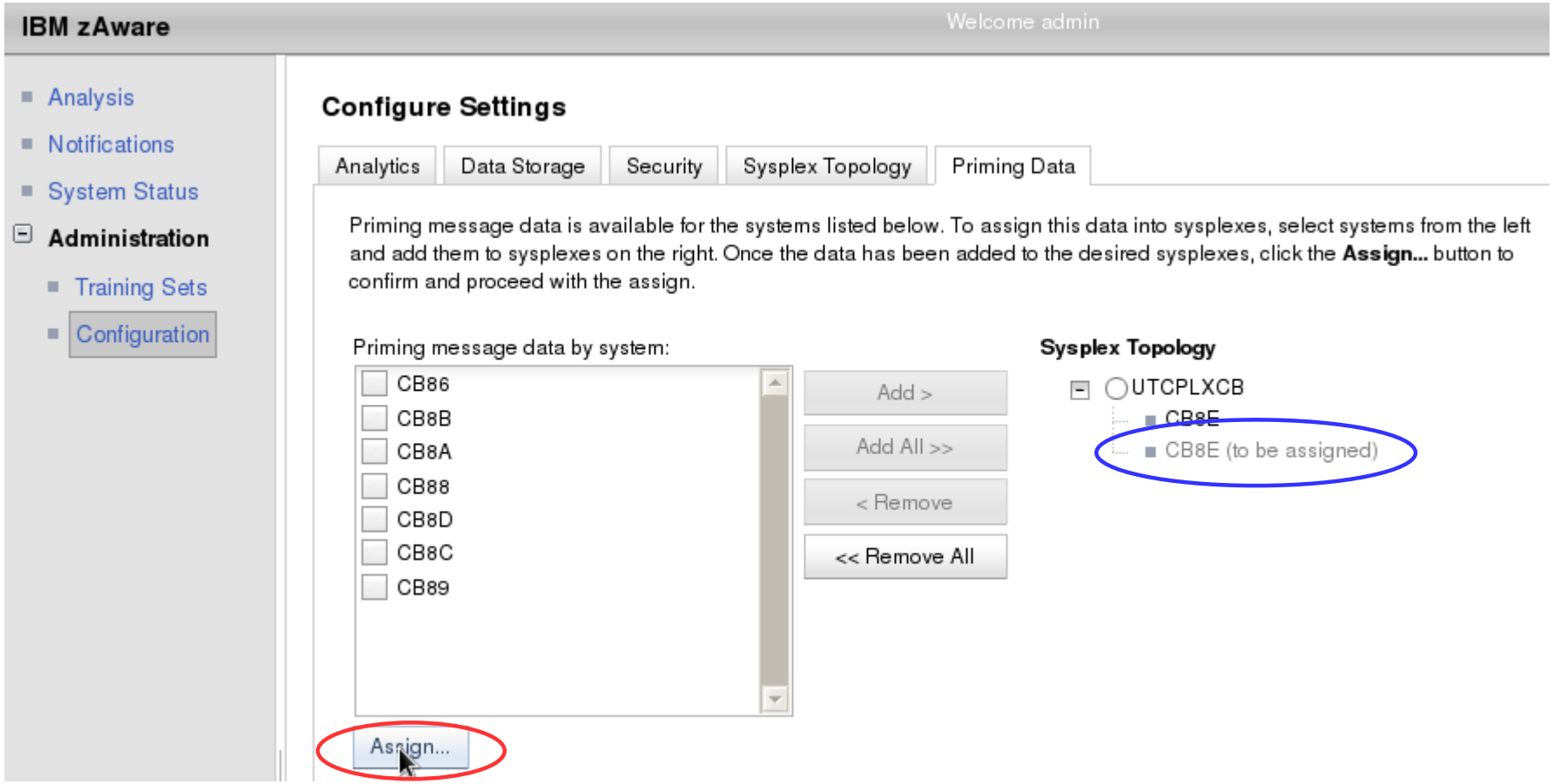
Priming zAware – zAware GUI – part 1

- Recommend to bulk load all logs before assigning
  - Connections are terminated during assignment

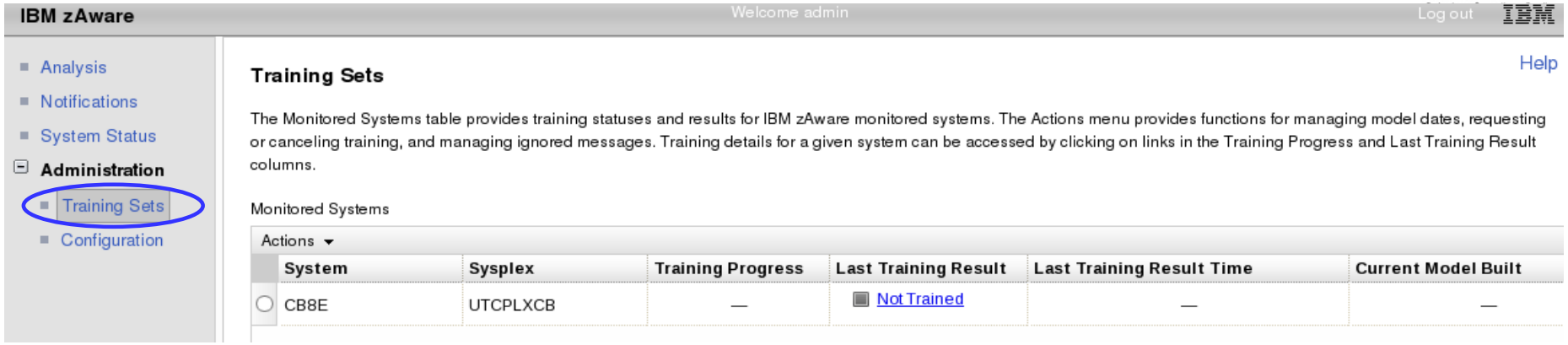


Priming zAware – zAware GUI – part 2

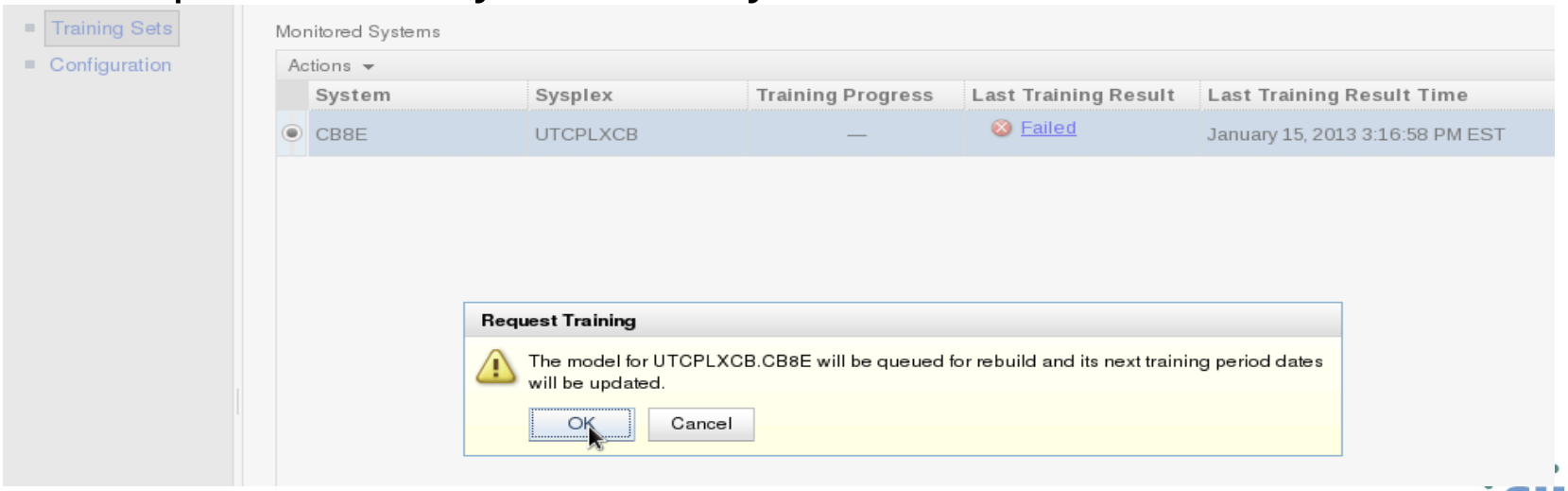
- Assign, then confirm disconnect of all systems
- Usually logger reconnects automatically



Training a model

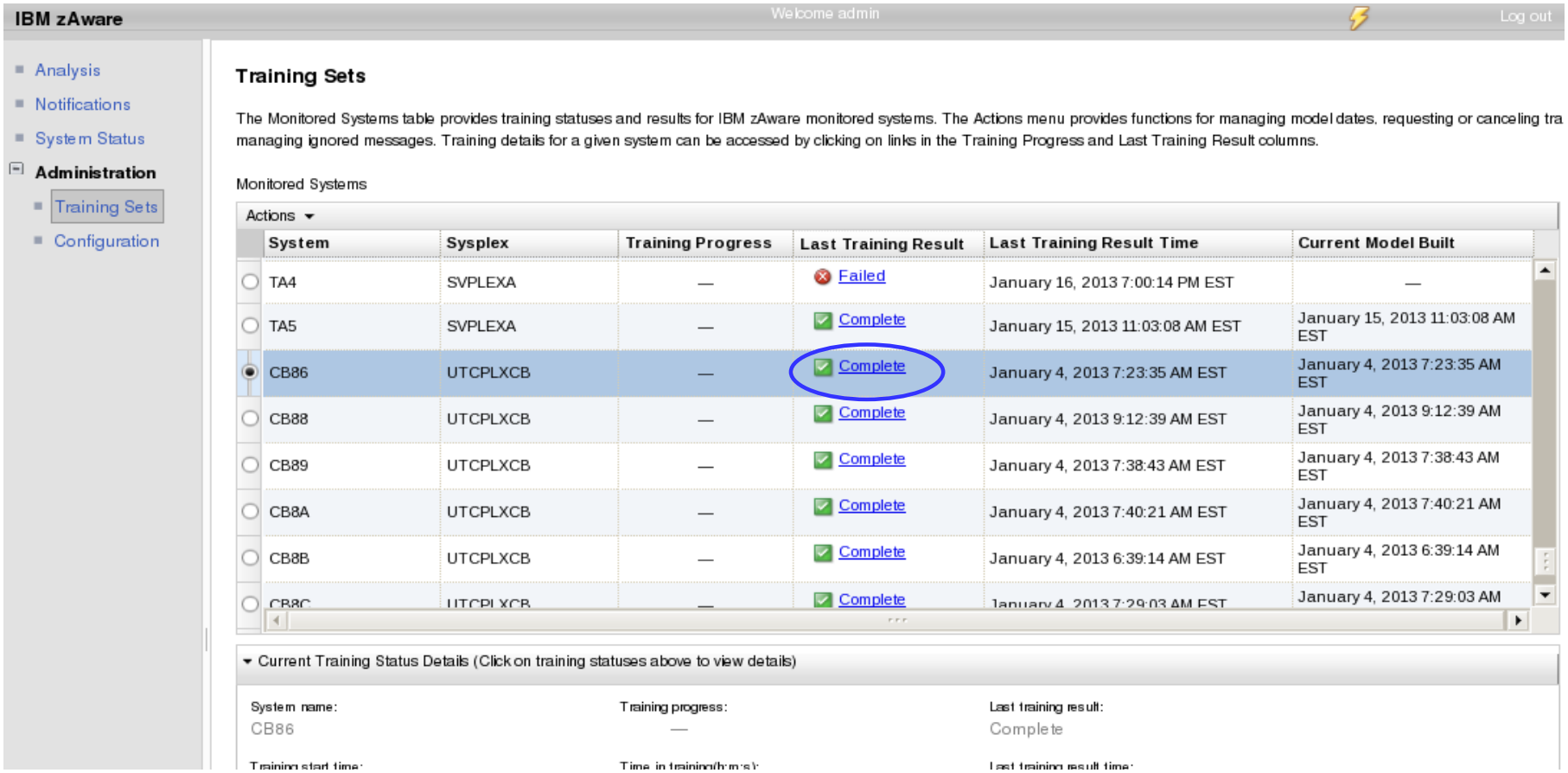


- Actions > Request Training
  - processed asynchronously



Training complete

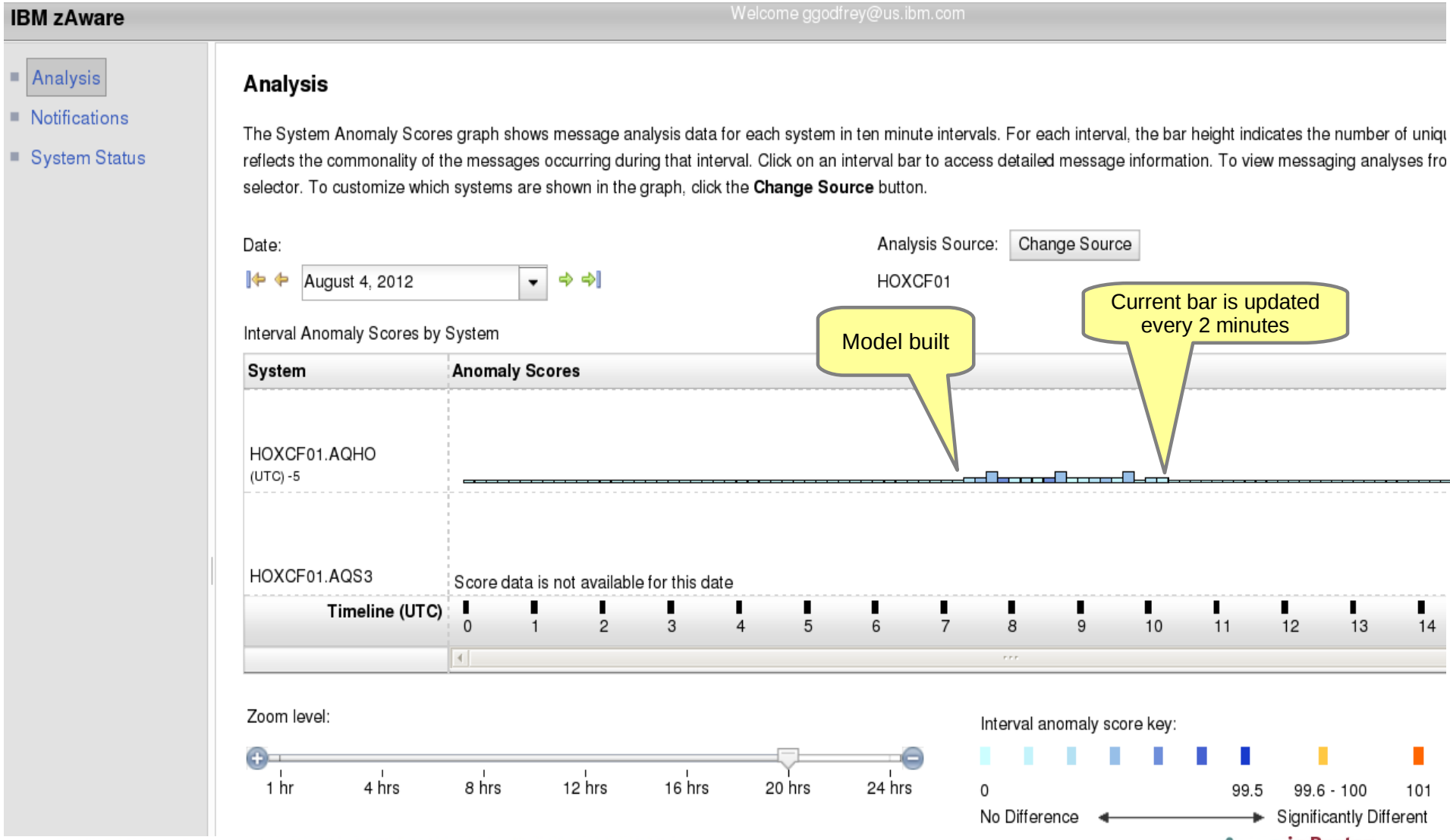
- After more systems have connected and trained



- Failed training is typically due to too few unique messages. Check the Notifications.

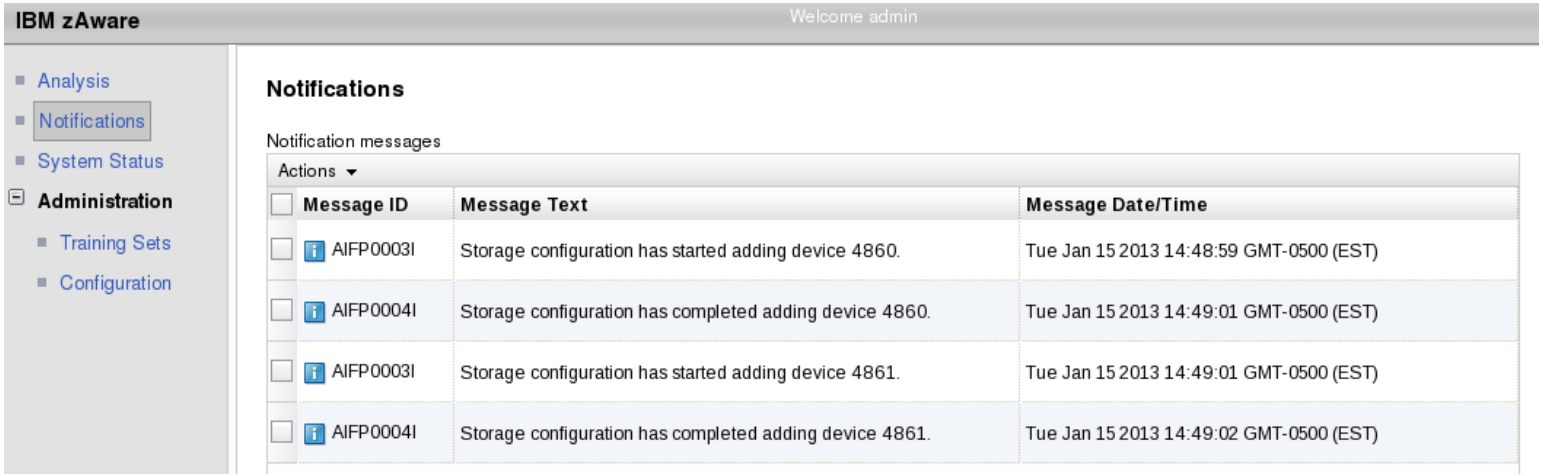
Analysis results

- Once a model is built, a connected system will generate results



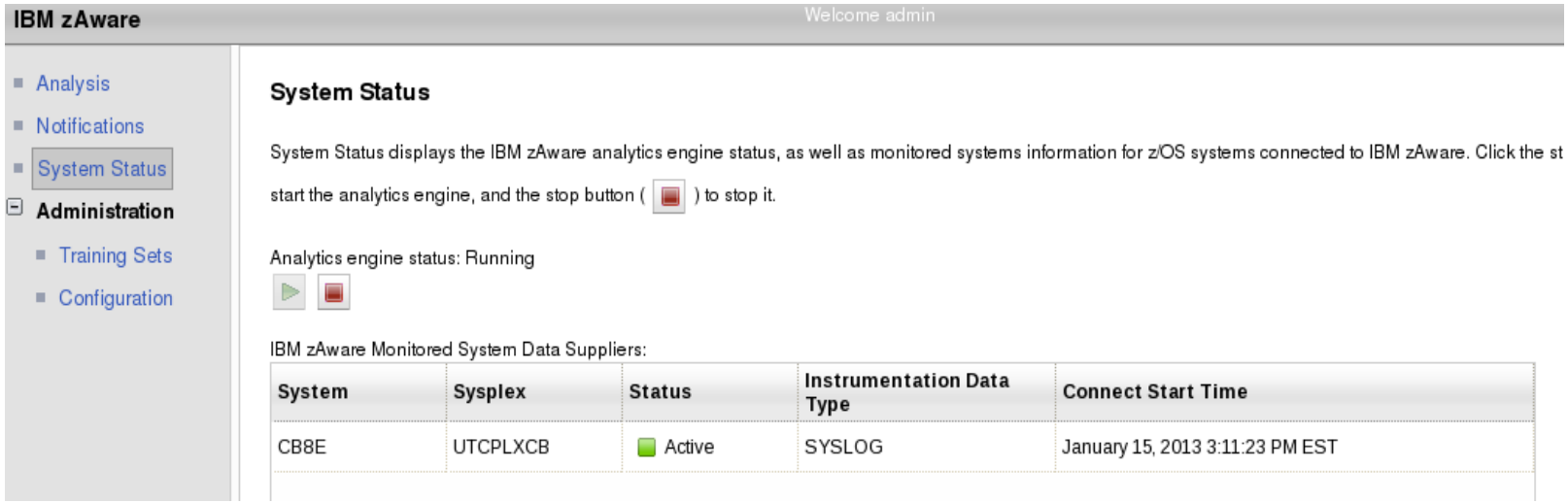
Notifications

- Notifications
  - zAware messages for asynchronous events
    - Storage, Training, Bulk load, ...
  - Viewable by all users
  - Persistent, until removed by an admin (or deactivate)
  - New ones indicated by  in header

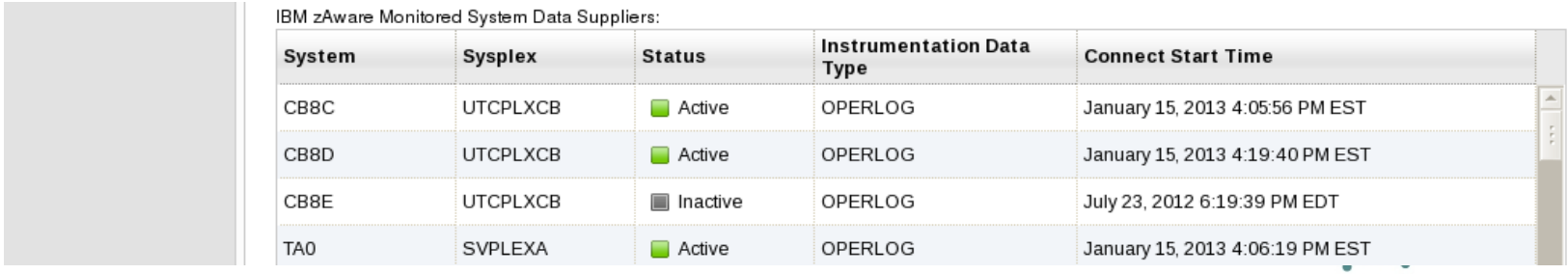


Connection status

- System status of monitored systems
  - Bulk load in progress



  - Normal operation



You should now understand the steps to set up IBM zAware.

Questions?

Primary References

- IBM System z Advanced Workload Analysis Reporter (IBM zAware) Guide
  - SC27-2623-00
  - http://www.ibm.com/systems/z/os/zos/bkserv/r13pdf/#E0Z
    or
  - IBMResourceLink Library → zEC12 → Publications

- Redbook: Extending z/OS System Management Functions with IBM zAware
  - SF24-8070-00

- z/OS 1.13 MVS Setting Up a Sysplex SA22-7625-22

Additional References

- Available from “Books” group of Classic Style UI and the Welcome page of the Tree Style UI (& IBM Resource Link: Library->zEC12->Publications)
  - IBM SC28-6919: Hardware Management Console Operations Guide (Version 2.12.0)
  - IBM SC28-6920: Support Element Operations Guide (Version 2.12.0)
  - IBM SB10-7030: Application Programming Interfaces
  - IBM SC28-2605: Capacity on Demand User’s Guide
  - IBM SB10-7154: Common Information Model (CIM) Management Interfaces
  - IBM SB10-7156: PR/SM Planning Guide
  - IBM SA22-1088: System Overview

- Available from IBM Resource Link: Library->zEC12->Technical Notes
  - System z Hardware Management Console Security
  - System z Hardware Management Console Broadband Remote Support Facility
  - System z Activation Profile Update and Processor Rules

Registering for IBM Resource Link Access

- Registering for IBM Resource Link Access
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- To register:
  - Open the Resource Link sign-in page: http://www.ibm.com/servers/resourcelink/
  - You need an IBM ID to get access to Resource Link.
    - If you do not have an IBM ID and password, select the "Register for an IBM ID" link in the "Your IBM Registration" menu. Return to the Resource Link sign-in page after you get your IBM ID and password.
    - Note: If you're an IBM employee, your IBM intranet ID is not an IBM ID.
  - Sign in with your IBM ID and password.
  - Follow the instructions on the subsequent page.