IBM

Spyre Accelerator User's Guide

GC28-7071-00

Note:

Before you use this information and the product it supports, read the information in “Safety” on page v, “Notices” on page 35, and *IBM Systems Environmental Notices and User Guide*, Z125–5823.

This edition, GC28-7071-00, applies to IBM z17 (Model ME1) and IBM LinuxONE Emperor 5 (Model ML1).

There might be a newer version of this document in a **PDF** file available on **IBM Documentation**. Go to https://www.ibm.com/docs/en/systems-hardware, select **IBM Z** or **IBM LinuxONE**, then select your configuration, and click **Library Overview** on the navigation bar.

Contents

Safety

Safety notices

Safety notices may be printed throughout this guide. **DANGER** notices warn you of conditions or procedures that can result in death or severe personal injury. **CAUTION** notices warn you of conditions or procedures that can cause personal injury that is neither lethal nor extremely hazardous. **Attention** notices warn you of conditions or procedures that can cause damage to machines, equipment, or programs.

World trade safety information

Several countries require the safety information contained in product publications to be provided in their local language(s). If this requirement applies to your country, a safety information booklet is included in the publications package shipped with the product. The booklet contains the translated safety information with references to the US English source. Before using a US English publication to install, operate, or service this product, you must first become familiar with the related safety information in the *Systems Safety Notices*, G229-9054. You should also refer to the booklet any time you do not clearly understand any safety information in the US English publications.

Laser safety information

All IBM Z® and IBM® LinuxONE (LinuxONE) models can use I/O cards such as FICON®, Open Systems Adapter (OSA), Network Express, Integrated Coupling Adapter2.0 SR (ICA SR2.0), zHyperLink Express, or other I/O features which are fiber optic based and utilize lasers (short wavelength or long wavelength lasers).

Laser compliance

All lasers are certified in the US to conform to the requirements of DHHS 21 CFR Subchapter J for Class 1 or Class 1M laser products. Outside the US, they are certified to be in compliance with IEC 60825 as a Class 1 or Class 1M laser product. Consult the label on each part for laser certification numbers and approval information.

Laser Notice: U.S. FDA CDRH NOTICE if low power lasers are utilized, integrated, or offered with end product systems as applicable. Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

CAUTION: Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

CAUTION: This product contains a Class 1M laser. Do not view directly with optical instruments. (C028)

About this publication

This publication contains information about the IBM Spyre® Accelerator on the 9175 system.

Unless otherwise stated, throughout this document "9175" refers to the IBM z17® (Model ME1) or IBM LinuxONE Emperor 5 (Model ML1).

Figures included in this document illustrate concepts and are not necessarily accurate in content, appearance, or specific behavior.

Related publications

Publications that you will find helpful and that you should use along with this publication are in the following list. The following publications are available on **IBM Documentation**. Go to https://www.ibm.com/docs/en/systems-hardware, select **IBM Z** or **IBM LinuxONE**, then select your configuration, and click **Library Overview** on the navigation bar.

- Spyre Support Appliance for IBM Z and LinuxONE User's Guide, GC28-7072
- Appliance Control Center for IBM Z and LinuxONE User's Guide, GC28-7073
- Connectivity Mapping Tool User's Guide, GC28-7058
- z/OS® Hardware Configuration Definition (HCD) User's Guide, SC34-2669
- Secure Service Container (SSC) User's Guide, SC28-7062
- IBM Dynamic Partition Manager (DPM) Guide
- IBM DS8900F documentation
- Spyre Accelerator for IBM Z and LinuxONE content solution

Related HMC and SE console information

Hardware Management Console (HMC) and Support Element (SE) information can be found on the console help system.

Accessibility features

Accessibility features help users who have physical disabilities such as restricted mobility or limited vision use software products successfully. The accessibility features can help users do the following tasks:

- Run assistive technology such as screen readers and screen magnifier software.
- Operate specific or equivalent features by using the keyboard.
- Customize display attributes such as color, contrast, and font size.

Consult assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in this product. Consult the product information for the specific assistive technology product that is used to access our product information.

Keyboard navigation

This product uses standard Microsoft Windows navigation keys.

IBM and accessibility

See http://www.ibm.com/able for more information about the commitment that IBM has to accessibility.

How to provide feedback to IBM

We welcome any feedback that you have, including comments on the clarity, accuracy, or completeness of the information.

For additional information use the following link that corresponds to your configuration:

Configuration	Link
IBM z17® Model ME1	https://www.ibm.com/docs/en/systems-hardware/zsystems/9175-ME1?topic=how-send-feedback
IBM LinuxONE Emperor 5 Model ML1	https://www.ibm.com/docs/en/systems-hardware/linuxone/9175-ML1?topic=how-send-feedback

Chapter 1. Introduction

Introduction to IBM Spyre Accelerator

The Spyre AI Card, also known as the IBM Spyre Accelerator, is a high-performance, energy-efficient PCIe add-on designed to enhance AI inferencing capabilities on IBM Z and LinuxONE systems.

For more information, see the content solution for *Spyre Accelerator for IBM Z and LinuxONE* available at https://www.ibm.com/support/z-content-solutions/spyre-accelerator-z-and-linuxone/.

Key features include:

- *Architecture & Specs*
  - Equipped with **32 AI accelerator cores**, capable of handling matrix operations and low-precision workloads for high throughput.
  - Manufactured using **Samsung's advanced 5 nm process node**.
  - Each card supports up to **128 GB of LPDDR5 memory**, with ensembles of up to eight cards delivering **1 TB memory** and massive AI performance.
  - Delivers exceptional AI compute—exceeding **300 TOPS** per card—while consuming just **75 W**.
- *Usage & Benefits*
  - Delivers advanced **ensemble AI workflows** by complementing the on-chip Telum-II AI accelerator, enabling multi-model inferencing for tasks like real-time fraud detection and code assistance.
  - Enables on-premises generative AI use cases—such as running Watsonx Code Assistant™—while maintaining the inherent **security, reliability, and data locality** of the IBM Z environment.

Appliance Control Center for IBM Z & IBM LinuxONE

The Appliance Control Center (ACC) is a secure application for deploying software appliances on IBM Z and IBM LinuxONE systems. It integrates with the Hardware Management Console (HMC) to manage and monitor appliances across multiple systems. ACC enables users to upload SSC-based appliances and updates, then handles their installation. By streamlining deployment, control, and maintenance, ACC simplifies appliance lifecycle management.

Spyre Support Appliance for IBM Z & IBM LinuxONE

The Spyre Support Appliance (SSA) is a dedicated solution for managing, monitoring, and diagnosing Spyre cards attached to IBM Z Logical Partitions (LPARs). SSA continuously tracks all connected Spyre cards to optimize performance and enable proactive error handling. Upon initialization, it activates all assigned Spyre cards and performs real-time monitoring—checking every second for newly added or removed cards, and dynamically handling initialization or cleanup. Beyond lifecycle management, SSA collects key metrics and health data to maintain performance and support early issue detection.

Hardware and software requirements

Before deploying the Spyre Accelerator on IBM Z or LinuxONE systems whether in Dynamic Partition Manager (DPM) or standard mode environments specific hardware and software prerequisites must be met to ensure optimal compatibility, stability, and performance. The following information details the hardware and software prerequisites necessary to support this offering.

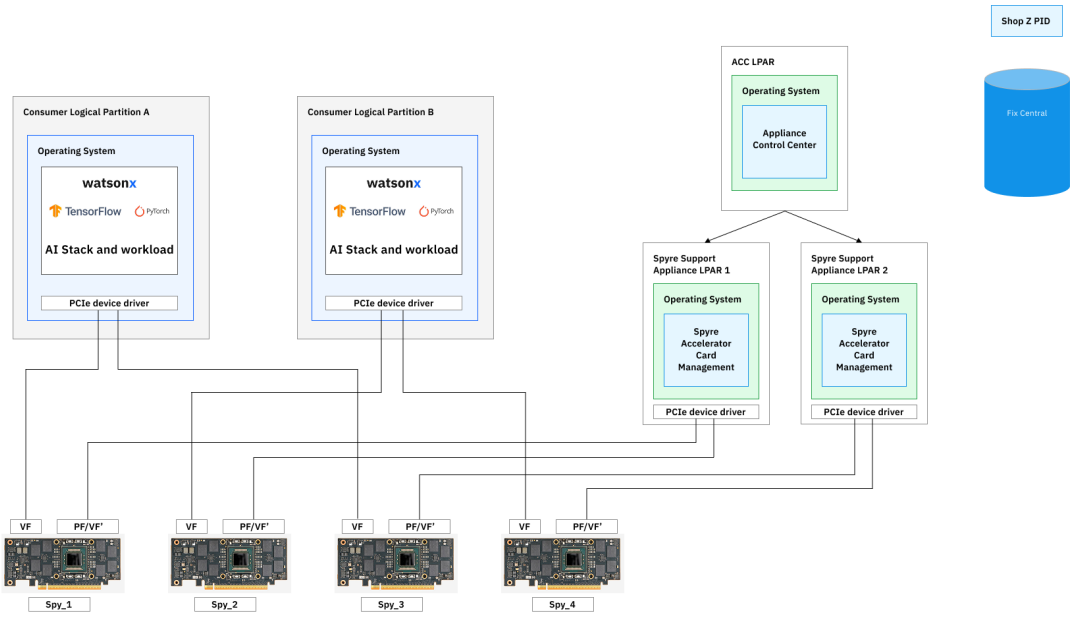
Table 1. Hardware requirements

Component	Requirement
System Platform	IBM z17 (supporting PCIe Gen4 and Spyre-capable firmware)
Partitioning Mode	DPM-enabled or non-DPM system
Physical Slot	Available PCIe slot (low-profile, Gen4-capable)
Memory	16 GB memory for ACC 50 GB memory for each SSA **Note:** The memory requirement for the consumer LPAR depends upon the workload requirements within the consumer LPAR.
Storage	50 GB for each appliance.
CPU Resources	For ACC and two SSA, two shared Integrated Facility for Linux® processors (If Ls) are required. **Note:** The CPU requirement for the consumer LPAR depends upon the workload requirements within the consumer LPAR.
Cooling & Power®	Chassis capable of handling additional 75 W per Spyre card
Networking	Atleast one networking interface for each appliance for internal communication in between ACC and SSAs.
Firmware	System firmware updated to latest version supporting Spyre devices (ACC/SSA Images)

Table 2. Software requirements - Control node/laptop

Component	Requirement
Python Runtime	Python 3.9+ (for ACC/SSA API communication)
Appliances	ACC and SSA appliances downloaded from IBM Fix Central
Ansible®	For ACC ansible playbooks

Solution overview



ACC LPAR

Purpose: Centralized control and orchestration of the appliances.

Role: Connects to the Hardware Management Console (HMC) in order to manage and monitor appliances on different IBM Z or LinuxONE systems.

Spyre Support Appliance LPAR 1 & 2

Purpose: Manage, monitor, and diagnose Spyre cards attached to an IBM Z Logical Partition (LPAR).

Role: Continuously monitors all connected Spyre cards to maintain efficiency and enable proactive error handling.

Spyre cards (*Spy_1*, *Spy_2*, *Spy_3* and, *Spy_4*)

Purpose: AI accelerator cards used for high-performance AI inferencing and model fine-tuning.

Notes:

- IBM Z or LinuxONE systems support up to 48 cards.
- For high availability, distribute cards across SSA1 and SSA2 so any single SSA failure does not impact all adapters for a workload LPAR.

Consumer LPAR A & LPAR B

Purpose: It is a logical partition used to run AI workloads.

Note:

- For in-transaction workloads using encoder models that require 100% scoring and high availability, it is beneficial to over provision Spyre cards by at least one to meet Reliability, Availability and Serviceability (RAS) objectives. For workloads distributed across multiple cards, an additional Spyre card can be used to hot-replace a failing card and resume operations within minutes. If sub-second switching and high availability are required, consider running two copies of the workload with a failover mechanism.
- The consumer LPAR must be configured to utilize at least two Virtual Functions (VFs), each provisioned from distinct Spyre cards managed by *separate* SSAs. This architecture facilitates high availability by enabling the application to implement a failover mechanism in the event of an SSA failure.

- The cards should be configured with PCIe path redundancy. For example, avoid assigning all cards in a single PCIe+ I/O drawer to one SSA. If two PCIe+ I/O drawers are available, distribute the cards evenly between the SSAs to ensure failover capability.

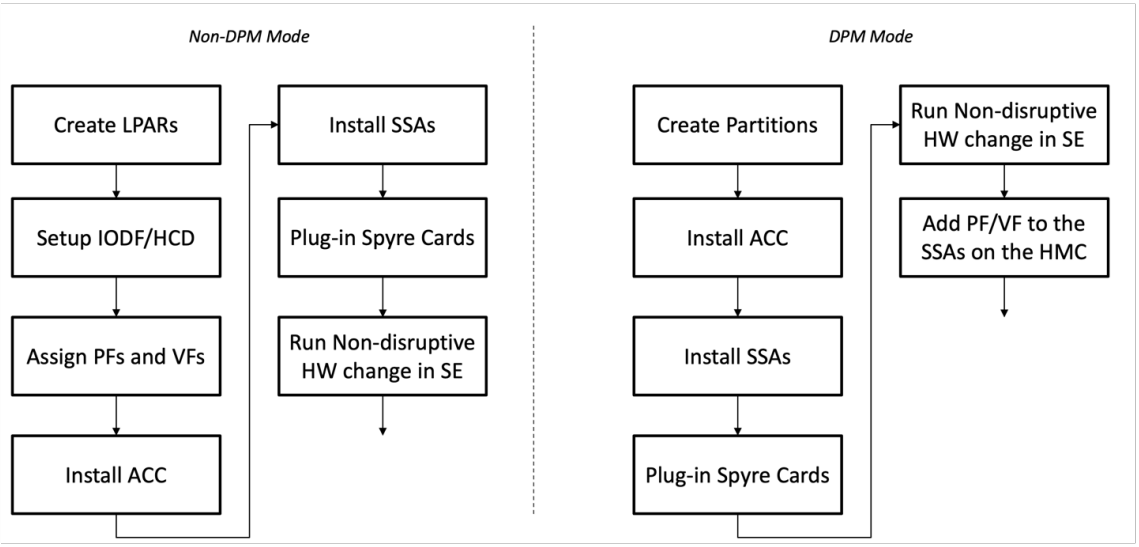
For setting up the Spyre cards, the following tasks must be completed

- Prepare the environment
- “Installing Appliance Control Center (ACC)” on page 19
- “Installing Spyre Support Appliance (SSA)” on page 27
- Plug in the Spyre cards.

These actions can be performed by either a single or multiple roles. In this guide, we use a single role to perform these tasks.

High level workflow

This guide walks you through a complete, end-to-end installation and configuration of IBM Z Spyre adapters, including creation of Secure Service Container (SSC) logical partitions (LPARs), and the installation of the Appliance Control Center for IBM Z & IBM LinuxONE (ACC) and Spyre Support Appliance for IBM Z & IBM LinuxONE (SSA), and the nondisruptive hot-plug and activation of Spyre cards.



1. Provision DASD and update HCD/IODF.
2. Provision three Secure Service Container (SSC) LPARs, two for Spyre Support Appliances (SSAs) and one for Appliance Control Center (ACC).

   Note: The ACC LPAR can reside on the same Central Processor Complex (CPC) or on a different CPC. ACC is also supported on IBM z16® CPCs. All CPCs involved in this configuration **must** be managed by the same Hardware Management Console (HMC).
3. Define Physical Function (PF) and Virtual Functions (VF) as Function IDs (FIDs) per Spyre card, assign PF and *first* VF to SSA, and *second* VF to the consumer workload LPAR.
4. Plan and map Physical Channel ID (PCHIDs) for Spyre adapters using the Connectivity Mapping Tool.

   Note: For more information, see the Connectivity Mapping Tool User's Guide.
5. Install ACC and SSA images using Hardware Management Console (HMC) and/or Support Element (SE) or ACC, then activate SSA LPARs.
6. Nondisruptive hot-plug and activation of Spyre cards – *IBM System Service Representative (SSR) task*

Tip: For high availability, distribute cards across SSA1 and SSA2 so any single SSA failure does not impact all adapters for a workload LPAR. IBM recommends configuring two or more SSAs per CPC, depending on the specific requirements and configuration needs of the system.

Note: The instructions provided in this guide are for non-DPM mode IBM Z systems. If you are using DPM mode IBM Z systems, then see “Creating the ACC and SSA LPARs” on page 15

Chapter 2. Preconfiguration

Define DASD for ACC and SSA LPARs

Before you begin

- Volume (ECKD)
- Minimum Storage - 50 GB

Procedure

1. If required, add Control Unit
   In this example, we have defined Control Unit (CU) `0F50`. Any undefined CU can be used.
2. Create a device for the new disk, and assign it to the corresponding partition.

```
                    Change Control Unit Definition

Specify or revise the following values.

Control unit number . . . . 0F50  +

Control unit type . . . . . 2107           +

Serial number . . . . . . . ABC01       +
Description . . . . . . . . DASD1 LCU 5D ACC SSA1 SSA2

Connected to switches . . . 17  18  __  __  __  __  __  __  +
Ports . . . . . . . . . . . DE  A3  __  __  __  __  __  __  +

Define more than eight ports . . 2   1. Yes
                                     2. No



 F1=Help     F2=Split     F3=Exit    F4=Prompt    F5= Reset
 F9=Swap     F12=Cancel
```

Figure 1. Change Control Unit Definition

What to do next

Configuration of IBM Z or LinuxONE system.

Preconfiguration for a standard mode system

Creating LPARs in IODF

Before you begin

For more details, see the z/OS Hardware Configuration Definition (HCD) User's Guide to properly create LPARs in the I/O definition files (IODF).

Note: To enable ACC to manage SSA, both must be configured on and accessible through the same network. ACC and SSAs should be on CPCs that are handled by the same HMC.

About this task

For each OSA adapter used by the network adapter in SSC LPARs, you must define three device IDs in the I/O configuration:

- One device ID for network traffic
- Two device IDs for read/write control data

If the CHPID/FID is shared across multiple SSC LPARs, these three device addresses can also be shared by the SSC containers.

Procedure

Create three LPARs.

```
Processor ID . . . . : B87         B87 z17
Configuration mode . : LPAR
Channel Subsystem ID : 1

/ Partition Name  Number  Usage + UID  Description
_ ACC             A       OS      N    ACC Appliance Control Center
_ SSA1            C       OS      N    Spyre Support Appliance
_ SSA2            D       OS      N    Spyre Support Appliance
```

The LPARs are accessible to the following CHPID/FID:

- 12 - OSA
- AA , B9 - FC or FCP. It provides access to the DASD (ECKD).

```
                    View Partition / Channel Paths

Command ===> _____________________________________ Scroll ===> CSR

Processor ID . . . : B87         B87 z17
Configuration mode : LPAR
Partition name . . : ACC         ACC Appliance Control Center

Enter to continue.

CHPID    Type    Mode    Description
12       OSD     SPAN    Campus Network
AA       FC      SPAN    32G
B9       FC      SPAN    32G

*********************** Bottom of data ************************


 F1=Help     F2=Split     F3=Exit    F7=Backward     F8=Forward
 F9=Swap     F12=Cancel   F22=Command
```

Figure 2. View Partition / Channel Paths

Create Physical Function

About this task

In HCD, open the **Work with PCIe Functions** view for the processor where you want to define the Function IDs (FIDs) and Spyre cards. Then, add new FIDs as follows:

- Add one Physical Function (PF) per card.
- Add two Virtual Functions (VFs) per card.

Assign the PF and the VF 1 to an SSA LPAR. Assign the VF 2 to the consumer LPAR that will use the card.

Important: Ensure that the cards assigned to an LPAR are distributed across two different SSAs for redundancy and high availability. If one SSA is restarted or fails, all cards attached to that SSA will become unavailable.

For example, if you have 8 cards and 2 Consumer LPARs:

- Assign 4 cards to each Consumer LPAR.
- For each Consumer LPAR, assign 2 cards to SSA1 and 2 cards to SSA2.

Procedure

1. Create the Physical Function (PF).

   Note: This PF is intended for SSA to manage the card.
2. Add PCIe Function for the PF.

   In this example:

   - *Function ID:* Enter the desired FID that best fits your configuration. Supported range `0000 - 4FFF` .
   - *Type:* `PAIA` for Spyre adapter
   - *Channel ID:* PCHID number of the card
   - *Physical Function:* Y for Yes

```
                    Add PCIe Function

Specify or revise the following values.

Processor ID . . . . . . . : B87         B87 z17

Function ID  . . . . . . . . 4010
Type . . . . . . . . . . . . PAIA          +

Channel ID . . . . . . . . . 18C  +
Port . . . . . . . . . . . . _    +
Virtual Function ID  . . . . ___  +    Physical Function   Y  (Y/N)
Number of virtual functions  0__
UID . . . . . . . . . . . . ___

Description  . . . . . . . . B87 SSA1 Physical Function


 F1=Help     F2=Split     F3=Exit    F4=Prompt    F5= Reset
 F9=Swap     F12=Cancel
```

3. From the **Define Access List** panel, select the LPAR that the device will attach to; when activated, it will be the primary LPAR that owns this FID. This is also where you select the SSA LPAR.

```
                    Define Access List

Command ===> _____________________________________ Scroll ===> CSR

Select one partition for the access list.

Function ID  . . . . : 4010

/ CSS ID  Partition Name   Number  Usage  Description
/ 1       SSA1             C       OS     Spyre Support Appliance
_ 1       SSA2             D       OS     Spyre Support Appliance
_ 1       S5M              4       OS     S5M - PLX5
_ 1       S5V              F       OS     S5V - PLX5
_ 1       S51              1       OS     S51 - PLX5
_ 1       S53              3       OS     S53 - PLX5
_ 1       S55              5       OS     S55 - PLX5
_ 1       TA0              6       OS     TA0 - PLXA
_ 1       X5CFB87          7       CF     X5CFB87 - PLX5
_ 2       IESPLN1          5       OS     zLinux - PyTorch Demo
_ 2       R7A              A       OS     R7A - PLX7
_ 2       R72              2       OS     R72 - PLX7

F1=Help     F2=Split     F3=Exit     F5= Reset     F6=Previous
F7=Backward F8= Forward  F9=Swap    F12=Cancel   F22=Command
```

4. *Optional:* Select one or more partitions to include in the candidate list. This action allows the FID to be moved from the Access List LPAR to the selected Candidate List.

   In this example, SSA2 was selected as the candidate.

```
                    Define Candidate List

 Command ===> _____________________________________ Scroll ===> CSR

 Select one or more partitions for inclusion in the candidate list.

 Function ID  . . . . : 4010

 / CSS ID  Partition Name   Number  Usage  Description
 _ 1       R71              B       OS     R71 - PLX7
 _ 1       R75              2       OS     R75 - PLX7
 _ 1       R79              9       OS     R79 - PLX7
 / 1       SSA2             D       OS     Spyre Support Appliance
 _ 1       S5M              4       OS     S5M - PLX5
 _ 1       S5V              F       OS     S5V - PLX5
 _ 1       S51              1       OS     S51 - PLX5
 _ 1       S53              3       OS     S53 - PLX5
 _ 1       S55              5       OS     S55 - PLX5
 _ 1       TA0              6       OS     TA0 - PLXA
 _ 1       X5CFB87          7       CF     X5CFB87 - PLX5
 _ 2       IESPLN1          5       OS     zLinux - PyTorch
Demo

 F1=Help     F2=Split     F3=Exit     F5= Reset     F6=Previous
 F7=Backward F8= Forward  F9=Swap    F12=Cancel   F22=Command
```

What to do next

Create Virtual Functions.

Create Virtual Functions

About this task

Use the following procedure to add two Virtual Functions (VFs) per Spyre card.

- Assign the first VF to an SSA LPAR.
- Assign the second VF to the Consumer LPAR that will use the card.

Procedure

1. Create the first Virtual Function (VF).

   Note: This first VF is intended for SSA to manage the card.
2. Add PCIe Function for the VF.

   In this example:

   - *Function ID:* Enter the desired FID that best fits your configuration. Supported range `0000` - 4FFF .

     Note: IBM recommends you use the FID next to the Physical Function (PF) for ease of tracking.
   - *Type:* PAIA for Spyre adapter
   - *Channel ID:* PCHID number of the card
   - *Virtual Function:* 1
   - *Physical Function:* N for No
   - *Number of virtual functions:* 1

```
                    Add PCIe Function

Specify or revise the following values.

Processor ID . . . . . : B87         B87 z17

Function ID  . . . . . . . . 4011
Type . . . . . . . . . . . . PAIA          +

Channel ID . . . . . . . . . 18C  +
Port . . . . . . . . . . . . . _    +
Virtual Function ID  . . . . 1__  +    Physical Function   N  (Y/N)
Number of virtual functions  1
UID . . . . . . . . . . . . ___

Description  . . . . . . . . B87 SSA1 1st Virtual Function


 F1=Help     F2=Split     F3=Exit    F4=Prompt    F5= Reset  F9=Swap
F12=Cancel
```

3. From the **Define Access List** panel, select the same SSA LPAR that the Physical Function (PF) of this card previously defined.

```
                    Define Access List

Command ===> ________________________________________ Scroll ===> CSR

Select one partition for the access list.

Function ID  . . . . : 4011

/ CSS ID  Partition Name   Number  Usage  Description
_ 1       LP1              E       OS     LP1 for COD
_ 1       R7H              8       OS     R7H - PLX7
_ 1       R71              B       OS     R71 - PLX7
_ 1       R75              2       OS     R75 - PLX7
_ 1       R79              9       OS     R79 - PLX7
/ 1       SSA1             C       OS     Spyre Support Appliance
_ 1       SSA2             D       OS     Spyre Support Appliance
_ 1       S5M              4       OS     S5M - PLX5
_ 1       S5V              F       OS     S5V - PLX5
_ 1       S51              1       OS     S51 - PLX5
_ 1       S53              3       OS     S53 - PLX5
_ 1       S55              5       OS     S55 - PLX5

F1=Help     F2=Split     F3=Exit     F5= Reset     F6=Previous
F7=Backward F8= Forward  F9=Swap    F12=Cancel   F22=Command
```

4. *Optional:* Select one or more partitions to include in the candidate list. If a candidate was previously assigned during Physical Function definition, select the same set of LPARs.

```
                    Define Candidate List

Command ===> ________________________________________ Scroll ===> CSR

Select one or more partitions for inclusion in the candidate list.

Function ID  . . . . : 4011

/ CSS ID  Partition Name   Number  Usage  Description
_ 1       LP1              E       OS     LP1 for COD
_ 1       R7H              8       OS     R7H - PLX7
_ 1       R71              B       OS     R71 - PLX7
_ 1       R75              2       OS     R75 - PLX7
_ 1       R79              9       OS     R79 - PLX7
/ 1       SSA2             D       OS     Spyre Support Appliance
_ 1       S5M              4       OS     S5M - PLX5
_ 1       S5V              F       OS     S5V - PLX5
_ 1       S51              1       OS     S51 - PLX5
_ 1       S53              3       OS     S53 - PLX5
_ 1       S55              5       OS     S55 - PLX5
_ 1       TA0              6       OS     TA0 - PLXA

F1=Help     F2=Split     F3=Exit     F5= Reset     F6=Previous
F7=Backward F8= Forward  F9=Swap    F12=Cancel   F22=Command
```

5. Create the second VF.

   Note: This second VF is designated for the Consumer LPAR to drive workloads.

6. Add PCIe Function for the VF.

   In this example:

   - *Function ID:* Enter the desired FID that best fits your configuration. Supported range `0000 - 4FFF` .

     Note: IBM recommends you use the FID next to the first VF for ease of tracking.

   - *Type:* `PAIA` for Spyre adapter
   - *Channel ID:* PCHID number of the card
   - *Virtual Function:* 2
   - *Physical Function:* N for No
   - *Number of virtual functions:* 1

```
                    Add PCIe Function

Specify or revise the following values.

Processor ID . . . . . . . : B87         B87 z17

Function ID  . . . . . . . . 4012
Type . . . . . . . . . . . . PAIA          +

Channel ID . . . . . . . . . 18C  +
Port . . . . . . . . . . . . _    +
Virtual Function ID  . . . . 2__  +    Physical Function   N  (Y/N)
Number of virtual functions  1
UID . . . . . . . . . . . . ___

Description  . . . . . . . . B87 Linux lpar SPYDEMO


 F1=Help     F2=Split     F3=Exit    F4=Prompt    F5= Reset  F9=Swap
F12=Cancel
```

7. From the **Define Access List** panel, select the Consumer LPAR that will be used to drive workloads.

```
                    Define Access List

Command ===> _____________________________________ Scroll ===> CSR

Select one partition for the access list.

Function ID  . . . . : 4012

/ CSS ID  Partition Name   Number  Usage  Description
_ 4       R7D              4       OS     R7D - PLX5
_ 4       R7J              E       OS     R7J - PLX7
/ 4       SPYDEMO          F       OS     zLinux - Spyre
_ 4       S5A              A       OS     S5A - PLX5
_ 4       S5D              D       OS     S5D - PLX5
_ 4       S5G              7       OS     S5G - PLX5
_ 4       S5J              2       OS     S5J - PLX5
_ 4       S5N              8       OS     S5N - PLX5
_ 4       S5S              B       OS     S5S - PLX5
_ 4       TA3              3       OS     TA3 - PLXA
_ 4       ZAIU             1       OS     ZAIU - LINUX
_ 4       ZAIU1            6       OS     ZAIU1 - LINUX

F1=Help     F2=Split     F3=Exit     F5= Reset     F6=Previous
F7=Backward F8= Forward  F9=Swap    F12=Cancel   F22=Command
```

8. From the **Define Candidate List** panel, select any LPAR to which this Spyre card could be reassigned.

```
                    Define Candidate List

 Command ===> _____________________________________ Scroll ===> CSR

 Select one or more partitions for inclusion in the candidate list.

 Function ID  . . . . : 4011

 / CSS ID  Partition Name   Number  Usage  Description
 _ 4       R7D              4       OS     R7D - PLX5
 _ 4       R7J              E       OS     R7J - PLX7
 _ 4       S5A              A       OS     S5A - PLX5
 _ 4       S5D              D       OS     S5D - PLX5
 _ 4       S5G              7       OS     S5G - PLX5
 / 4       S5J              2       OS     S5J - PLX5
 _ 4       S5N              8       OS     S5N - PLX5
 _ 4       S5S              B       OS     S5S - PLX5
 _ 4       TA3              3       OS     TA3 - PLXA
 / 4       ZAIU             1       OS     ZAIU - LINUX
 / 4       ZAIU1            6       OS     ZAIU1 - LINUX
 _ 4       ZFAB1            9       OS     ZFAB1 - SSC for
Sentient

 F1=Help     F2=Split     F3=Exit     F5= Reset     F6=Previous
 F7=Backward F8= Forward  F9=Swap    F12=Cancel   F22=Command
```

9. After defining the FIDs, the **PCIe Functions** panel in HCD should display an overview of the configured FIDs.

```
 / FID    CHID+ P+  VF+  PF  Type+        UID   Description
 _ 4010   18C   _   __   Y   PAIA         ____  B87 SSA1 Physical Function
 _ 4011   18C   _   1    N   PAIA         ____  B87 SSA1 1st Virtual Function
 _ 4012   18C   _   2    N   PAIA         ____  B87 Linux lpar SPYDEMO
```

10. Repeat the above procedure for any additional Spyre cards.

Example

```
FUNCTION FID=4010,PF,PCHID=18C,PART=((SSA1),(SSA2)),TYPE=PAIA
FUNCTION FID=4011,VF=1,PCHID=18C,PART=((SSA1),
(SSA2)),TYPE=PAIA
FUNCTION FID=4012,VF=2,PCHID=18C,PART=((SPYDEMO),(SSA2,S5J,ZAIU,ZAIU1)),TYPE=PAIA
```

Figure 3. Input/Output Configuration Program (IOCP) from above example

Preconfiguration for a DPM-enabled system

Creating the ACC and SSA LPARs

This procedure provides step-by-step instructions to create LPARs to install ACC and SSA in a Dynamic Partition Manager (DPM) enabled environment.

Before you begin

Make sure that you have the appropriate authorization to use the **Create Partition** task. You need to use a customized user ID either with authorization to the task, or with the predefined System Programmer Tasks role.

About this task

To install ACC and SSA, you must configure three SSC LPARs.

- One for ACC
- Two for SSA.

  Note: SSA used two LPARs for high availability.

The following table lists the minimum system requirements for ACC and SSA.

LPAR	Minimum requirement
ACC	• *Processor type:* Integrated Facility for Linux (IFL): Two shared • *RAM:* 16 GB memory • *Disk:* 50 GB (dedicated) • *Network interface:* NETH or OSA
SSA 1	• *Processor type:* Integrated Facility for Linux (IFL): Two shared • *RAM:* 50 GB memory • *Disk:* 50 GB (dedicated) • *Network interface:* NETH or OSA
SSA 2	• *Processor type:* Integrated Facility for Linux (IFL): Two shared • *RAM:* 50 GB memory • *Disk:* 50 GB (dedicated) • *Network interface:* NETH or OSA

Procedure

1. Open the **Create Partition** task.

   You can access this task from the main HMC page by selecting the Systems Management node and expanding the Configuration task group, by selecting a specific DPM-enabled system, or by selecting the task in the Tasks index. For example:

   a) Select a DPM-enabled system listed under the Systems Management node.

   b) Click the link for the **Create Partition** task.

      The **Create Partition** window opens, with an overlay that highlights key task controls on the window.

2. Required: Enter the name of the new partition, select the system, an optional short name, the partition type, and an optional description.

   The short name must uniquely identify the partition from all other partitions that are defined on the same system.

   a) Specify the name of the new partition, which can be 1 - 64 characters in length. Supported characters are alphanumerics, blanks, periods, underscores, dashes, or at symbols (@). Names cannot start or end with blank characters.

   b) Select the desired System from the drop down menu where you want the partition to be created.

   c) To auto generate the partition ID, enable the option Generate partition ID automatically.

   d) Optionally, specify a description for the partition. The description can be up to 1024 characters in length.

   e) For partition type, select **Secure Service Container** from the list, as shown in .

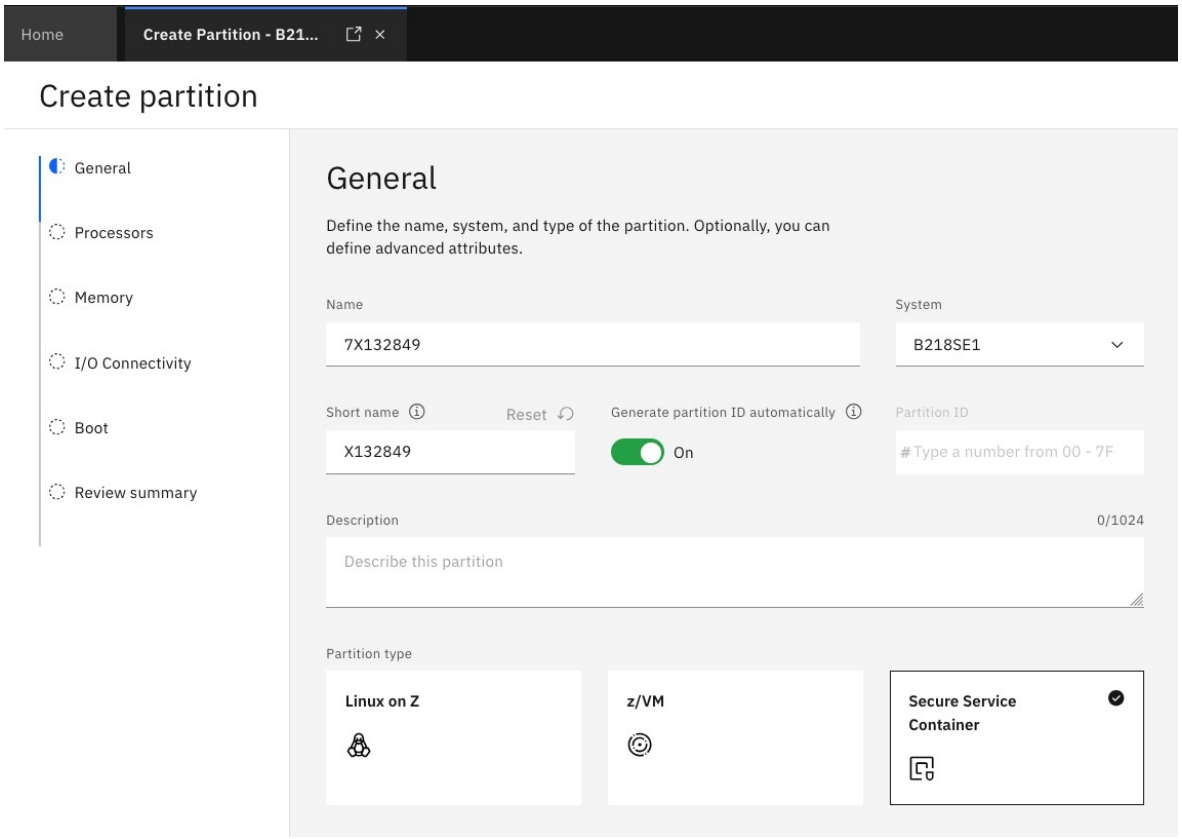


Figure 4. The General section of the Create Partition task

When the selected partition type is **Secure Service Container**, the page display includes the following additional fields.

Administrator user ID
Enter the user ID to be used as the default administrator user ID for the Secure Service Container partition. This Administrator ID has authority to perform any task that is available through the graphical user interface (GUI) and the WebService interface.

Administrator password
Enter the password for the administrator user ID. The administrator password can have a minimum of 8 characters and a maximum of 256 characters.

Confirm administrator password
Reenter the password exactly as you typed it for the Administrator password field.

   f) From the advance attributes, select the acceptable statuses and partition access controls.

Define the acceptable availability status values for the partition, based on the importance of its workload.

g) When you have finished, click **Next** to navigate to the next page in the task.

3. Required: Use the Processors page to define the number of shared virtual processors for the partition.

   a) Select two shared IFLs.

4. Required: Use the Memory page to define the initial and maximum amounts of memory to be assigned to the new partition. Keep both initial and maximum amounts the same.
5. Required: Use the I/O Connectivity page to define the network interface cards (NICs) that the new partition requires to access specific networks. For a Secure Service Container partition, you must also specify at least one management NIC or a HiperSockets management NIC for communication.

   Since a NIC is likely already configured, Spyre setup simply requires assigning an available IP address to each Secure Service Container (SSC).

6. On the **Secure Service Container web interface communication** section, provide the required network settings that are displayed.

   Some of the values that you supply depend on the IP address type of the NIC that you created to access the web interface. An asterisk (*) preceding the label indicates that a value is required.

   Hostname
   Enter the Linux host name of the appliance to run in the Secure Service Container partition. To access the Secure Service Container web interface, users need to specify a URL that contains either a hostname or an IP address for the Secure Service Container partition. A hostname can be 1 - 32 characters long. It cannot contain blanks. Valid characters are numbers 0 - 9, letters A - Z (any case), and the following special characters: period (.), colon (:), and hyphen (-).

   Default IPv4 Gateway
   Enter an IPv4 address for the default gateway. A default IPv4 gateway is required if you specified a Static IPv4 IP address type for the NIC.

   Note: ACC and SSAs don't support IPv6.

   DNS Server 1
   Enter an IPv4 or IPv6 address for the primary domain name system (DNS) server.

   DNS Server 2
   Enter an IPv4 or IPv6 address for a secondary DNS server.

7. To add a storage group, complete the following steps:

   System administrators create storage groups and tape links to enable partitions (and the operating systems and applications that they host) to use physical storage hardware that is connected to the system.

   Important: For ACC, assign a storage group with a dedicated 16GB volume to hold the ACC image. For SSA, assign a storage group with a dedicated 50GB volume to hold the SSA image.

   a) Click **Storage** to attach storage groups.

   Attaching a storage group enables the partition to access storage networks and hardware that is connected to the DPM-enabled system.

   b) Click on Add storage group and then select the storage groups.

   Select the storage group that is listed in the Storage Groups table to attach to this partition.

8. On the Boot page, select the boot mode as **Installer mode**.

   When the partition starts, the system initializes the SSC Installer, allowing you to access the SSC web interface and install an appliance.

   Note: By default, Installer mode is automatically selected while defining a SSC partition.

9. Click **Next** to navigate to the Summary page.

   You might need to vertically scroll the Summary page to view all of the partition properties. If necessary, click **Back** to return to a particular page to change a property value or setting.

10. Required: On the Summary page, click **Finish** to save the partition definition.
    A progress indicator is displayed until DPM finishes creating the partition.

What to do next

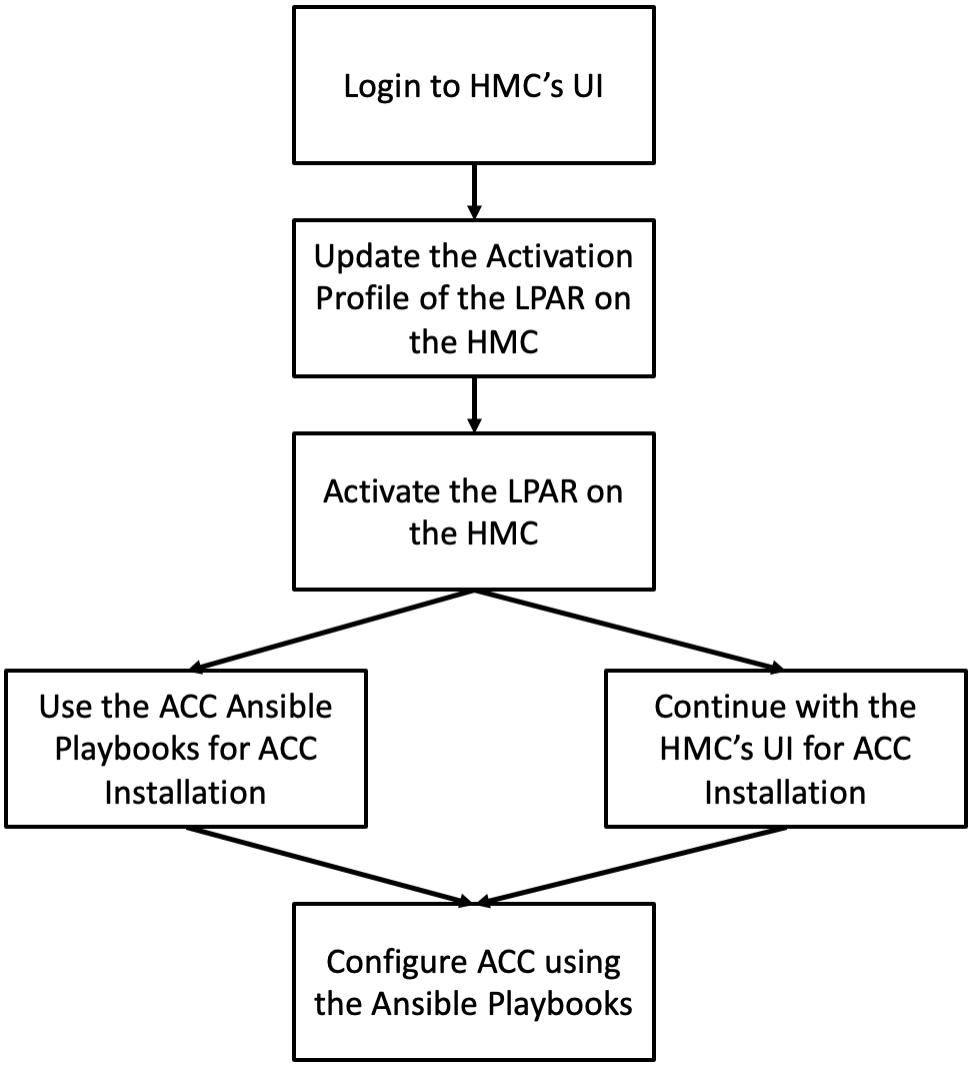
Repeat the procedure to create the remaining LPARs as needed.

Chapter 3. Installing Appliance Control Center for IBM Z & IBM LinuxONE

Installing Appliance Control Center (ACC)

You can install Appliance Control Center for IBM Z & IBM LinuxONE by using either of the two methods:

- Install using Ansible playbook scripts
- Install using Hardware Management Console (HMC) user interface (UI)



Attention: The Ansible playbooks referred to in this section are available on GitHub at https://github.com/IBM/z_ansible_collections_samples/tree/main/z_appliance_control_center.

Downloading Appliance Control Center from Fix Central

You can download the IBM Z Appliance Control Center (ACC) from IBM Fix Central.

Before you begin

- You must have an IBMid.

- Know your product details

Procedure

1. Go to the Fix Central website and sign in using your IBMid credentials.
2. Identify the product: IBM Z Appliance Control Center
   a) On the homepage, use the search bar or the **Find product** tab to locate your product.
   b) Type the product name into the search field (e.g., "IBM Z Appliance Control Center") and select it from the list.
   c) Specify the Installed Version and Platform (operating system). You can select **All** for a broader search. Click **Continue**.
3. Browse for fixes.
4. After identifying the appliance images or fixes, select the ones you want to download and click **Continue**.
5. Select download options.
6. Accept the terms and conditions and click **Download** now.
7. Download and untar the file.
   a) Follow the on-screen instructions to complete the download.

   CAUTION: Do not change the filename. Changing the filename will lead to issues during installation.

   a) On your control node, untar the file using the command:

   ```
   tar -xvf Appliance_Control_Center_for_IBMZ_and_IBMLinuxOne_v1.2.6.tar
   ```

   Verify the filename before running the command.

Results

The following files will be untarred on the control node:

- Image with production key - `Appliance_Control_Center_for_IBMZ_and_IBMLinuxOne_v1.2.6.image.img.gz`
- Garasign signatures
- Release Notes with restrictions listed - `Release_Notes_ACC_v1.2.6.txt`
- CMD line tool
- License files
- User’s Guide

For installation, use the "img.gz" appliance image file.

Update Activation Profile

Use this procedure to create an activation profile.

Before you begin

- For a more detailed procedure, see the Secure Service Container (SSC) User's Guide on IBM Documentation.
- The target FCP disks and FICON DASD must be large enough to fit the uncompressed appliance. Check the recommended size for the appliance before proceeding with installation.

Procedure

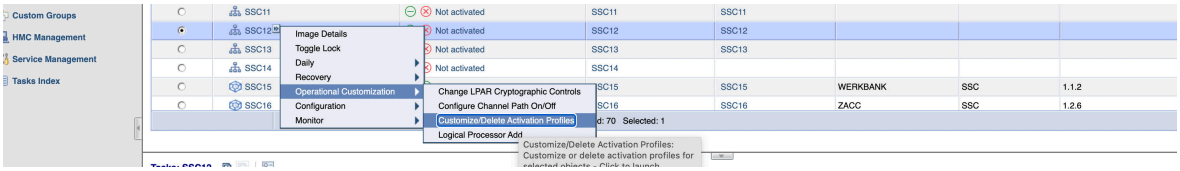
1. Define activation profile.

a) Open the Hardware Management Console (HMC) interface.

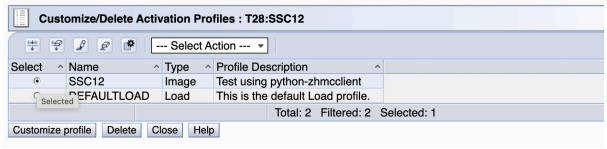
b) Navigate to Partitions.

c) Select the LPAR.

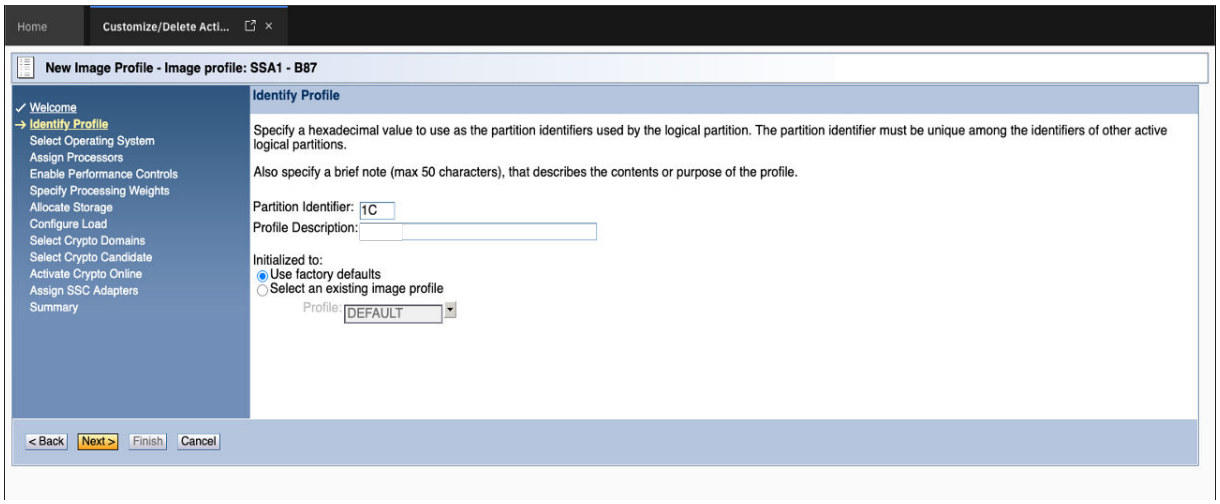
Right-click on the logical partition (LPAR) you wish to activate. Click **Operational Customization[Customize/Delete Activation Profiles]**



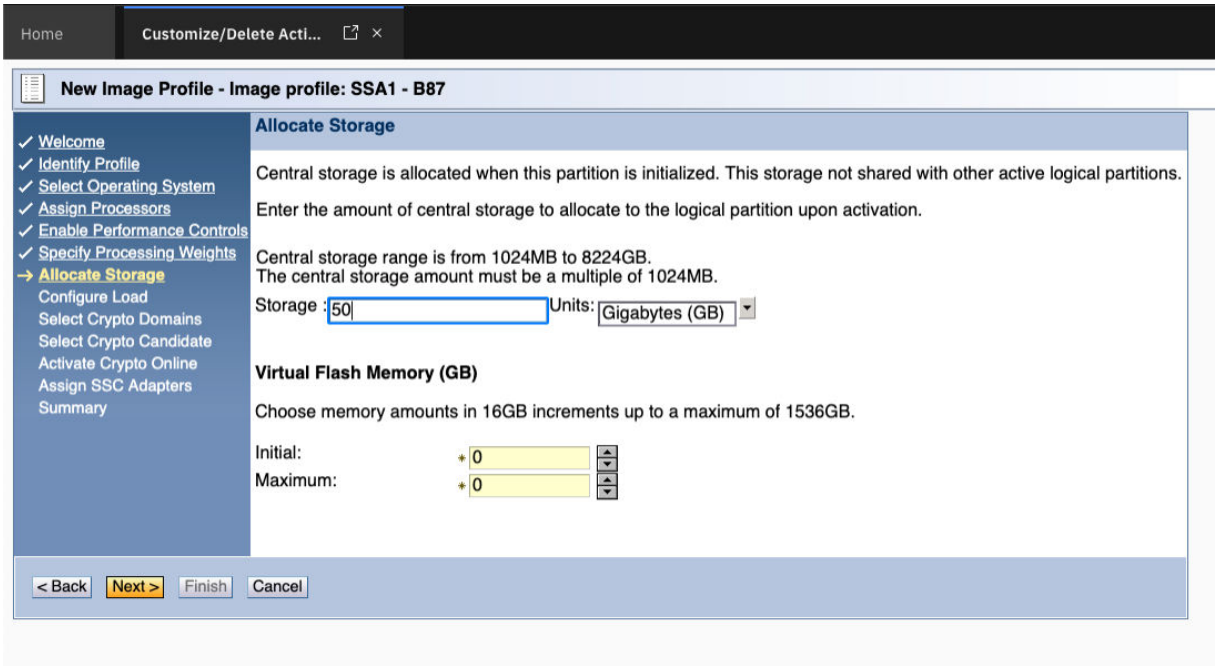
d) Select the image profile and then click **New image profile**



2. Enter the Partition Identifier and Profile Description and then click **Next**.

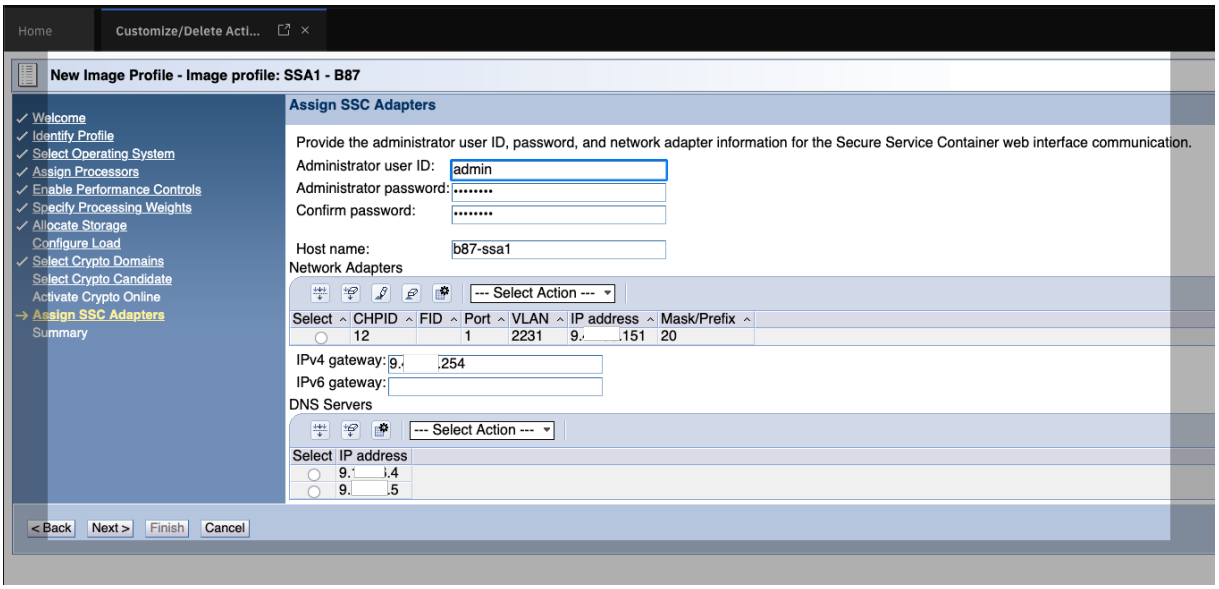


3. Change the operating system to SSC and then click **Next**.
4. Define the number of processors and then click **Next**.
5. Select None for Processor performance controls and then click **Next**
6. Specify the processing weights and then click **Next**.
7. Allocate the storage and then click **Next**.

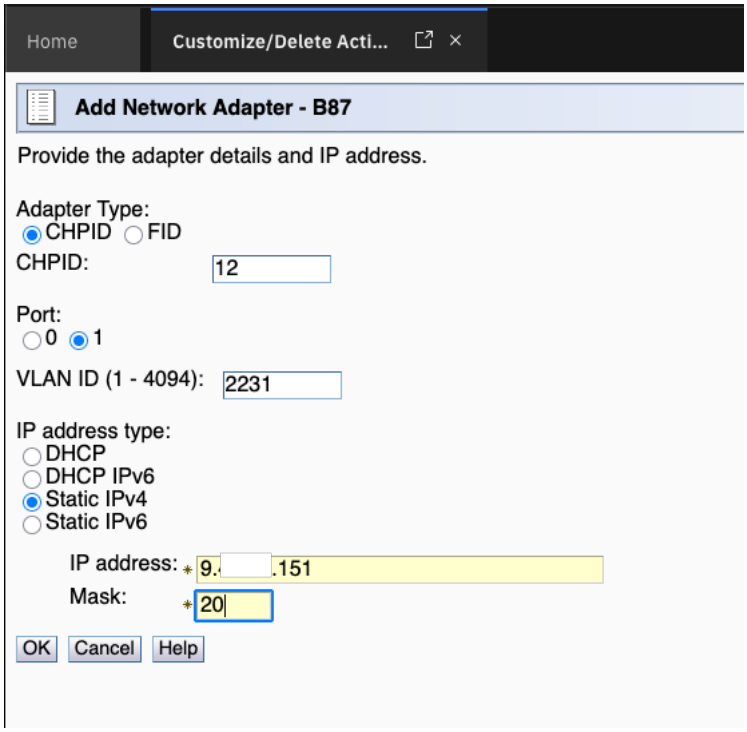


8. On the **Select Crypto Domains** page, do not select anything and then click **Next**.
9. In the **Assign SSC Adapters** page, enter the Administrator credentials, host name, Network Adapters details, and the DNS server. Click **Next**

   Important: You need this information to configure the Ansible playbook.



Click Add Network Adapter, and enter the network information and then click **OK**.



10. Review the summary and then click **Save**.

Installing ACC using Ansible

Appliance Control Center for IBM Z & IBM LinuxONE can be installed using either the provided Ansible playbooks or the Hardware Management Console (HMC) user interface (UI). IBM recommends using the Ansible playbooks for streamlined and automated deployment. Download the installation scripts, update the variables, and run the script to install Appliance Control Center for IBM Z & IBM LinuxONE. If you prefer to use the HMC UI, skip this section and proceed to installing ACC using UI.

Before you begin

- Download the Appliance Control Center for IBM Z & IBM LinuxONE installation image from the Fix Central to the control node.
- Download and save the scripts that are available on GitHub at https://github.com/IBM/z_ansible_collections_samples/tree/main/z_appliance_control_center.
- Ensure that the LPARs are created and available on the HMC.
- Ensure that you have the SSC network information.
- Ensure that Ansible is already installed on the control node, for example, a laptop.
- Ensure that ACC is configured in default mode before proceeding. The procedure described below depends on ACC's ability to communicate directly with the HMC. If ACC cannot send commands to the HMC, it is operating in standalone mode, and the appropriate Ansible playbooks must be used instead. For more information, see *IBM Z and LinuxONE Appliance Control Center User's Guide*

Procedure

1. Export your HMC credentials by running the command:

```
export HMC_USER=<enter_HMC_username>
export HMC_PASSWORD=<enter_HMC_password>
```

2. Modify the variables in `appliance_deploy_default_ansible/acc_env_vars.yaml` to match your environment

Use the .img.gz file which was downloaded in “Downloading Appliance Control Center from Fix Central” on page 19 for the "IMAGE_PATH" variable.

3. To install ACC, run the following playbook:

```
ansible-playbook ./appliance_deploy_default_ansible/00_acc_install.yaml
```

Results

The Appliance Control Center for IBM Z & IBM LinuxONE is installed.

Note: Please check the progress of the installation on the HMC. This can take up to 15 minutes.

Installing ACC using UI

Use this procedure to install and start Appliance Control Center for IBM Z & IBM LinuxONE and Spyre Support Appliance for IBM Z & IBM LinuxONE in a Secure Service Container partition.

Before you begin

- For a more detailed procedure, see the Secure Service Container (SSC) User's Guide on IBM Documentation.
- The target FCP disks and FICON DASD must be large enough to fit the uncompressed appliance. Check the recommended size for the appliance before proceeding with installation.
- You must configure and start a Secure Service Container partition with the boot option **Secure Service Container Installer** selected.
- You need to know the IP address for the Secure Service Container partition.
- Order and download the ACC and SSA to your local disk.
- To avoid network latency, upload the appliance image from a browser on the same network as the Installer.
- Slow I/O can affect installation time. If other workloads are consuming bandwidth on the storage server or channel subsystem, consider performing the installation when the system is less busy.

Procedure

1. Connect to the Secure Service Container installer through the browser of your choice.

   For example: https://ip_address
2. On the Login page, enter the Administrator user ID and password values that you supplied in partition definition , and click **Login**.

   The main page of the installer opens.
3. On the main page, click the plus (+) icon to install image files from local media.

   The page display changes to the **Install Software Appliance** page.
4. On the **Install Software Appliance** page, complete the following steps.
   a) Make sure that **Upload image to target disk** is selected.
   b) Under **Local Installation Image**, click Browse and navigate to the location where you downloaded and extracted the appliance images from IBM Fix Central onto your local disk. Select the software appliance image and click **Open**.

      Note: The **Local Installation Image** file should end with extension: `img.gz`
   c) Under **Target Disk on Server**, select the device type.

      FICON DASD
      If you select **FICON DASD** as the device type, click the down arrow in the **Disk** field to display a list of available disks on the server, and either scroll the list or begin typing a disk name in the text box to filter the search. From the list, select a disk.

Note: For FICON DASD, only channel subsystem (CSS) 0 and subchannel set ID (SSID) 0-2 are supported. Also, make sure that you specify a four-character hexadecimal device number.

FCP
If you select **FCP** as the device type, select one of the options that are listed for the **Discovery** field.

Scan All Devices
Select this option and click **Discover**. When the discovery operation completes, select a disk from the **Disk** list.

Scan Single Device Only
Select this option, then select a storage device from the **Device** list, and click **Discover**. When the discovery operation completes, select a disk from the **Disk** list.

Manual
Select this option, select a storage device from the **Device** list, and enter the target worldwide port number (WWPN) and logical unit number (LUN) information for the disk. Both the WWPN and LUN must be 16-character hexadecimal numbers.

Then click **Check Path** to validate these details. If an error message is displayed, you must correct the WWPN or LUN details before you can proceed.

d) Click **Apply** to upload the software appliance image to the target disk on the server.

A confirmation dialog is displayed.

5. On the confirmation dialog, complete the following steps.

a) Click **Yes** to continue with the installation.

The Secure Service Container installer performs a low-level disk format, uploads the appliance image to the target disk, and prepares the partition to load the appliance on the next system restart.

- When the restart process begins, the installer displays the restart window.
- If an IP address type other than DHCP is in use for the appliance page, the Secure Service Container installer redirects the browser to the software appliance page, if that page is provided by the appliance.

What to do next

To initialize the ACC, perform the post configuration by following the instructions that are provided in "Post Configuration of ACC" on page 25.

Post Configuration of ACC

About this task

Once the Appliance Control Center for IBM Z & IBM LinuxONE (ACC) is installed using the UI, it still needs to be configured to manage the SSA LPARs. Use the following procedure to configure the ACC.

Note: Configuration is handled by the Ansible playbook or REST API.

Procedure

1. Download and save the scripts that are available on GitHub at https://github.com/IBM/z_ansible_collections_samples/tree/main/z_appliance_control_center.
2. Export your HMC credentials by running the command:

```
export HMC_USER=<enter_HMC_username>
export HMC_PASSWORD=<enter_HMC_password>
```

3. Navigate to `appliance_deploy_default_ansible` directory and update the variables present in `admin_vars.yaml` file.

- `cc_url` - ACC IP address.

- `z_machine_lpar` - is the LPAR on which the appliance is installed.
- `app_ip` - LPAR IP address.
- Any additional variables related to SSA LPARs.

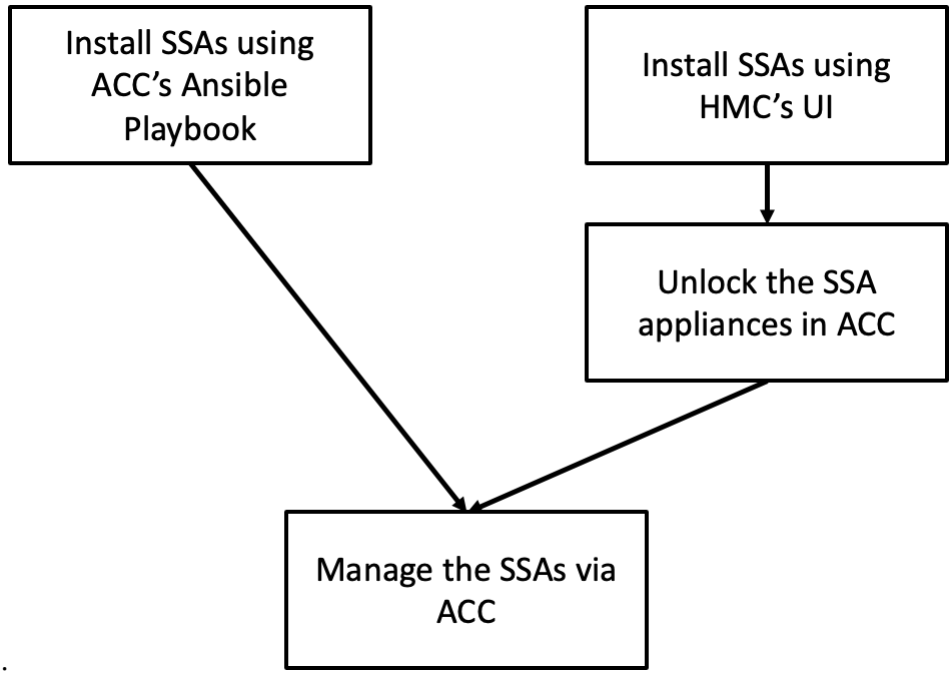
4. Run the following Ansible playbook
   `ansible-playbook 01_admin_actions.yaml`
5. Configure the SSA LPARs to be a part of a resource group by running:

```
ansible-playbook 02b_assign_2_lpar.yaml
```

Chapter 4. Installing Spyre Support Appliance for IBM Z & IBM LinuxONE

Installing Spyre Support Appliance (SSA)

Steps to configure the card after



installation .

Attention: The Ansible playbooks referred to in this section are available on GitHub at https://github.com/IBM/z_ansible_collections_samples/tree/main/z_appliance_control_center.

Note: If SSA is already installed, skip this section.

Install SSA using ACC with Ansible

IBM Z Spyre Support Appliances (SSA) can be installed using either the provided Ansible playbooks or the Hardware Management Console (HMC) user interface (UI). IBM recommends using the IBM Appliance Control Center's playbooks for streamlined and automated deployment. Download the installation scripts, update the variables, and run the script to install SSA. If you prefer to use the HMC UI, skip this section and proceed to "Installing SSA using UI" on page 28.

Before you begin

Download the Appliance Image from the Fix Central at https://www.ibm.com/support/fixcentral.

Note: Ensure that the LPARs or partitions are already created and available on the HMC's UI.

Procedure

1. Download and save the scripts that are available on GitHub at https://github.com/IBM/z_ansible_collections_samples/tree/main/z_appliance_control_center.
2. Navigate to the deployment directory.

```
cd appliance_deploy_default_ansible
```

3. Update configuration files.
   - Modify the variables in the `owner_vars.yaml` file.
   - Update the `cc_url` in the `admin_vars.yaml` file to point to the correct ACC IP address.
   - Update the `image_path` variable in the `owner_vars.yaml` file to specify the location of the downloaded image.
4. Run the following playbook to update owner credentials and upload the appliance image:

```
ansible-playbook 03_owner_action.yaml
```

5. Run the following playbook to install the SSA appliances on the target LPAR.

```
ansible-playbook 04_install_flow.yaml
```

What to do next

To pull logs, perform concurrent updates, upgrade, check health status, or update ACC, use the scripts located in:

```
other_usecases_ansible
```

Installing SSA using UI

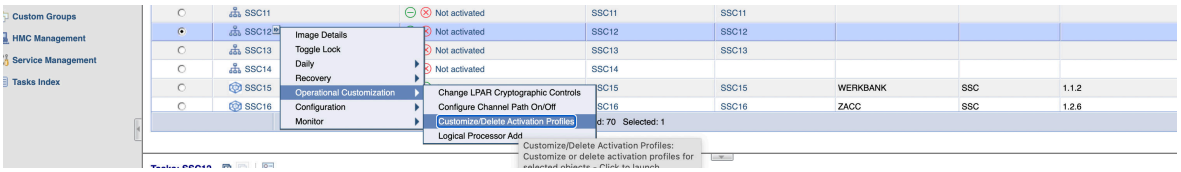
Use this procedure to install and start Spyre Support Appliance for IBM Z & IBM LinuxONE in a Secure Service Container partition.

Before you begin

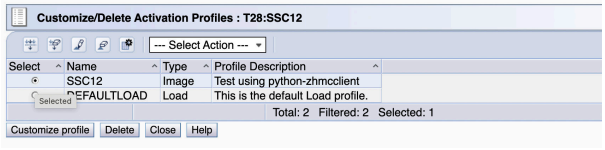
- For a more detailed procedure, see the Secure Service Container (SSC) User's Guide on IBM Documentation.
- The target FCP disks and FICON DASD must be large enough to fit the uncompressed appliance. Check the recommended size for the appliance before proceeding with installation.
- You must configure and start a Secure Service Container partition with the boot option **Secure Service Container Installer** selected.
- You need to know the IP address for the Secure Service Container partition.
- Order and download the SSA to your local disk.
- To avoid network latency, upload the appliance image from a browser on the same network as the Installer.
- Slow I/O can affect installation time. If other workloads are consuming bandwidth on the storage server or channel subsystem, consider performing the installation when the system is less busy.

Procedure

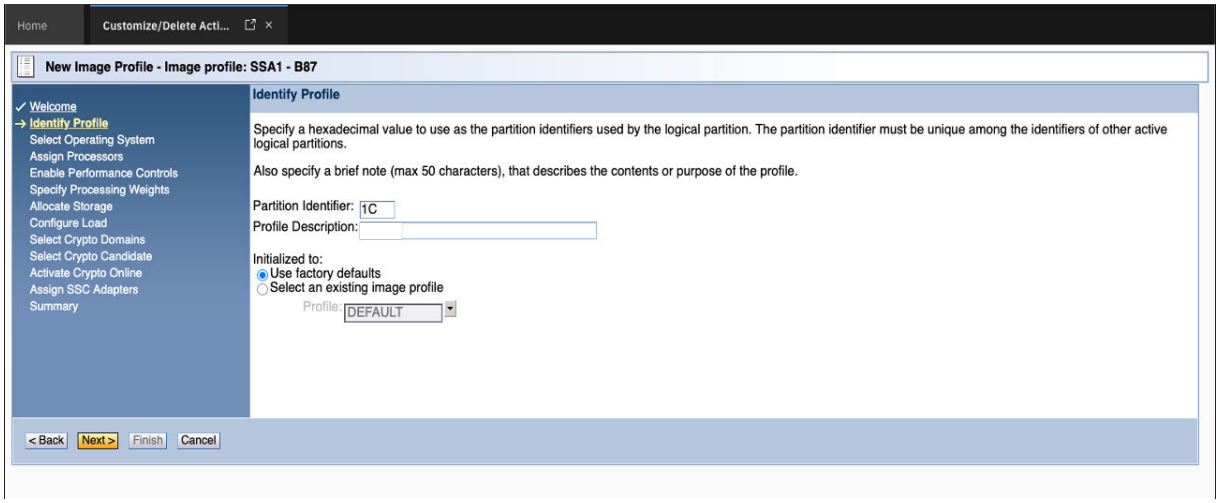
1. Define activation profile.
   a) Open the Hardware Management Console (HMC) interface.
   b) Navigate to Partitions.
   c) Select the LPAR.
   Right-click on the logical partition (LPAR) you wish to activate. Click **Operational Customization[Customize/Delete Activation Profiles]**.



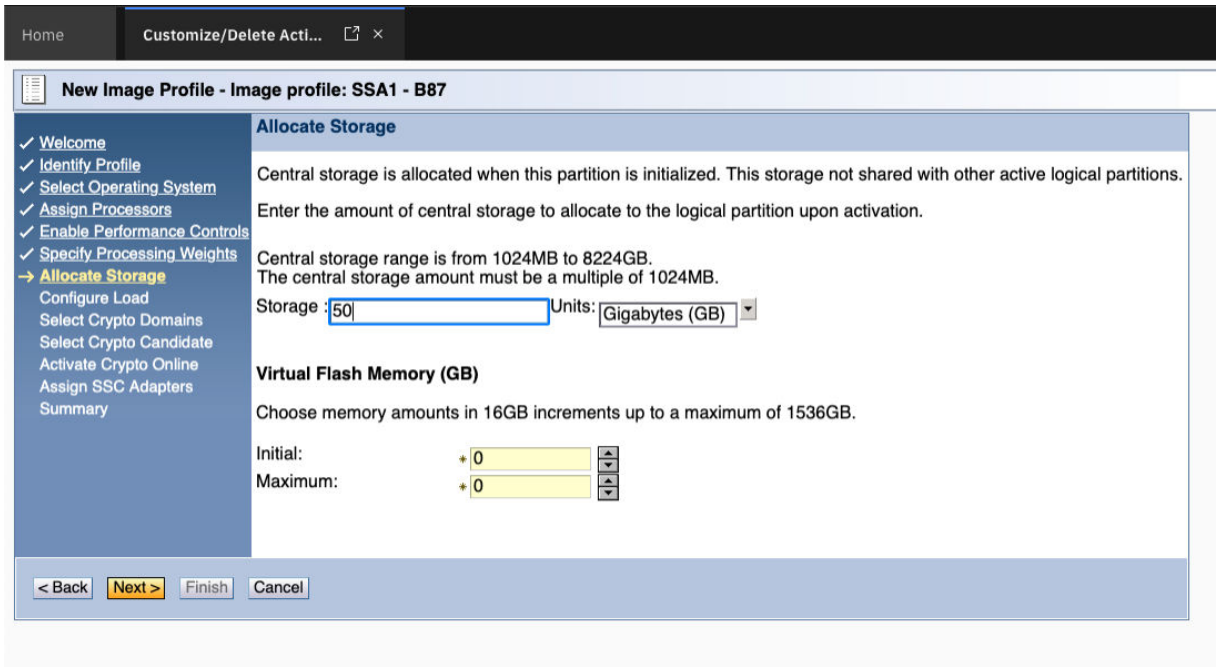
d) Select the image profile and then click **New image profile**.



2. Enter the Partition Identifier and Profile Description and then click **Next**.

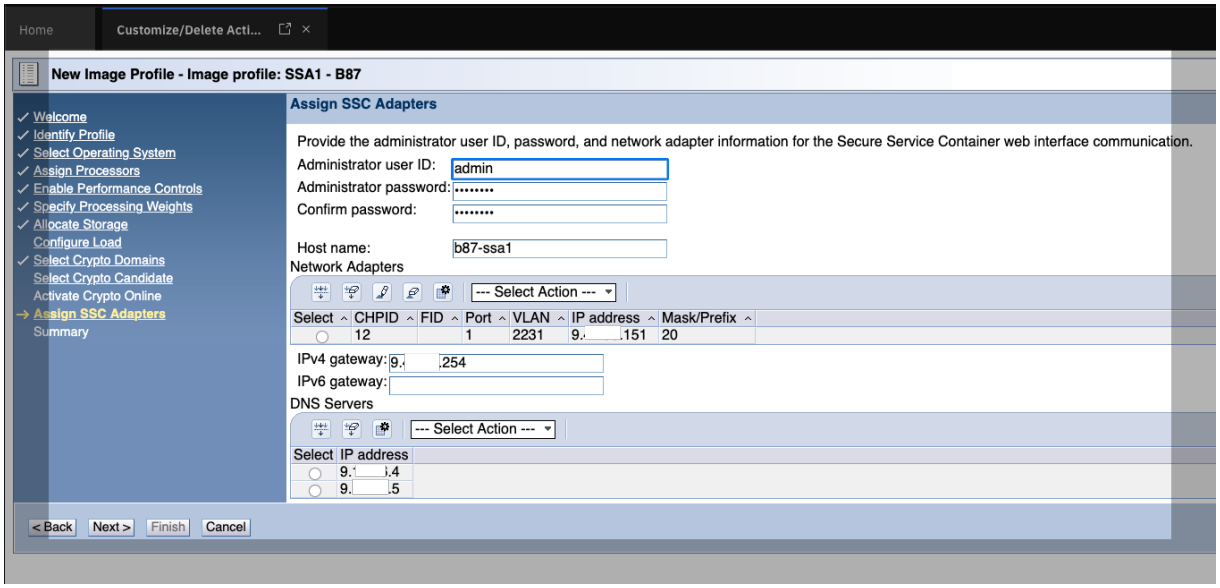


3. Change the operating system to SSC and then click **Next**.
4. Define the number of processors and then click **Next**.
5. Select None for Processor performance controls and then click **Next**
6. Specify the processing weights and then click **Next**.
7. Allocate the storage and then click **Next**.

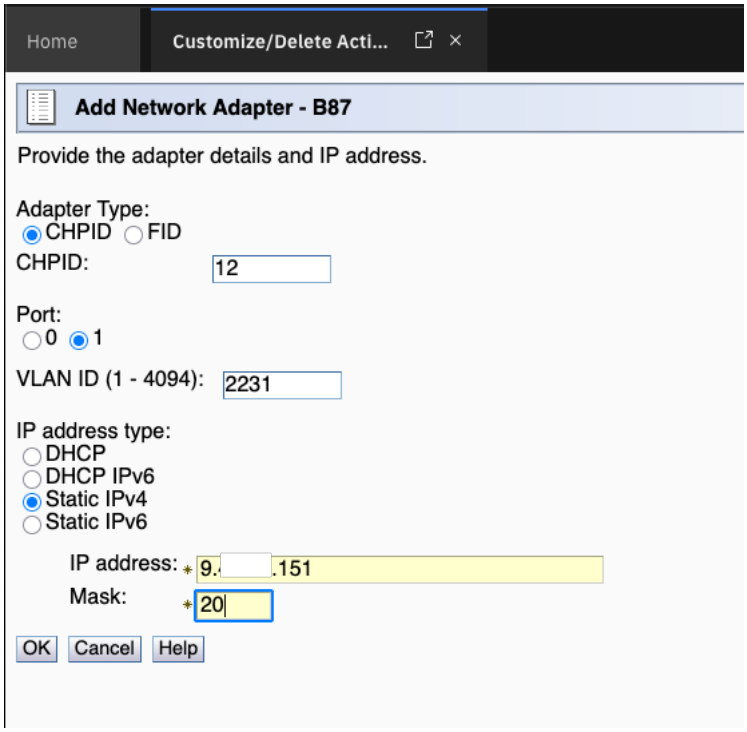


8. On the **Select Crypto Domains** page, do not select anything and then click **Next**.
9. In the **Assign SSC Adapters** page, enter the Administrator credentials, host name, Network Adapters details, and the DNS server. Click **Next**

   Important: You need this information to configure the Ansible playbook.



Click Add Network Adapter, and enter the network information and then click **OK**.



10. Review the summary and then click **Save**.
11. Connect to the Secure Service Container installer through the browser of your choice.

    Use the IP address of the network adapter that is specified in the image profile (standard mode system) or the partition definition (DPM-enabled system) for the Secure Service Container partition. For example: https://ip_address
12. On the Login page, enter the Administrator user ID and password values that you supplied in the image profile (standard mode system) or the partition definition (DPM-enabled system), and click **Login**.

    The main page of the installer opens.
13. On the main page, click the plus (+) icon to install image files from local media.

    The page display changes to the **Install Software Appliance** page.
14. On the **Install Software Appliance** page, complete the following steps.

a) Make sure that **Upload image to target disk** is selected.

b) Under **Local Installation Image**, click Browse and navigate to the location where you downloaded and extracted the appliance images from IBM Fix Central onto your local disk. Select the software appliance image and click **Open**.

Note: The **Local Installation Image** file should end with extension: `img.gz`

The **Image Details** section is populated with information about the selected software appliance.

c) Under **Target Disk on Server**, select the device type.

FICON DASD

If you select **FICON DASD** as the device type, click the down arrow in the **Disk** field to display a list of available disks on the server, and either scroll the list or begin typing a disk name in the text box to filter the search. From the list, select a disk.

Note: For FICON DASD, only channel subsystem (CSS) 0 and subchannel set ID (SSID) 0-2 are supported. Also, make sure that you specify a four-character hexadecimal device number.

FCP

If you select **FCP** as the device type, select one of the options that are listed for the **Discovery** field.

Scan All Devices

Select this option and click **Discover**. When the discovery operation completes, select a disk from the **Disk** list.

Scan Single Device Only

Select this option, then select a storage device from the **Device** list, and click **Discover**. When the discovery operation completes, select a disk from the **Disk** list.

Manual

Select this option, select a storage device from the **Device** list, and enter the target worldwide port number (WWPN) and logical unit number (LUN) information for the disk. Both the WWPN and LUN must be 16-character hexadecimal numbers.

Then click **Check Path** to validate these details. If an error message is displayed, you must correct the WWPN or LUN details before you can proceed.

d) Click **Apply** to upload the software appliance image to the target disk on the server.

15. On the confirmation dialog, complete the following steps.

a) Click **Yes** to continue with the installation.

The Secure Service Container installer performs a low-level disk format, uploads the appliance image to the target disk, and prepares the partition to load the appliance on the next system restart.

- When the restart process begins, the installer displays the restart window.
- If an IP address type other than DHCP is in use for the appliance page, the Secure Service Container installer redirects the browser to the software appliance page, if that is page is provided by the appliance.

What to do next

Repeat the procedure to install SSA2.

Verification

After installing ACC and the two SSAs, you can validate whether the appliances are active by running the appropriate validation playbook.

Procedure

1. Download and save the scripts that are available on GitHub at https://github.com/IBM/z_ansible_collections_samples/tree/main/z_appliance_control_center.

2. Navigate to the folder

```
other_usecases_ansible
```

3. Modify the variables in

```
acc_ssa_install_check_vars.yaml
```

4. Run the playbook

```
ansible-playbook 08_acc_ssa_install_check.yaml
```

Chapter 5. Installing the Spyre Accelerator card

Installing the physical card into the system

Once the ACC and SSA are installed on all three LPARs, you're ready to hot-plug the Spyre cards.

Before you begin

Before physically installing the Spyre Accelerator card into your IBM Z or LinuxONE system, adhere to the following safety and handling guidelines to prevent hardware or system damage.

Attention:

The following procedure is intended for IBM® authorized service personnel *only*, such as the IBM Systems Service Representatives (SSR) trained to install and repair this configuration.

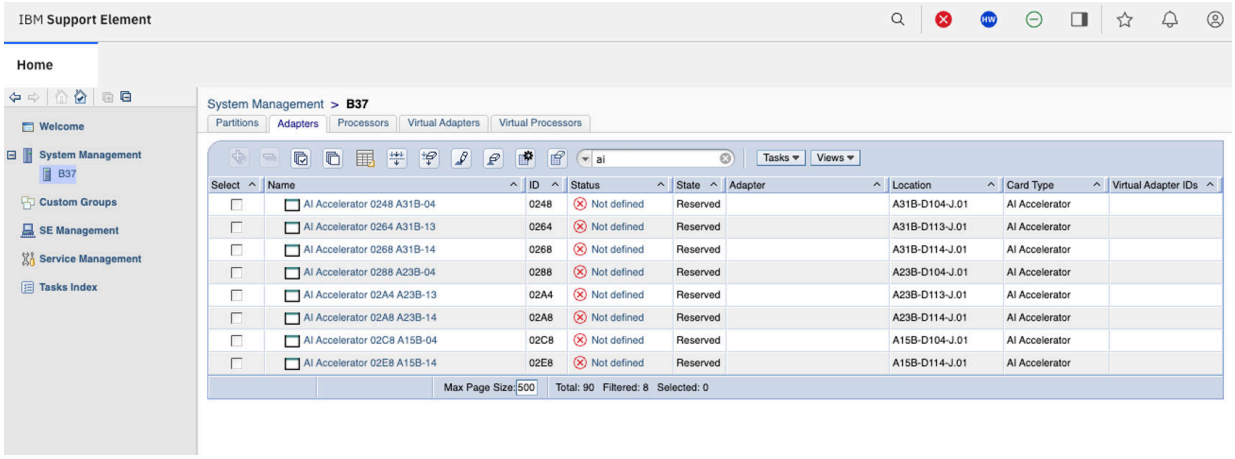
- Power down the system, *or* confirm that your system supports hot-plug PCIe insertion.
- Use an ESD wrist strap to ground yourself and prevent electrostatic discharge.
- Handle the card by its edges; avoid touching connectors or components.
- Inspect the card for any visible damage or defects before installation

Procedure

1. Navigate to the Support Element (SE), and search for a non-disruptive hardware change.
2. Click **Install**.
3. Select the hardware type.

   Note: This is the channel card or cryptographic card.
4. Select the locations where your Spyre cards will be installed.

   Note: In a DPM environment, only available location will be displayed. If space is needed, remove existing cards before proceeding.
5. Physically install the Spyre cards at the designated locations.



The newly installed Spyre cards should appear under **Adapters** in the SE, listed as "AI Accelerator" and initially in a *Not defined* state.

Connecting Spyre card to SSA (standard mode system)

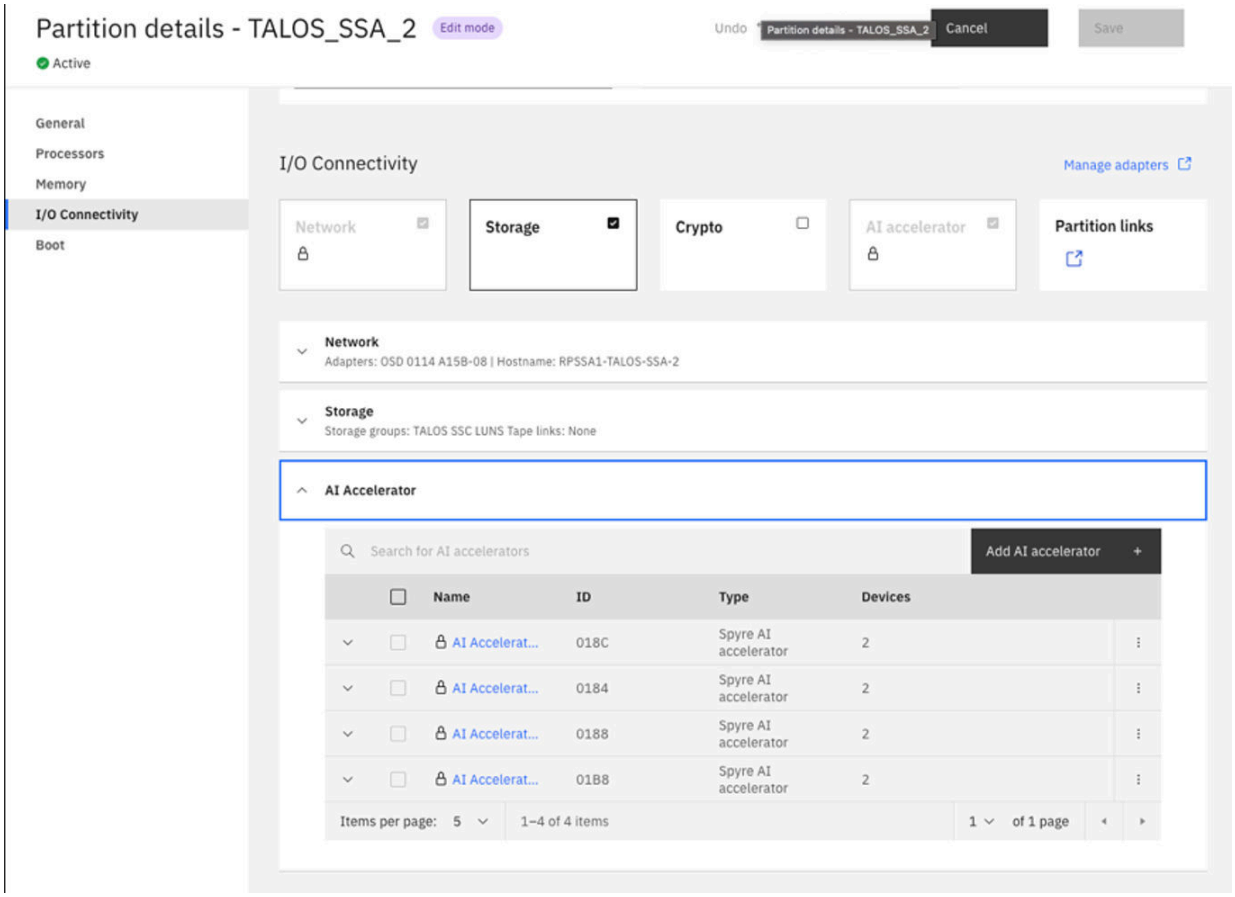
No further action is needed to add the Spyre Accelerator card to your to Spyre Support Appliance (SSA). This has already been completed in the previously completed procedures in the *Preconfiguration for a standard mode system* section.

Connecting Spyre card to SSA (DPM-enabled system)

Use the following procedure to add the Spyre Accelerator card to your to Spyre Support Appliance (SSA), and verify the hardware visibility in the output logs. This procedure is based on a DPM-enabled environment.

Procedure

1. From the Hardware Management Console (HMC), open your SSA partition. Wait for it to fully load.
2. On the SSA panel, click **Edit**.
3. Scroll down to the I/O connectivity option, and click **AI accelerator**.



Note: In DPM mode, PF and VF are automatically assigned to the SSA.

4. Add the Spyre Accelerator card(s) to the designated SSA.

Results

Once the procedure is complete, the Spyre Accelerator card(s) have been successfully added to the SSA dynamically.

What to do next

Go to the consumer partition and assign the Spyre Accelerator card(s) to the partition. For more information, see IBM Dynamic Partition Manager (DPM) Guide.

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