Cisco UCS Director

VSPEX Implementation Guide

Cisco Systems, Inc.

Abstract

This document describes the steps required to deploy CISCO UCS Director on an EMC® VSPEX™.

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Contents

Chapter 1 Introduction

This chapter presents the following topics:

Purpose of this guide

EMC VSPEX is a pre-validated and modular architecture built with proven best-of-breed technologies to create and provide complete end-to-end converged/physical/virtualization solution. The end-to-end solutions enable you to make an informed decision while choosing the hypervisor, compute, storage and networking layers.

The Cisco UCS Director is a multi-tenant, multi-hypervisor and multi-cloud (private and public cloud) provisioning, management and orchestration solution that provides comprehensive virtual and physical infrastructure control, management, monitoring and orchestration via single pane of glass.

This Implementation guide provides step by step instructions on how to setup, configure and operate VSPEX via Cisco UCS Director .

- Including how to setup VSPEX environment.
- How to setup and configure Cisco UCS Director/ for VSPEX environment.

Business value

Cisco UCS Director is a certified solution for EMC VSPEX validated reference configuration/specification. It delivers a converged/physical/virtualized data center solution converged stack composed of leading computing, networking, storage, and infrastructure software components. It also offers a choice of baremetal hypervisors/Linux provisioning/deprovisioning via single pane of glass through a single click. This solution can easily be :

- Optimized for a variety of application workloads.
- Optimized for mixed application workloads and cloud environments
- Converged infrastructure solutions.
- Helps deploy virtual machines in various sizes to meet application needs.

Scope

The guide discusses about configuring networking, storage, computing and additional infrastructure required to support VSPEX specification/environment. This guide provides a brief description of features, various test cases, and design objectives described by VSPEX specification and that are supported/implemented by Cisco UCS Director.

Audience

This guide is intended for anyone (administrators, architects, end users) who are familiar with VSPEX specification/architecture/environment, Cisco UCS Director /Cisco UCS Director Baremetal Agent and want to setup, configure, administer, manage and operate VSPEX environment using Cisco UCS Director /Cisco UCS Director Baremetal Agent.

In addition, Cisco UCS Director administrators/users/operators who want to setup configure, administer, manage and operate VSPEX using Cisco UCS Director are expected to have basic skills in the following:

- Good understanding of complete physical infrastructure elements described by VSPEX specification.
- Good understanding of VSPEX Fundamentals:
  - Setup and Management
  - Core Management (Storage, Network, Physical operations and Server monitoring).
  - Design objectives
- Good understanding and hands-on experience with Virtualization technologies
  - VMware vCenter
  - ESX (i)
  - Cisco 1000v (VSM/VEM)
- DHCP configuration
- PXE understanding
- TFTP functionality
- HTTP functionality
- Basic Linux skills
  - Using SSH to login into appliance
  - Configure DHCP server parameters
  - Configuring Network IP addresses using DHCP/Static

Terminology

Following acronyms are used in the current document.

Table 1. **Terminlogy**

Term	Definition
HTTP	Hypertext Transfer Protocol
DHCP	Dynamic Host Configuration Protocol
TFTP	Trivial file transfer protocol
PXE	Pre Boot Execution (environment)
VSM	Virtual Supervisor Module
VEM	Virtual Ethernet Module
NAS	Network Attachment Storage
SAN	Storage Area Network
QoS	Quality of Service
UCS	Unified Computing System
HA	High Availability
VIF	Virtual Interface
VMDK	VMware Virtual Machine Disk
VMFS	VMware Virtual Machine File System

Prerequisites

EMC VSPEX Prerequisites Cisco UCS Director /Cisco UCS Director Baremetal Agent Prerequisites.

Table 2. **Prerequisites**

Component	Requirement
Cisco UCS Director	3.4.1.1+
Cisco UCS Director Baremetal Agent	3.4.0.1+
Cisco UCS Director - Reservation	Minimum CPU – 3000 Ghz Memory – 3 GB
Cisco UCS Director Baremetal Agent - Reservation	Minimum CPU – 2000 Ghz Memory – 2 GB
Network Connectivity	Make sure not to have another DHCP server in the same vLan network where Cisco UCS Director Baremetal Agent will be installed

Component	Requirement
Cisco UCS Director Server reachability	• Make sure Cisco UCS Director can reach Cisco UCSM over the network • Make sure Cisco UCS Director can reach EMC VNX over the network • Make sure Cisco UCS Director can reach Cisco UCS Director Baremetal Agent over the network • Make sure Cisco UCS Director can reach Cisco N5K and Cisco N1K switches.
Cisco UCS Director Baremetal Agent Server reachability	Make sure Cisco UCS Director Baremetal Agent is able to reach Cisco UCS Director over the network
Bare metal reachability	Make sure bare metal is on the same network/vLAN as that of Cisco UCS Director Baremetal Agent
DHCP setup	Make sure you have configured DHCP server with appropriate IP address range etc. on Cisco UCS Director Baremetal Agent.
Cisco UCS Director Database setup	Make sure you enable remote database access on Cisco UCS Director
Cisco UCS Director /etc/hosts file	Add an entry (IPAddress details) for Cisco UCS Director Baremetal Agent appliance(reachable IP Address on same vLAN) using Cisco UCS Director ShellAdmin CLI
Cisco UCS Director Baremetal Agent /etc/hosts file	Add an entry for Cisco UCS Director (reachable IP Address on same vLAN)
VMware (VCenter Server/ESX/ESXi)	4.0/4.1/5.x

Solution tested

This section describes VSPEX validation testing completed for Cisco UCS Director v3.4.

The following describes the VSPEX environment on which Cisco UCS Director v3.4 was VSPEX Labs validated:

Table 3. **Solution tested**

Component	Requirement
Networking	Two Cisco Nexus 5500-series switches. Two Cisco UCS 6200 series.

Component	Requirement
Computing	One or more chassis of Cisco UCS blades with two fabric extenders per chassis
Storage	EMC VNX 5500
Configuration	Please refer to VSPEX reference configuration.
Hardware Connectivity	Please refer to VSPEX specification for Hardware connectivity.
Network Connectivity	Please make sure network connectivity is appropriate as per VSPEX specification.

The following VSPEX validation test cases were executed:

1. Provision Block Storage Pool
2. Baremetal ESXi5.1 SAN Boot
3. VMFS Datastore with Zone Creation
4. Baremetal Provisioning with Local Storage
5. Add LUN to Storage Group and mount as Datastore
6. Resize VNX Datastore
7. Create Filesystem and mount as NFS Datastore

Note: For screenshots of the workflows (test cases) refer to Appendix A.

Chapter 2 Deployment

This chapter presents the following topics:

VSPEX Depolyment

Introduction

This section describes the setup you need to complete to deploy/setup VSPEX infrastructure (networking, storage and security). In addition, it provides deployment/setup reference to Cisco UCS Director , Cisco UCS Director Baremetal Agent deployment to help you prepare for VSPEX related activities.

Before you use this information, please make sure you are well versed with VSPEX system architecture, specification, physical and virtual infrastructure that makes up VSPEX system.

VSPEX Deployment

EMC has joined forces with the industry's leading providers of IT infrastructure to create a complete virtualization solution that accelerates deployment of private cloud, end user computing and virtualized applications. Built with EMC Next-Generation VNX, EMC backup and tight integration with EMC alliance partner's best-of-breed technologies, VSPEX provides ease of management, greater choice, higher efficiency, and lower risk. Validation by EMC ensures predictable performance and enables customers to select technology that leverages their existing IT infrastructure while eliminating planning, sizing, and configuration burdens. VSPEX provides a virtual infrastructure for customers looking to gain simplicity that is characteristic of truly converged infrastructures while at the same time gaining more choice in individual stack components..

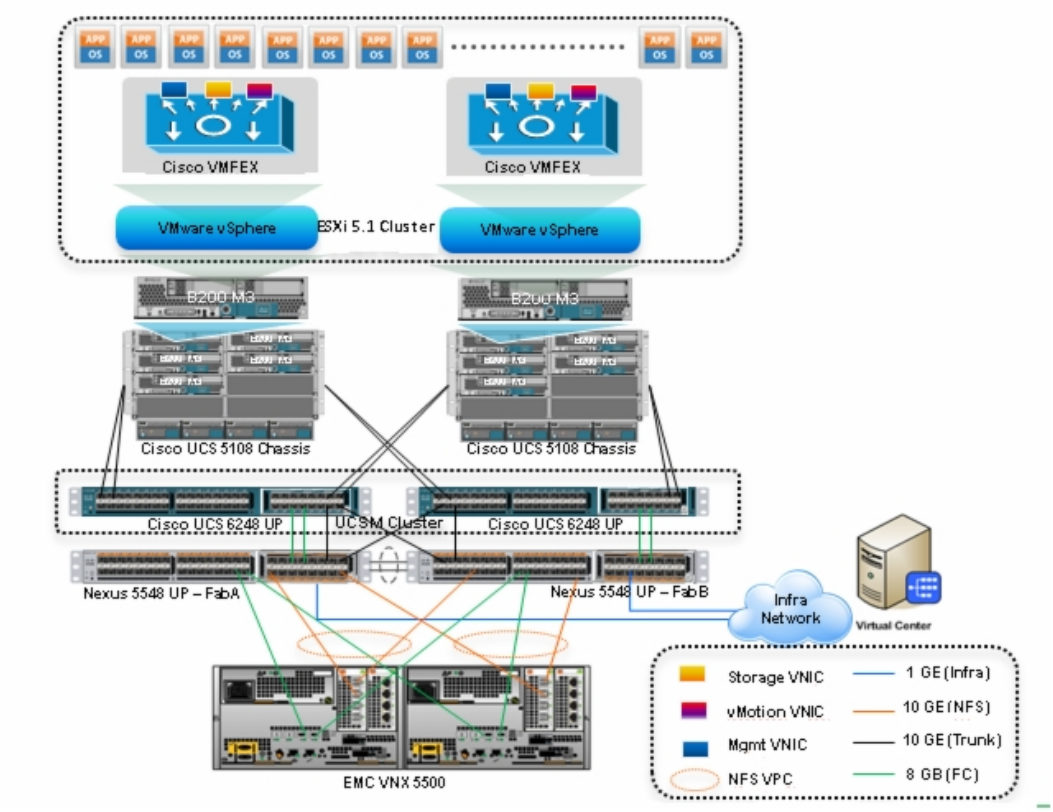

Figure 1. VSPEX Private cloud diagram – VMware with Cisco UCS and Nexus for up to 250 virtual machines.

As VSPEX architecture is highly modular; each customer's VSPEX unit may vary in its configuration. It is out-of-scope of this guide to cover various deployment/setup of VSPEX infrastructure in customer's premises. Instead, this guide presumes that customer's would have properly performed the following tasks as per VSPEX specifications (prior to using this guide) and explains/covers day-to-day management and operations of such VSPEX deployment/setup using Cloupia's software Cisco UCS Director /Cisco UCS Director Baremetal Agent:

- Deployment of Hardware/Software
- Setting up of Hardware/Software
  - Physical wiring
  - Physical connectivity
  - Network connectivity, etc
  - Administrators have appropriately defined the entire necessary infrastructure for configuration and operational for VSPEX Cisco UCSM Configuration (Server pools, vLANS, IP Address range, MAC/vHBA pools, Templates, etc).

- Cisco Nexus configuration (vLans, Trunks, Ports etc).
- Storage configuration (Data Movers, Storage Pools, LUNs, etc).

Cisco UCS Director Deployment	For installation and deployment of "Cisco UCS Director" for VSPEX, please refer to http://www.cisco.com/en/US/products/ps13050/prod_installation_guides_list.html
Cisco UCS Director Baremetal Agent Deployment	Please refer to "Cisco UCS Director Baremetal Agent Setup Guide V3.0.x" for installation and deployment of "Cisco UCS Director Baremetal Agent" for VSPEX. http://www.cisco.com/en/US/docs/unified_computing/ucs/ucs-director/bma-install/b_UCSD_BMA_Install.html

Chapter 3 Configuration

This chapter presents the following topic:

Configuration

Cisco UCS Director VSPEX Implemenation guide articulates the setup, configuration and operational aspects of Cisco UCS Director and Cisco UCS Director Baremetal Agent for VSPEX infrastructure. This guide does not cover other features and functionality of Cisco UCS Director . Following sections cover required Cisco UCS Director/Cisco UCS Director Baremetal Agent configuration required for VSPEX operational functionality.

VSPEX Configuration

It is out-of-scope of this document to cover the required VSPEX infrastructure configuration. For more details, please refer to VSPEX specifications and/or other documents for infrastructure configuration. (https://community.emc.com/docs/DOC-16196)

Cisco UCS Director Configuration

This section covers necessary infrastructure configuration that is required on 'Cisco UCS Director' with external VSPEX components.

Cisco UCS Configuration

Cisco UCS Director provides support for Cisco UCS (Unified Computing System) infrastructure. It provides auto- discovery, monitoring and complete visibility to manage all Cisco UCS components. Following section(s) explain adding Cisco UCS account into Cisco UCS Director to support VSPEX functionality.

Add Data Center

To add a Cisco UCS Manager (UCSM) account, a Data Center needs to be added first.

1. Select Administrator →Physical Accounts → Data Center tab → Click on 'Add' to add a Data Center.
2. Specify the Data Center 'Name', select the 'Type' of Data Center and the location 'Address'. Then click on 'Add' to create the Data Center.

Add Cisco UCS Account

1. Once a Data Center has been added, a Cisco UCSM account can be added.

Note: Add the Cisco UCSM account to the above created 'Data Center'

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2. Select Administrator →Physical Accounts → Physical Accounts tab → Click on 'Add'

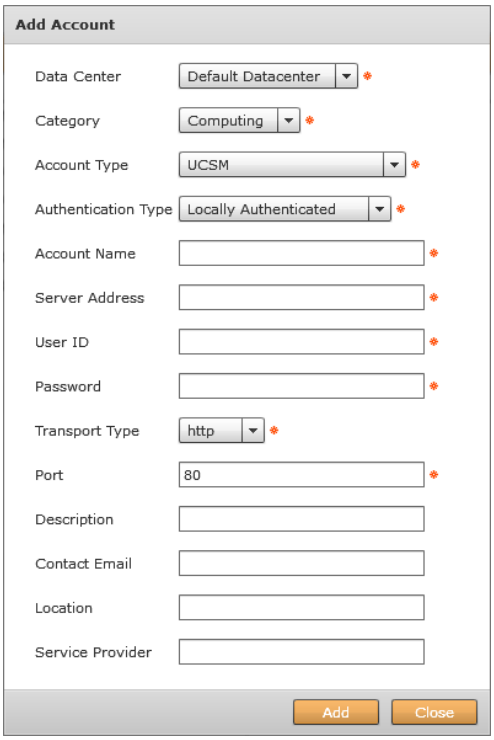


Figure 2. Add UCS Account

Table 4. **Add Account fields fields explanation**

Field Name	Description
Data Center	Select the Data Center to which the UCSM account will be associated to.
Category Type	Sepcify the type of infrastructure. In this case 'Computing'.
Account Type	Select the account type. In this case UCSM.
Authentication Type	Specify the authentication Type , Locally Authenticated or Remotely Authenticated. Locally Authenticated User Accounts - A locally authenticated user account is authenticated directly through the fabric interconnect and can been enabled or disabled by anyone with admin or AAA privileges. Remotely Authenticated User Accounts - A remotely authenticated user account is any user account that is authenticated through LDAP, RADIUS, or TACACS+.
Account Name	Specify a name for the UCSM account.
Server Address	Specify the IP address of the UCSM.
User ID	Specify the user id UCSM.
Password	Specify the password for the UCSM.

Field Name	Description
Transport Type	Select the transport type, either http or https.
Port	Specify the port number of the UCSM.
Description	Specify the description if required.
Contact Email	Specify the email address if required.
Location	Specify the location of the UCSM if required.
Service Provide	Service provider name if any.

Cisco UCS Director will automatically discover all infrastructure elements in the Cisco UCSM account like Chassis, Servers, Fabric Interconnects, Service Profiles, Server Pools etc. in the newly added UCSM account. Typically the discovery process takes about 5 minutes or depends upon the time interval mentioned under Administration → Physical Accounts → Infrastructure System Parameters tab.

Verify Cisco UCSM account discovery and connectivity

Once one or more UCSM accounts have been added to Cisco UCS Director, verify the Account connectivity by testing the account status/reachablility.

1. Select Administration → Physcial accounts → Physical accounts tab → Select the account.
2. Click on 'Test Connection'

Once a UCSM account has been added and it is reachable, all the underlying components are discovered and displayed as tabular reports.

1. Select Physical → Compute.
2. Select the Data Center name from the left column.
3. Select the Compute Accounts tab.
4. Double-click (or select an account and click on "View Details") on one of the accounts found under the Compute Accounts tab.

All discovered components of Cisco UCS in VSPEX environment are displayed at the Cisco UCSM account level. They are as follows:

a. Chassis
b. Servers
c. Fabric Interconnects
d. Organizations
e. Service Profiles
f. VSANs
g. VLANs

h. Port Channels
i. QOS System Class
j. Chassis Discovery Policy
k. Management IP Pool
l. Flow Control Policies
m. Locales
n. Faults

Note: For more information about management of Cisco UCSM vis Cisco UCS Director please refer Cisco UCS Director UCS Management Guide.

EMC VNX Configuration

Cisco UCS Director provides support for EMC VNX storage . It supports auto- discovery, monitoring and complete visibility to manage all the VNX (VNX 5500) components. Following section(s) explain adding EMC VNX account into Cisco UCS Director to support VSPEX functionality.

Add EMC VNX Account

1. Select Administrator →Physical Accounts → Physical Accounts tab → Click on 'Add'

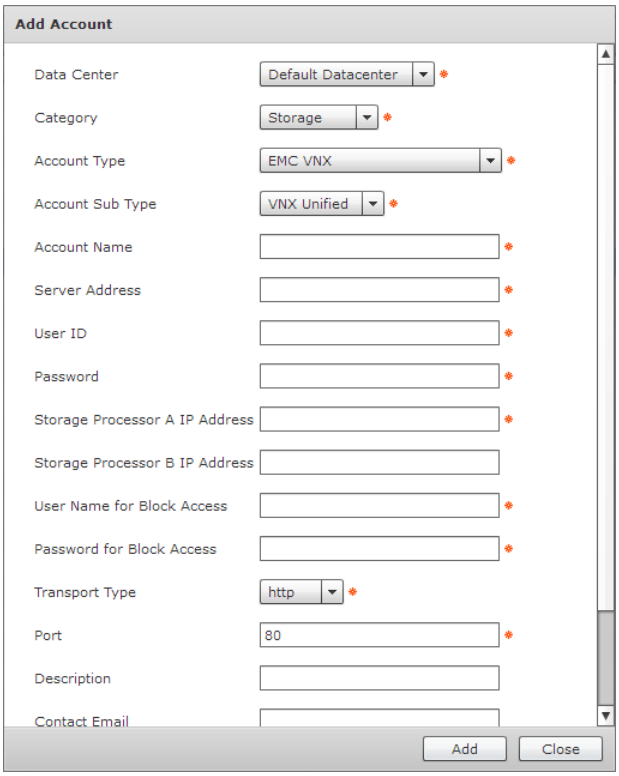


Figure 3. Add EMC VNX Account

Table 5. Add Account fields fields explanation

Field Name	Description
Data Center	Select the Data Center to which the compute account is added.
Category Type	Sepcify the type of infrastructure. In this case 'Storage'.
Account Type	Select the account type. In this case EMC VNX.
Account Sub Type	Select the VNX account sub type – File, Block or Unified.
Account Name	Specify a name for the VNX account.
Server Address	Specify the IP address of the VNX.
User ID	Specify the user id VNX.
Password	Specify the password for the VNX.
Storage Processor A IP address	Specify the IP address of Storage Processor A.
Storage Processor B IP address	Specify the IP address of Storage Processor B.
User Name for Block Access	Specify the user name for block access.
Password for Block Access	Specify the password for block access.
Transport Type	Select the transport type, either http or https.
Port	Specify the port number of the VNX.
Description	Specify the description if required.
Contact Email	Specify the email address if required.
Location	Specify the location of the VNX if required.
Service Provide	Service provider name if any.

Cisco UCS Director will automatically discovers all the storage elements in the VNX account. Typically the discovery process will take about 5 minutes.

Verify EMC VNX account discovery and connectivity

Once VNX account has been added to Cisco UCS Director, verify the account connectivity by testing the account status/reachablility using following path:

1. Select Administration → Physcial accounts → Physical accounts tab → Select the newly added VNX account.

2. Click on 'Test Connection'

Once a VNX account has been added and it is reachable, all the underlying components are discovered and displayed as tabular reports.

1. Select Physical → Storage.
2. Select the Data Center name from the left column.
3. Click on Storage Accounts.
4. Double-click (or select an account and click on "View Details") on the VNX account(s) found under the Storage Accounts tab.

All discovered components of EMC VNX component(s) in VSPEX environment are displayed at the EMC VNX account level. They are as follows:

a. Data Movers
b. Storage Processors
c. Storage Pools
d. RAID Groups
e. Disk Devices
f. Hosts
g. Initiators
h. Storage Groups
i. LUNs
j. Ports

Cisco Nexus Configuration

Cisco UCS Director provides support for a multitude of Network devices. Users can add the devices to the Cisco UCS Director and monitor them. The device categories currently supported are:

- Cisco IOS devices
- Cisco Nexus OS devices
- Cisco UCS Fabric Interconnect

Following section(s) explain adding Cisco 5K device(s) account into Cisco UCS Director to support VSPEX functionality.

Note: Cisco UCS Director recommendation is to use common Datacenter name for converged Infrastructure accounts like Cisco UCSM, Storage, and Network representing your true data center.

Add Network Devices

To add Cisco Nexus Device(s) to the Cisco UCS Director required for this VSPEX configuration's functionality:

1. Select Administrator →Physical Accounts → Manage Network Elements tab → Click on 'Add Network Element'

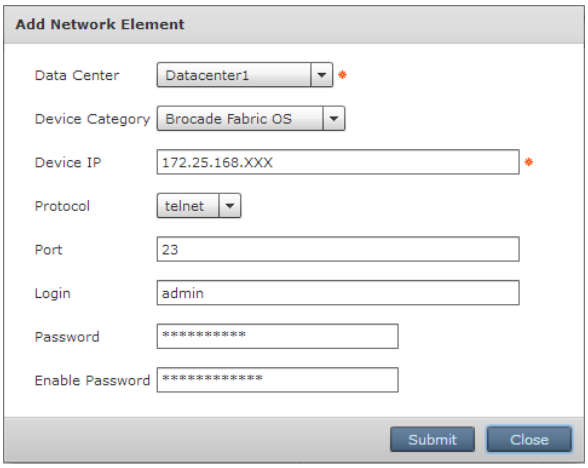


Figure 4. Add Network Element (remove Brocade and add Nexus screen shot).

Table 6. Add Network Element fields explanation

Field Name	Description
Data Center	Select the Data Center to which the other account compute and storage are added.
Device Category	Select the type of device category being added.
Device IP	Specify the IP address of the network device.
Protocol	Select the protocol used to communicate with the device. Either telnet or ssh can be used.
Port	The port number of the network device
Login	Specify the login id of the device
Password	Specify the device password
Enable Password	Certain devices require a separate password to enter in the command configuration mode. Specify any such password in this field.

Cisco UCS Director will discover the devices and collect inventory from the network devices and display them in the form of tabular reports. To view device details that is already added to Cisco UCS Director .

2. Select Physical → Network.
3. Select the Data Center name from the left column.
4. Select the 'Managed Network Element' tab.

To view details of a specific device:

1. Select a device from the list and click on 'View Details'

2. This will display all information related to the device like Interfaces, Configurations, Port Profiles, Private VLANs, and Port Capabilities etc.

Cisco UCS Director Baremetal Agent Configuration

Cisco UCS Director Baremetal Agent provides all the necessary network services infrastructure required for VSPEX operations. Network services that are provided by Cisco UCS Director Baremetal Agent are as follows:

- DHCP Services
- TFTP Services
- HTTP Services

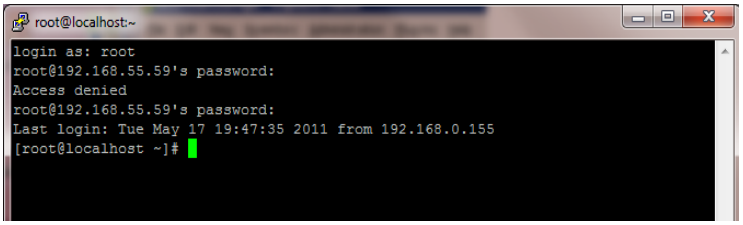
In this section, basic necessary configuration that is required on Cisco UCS Director Baremetal Agent to support VSPEX infrastructure operations (as shown in Figure 1) is/are covered.

Note: Please refer to 'Cisco UCS Director Baremetal Agent Setup Guide' for more details on installation, setup and configuration.

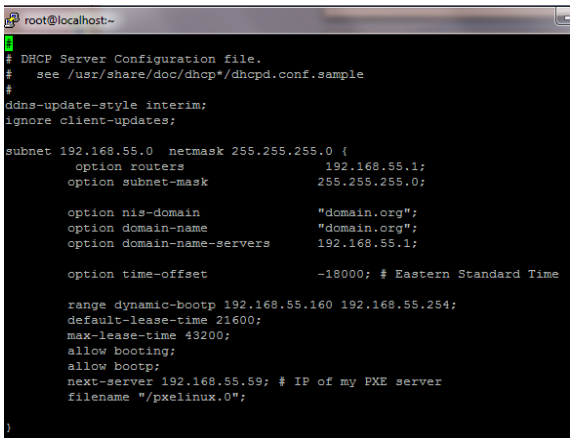
DHCP Configuration

A simple DHCP example along with screen shot has been provided below for your reference. Use this example as a reference and modify appropriately as per your environment.

1. Log into 'Cisco UCS Director Baremetal Agent' appliance using SSH or via 'Cisco UCS Director Baremetal Agent' console (default 'root' password for 'Cisco UCS Director Baremetal Agent'is 'pxeboot').



2. Using an editor (e.g. vi), edit 'DHCP' configuration file "vi /etc/dhcpd.conf" (you can use any editor of your choice).



3. Change the following configuration parameters according to your network (or check with your Network administrator)

a. Option router

b. Subnet mask

c. Domain name server

d. Dynamic-bootp range etc.

4. Once you configure 'DHCP' server, restart DHCP server (/etc/init.d/dhcpd restart)

Note: If the VNIC on which Cisco UCS Director Baremetal Agent is running is not directly connected to the VLAN in which UCS blade servers are directly connected then router must be configured to forward DHCP requests to this DHCP.

Hosts file configuration – Cisco UCS Director reachability

Using an editor (e.g. vi), edit 'hosts' configuration file "vi /etc/hosts" (you can use any editor of your choice) and add "Cisco UCS Director " IP address to the file to make sure Cisco UCS Director Baremetal Agent services can reach Cisco UCS Director appliance.

DHCP Configuration

Initially, 'Cisco UCS Director Baremetal Agent must be configured with IP address of 'Cisco UCS Director'

1. cd /opt/infra
2. ./stopInfraAll.sh
3. ./configure.sh <IP-ADDRESS –OF-Cisco UCS Director >
4. ./startInfraAll.sh

Verify that 'Cisco UCS Director Baremetal Agent' can reach 'Cisco UCS Director ' (Use ping command to test the reachability)

Make sure Cisco UCS Director Baremetal Agent is on the same network/interface/vLAN as that of Cisco UCS Director for providing network services. In addition, make sure Cisco UCS Director Baremetal Agent is on the same network/interface/vLAN as that of UCS Blade servers (It UCS Blade servers on different network/vLAN/interface).

Note: Enable DB communication on Cisco UCS Director using 'ShellAdmin'. Also verify (using ping) Cisco UCS Director and Cisco UCS Director Baremetal Agent.

Chapter 4 Operations

This chapter presents the following topic:

Before using Cisco UCS Director for VSPEX operations, please make sure the following are met (Day-0 operations namely, Deployment, Setup and basic VSPEX Configuration):

1. VSPEX hardware as per Figure 1/Specification is deployed, powered-on, connected and is ready for operations
2. All the network connectivity is configured and reachable (Cisco UCS Director , Cisco UCS Director Baremetal Agent, Cisco UCS, Cisco FI, Cisco
3. Nexus 5K, VNX 5500, SAN configuration (if any), vLANS on Cisco Nexus 5K, TrunkPorts etc).
4. Make sure Cisco UCS Manager is appropriately setup/configured along with FI (Create and configure appropriate vLANS – Management, NFS, vMotion, Packet Control, VM-Traffic, Native vLANS).
5. Make sure Cisco UCS Unified Fabric Interconnect Ports are appropriately configured (Server Ports, Uplink Ports, and Fibre Channel Ports) with uplink Ethernet switch.
6. Cisco UCS Director should be able to discover, manage and monitor Cisco UCS (M), EMC VNX, Cisco Nexus 5K (all the elements should be discovered and are reachable via Cisco UCS Director – please verify the data using appropriate reports using "Physical" Menu tab from Cisco UCS Director UI.

a. Physical → Compute (Cisco UCS)

b. Physical → Strorage (EMC VNX)

c. Physical → Network (Nexus switch)

7. Once the above basic setup is completed, please move to the next section for Cisco UCS Director Operational configuration.

Cisco UCS Director Operational Configuration

After basic deployment, Uplink port(s) setup, VSANs and VLANs set up are done, you need to create following objects to setup for VSPEX operations (Bare metal provisioning, vLAN provisioning, Multi- tenant operations, etc.).

Following steps describe basic Cisco UCS Director Operational Configuration as per VSPEX specifications. All the steps described below use(s) basic example(s)/use case to explain the steps required for Cisco UCS Director as per VSPEX Specification(s). Please change/modify/add respective properties/parameters appropriately as per your Cisco UCS Director /VSPEX environment.

Note: Cisco UCSM or UCSM, Cisco UCS or UCS are used interchangeably in the following sections.

Cisco UCS Director/UCSM related configuration

1. Create an Organization

From Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts →Select an Account →View Details → Organizations → Click Add → Enter appropriate values and submit the changes to create New Organization (example: Demo-Org)

2. Chassis Discovery Policy

Ensure that the policy under the UCS account, has 2-link option selected.

a. From Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts → Chasis Discovery Policy.

(or)

b. From UCSM → Equipment (Top level Tab) →Equipment (Tree) → Global Policies → Chassis Discovery Policy (on the right hand side) →Action (Select 2-Link 'Radio' button).

Create following objects under new Organization 'Demo-Org'

3. Create UUID Suffix pool.

Leave the defaults. All the names should be less than 16 characters.

4. Create 2 MAC Pools for Fabric A & B respectively.

Following properties should be set while MAC Pool creation.

- Specify Name for MAC Pool.
- Specify Description for MAC Pool (Optional).
- Select Account Name.
- Select Demo-Org as its Organization.
- Specify First MAC Address.
- Specify size as 2 (recommended MAC Pool Block size).

Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts →Select an Account → View Details →Organization → Select Demo-Org created in step 1→MAC Pools → Click Add → Enter appropriate values (mentioned above) and submit the changes to create MAC Pool for Fabric Interconnect A.

Note: Follow the same procedure to create MAC Pool for Fabric Interconnect B (as per your environment).

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5. Create WWNN Pools.

Following properties should be set for creating WWNN Pool.

- Specify WWNN Pool Name.
- Enter Description for the Pool(Optional).
- Select Demo-Org as its Organization.
- Specify First WWNN Address.
- Specify size as 2(recommended WWNN Pool Block size).

From Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts →Select an Account → View Details →Organization → Select Demo-Org created in step 1→ WWNN Pool → Click Add → Enter appropriate values (mentioned above) and submit the changes to create WWNN Pool.

6. Create two WWPN Pools, for Fabric A & B.

Following properties should be set for creating WWPN Pools.

- Specify WWPN Pool Name.
- Enter Description for the Pool(Optional).
- Select Demo-Org as its Organization.
- Specify First WWPN Address.
- Specify size as 2(recommended WWPN Pool Block size).

From Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts →Select an Account → View Details →Organization → Select Demo-Org created in step 1→ WWPN Pools → Click Add → Enter appropriate values and submit the changes to create WWPN Pool for Fabric A.

Note: Follow the same procedure to create WWPN Pool for Fabric Interconnect B

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7. Create Network Control Policy (with CDP Enabled)

Following property should be set while Network Control Policy creation.

- Select CDP as Enabled

From Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts →Select an Account → View Details →Organization → Select

Demo-Org created in step 1→ Network Control Policy → Click Add → Enter appropriate values (mentioned above) and submit the changes to create Network Control Policy.

8. Create two vNIC Templates for Fabric A & B

Following properties should be set while vNIC Template creation.

- Specify Name for the vNIC Template.
- Specify Description for the vNIC Template(Optional).
- Select UCS Account name.
- Select Demo-Org as its Organization.
- Select Switch Id as Fabric A.
- Target – Adapter and VM options should be both selected.
- Select Template Type as "Initial Template".
- Select all the VLANs that are created in step 5.
- Select Native VLAN as the Native-VLAN that is created in step 5.
- Specify MTU as 9000(recommended).
- Select MAC pool created in previous step 4 for this Fabric Id
- Select QoS Policy (Optional).
- Select Network Control Policy created in step 7 for this Organization.
- Select Pin Group (Optional).
- Select Stats Threshold Policy (Optional).

From Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts →Select an Account → View Details →Organization → Select Demo-Org created in step 1→ VNIC Templates→ Click Add→ Enter appropriate values (mentioned above) and submit the changes to create vNIC Template.

Note: (1) If PXE server and UCS Server are in separate VLANs we need to create vNIC templates or Fabric A and Fabric B for both PXE Server and UCS Server.(2) Follow the same procedure to create vNIC Template for Fabric Interconnect B.

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9. Create two vSANs for Fabric A & B

From Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts → Select an Account → View Details → VSAN → Click Add → Enter appropriate values (as per your environment) and submit the changes to create VSAN for Fabric A.

Note: Follow the same procedure to create VSAN for Fabric Interconnect B

10. Associate two vSANS created in the previous step, with Fabric A & B

From Cisco UCS Director → Physical → Compute → Data Center → UCSM Accounts → Select an Account → View Details → Fabric Internnect → Select row Fabric Interconnect A → View Details → Ethernet Ports → Under "Fixed/Expansion Port" Column (Identify Expansion Module Ports 1)→ Select the port 1 and click "Associate VSAN" to associate VSAN with Fabric A.

Note: Follow the same procedure to identify Expansion Module Port 2 and Associate VSAN for Fabric B.

11. Create vHBA Template for Fabric A & B

Following properties should be set for vHBA Template.

- Select UCS Account.
- Select Demo-Org as its Organization.
- Select Switch Id as Fabric A.
- Select VSAN for Fabric A created under step 9.
- Select Template Type as "Initial Template"
- Specify Max Data Field Size as 2048.
- Select WWN Pool for this organization created in step 5.
- Select QoS Policy (Optional).
- Select Pin Group (Optional).
- Select Stats Threshold Policy (Optional).

From Cisco UCS Director →Physical → Compute → Data Center → UCSM Accounts →Select an Account → View Details →Organization → Select Demo-Org created in step 3 → VHBA Templates →Click → Add → Enter appropriate values and submit the changes to create vHBA Template for Fabric A.

Note: Follow the same procedure to create VHBA Template for Fabric Interconnect B.

12. Create two Boot Policies for LAN Boot and SAN Boot

First Create a Boot Policy (Example: LANSANPolicy) with following properties set.

- Select UCS Account Name.
- Select Demo-Org as its Organization.
- In Add Boot Device, select 'Add LAN Boot, Enter names for primary vNIC and secondary vNIC if any.
- Select 'Add SAN Boot, Enter names for primary vHBA and secondary vHBA if any.
- Select 'Add SAN Boot' Target for Primary vHBA. Enter values for primary Boot Target LUN and its WWPN. Enter values for secondary Boot Target LUN and its WWPN.

Note: You need to get this from your 'Physical' infra environment from Cisco UCS Director or check with the storage admin.

Cisco UCS Director related configuration

1. Create vNICS for Fabric A and Fabric B.
   - Select UCS Account Name.
   - Select Demo-Org as its Organization.
   - Select Use LAN Connectivity Template since we are creating from vNIC Template.
   - Select vNIC Template for Fabric A that was created under step 8.
   - Select Adapter Policy – VMWare.

Note: In case where PXE Server and UCS Server are in different VLANs and we have separate vNIC Templates for PXE and UCS Server we need to create vNICs for Fabric A and Fabric B for both PXE Server and UCS Server.

From Cisco UCS Director → Policie → UCS → vNIC → Click Add → Enter appropriate values and submit the changes to create vNIC for Fabric A.

Note: Follow the same procedure to create vNIC for Fabric B

2. Create vHBAs for Fabric A and Fabric B
   - Select UCS Account Name.
   - Select Demo-Org as its Organization.
   - Select Use SAN Connectivity Template since we are creating from vHBA Template.
   - Select vHBA Template for Fabric A that was created under step.
   - Select Adapter Policy – VMWare.

From Cisco UCS Director → Policie → UCS → vHBA → Click Add → Enter appropriate values and submit the changes to create vHBA for Fabric A.

Note: Follow the same procedure to create vHBA for Fabric B

3. Create UCS Network Policy
   - Select UCS Account Name.
   - Select Demo-Org as its Organization.
   - Select Dynamic vNIC Connection Policy (Optional).
   - Select LAN Connectivity Type – Expert
   - Select Add vNIC – 2 (In case we have both Fabric A and Fabric B. 1- in case we have only Fabric A).
   - Select vNIC from the one we created in step 7.

Note: In case PXE Server and UCS server are in separate VLANs, we need to create separate Network policy with appropriate vNICs for each.

From Cisco UCS Director → Policies→UCS→Network Policy→Click Add → Enter appropriate values and submit the changes to create UCS Network Policy.

4. Create UCS Storage Policy
   - Select UCS Account Name.
   - Select Demo-Org as its Organization.
   - Select Local Disk Config Policy (Optional).
   - Select SAN Connectivity Type – Expert
   - Select WWNN Pool.

- Select Add vHBA – 2 (In case we have both Fabric A and Fabric B. 1- in case we have only Fabric A).
- Select vHBA from the one we created in step 14.

From Cisco UCS Director → Policies → UCS → Storage Policy → Click Add → Enter appropriate values and submit the changes to create UCS Storage Policy.

Note: Above steps are explained with the assumption that the complete VSPEX is available. In case if any of elements are missing, please modify/validate the parameters appropriately before moving to next section.

Chapter 5 VSPEX Use Cases

Cisco UCS Director VSPEX Use Cases

In Cisco UCS Director context, VSPEX specifications (Test cases, Design Objectives, and other recommended operations) are addressed in one of the following ways:

- Orchestration workflows (test cases).
- Orchestration tasks (Design Objectives).
- UI Actions (for one time setup etc).
- Administrative configuration.

This section explains one of the VSPEX Specification/Test cases via step-by-step instructions. Rest of the test cases, Design Objectives, Other tasks (One time setup, Admin configuration, etc.), are explained/covered under Appendix A, B, C

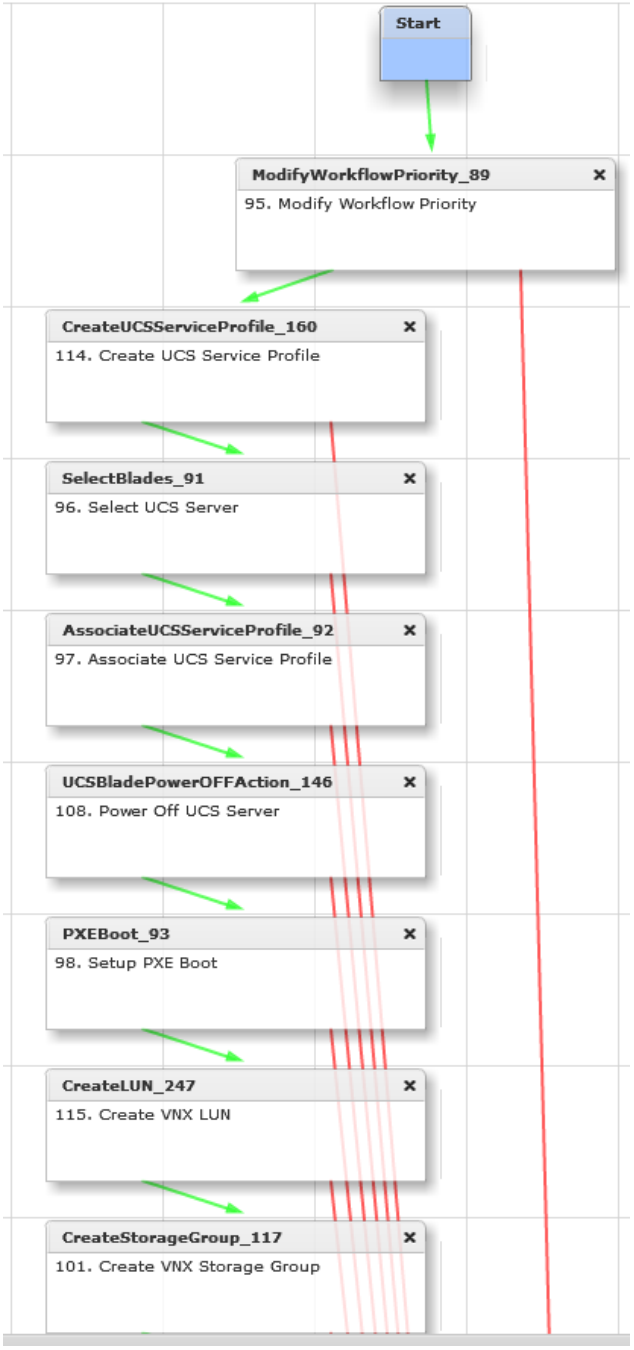
Use Case 1: Stateless Blade Server

Baremetal Server Provisioning

This section describes one of the VSPEX algorithm/use case for provisioning a stateless blade

The use case is explained with end to end workflow along with screenshots.

The following diagram/screenshot despicts Cisco UCS Director end to end orchestration workflow.


Start
ModifyWorkflowPriority_89
95. Modify Workflow Priority
CreateUCSServiceProfile_160
114. Create UCS Service Profile
SelectBlades_91
96. Select UCS Server
AssociateUCSServiceProfile_92
97. Associate UCS Service Profile
UCSBladePowerOFFAction_146
108. Power Off UCS Server
PXEBoot_93
98. Setup PXE Boot
CreateLUN_247
115. Create VNX LUN
CreateStorageGroup_117
101. Create VNX Storage Group

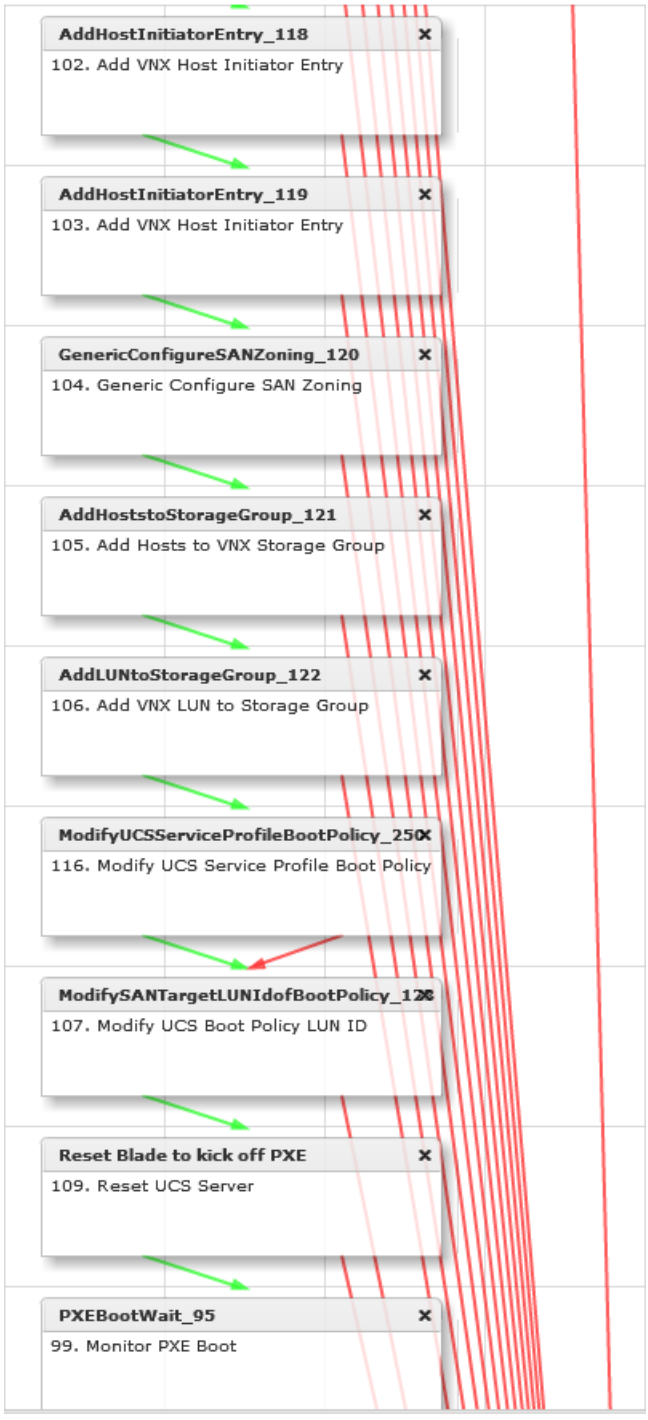

AddHostInitiatorEntry_118
102. Add VNX Host Initiator Entry
AddHostInitiatorEntry_119
103. Add VNX Host Initiator Entry
GenericConfigureSANZoning_120
104. Generic Configure SAN Zoning
AddHoststoStorageGroup_121
105. Add Hosts to VNX Storage Group
AddLUNtoStorageGroup_122
106. Add VNX LUN to Storage Group
ModifyUCSServiceProfileBootPolicy_250
116. Modify UCS Service Profile Boot Policy
ModifySANTargetLUNIdofBootPolicy_12
107. Modify UCS Boot Policy LUN ID
Reset Blade to kick off PXE
109. Reset UCS Server
PXEBootWait_95
99. Monitor PXE Boot

Figure 5. Baremetal Server Provisioning workflow

Workflow Details

This section explains all the workflow steps in details that are part of the Figure 5.

Step 1: Modify Workflow Priority

In order to bind to the current environment or to see more details, double click on the task 'Modify Workflow Priority'. Once you double click on the task, Cisco UCS Director workflow designer will pop up a window (task wizard as shown in Fig 6) with more details and walk you through inputs/outputs as required by this task.

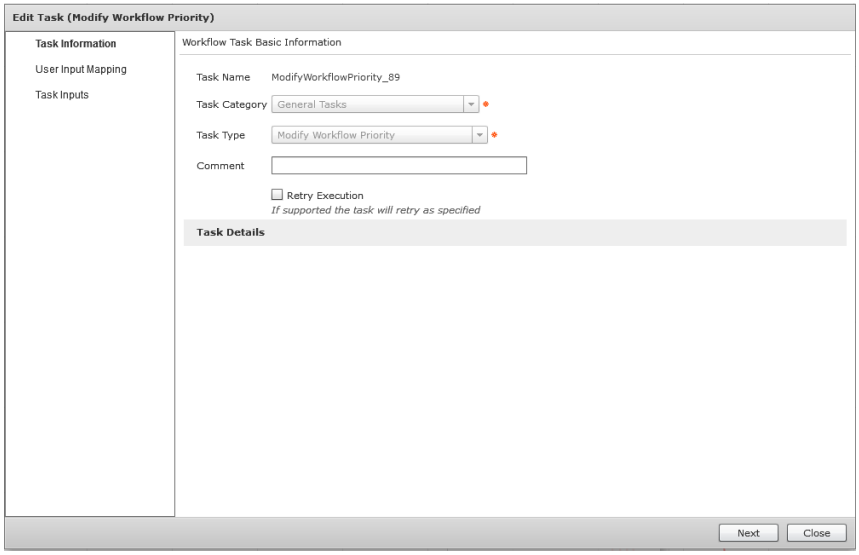


Figure 6. Modify Workflow Priority

As shown below, Fig 7 presents any user input mappings to input attributes (which are none in this case).

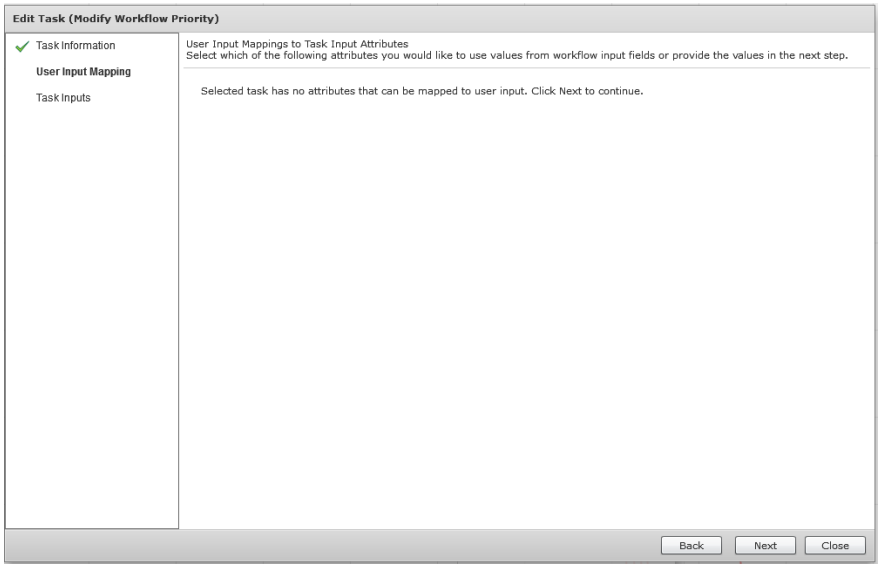


Figure 7.

As shown below, Fig 8 presents 'Revalidation' button along with the option of selecting priority. In this case, the priority option selection is 'High' (as shown below).

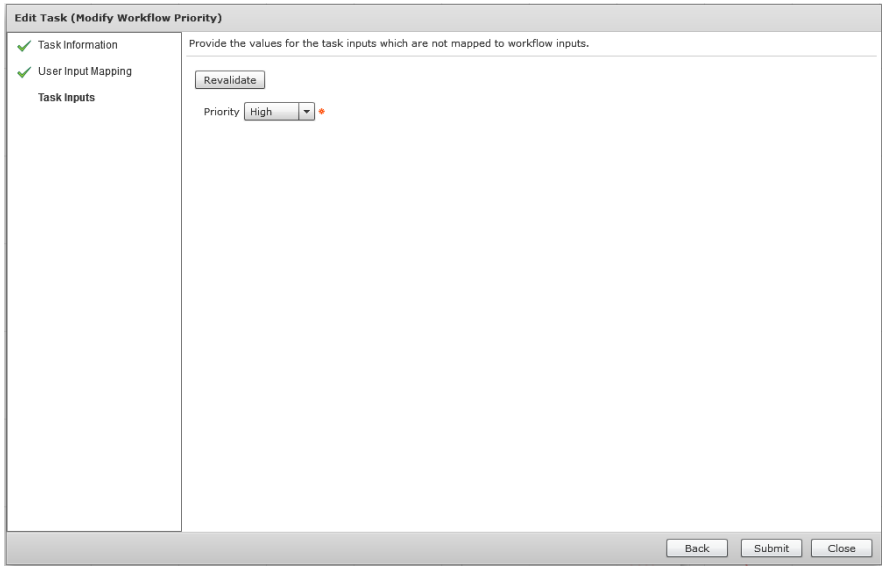


Figure 8.

Please select 'Revalidate' button in order to revalidate/bind the task to the local environment. Once you revalidate the task, please select 'Submit' button and task details are saved in the database and pops-up a confirmation window (as shown in Fig 9).

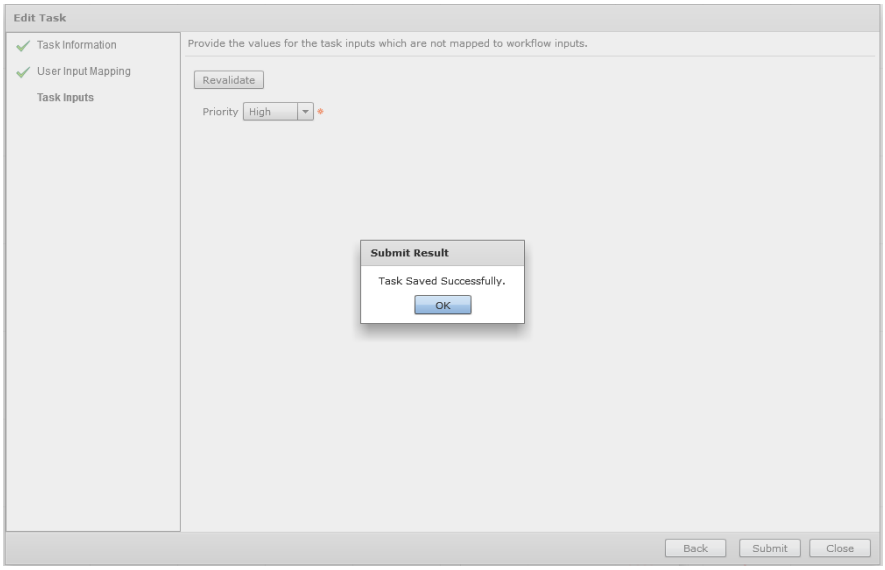


Figure 9.

Step 2: Create UCS Service Profile Task

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window (and walks you through the wizard).

As shown below, Fig 10 presents basic task information for 'CreateUCServiceProfile' task. Select 'Next' button to take you to the next screen.

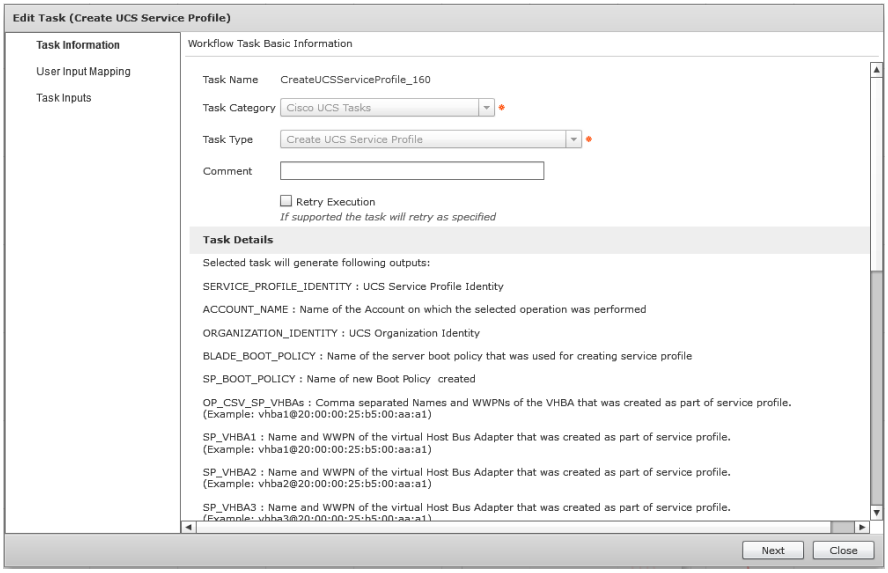


Figure 10.

As shown below, Fig 11 presents user input mapping for this task. As highlighted, in the current flow, task is mapping 'Service Profile Name' as input to the flow (It means, during the workflow execution time, workflow is expecting user to feed the 'Service Profile Name'). Select 'Next' button to take you to the next screen.

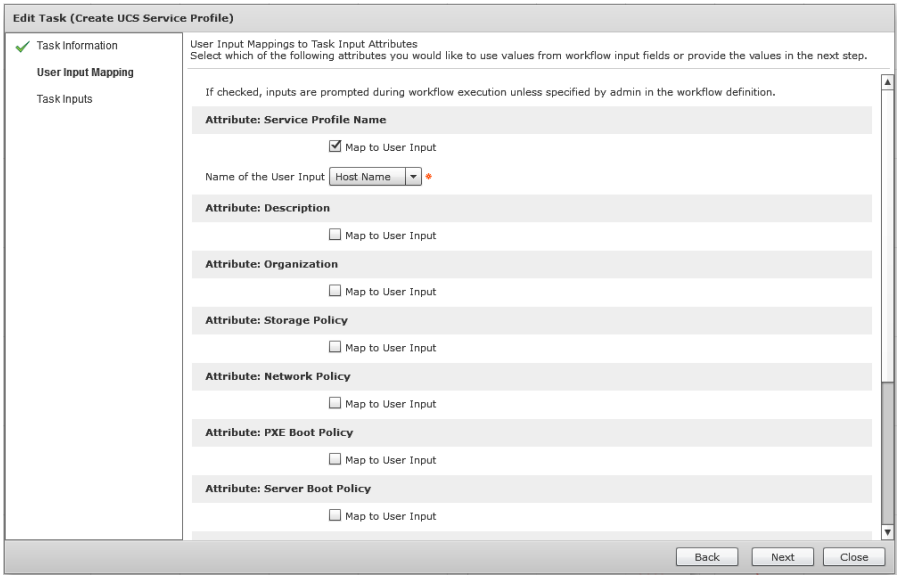


Figure 11.

Note: Following are the assumptions in the current Cisco UCS Director workflow context:

- All the VSPEX required elements are discovered, managed etc. via Cisco UCS Director .
- All the required pools, resources etc. for Service profile are created via Cisco UCS Director .
- In addition, all the required Cisco UCS Director policies are defined and bound to the respect pools/resources, etc. via Cisco UCS Director .

As shown below, Fig 12 presents binding all the required 'Service Profile' parameters to your environment. Once you click 'Revalidate' button as depicted in 'Fig 12, Cisco UCS Director will bind all the necessary parameters to respective fields (as shown below).

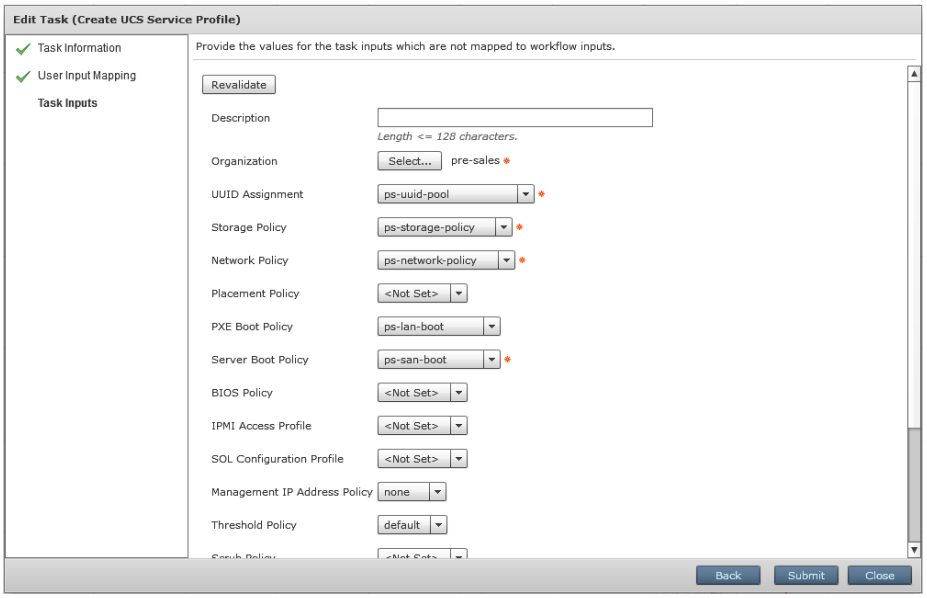


Figure 12.

Once all the parameters (as shown above) are appropriately bound, select 'Submit' button and task details are saved in the database and pops-up a confirmation window.

Step 3: Select UCS Server

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 13 presents basic task information for 'Select UCS Server' task. Select 'Next' button to take you to the next screen

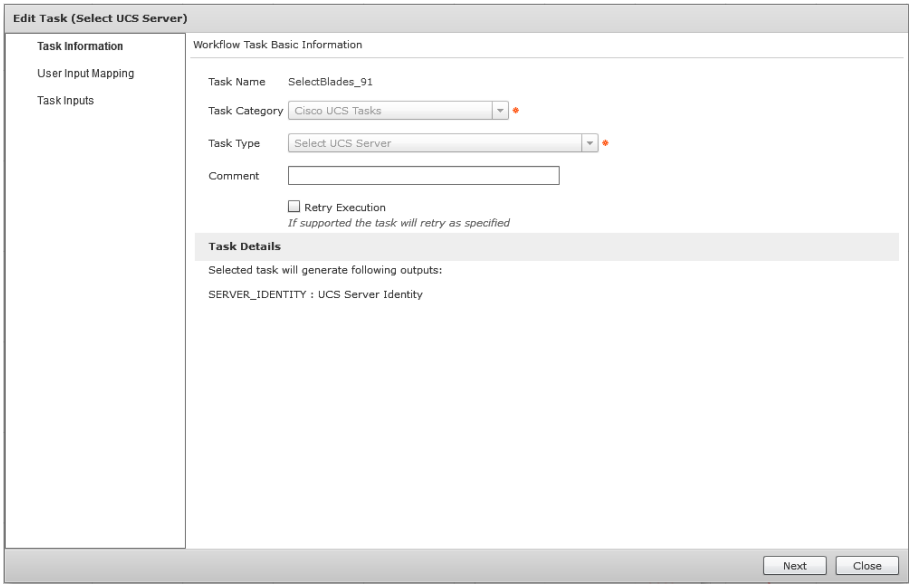


Figure 13.

As shown below, Fig 14 presents binding of required 'Select UCS Server' parameters to your environment. Select 'Next' button to take you to the next screen.

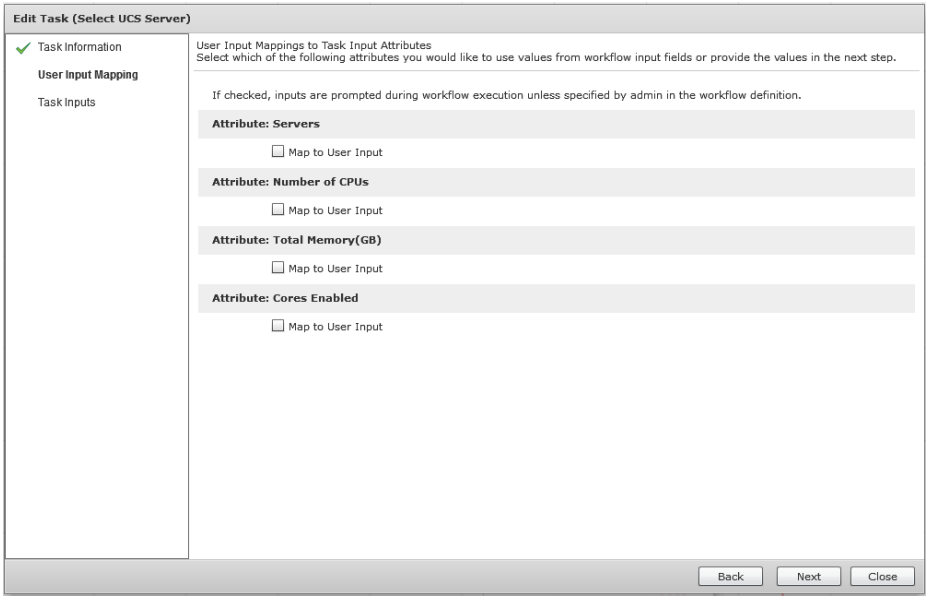


Figure 14.

As shown below, Fig 15 presents binding all the required 'Select UCS Server' parameters to your environment. Once you click 'Revalidate' button as depicted in 'Fig 15, Cisco UCS Director will bind all the necessary parameters to their respective fields.

In addition, users will be able select 'Server Selection Scope', Choose servers along with 'Number of CPUs' and 'Total Memory' via this screen (as shown below).

Note: Please make sure all the parameters are appropriately mapped and are accurate as per your environment.

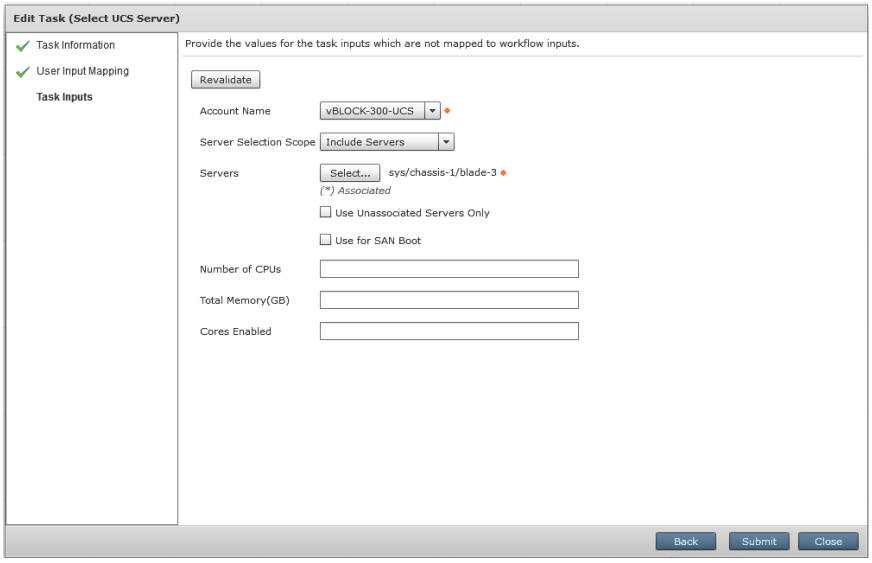


Figure 15.

Once all the parameters (as shown above) are appropriately bound, select 'Submit' button and task details are saved in the database and pops-up a confirmation window.

Step 4: Associate UCS Profile

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 16 presents basic task information for 'Associate UCS Service Profile'task. Select 'Next' button to take you to the next screen.

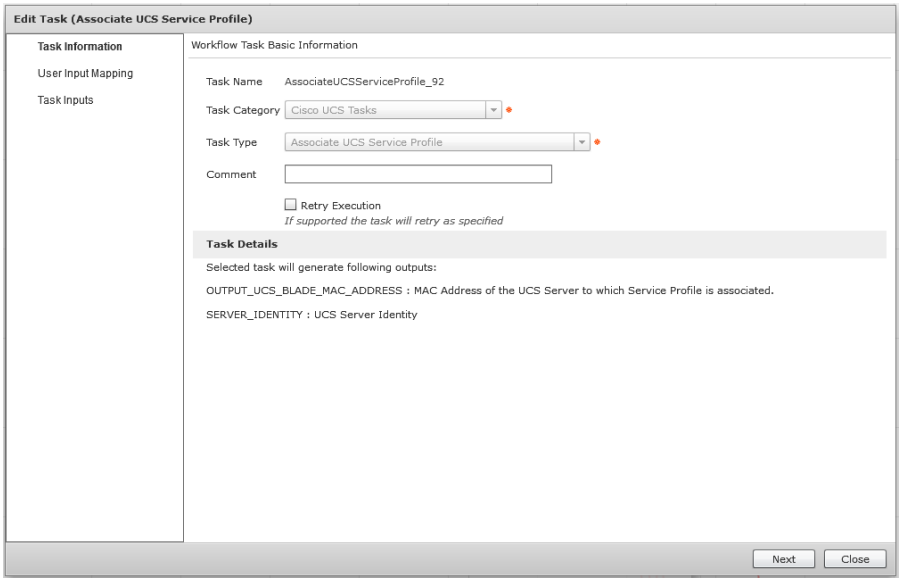


Figure 16.

As shown below, Fig 17 presents binding of required 'Associate UCS Service Profile' parameters to your environment. Select 'Next' button to take you to the next screen.

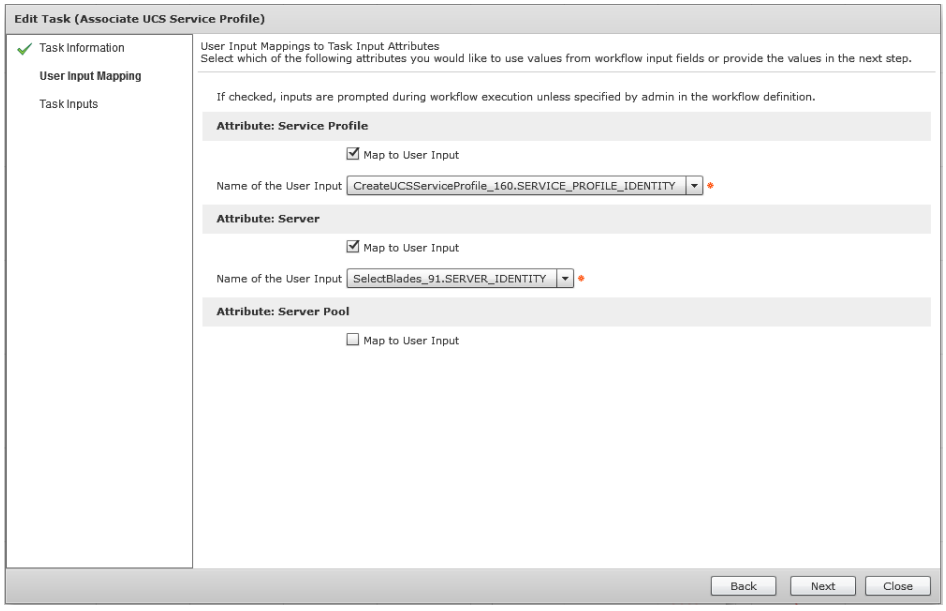


Figure 17.

As shown below, Fig 18 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window. In addition, users will be able select 'Server Selection Scope'.

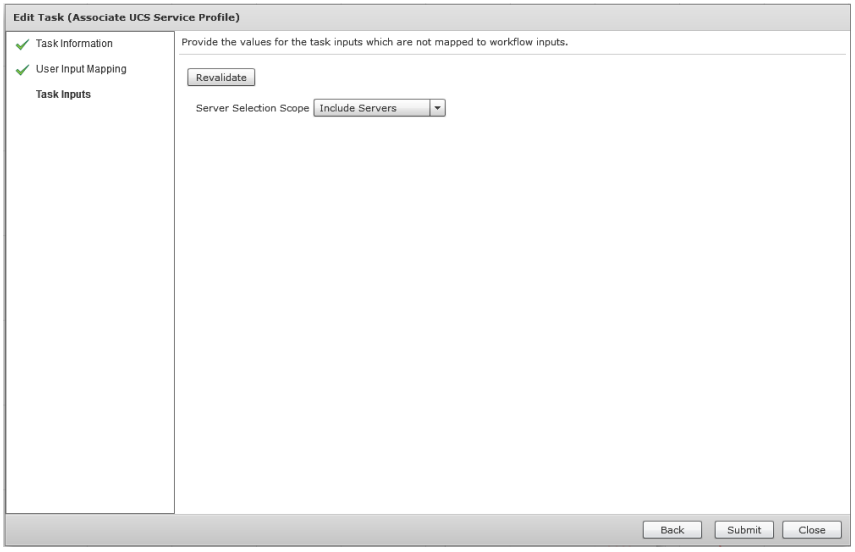


Figure 18.

Step 5: Power Off UCS Server

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 19 presents basic task information for 'Power Off UCS Server' task. Select 'Next' button to take you to the next screen.

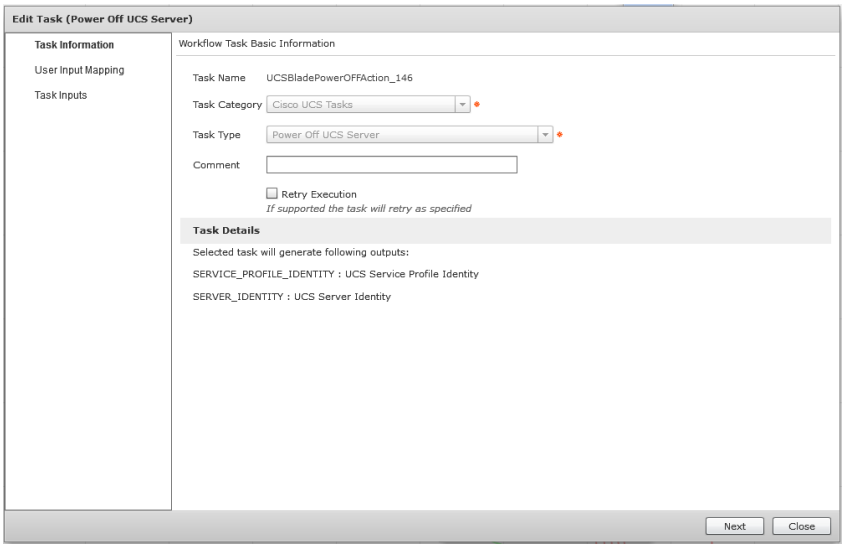


Figure 19.

As shown below, Fig 20 presents binding of required 'Power Off UCS Server' parameters to your environment. Select 'Next' button to take you to the next screen.

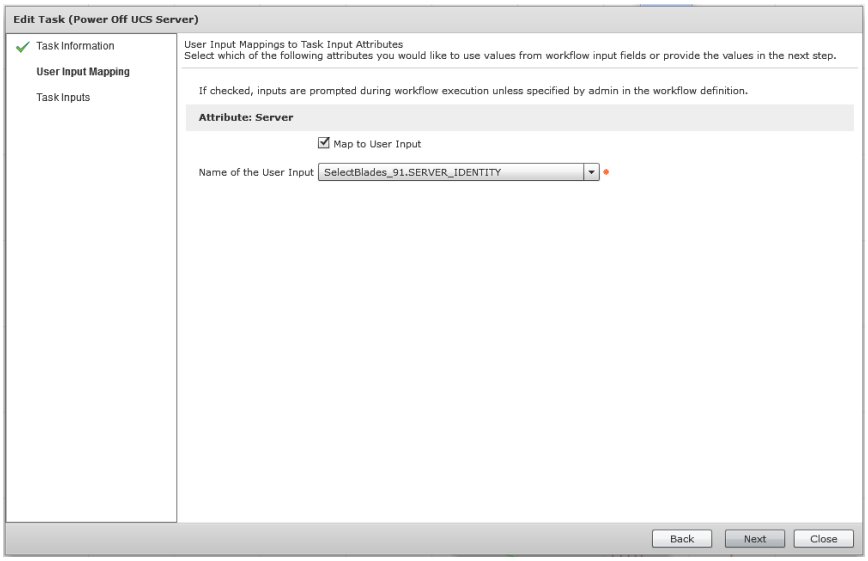


Figure 20.

As shown below, Fig 21 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

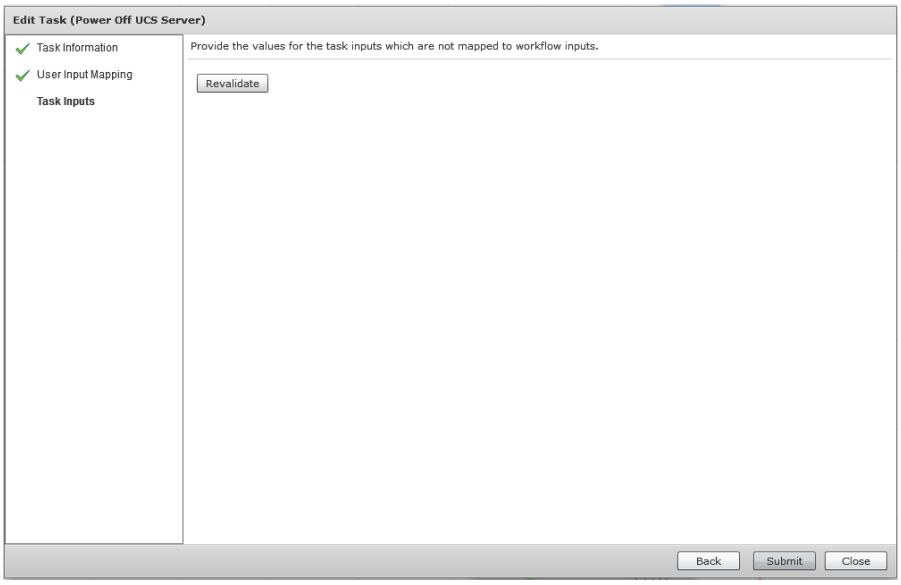


Figure 21.

Step 6: Setup PXE Boot

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 22 presents basic task information for 'Setup PXE Boot' task. Select 'Next' button to take you to the next screen.

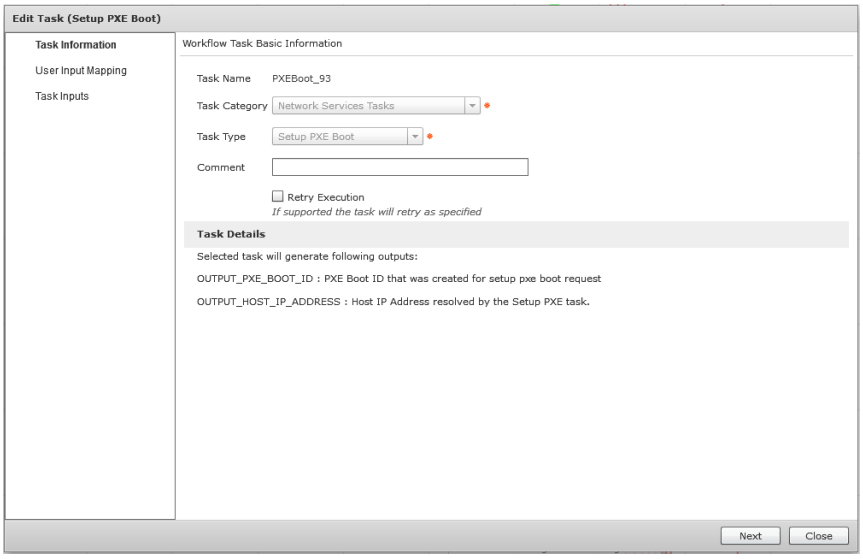


Figure 22.

As shown below, Fig 23 presents binding of required 'Setup PXE Boot' parameters to your environment. Select 'Next' button to take you to the next screen.

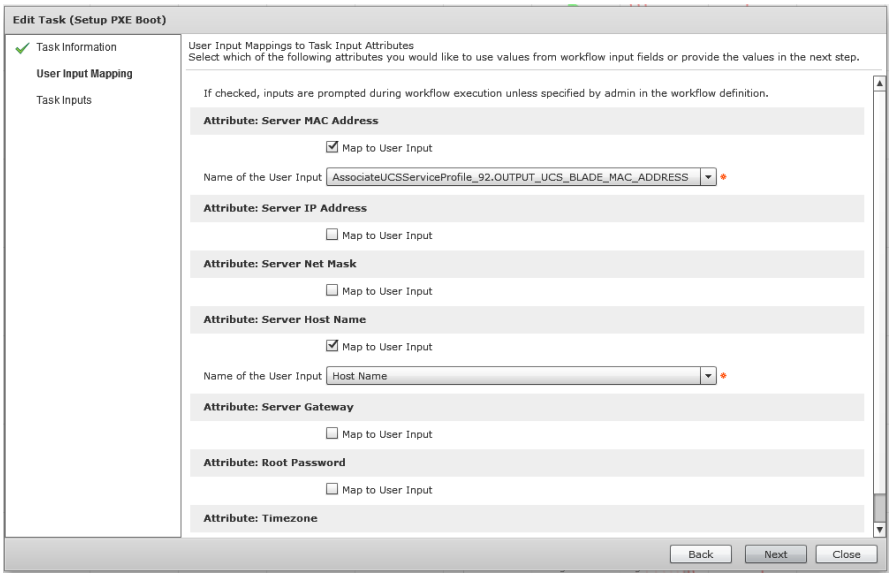


Figure 23.

As shown below, Fig 24 presents binding all the required 'Setup PXE Boot' parameters to your environment. Once you click 'Revalidate' button as depicted in 'Fig 24, Cisco UCS Director will bind all the necessary parameters to respective fields.

In addition, users are expected to select the required 'OS Type', 'Server IP Address (Range)','Server Net Mask', 'Server Gateway', 'Root Password', 'and Timezone'.

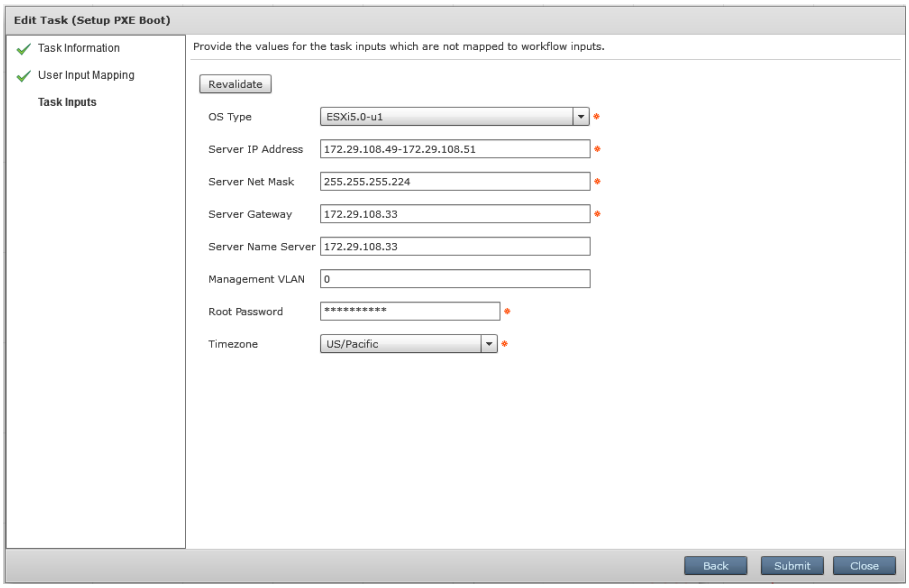


Figure 24.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 7: Create VNX LUN

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 25 presents basic task information for 'Create VNX LUN' task. Select 'Next' button to take you to the next screen.

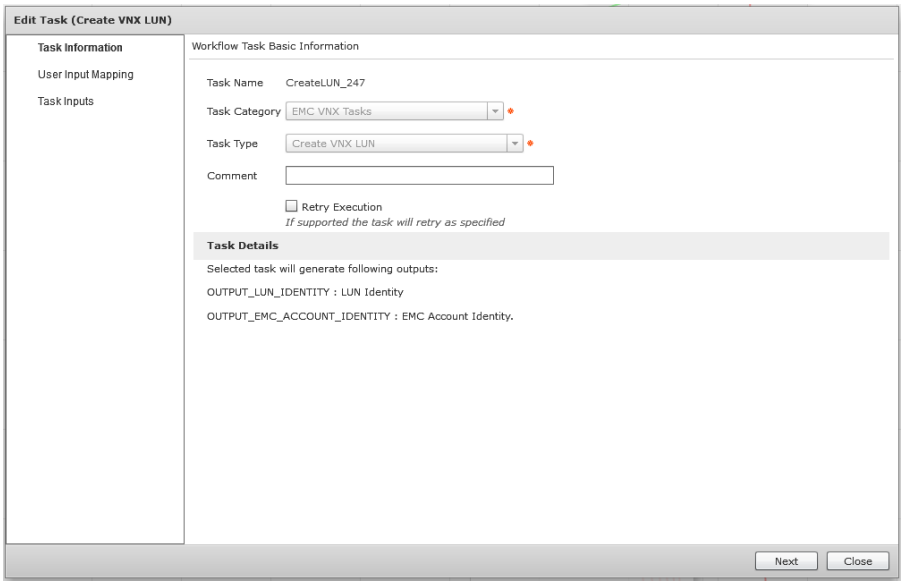


Figure 25.

As shown below, Fig 26 presents binding fields are not required. Select 'Next' button to take you to the next screen.

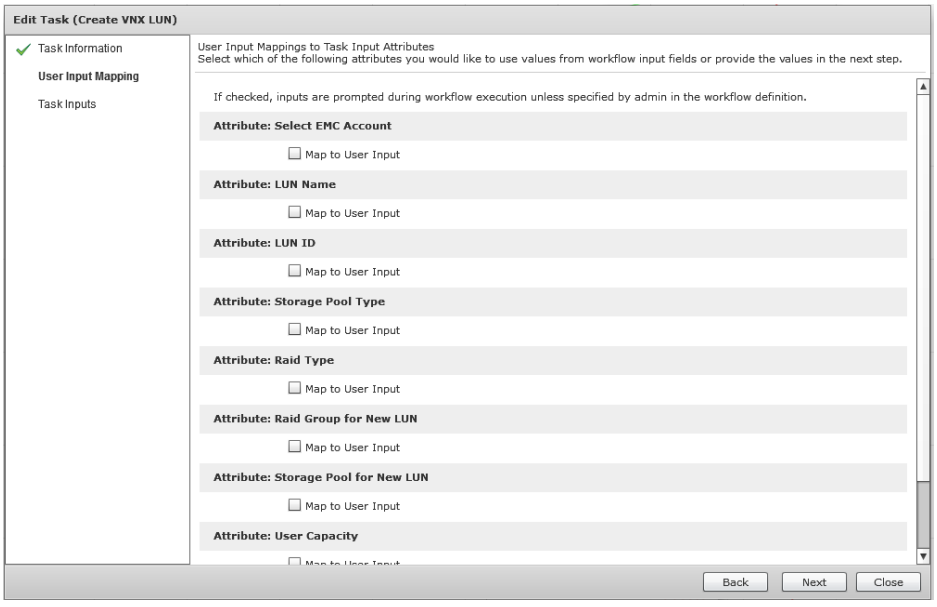


Figure 26.

As shown below, Fig 27 presents very important step of binding all the required 'Create VNX LUN' parameters to your environment. Once you click 'Revalidate' button as depicted in 'Fig 27, Cisco UCS Director will bind all the necessary parameters to respective fields.

In addition, users are expected to select the required inputs in the form.

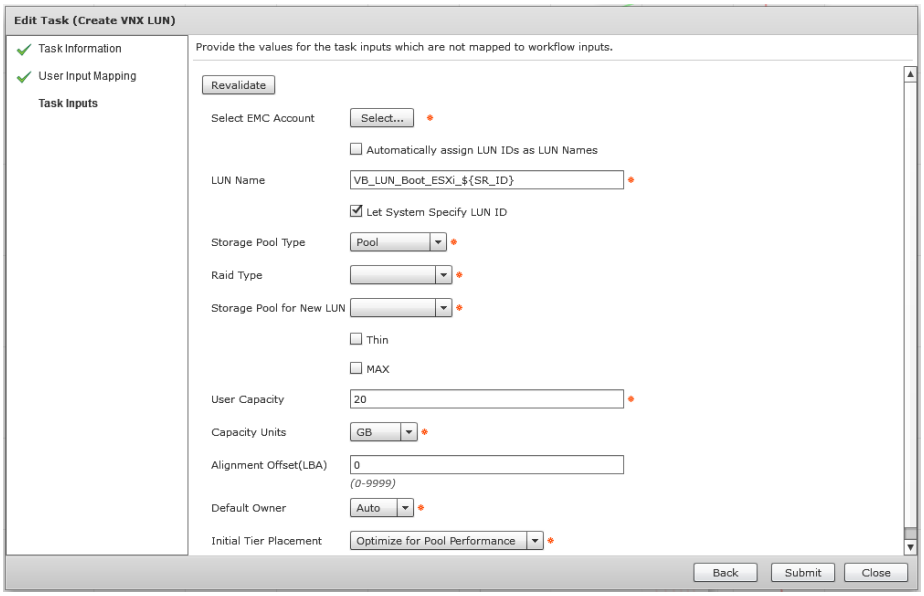


Figure 27.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 8: Create VNX Storage Group

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 28 presents basic task information for 'CreateVNX Storage Group' task. Select 'Next' button to take you to the next screen.

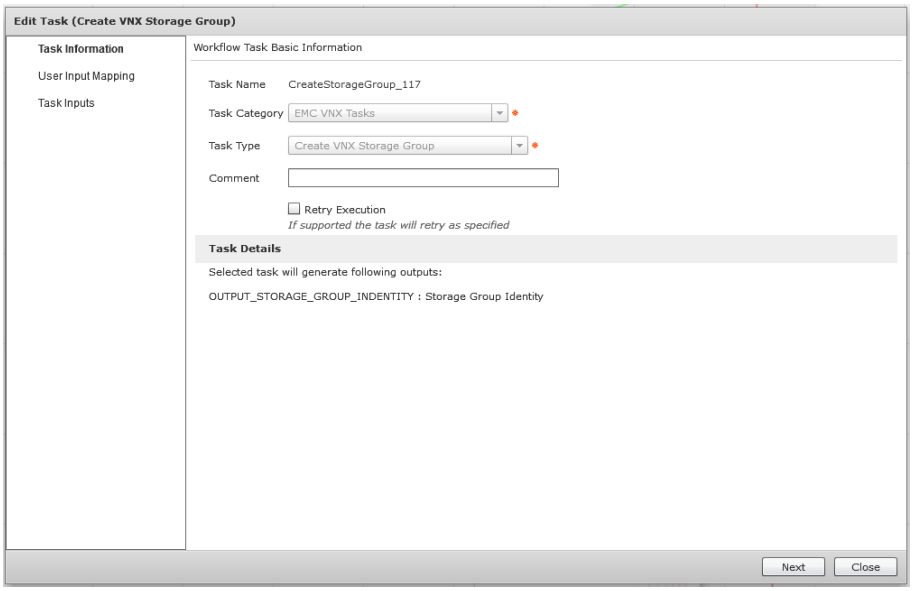


Figure 28.

As shown below, Fig 29 presents binding fields are not required. Select 'Next' button to take you to the next screen.

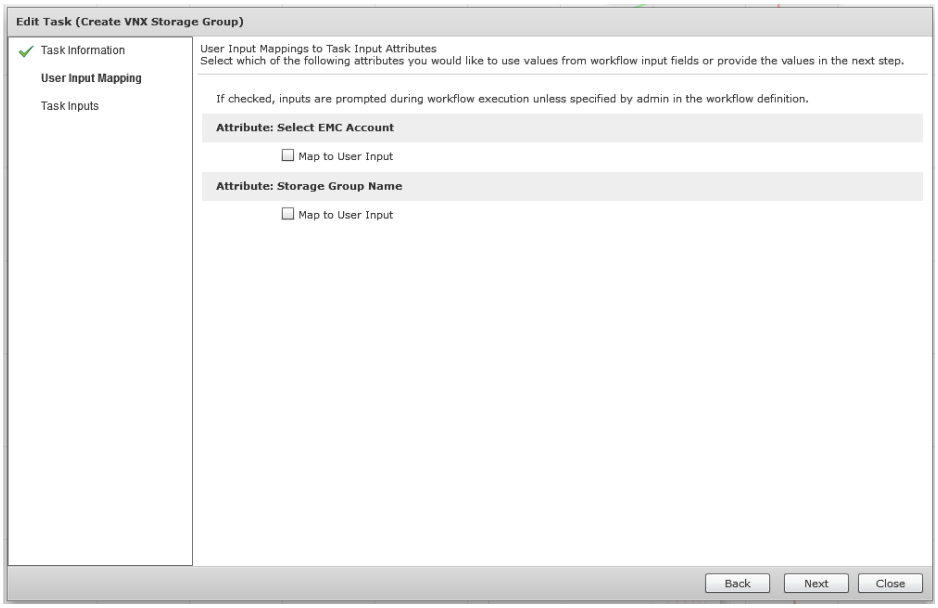


Figure 29.

As shown below, Fig 30 presents binding all the required 'Create VNX Storage Group' parameters to your environment. Once you click 'Revalidate' button as depicted in Fig 30, Cisco UCS Director will bind all the necessary parameters to respective fields.

In addition, users are expected to select the EMC VNX account and change the Storage Group Name if required.

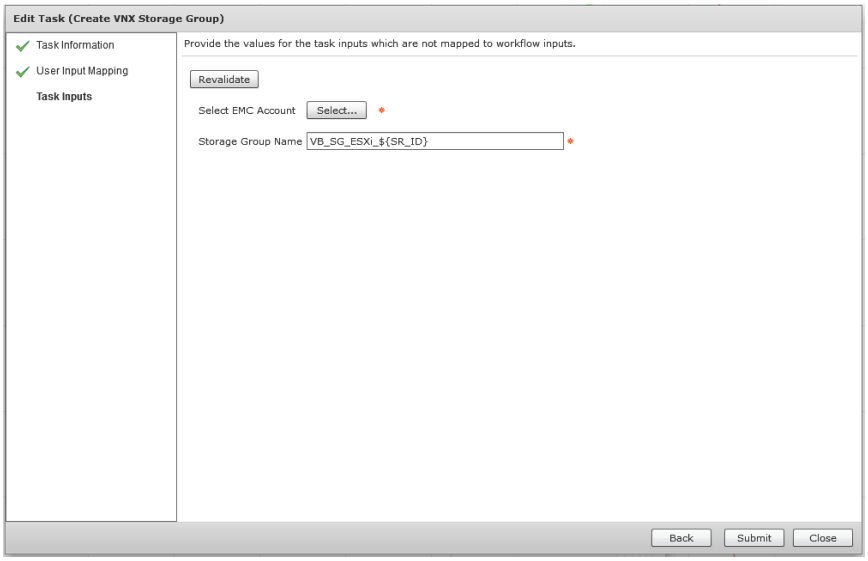


Figure 30.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 9: Add VNX Host Initiator Entry

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 31 presents basic task information for 'Add VNX Host Initiator Entry' task. Select 'Next' button to take you to the next screen.

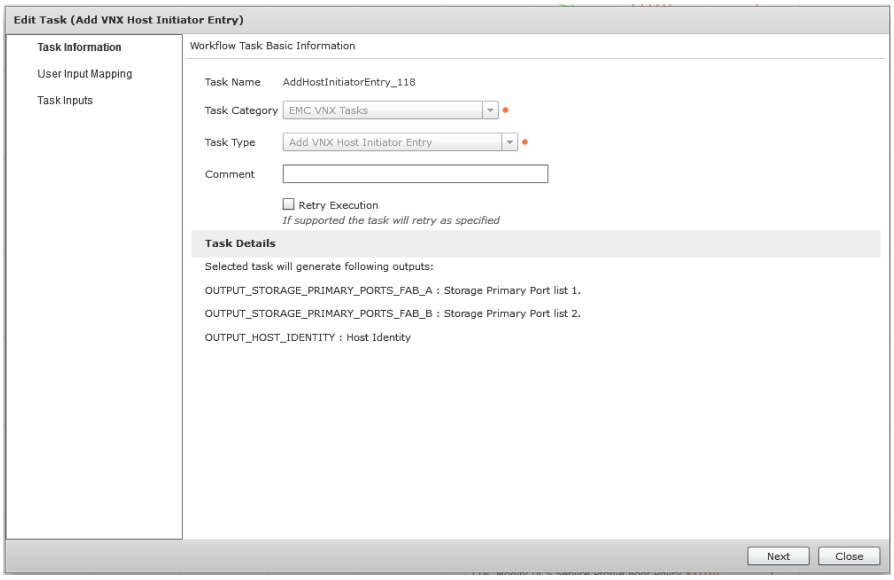


Figure 31.

As shown below, Fig 32 presents binding of required 'Add VNX Host Initiator Entry' parameters to your environment. Select 'Next' button to take you to the next screen.

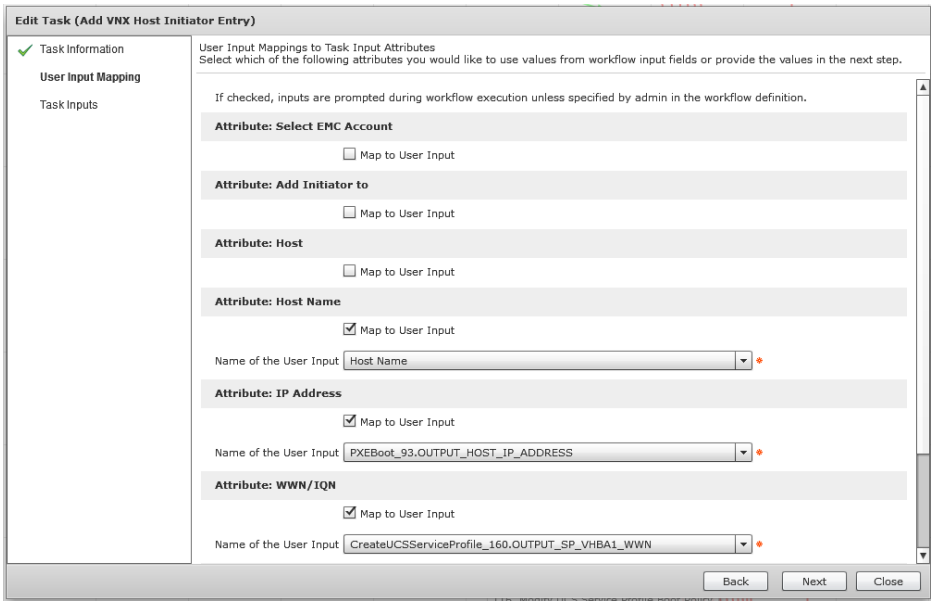


Figure 32.

As shown below, Fig 33 presents binding all the required 'Add VNX Host Initiator Entry' parameters to your environment. Once you click 'Revalidate' button as depicted in 'Fig 33, Cisco UCS Director will bind all the necessary parameters to respective fields.

As show below, Fig 33 users are expected to select the required fields in the form.

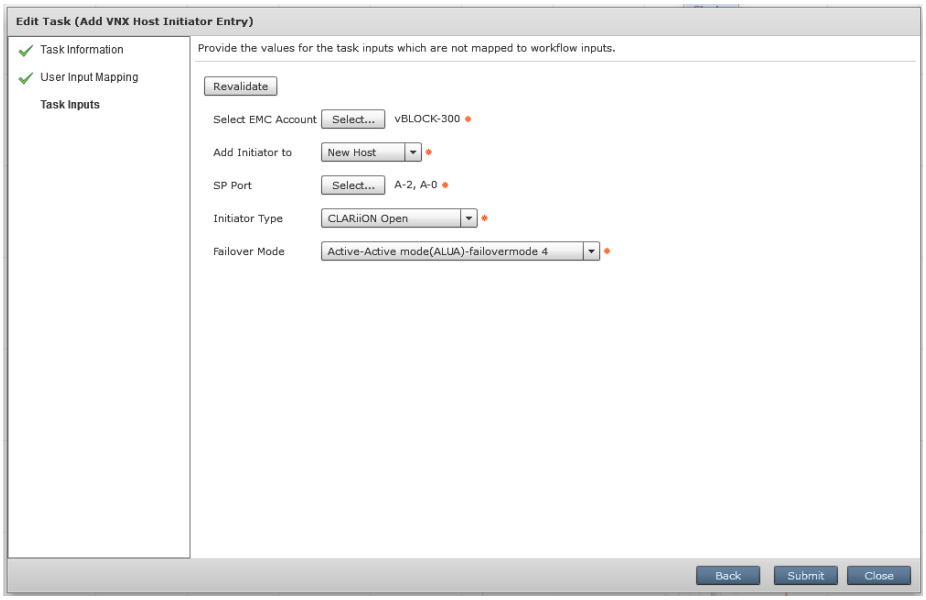


Figure 33.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 10: Add VNX Host Initiator Entry

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 34 presents basic task information for 'Add VNX Host Initiator Entry' task. Select 'Next' button to take you to the next screen.

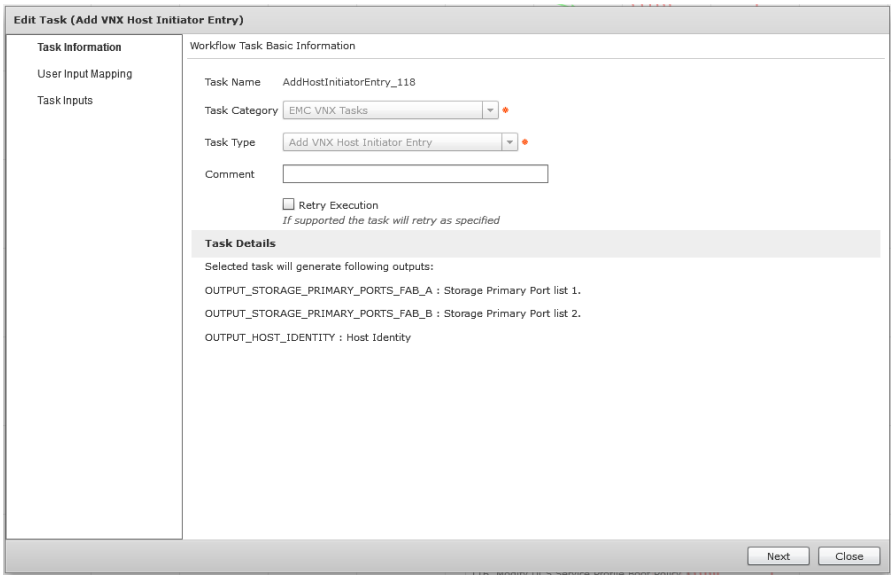


Figure 34.

As shown below, Fig 35 presents binding of required 'Add VNX Host Initiator Entry' parameters to your environment. Select 'Next' button to take you to the next screen.

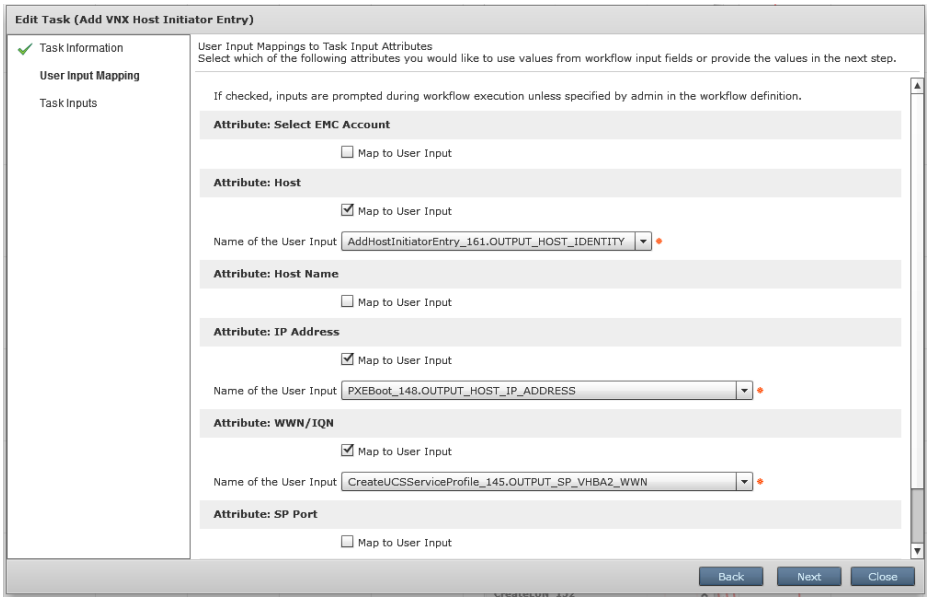


Figure 35.

As shown below, Fig 36 presents binding all the required 'Add VNX Host Initiator Entry' parameters to your environment. Once you click 'Revalidate' button as depicted in Fig 36, Cisco UCS Director will bind all the necessary parameters to respective fields.

As show below, Fig 36 users are expected to select the required fields in the form.

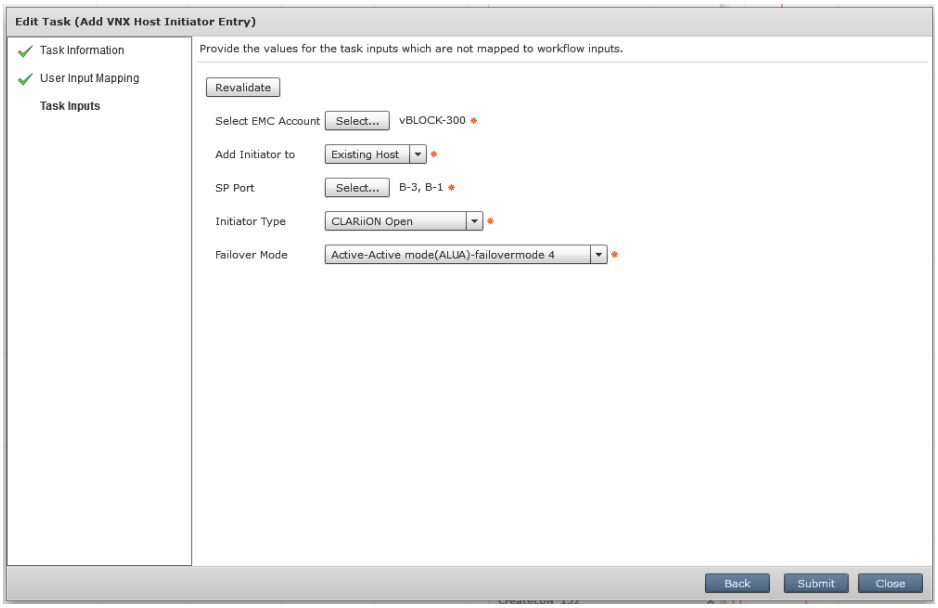


Figure 36.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 11: Generic Configure SAN Zoning

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 37 presents basic task information for 'Generic Configure SAN Zoning' task. Select 'Next' button to take you to the next screen.

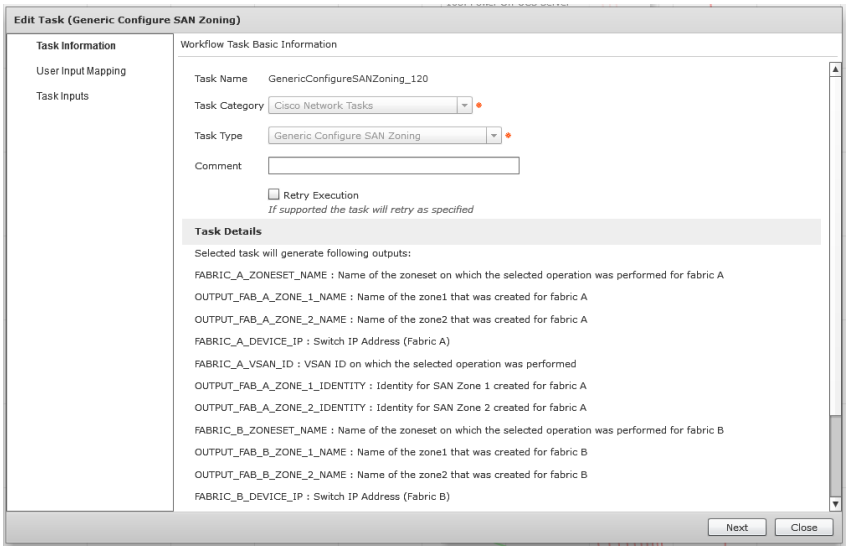


Figure 37.

As shown below, Fig 38 presents binding of required 'Generic Configure SAN Zoning' parameters to your environment. Select 'Next' button to take you to the next screen.

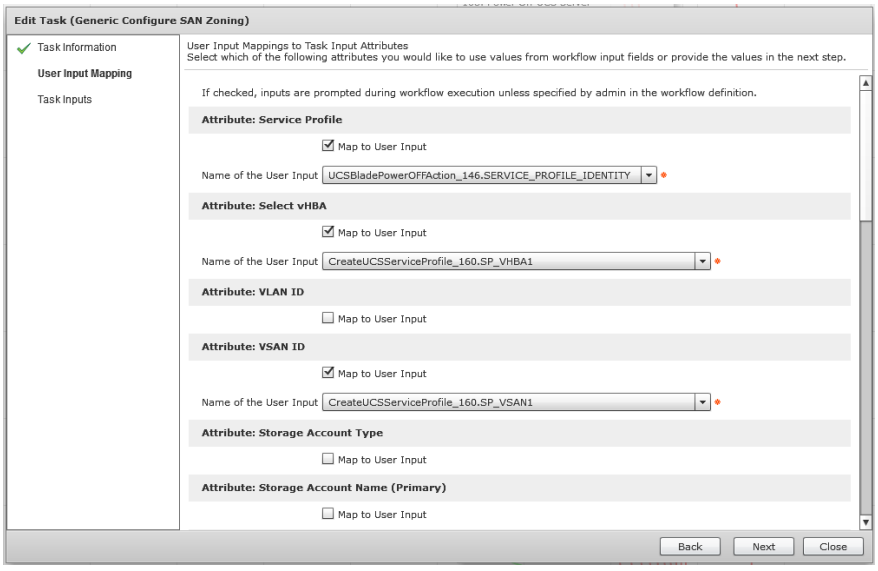


Figure 38.

As shown below, Fig 39 presents (very important step) of binding all the required 'San Zone' parameters to your environment. Once you click 'Revalidate' button as depicted in 'Fig 39', Cisco UCS Director will bind all the necessary parameters to respective fields (as shown below).

Note: Please make sure all the parameters are appropriately mapped and are accurate as per your environment.

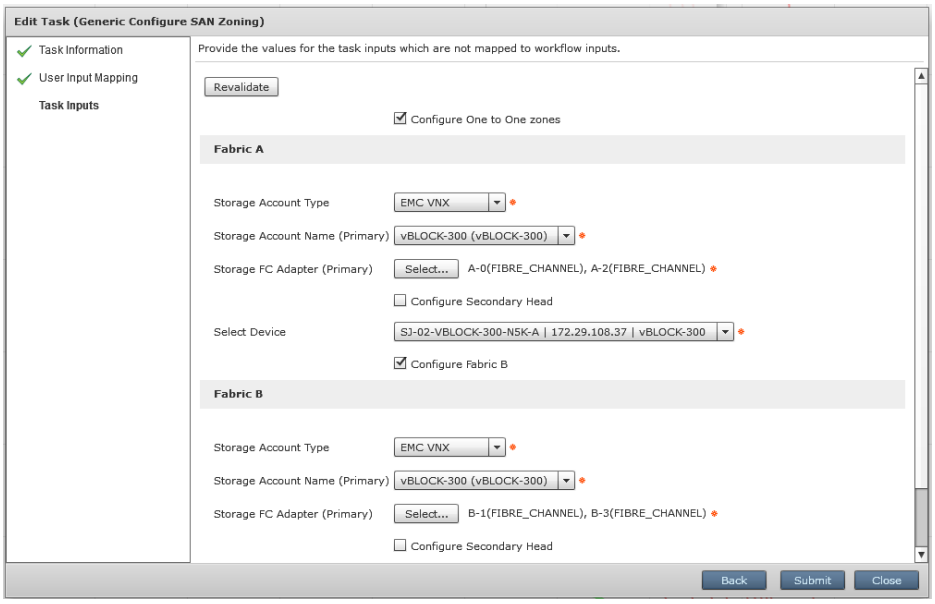


Figure 39.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 12: Add Hosts to VNX Storage Group

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 40 presents basic task information for 'Add Hosts to VNX Storage Group' task. Select 'Next' button to take you to the next screen.

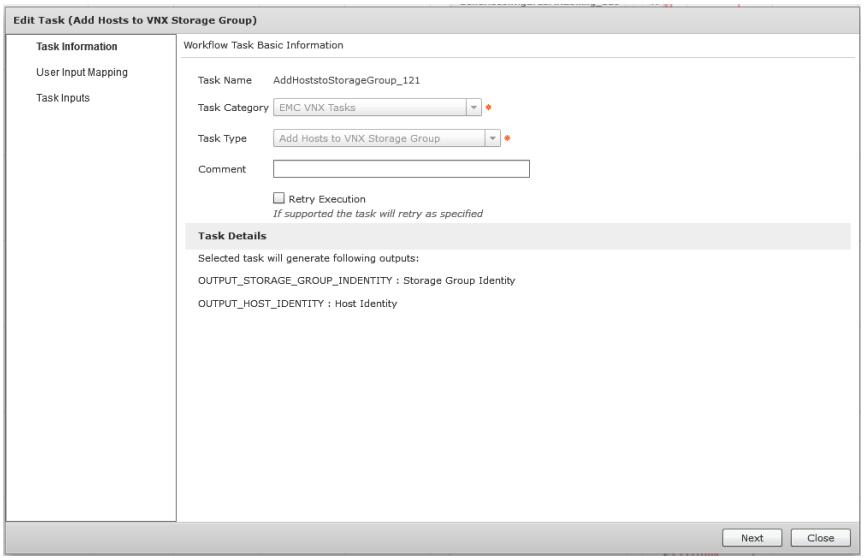


Figure 40.

As shown below, Fig 41 presents binding of required 'Add Hosts to VNX Storage Group' parameters to your environment. Select 'Next' button to take you to the next screen.

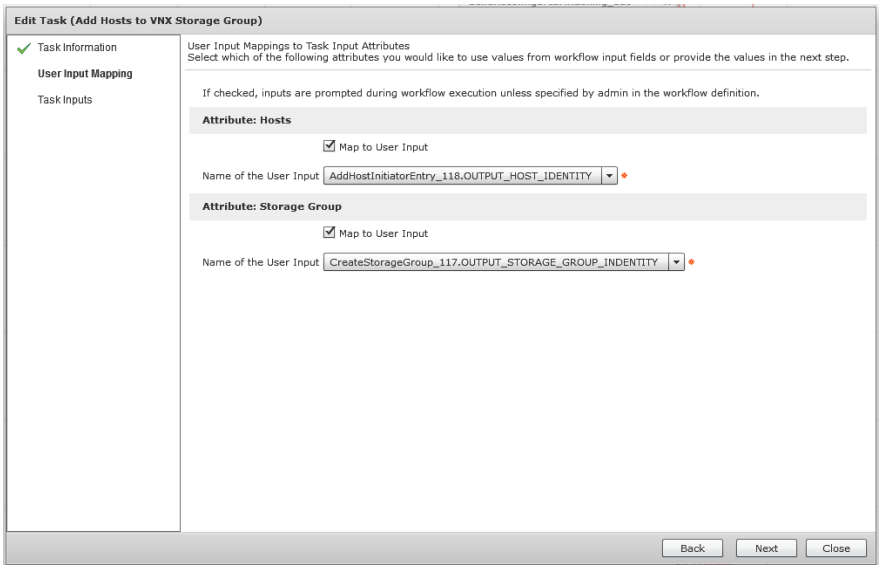


Figure 41.

As shown below, Fig 42 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

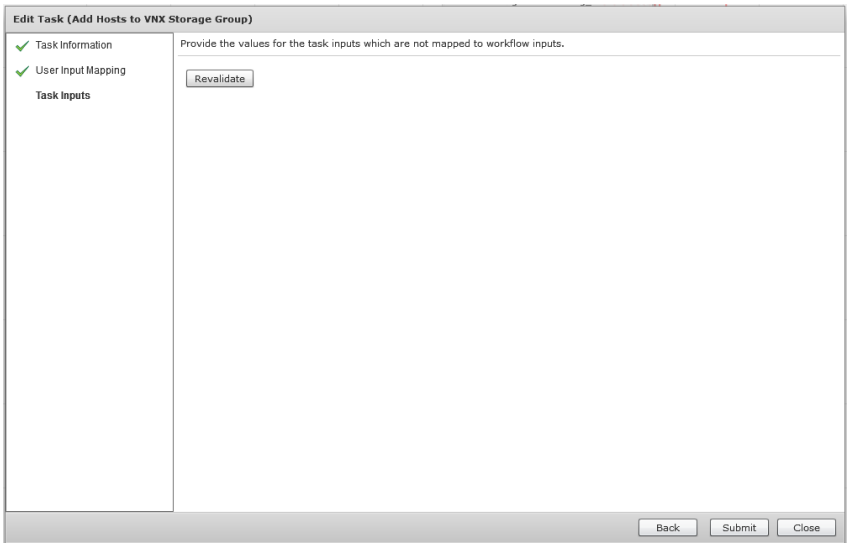


Figure 42.

Step 13: Add VNX LUN to Storage Group

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 43 presents basic task information for 'Add VNX LUN Storage Group' task. Select 'Next' button to take you to the next screen.

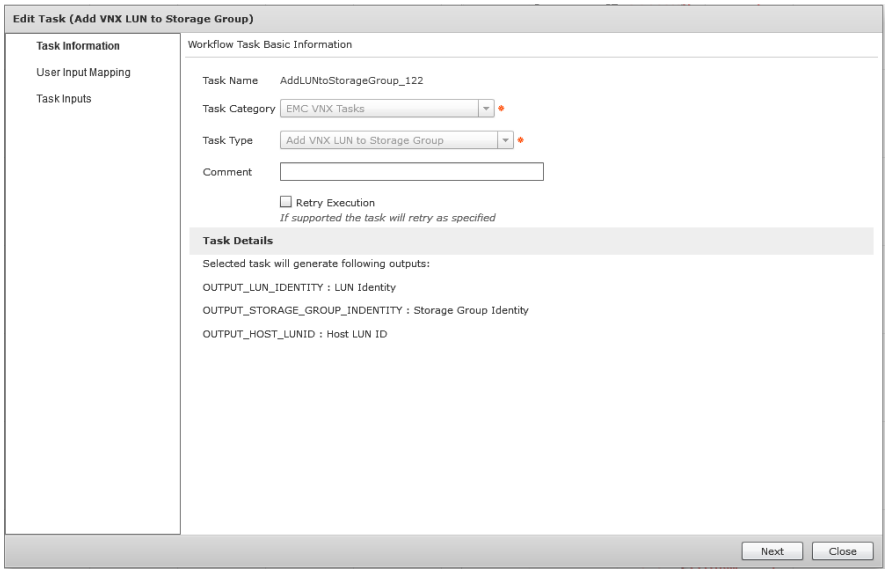


Figure 43.

As shown below, Fig 44 presents binding of required 'Add VNX LUN Storage Group' parameters to your environment. Select 'Next' button to take you to the next screen.

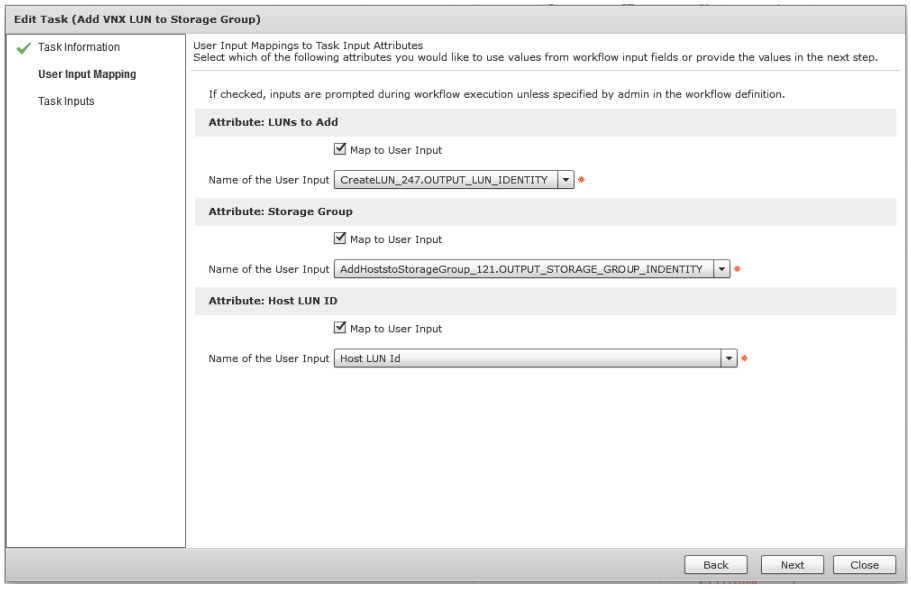


Figure 44.

As shown below, Fig 45 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

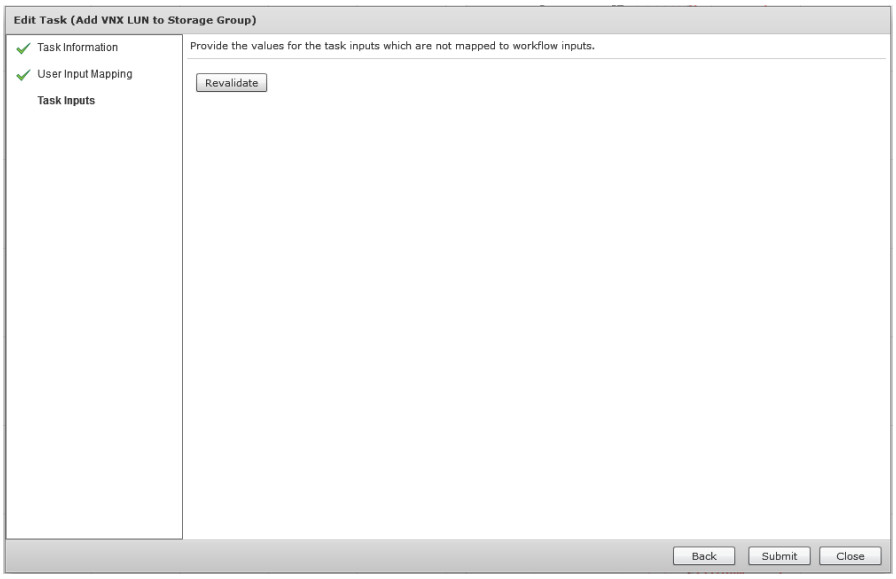


Figure 45.

Step 14: Modify UCS Service Profile Boot Policy

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 46 presents basic task information for 'Modify UCS Service Profile Boot Policy' task.Select 'Next' button to take you to the next screen

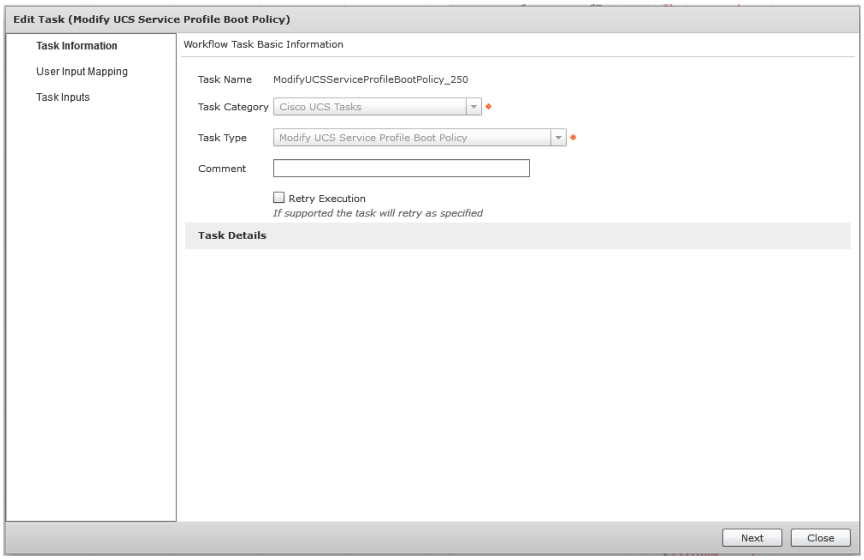


Figure 46.

As shown below, Fig 47 presents binding of required 'Modify UCS Service Profile Boot Policy' parameters to your environment. Select 'Next' button to take you to the next screen.

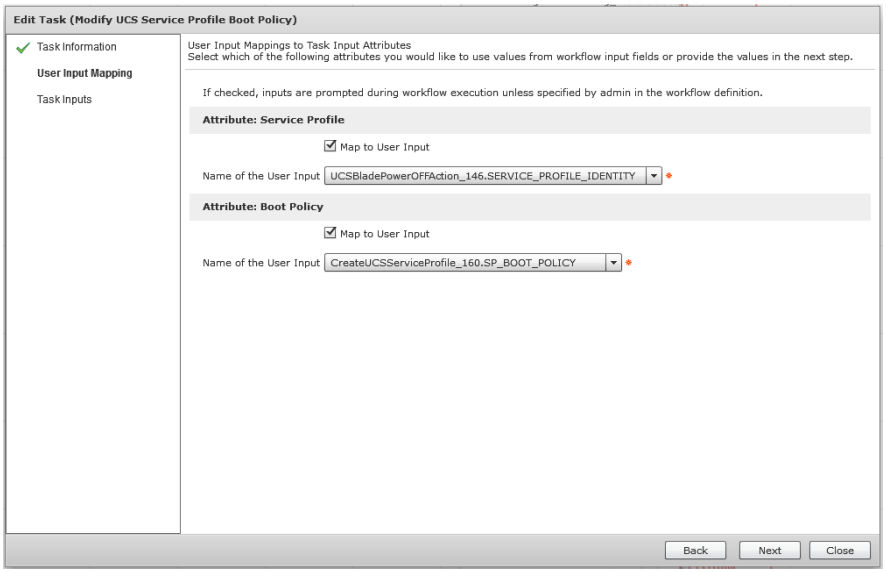


Figure 47.

As shown below, Fig 48 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

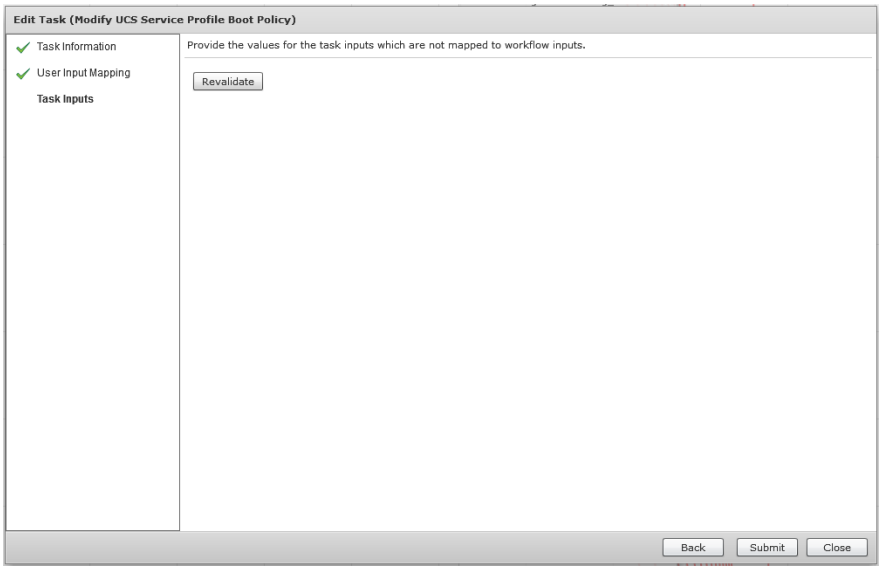


Figure 48.

Step 15: Modify UCS Boot Policy LUN ID

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 49 presents basic task information for 'Modify UCS Boot Policy LUN ID' task.Select 'Next' button to take you to the next screen.

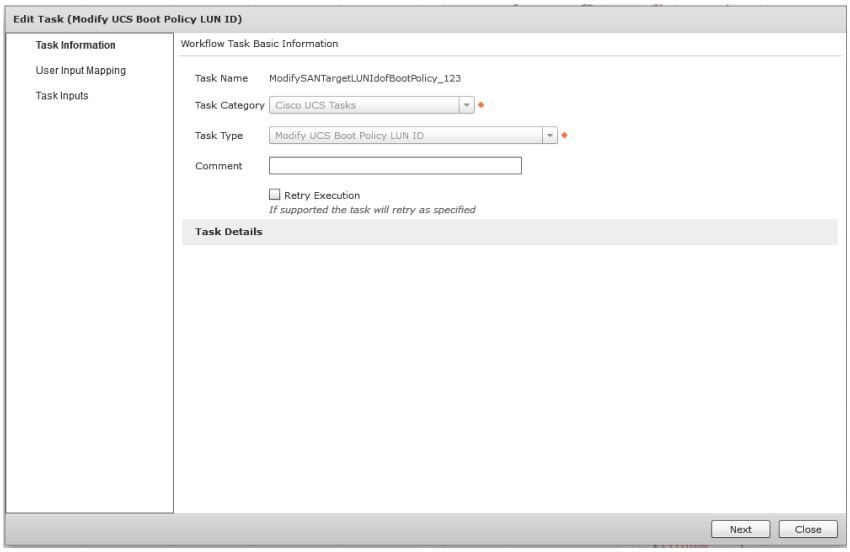


Figure 49.

As shown below, Fig 50 presents binding of required 'Modify UCS Boot Policy LUN ID' parameters to your environment. Select 'Next' button to take you to the next screen.

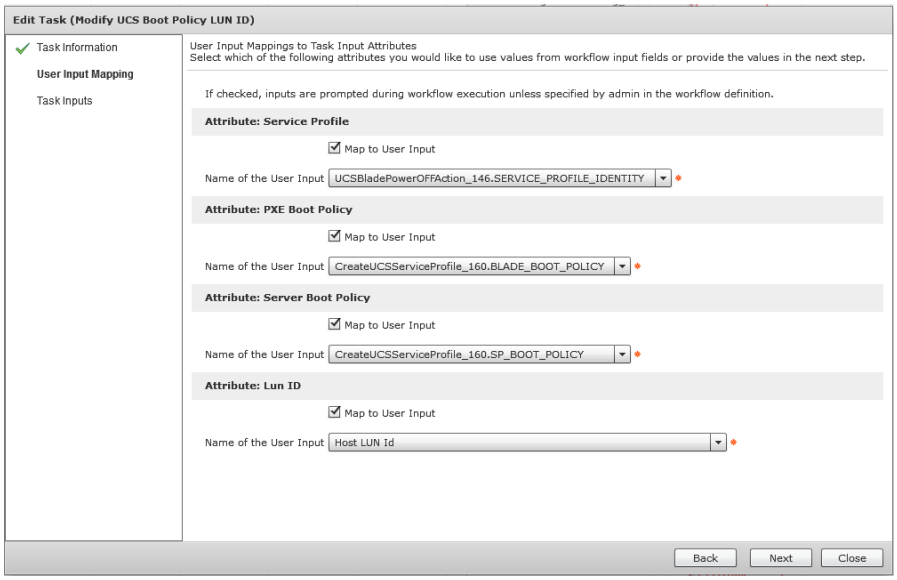


Figure 50.

As shown below, Fig 51 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

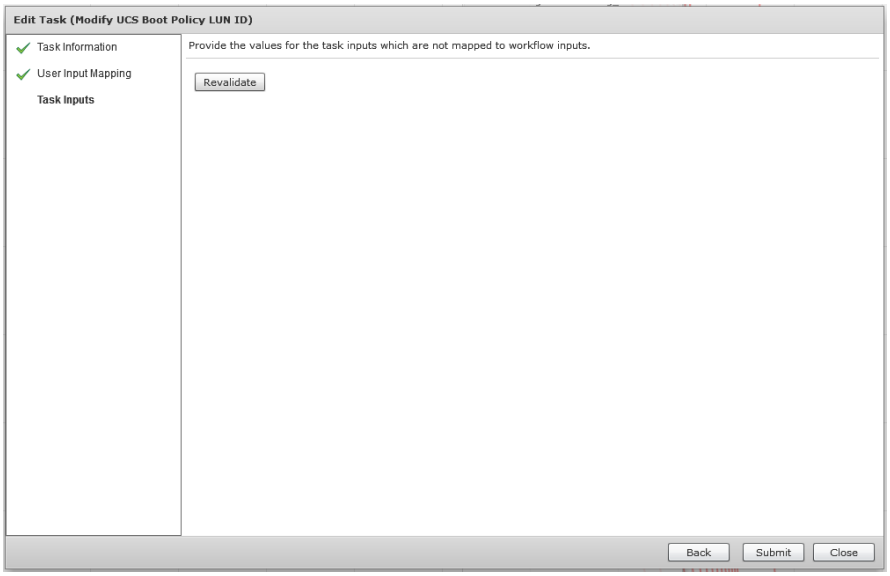


Figure 51.

Step 16: Reset UCS Server

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 52 presents basic task information for 'Reset UCS Server' task.Select 'Next' button to take you to the next screen.

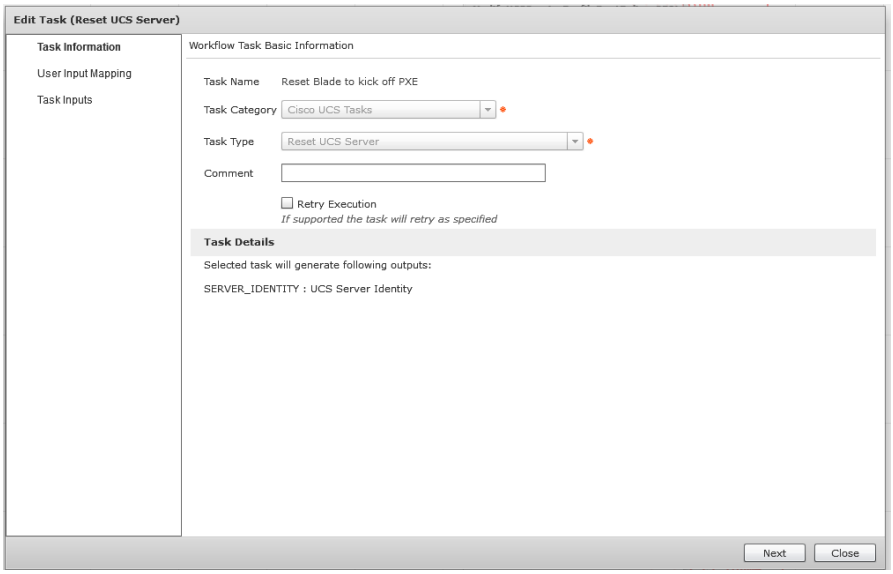


Figure 52.

As shown below, Fig 53 presents binding of required 'Reset UCS Server' parameters to your environment. Select 'Next' button to take you to the next screen.

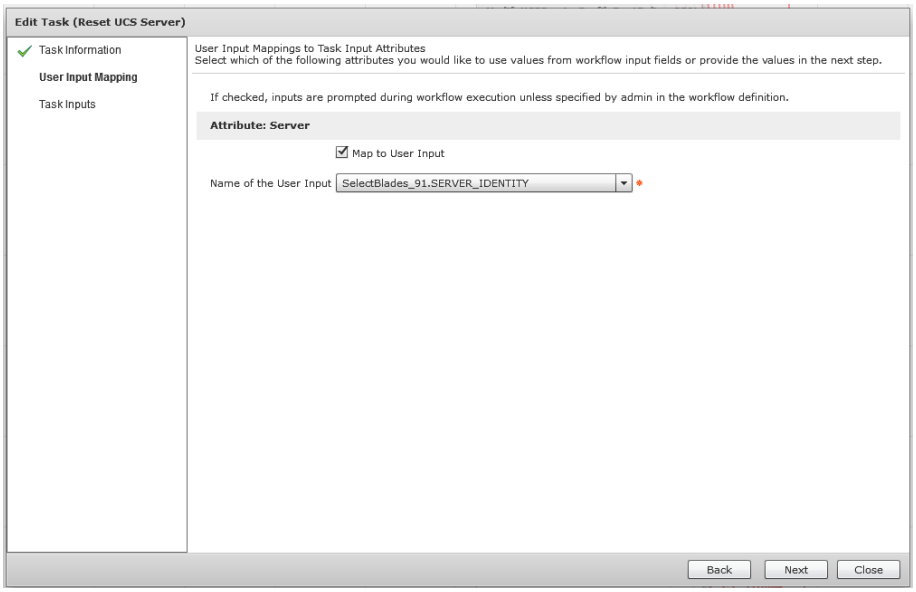


Figure 53.

As shown below, Fig 54 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

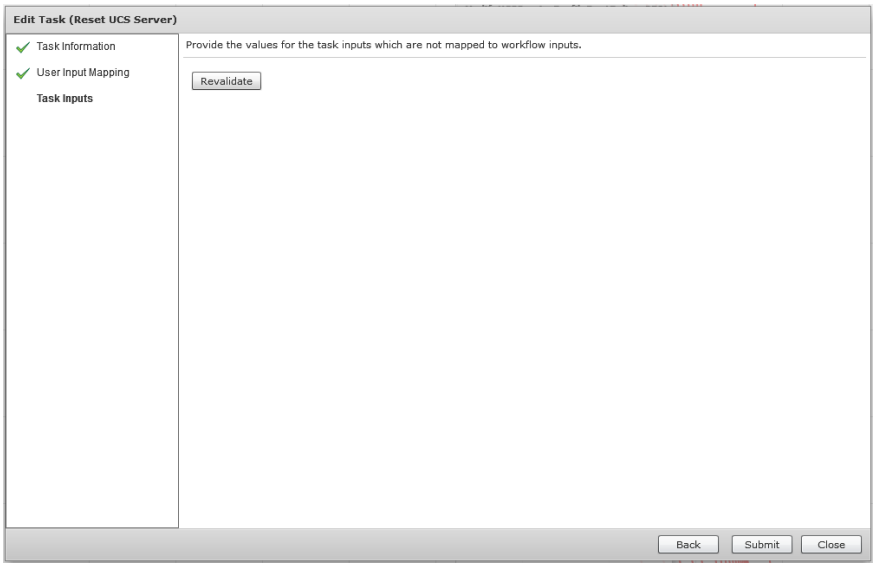


Figure 54.

Step 17: Monitor PXE Boot

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 55 presents basic task information for 'Monitor PXE Boot' task.Select 'Next' button to take you to the next screen.

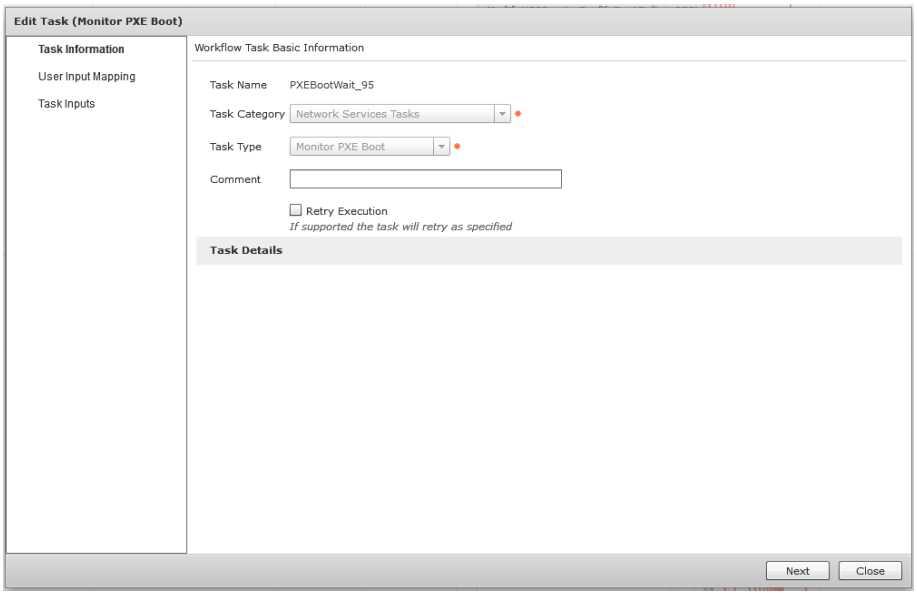


Figure 55.

As shown below, Fig 53 presents binding of required 'Monitor PXE Boot' parameters to your environment. Select 'Next' button to take you to the next screen.

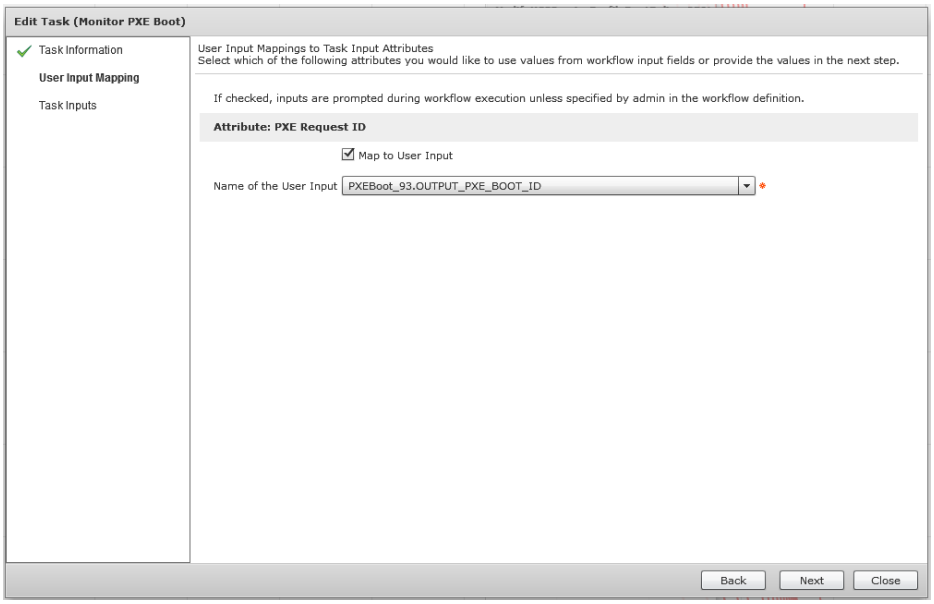


Figure 56.

As shown below, Fig 57 presents select 'Revalidate' button in order to bind this task to local environment. Users are expected to select Max Wait Time.

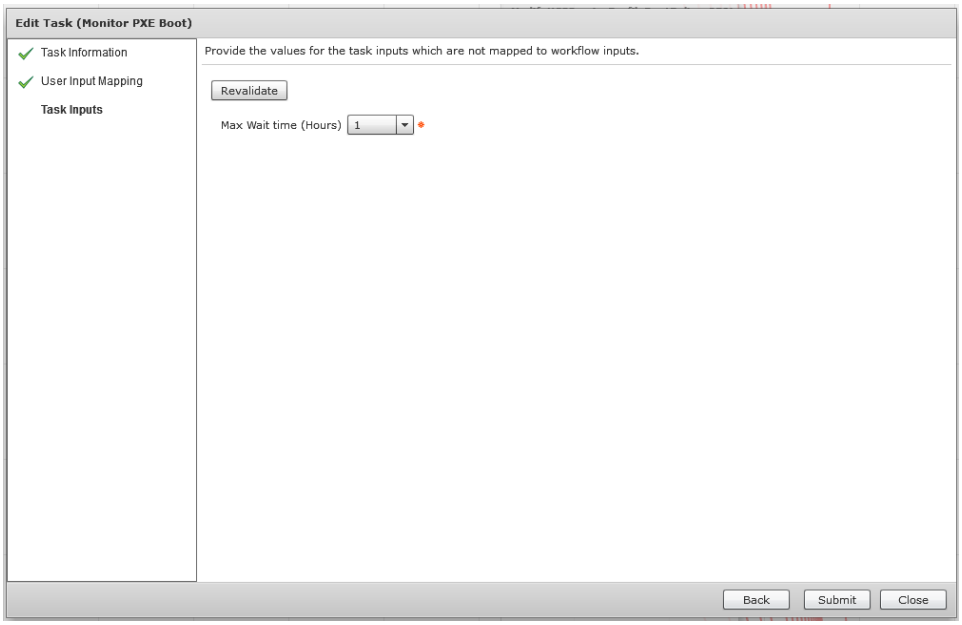


Figure 57.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 18: Modify UCS Service Profile Boot Policy

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 58 presents basic task information for 'Modify UCS Service Profile Boot Policy' task.Select 'Next' button to take you to the next screen

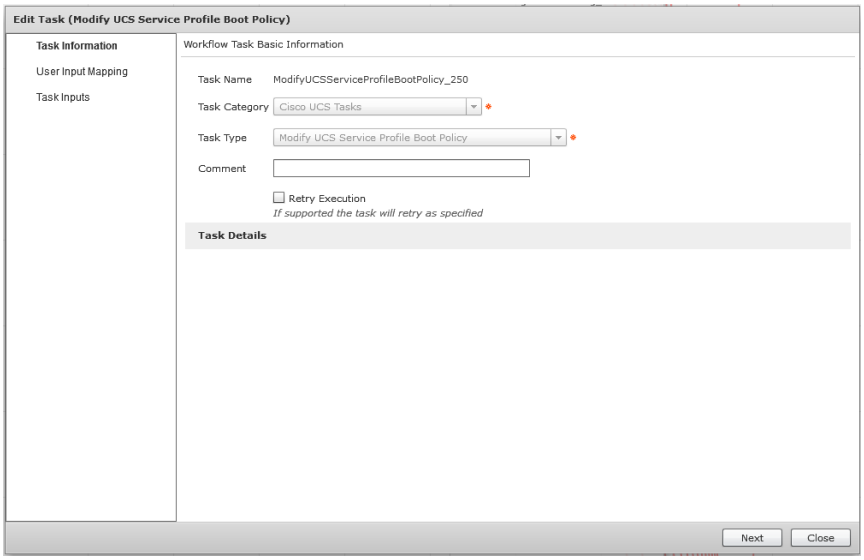


Figure 58.

As shown below, Fig 59 presents binding of required 'Modify UCS Service Profile Boot Policy' parameters to your environment. Select 'Next' button to take you to the next screen.

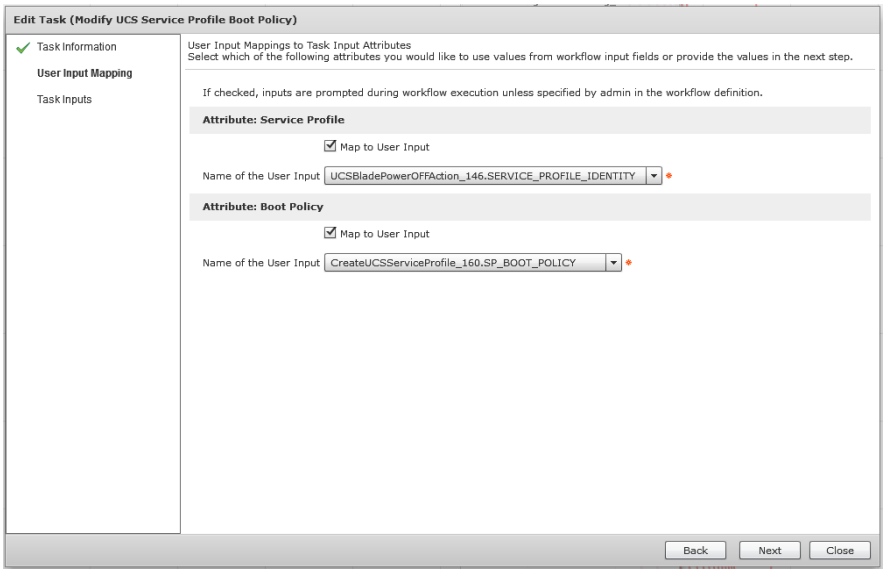


Figure 59.

As shown below, Fig 60 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

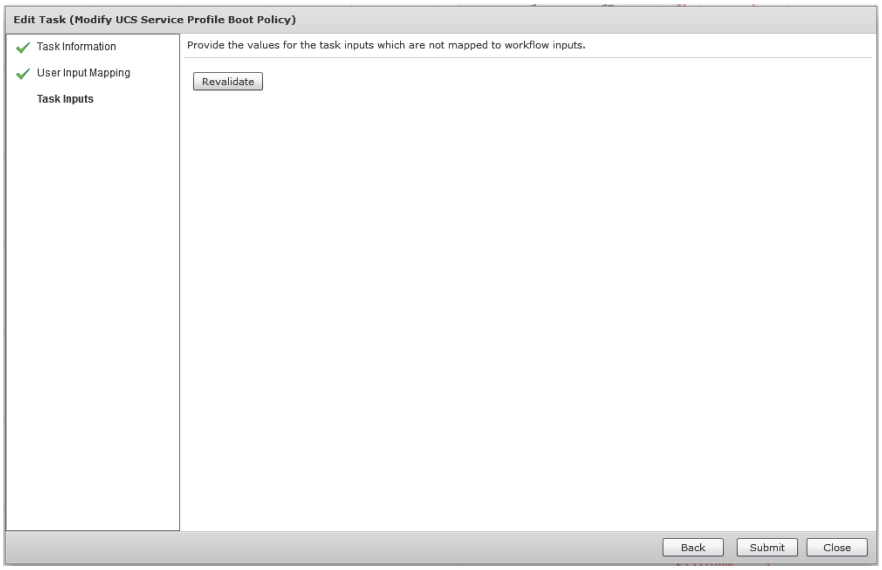


Figure 60.

Step 19: Add VLAN to Service Profile

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 61 presents basic task information for 'Add VLAN to Service Profile' task.Select 'Next' button to take you to the next screen

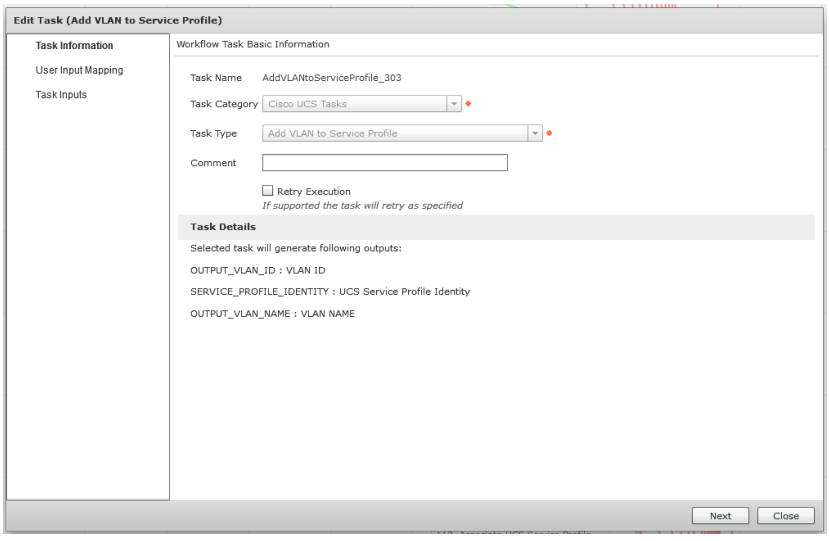


Figure 61.

As shown below, Fig 62 presents binding of required 'Add VLAN to Service Profile' parameters to your environment. Select 'Next' button to take you to the next screen.

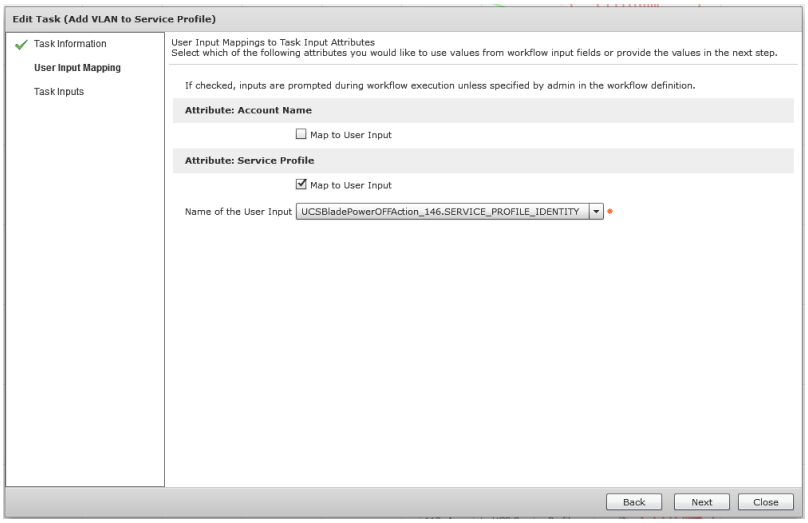


Figure 62.

As shown below, Fig 63 presents binding all the required 'Add VLAN to Service Profile' parameters to your environment. Once you click 'Revalidate' button as depicted in 'Fig 63, Cisco UCS Director will bind all the necessary parameters to respective fields

In addition, users are expected to select 'VLAN Type →Common/Global', 'Common/Global VLANs→Native VLAN'

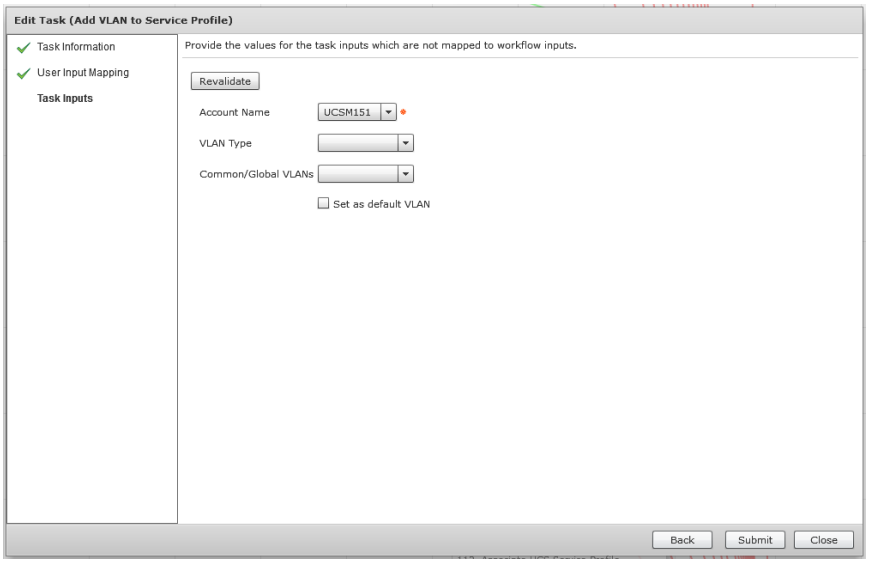


Figure 63.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 20: Disassociate UCS Service Profile

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 64 presents basic task information for 'Disassociate UCS Service Profile ' task.Select 'Next' button to take you to the next screen.

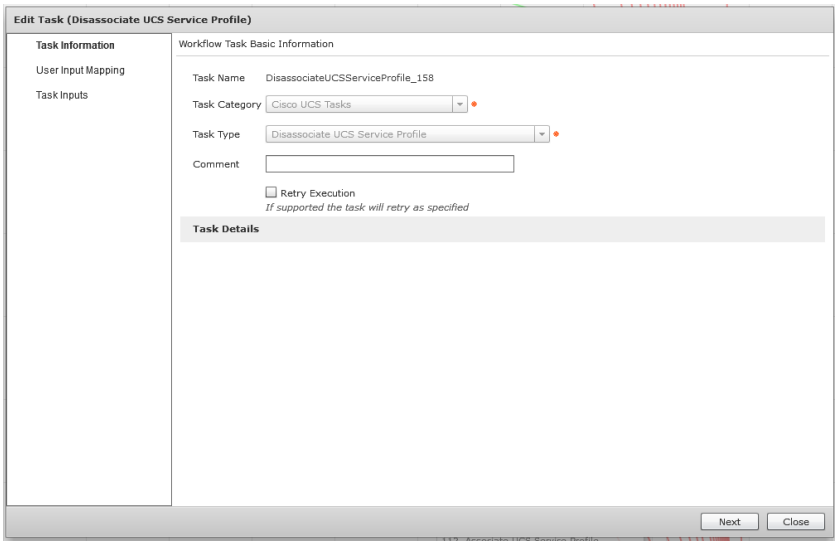


Figure 64.

As shown below, Fig 65 presents binding of required 'Disassociate UCS Service Profile' parameters to your environment. Select 'Next' button to take you to the next screen.

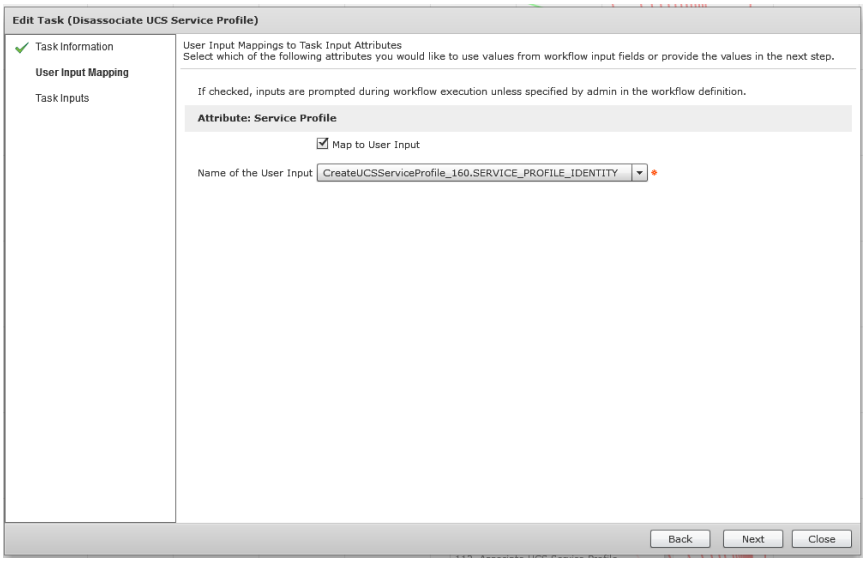


Figure 65.

As shown below, Fig 66 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

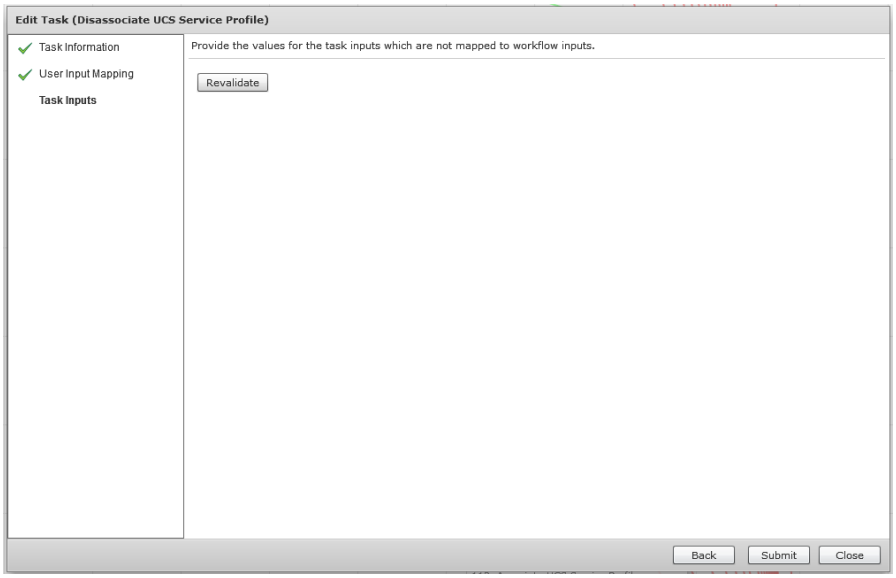


Figure 66.

Step 21: Wait for Specific Duration

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 67 presents basic task information for 'Wait for Specific Duration' task. Select 'Next' button to take you to the next screen.

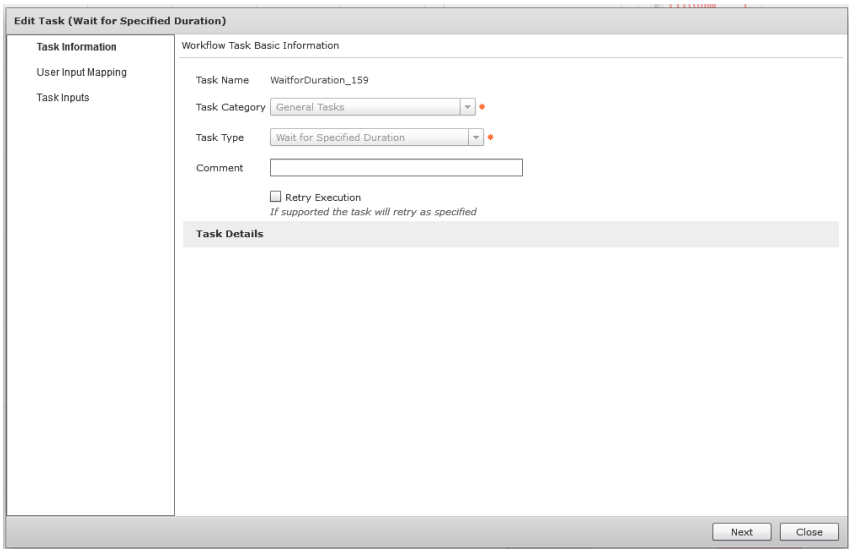


Figure 67.

As shown below, Fig 68 does not require binding if parameters. Select 'Next' button to take you to the next screen.

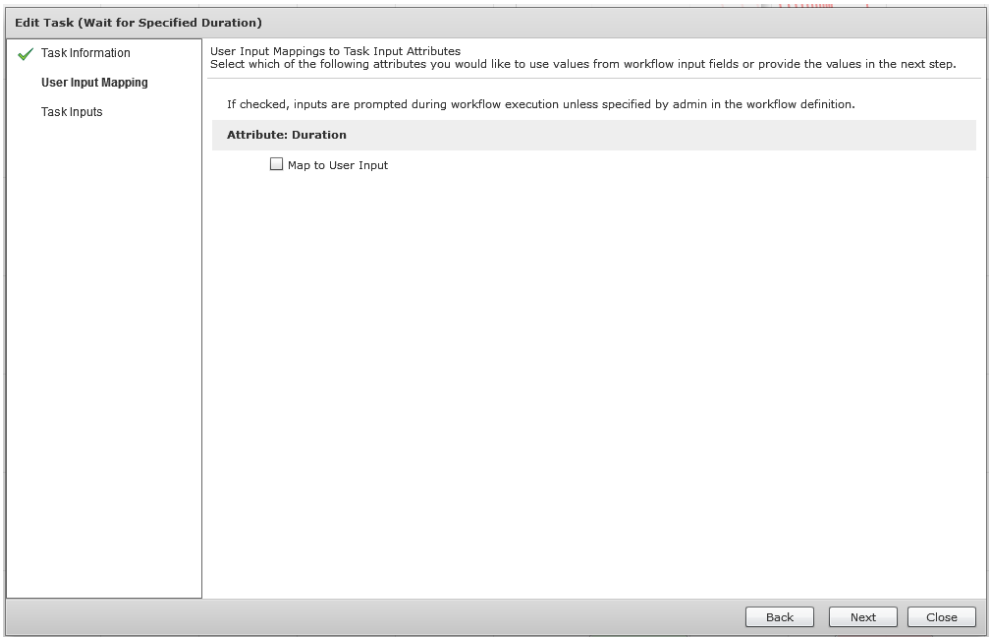


Figure 68.

As shown below, Fig 69 presents select 'Revalidate' button in order to bind this task to local environment. Users are expected to select wait Duration.

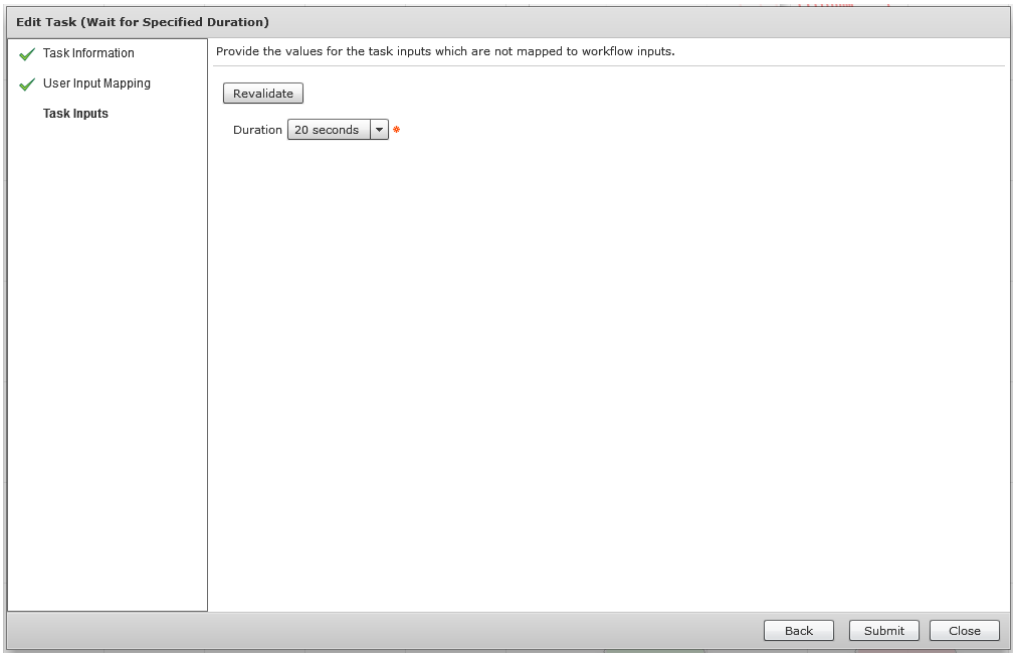


Figure 69.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 22: Associate UCS Profile

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up and walks you through the wizard.

As shown below, Fig 70 presents basic task information for 'Associate UCS Service Profile'task. Select 'Next' button to take you to the next screen.

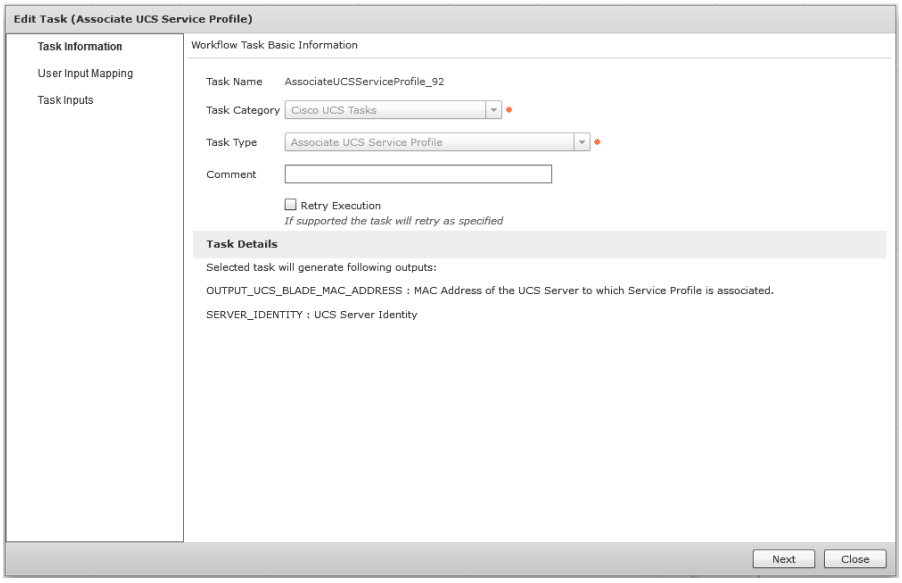


Figure 70.

As shown below, Fig 71 presents binding of required 'Associate UCS Service Profile' parameters to your environment. Select 'Next' button to take you to the next screen.

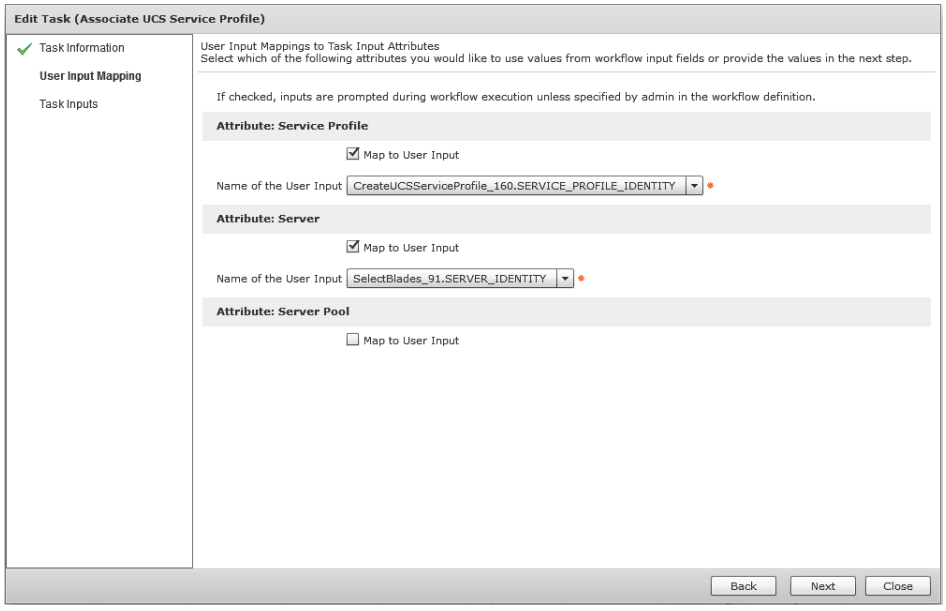
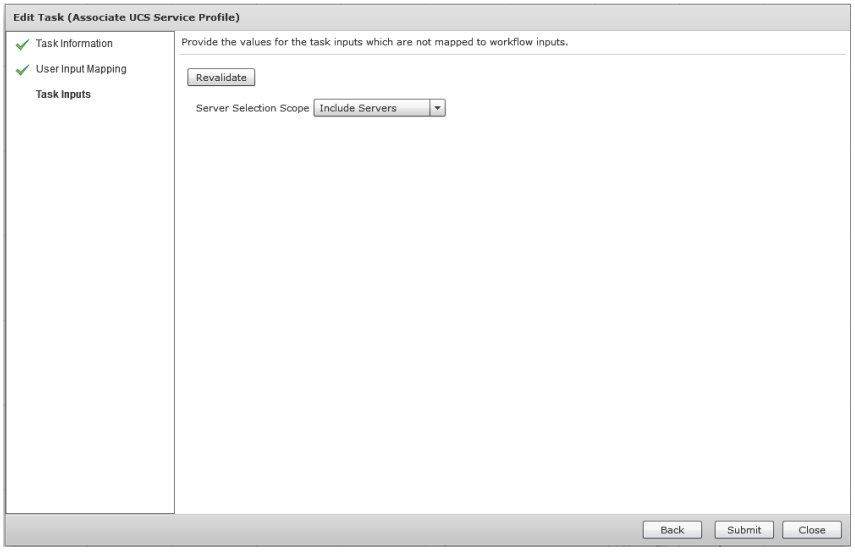


Figure 71.

As shown below, Fig 18 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window. In addition, users will be able select 'Server Selection Scope'.



Step 23: Wait for Specific Duration

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 72 presents basic task information for 'Wait for Specific Duration' task. Select 'Next' button to take you to the next screen.

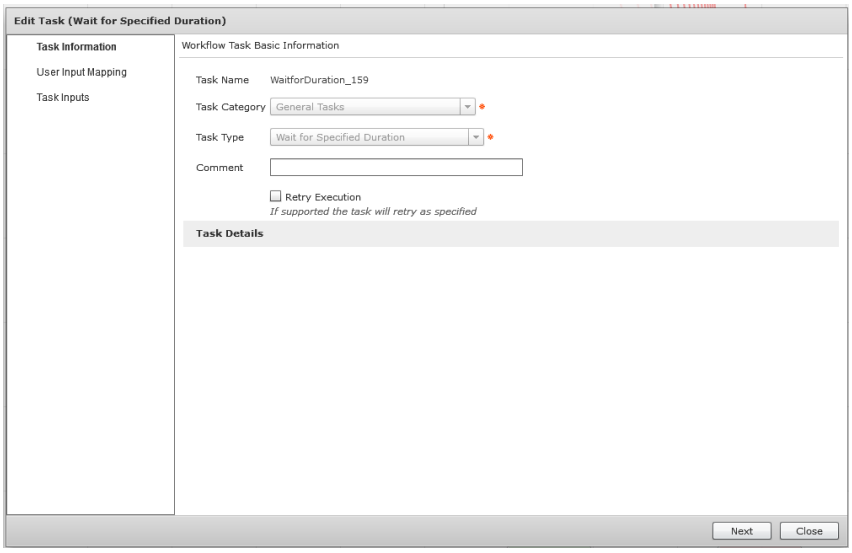


Figure 72.

As shown below, Fig 73 does not require binding if parameters. Select 'Next' button to take you to the next screen.

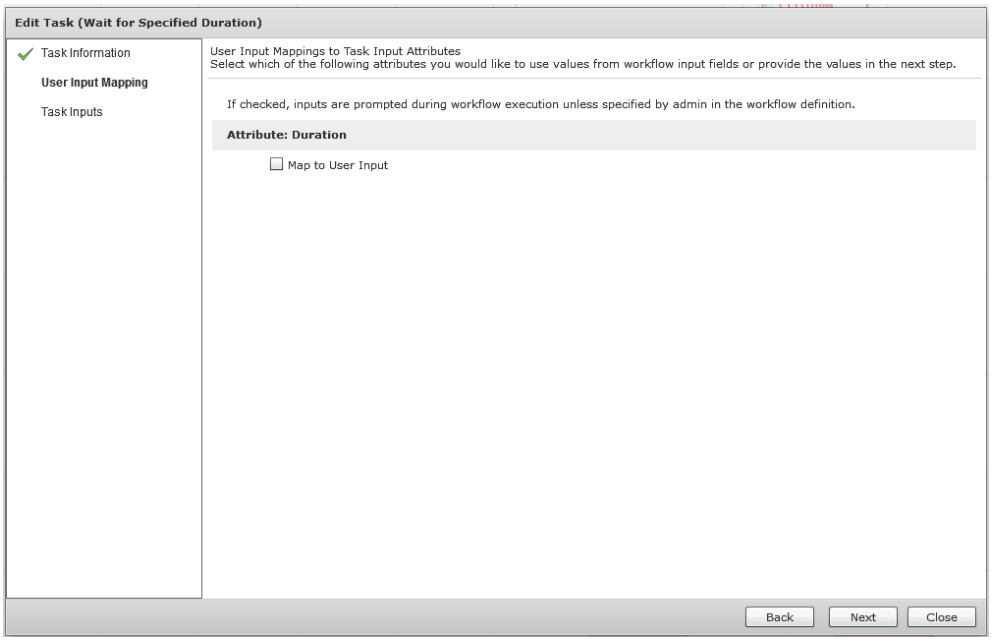


Figure 73.

As shown below, Fig 74 presents select 'Revalidate' button in order to bind this task to local environment. Users are expected to select wait Duration for 2 mins.

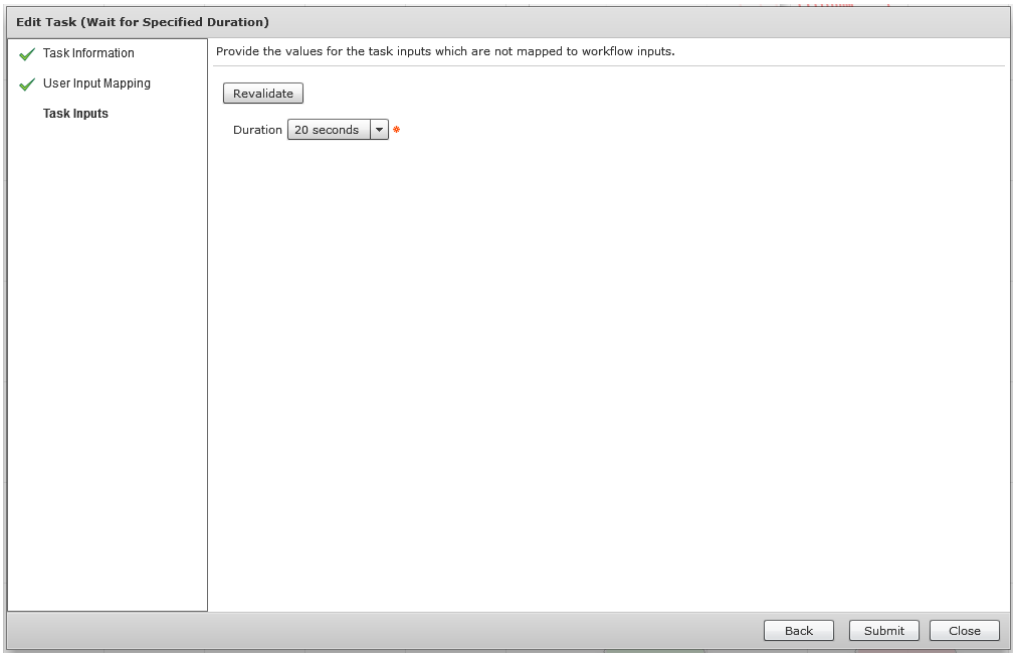


Figure 74.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 24: Reset UCS Server

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 75 presents basic task information for 'Reset UCS Server' task.Select 'Next' button to take you to the next screen.

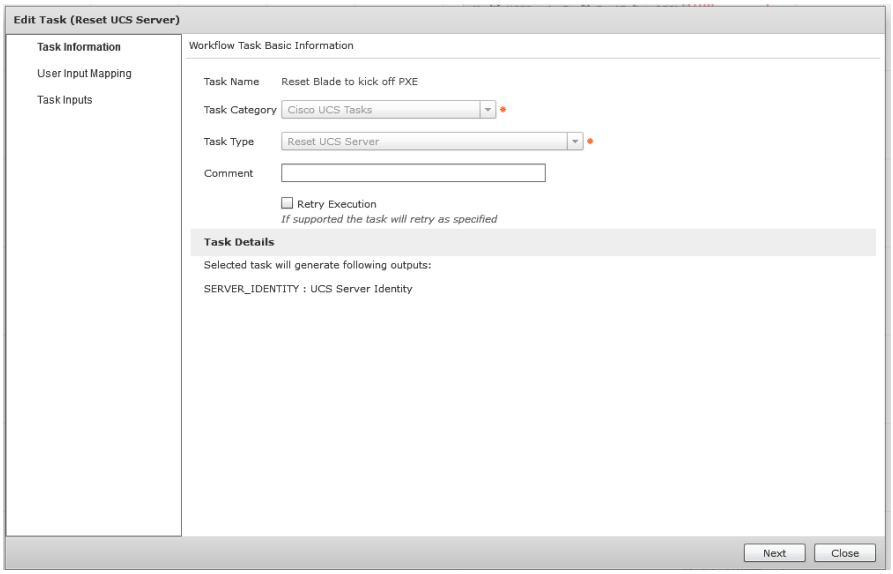


Figure 75.

As shown below, Fig 76 presents binding of required 'Reset UCS Server' parameters to your environment. Select 'Next' button to take you to the next screen.

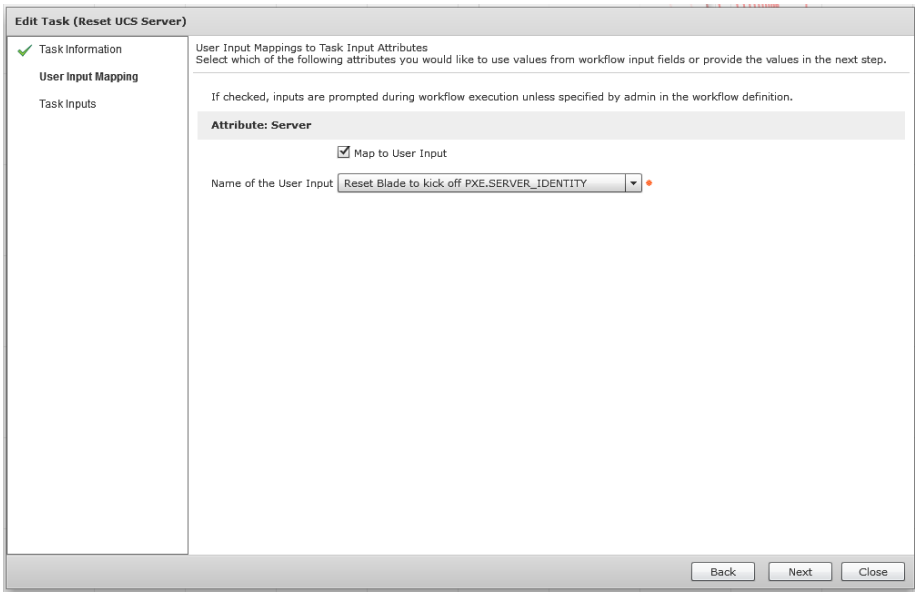


Figure 76.

As shown below, Fig 77 presents select 'Revalidate' button in order to bind this task to local environment. Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

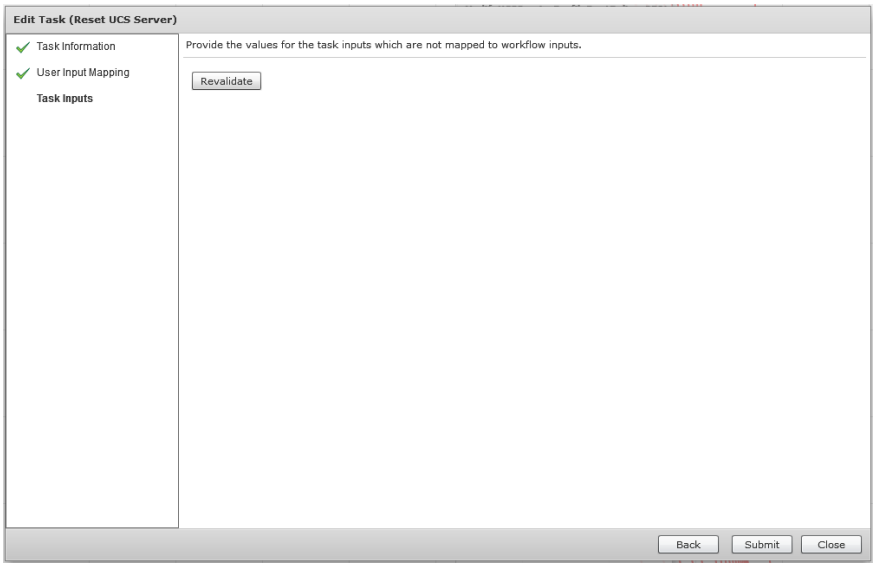


Figure 77.

Use Case 2: Storage Pool Provisioning

Create Storage Pool and mount as Datastore

This section describes one of the VSPEX Test cases/use case for provisioning Storage Pool

The use case is explained with end to end workflow along with screenshots.

The following diagram/screenshot despicts Cisco UCS Director end to end orchestration workflow.

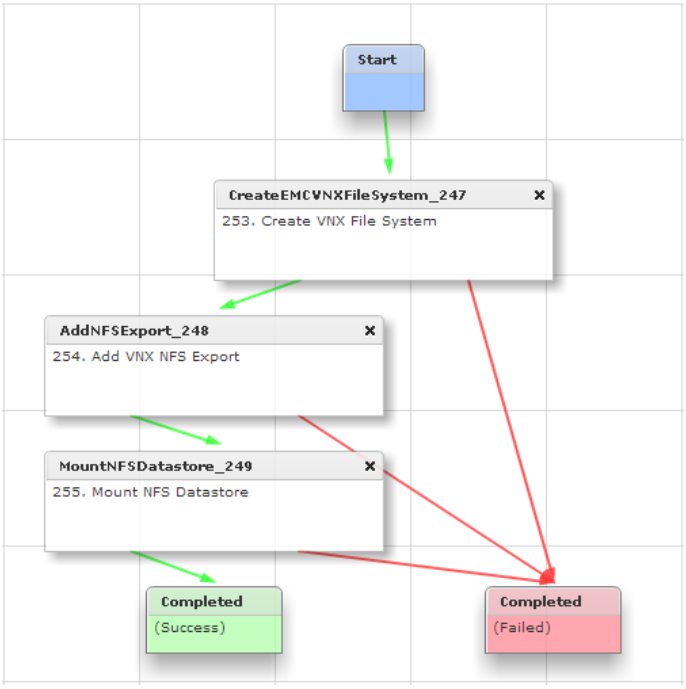


Figure 78.

Workflow Details

This section explains all the workflow steps in details that are part of the Figure 78.

Step 1: Create VNX File System

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 79 presents basic task information for 'Create VNX File System' task. Select 'Next' button to take you to the next screen.

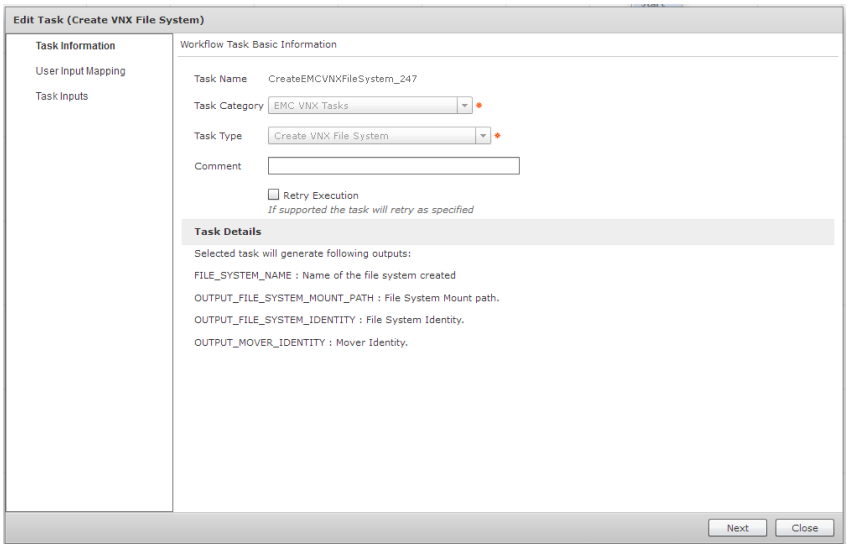


Figure 79.

As shown below, Fig 80 there are no binding inputs required for 'Create VNX File System' to your environment. Select 'Next' button to take you to the next screen.

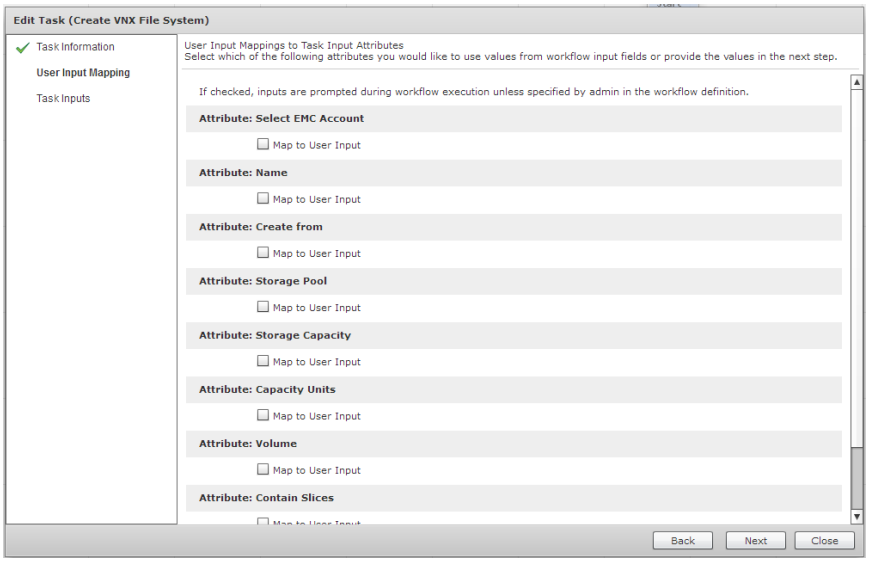


Figure 80.

As shown below, Fig 81 presents binding all the required 'Create VNX File System' parameters to your environment. Once you click 'Revalidate' button as depicted in Fig 81, Cisco UCS Director will bind all the necessary parameters to respective fields (as shown below).

Note: Please make sure all the parameters are appropriately mapped and are accurate as per your environment.

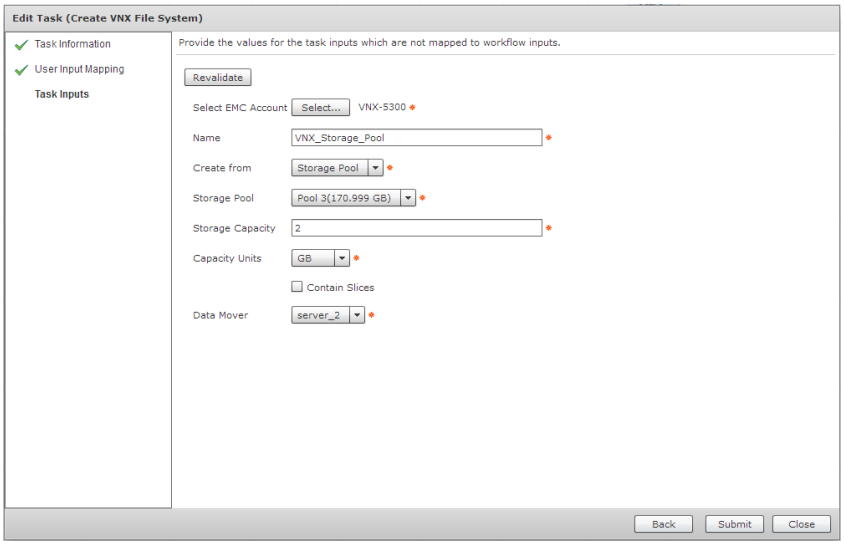


Figure 81.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 2: Create VNX NFS Export

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 82 presents basic task information for 'Create VNX NFS Export' task. Select 'Next' button to take you to the next screen.

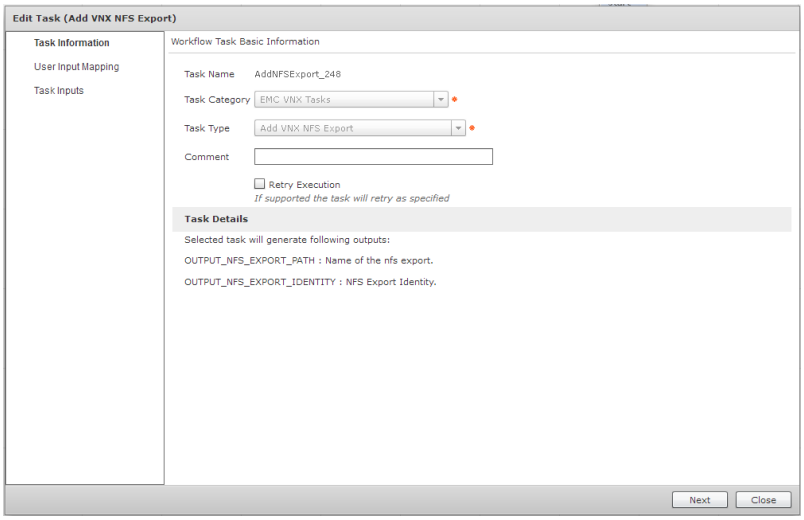


Figure 82.

As shown below, Fig 83 presents binding of required 'Add VNX NFS Export' parameters to your environment. Select 'Next' button to take you to the next screen.

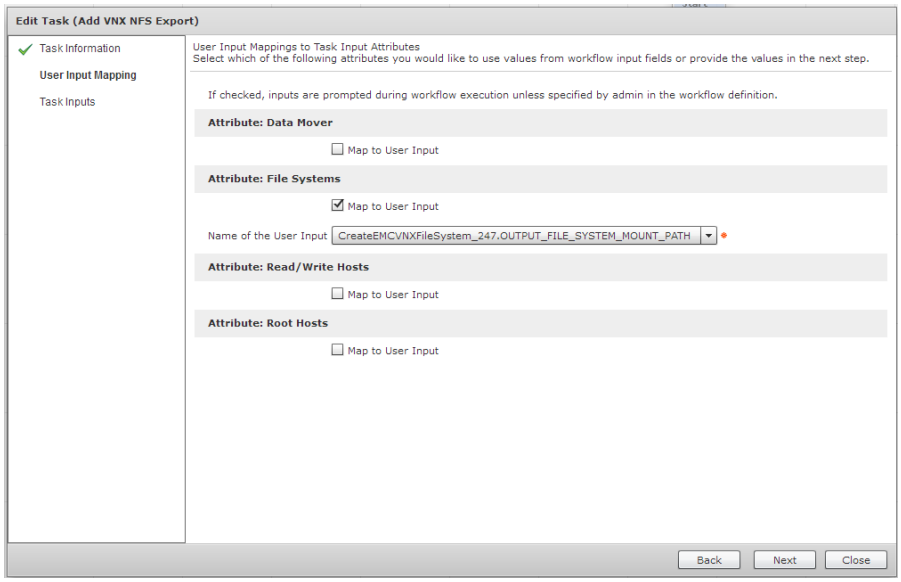


Figure 83.

As shown below, Fig 84 presents binding all the required 'Add VNX NFS Export' parameters to your environment. Once you click 'Revalidate' button as depicted in Fig 84, Cisco UCS Director will bind all the necessary parameters to respective fields (as shown below).

Note: Please make sure all the parameters are appropriately mapped and are accurate as per your environment.

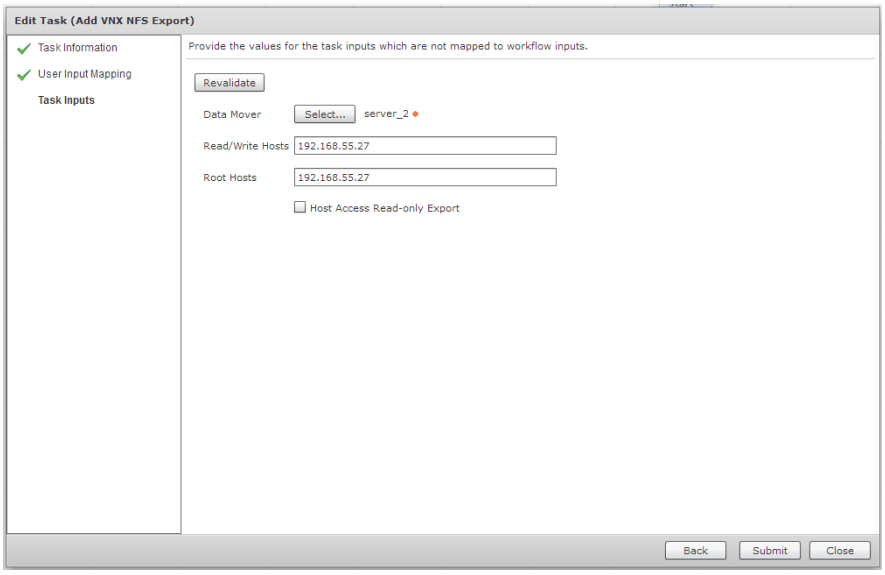


Figure 84.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Step 3: Mount NFS Datastore

In order to bind/validate this step in your environment, double click on the task. Cisco UCS Director workflow designer will pop up a window and walks you through the wizard.

As shown below, Fig 85 presents basic task information for 'Mount NFS Datastore' task. Select 'Next' button to take you to the next screen

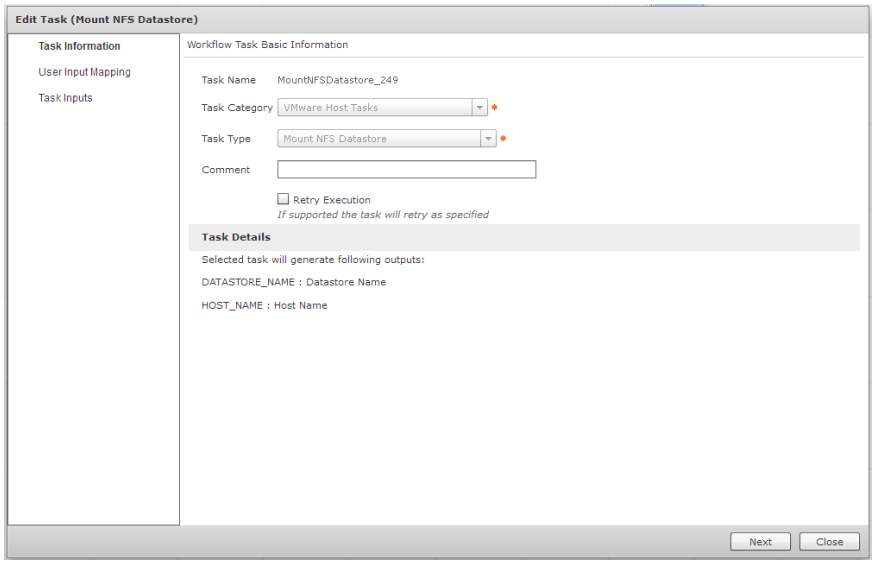


Figure 85.

As shown below, Fig 86 presents binding of required 'Mount NFS Datastore' parameters to your environment. Select 'Next' button to take you to the next screen.

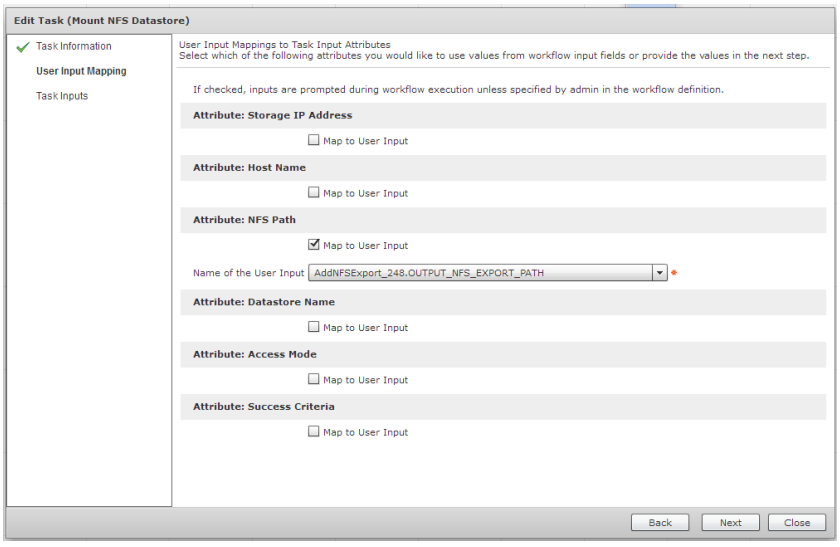


Figure 86.

As shown below, Fig 87 presents (very important step) of binding all the required 'Mount NFS Datastore' parameters to your environment. Once you click 'Revalidate' button as depicted in Fig 87, Cisco UCS Director will bind all the necessary parameters to respective fields (as shown below).

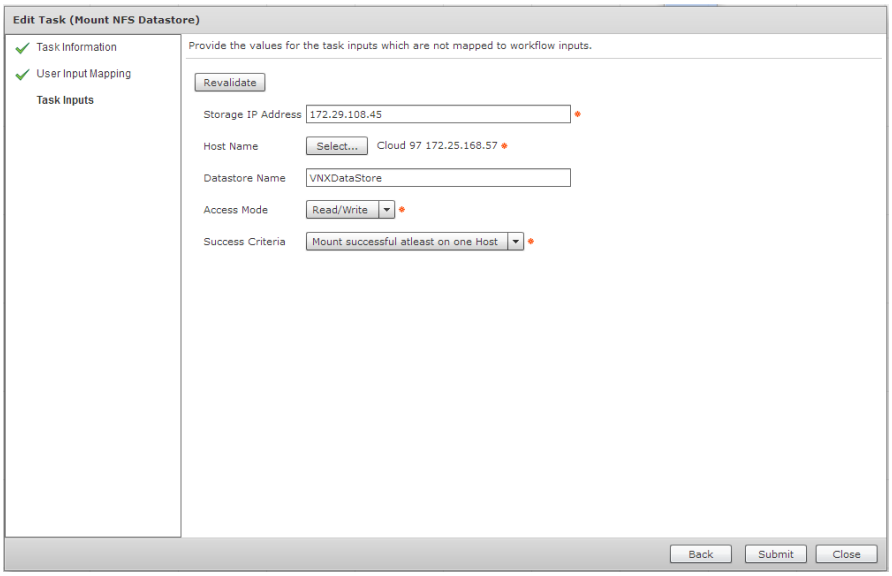


Figure 87.

Once you revalidate this task, select 'Submit' button. Task details are saved in the database and pops-up a confirmation window.

Chapter 6 Troubleshooting

Cisco UCS Director

Services

Make sure all the Cisco UCS Director services are up and running. SSH into the appliance using 'shelladmin' user and check if all the services are up and running (along with Database). If not, please restart the services; wait for couple of minutes before accessing Cisco UCS Director via web interface. If because of any reason if the services are down:

a. Make sure Cisco UCS Director VM has got sufficient resource reservation as recommended.

b. Reboot the Cisco UCS Director appliance to make sure VM starts without any problems.

Networking

Make sure that the Cisco UCS Director IP Address is pinggable over the network. If because of any reason if the network is unreachable:

a. Make sure the network configuration on Cisco UCS Director appliance is proper. This can be validated by logging into vCenter and checking the network configuration of Cisco UCS Director appliance as well as network connectivity for that virtual appliance.

b. Make sure port group/management network is reachable.

c. 'Connect' check box on VM is turned on.

User Interface

Make sure that the Cisco UCS Director is reachable via web browser. At times when you restart Cisco UCS Director appliance and/or services, give couple of minutes before you try connecting to Cisco UCS Director as the services may be coming. In case if you see any problems:

a. Please clear the cache and try accessing Cisco UCS Director via web.

b. Please use the recommended browser version and flash version.

VSPEX elements reachablility

Make sure Cisco UCS Director is able to reach all the VSPEX setup (UCSM, EMC VNX, Nexus 5K, Nexus 1000v, etc.).

Cisco UCS Director Baremetal Agent reachability

Make sure Cisco UCS Director is on the same interface or network as that of Cisco UCS Director Baremetal Agent.

Cisco UCS Director Baremetal Agent

DHCP Service

Make sure DHCP daemon is up and running. Following command can be used to check the status of DHCP server:

/etc/init.d/dhcp status <Enter>

Network Services

Make sure Cisco UCS Director Baremetal Agent network services are up and running. You can check the services status using the following command:

ps –ef | grep java <Enter>

The above command should display java processes. If not, restart the services and recheck to make sure all of them are up and running.

/opt/infra/startInfraAll.sh <Enter>

Cisco UCS Director reachability

Make sure Cisco UCS Director Baremetal Agent is able to reach/ping Cisco UCS Director Baremetal Agent IP Address. If not, check the connectivity via network configuration of Cisco UCS Director Baremetal Agent appliance using vCenter.

VSPEX elements reachability

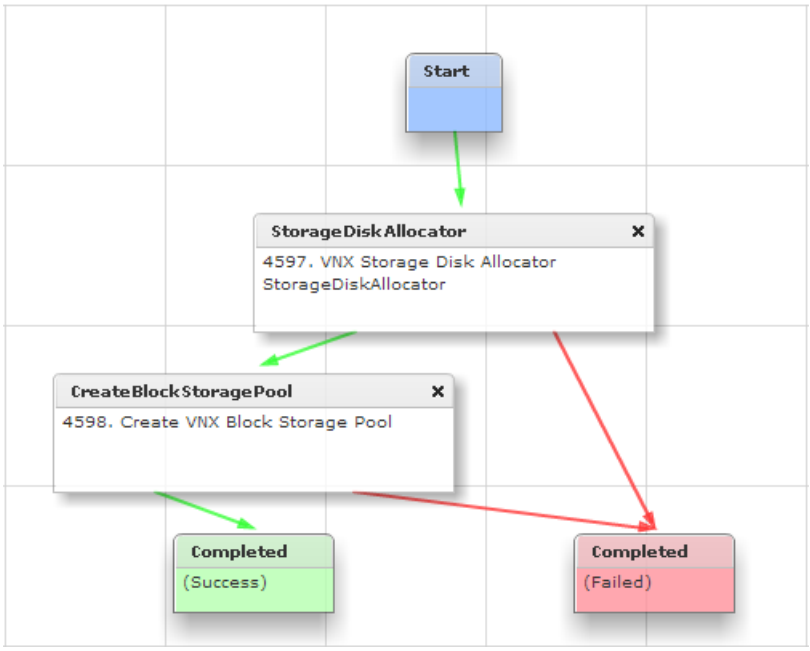
Make sure Cisco UCS Director Baremetal Agent is able to ping UCSM/Blade network. In addition, DHCP server running on Cisco UCS Director Baremetal Agent provides DHCP functionality for bare metal provisioning. Cisco UCS Director Baremetal Agent should be on the same network or interface as that of UCSM so that it can provide PXE functionality without any problem. Make sure there are no DHCP servers available in the same network as that of Cisco UCS Director Baremetal Agent.

Appendix A VSPEX Validation Test Cases

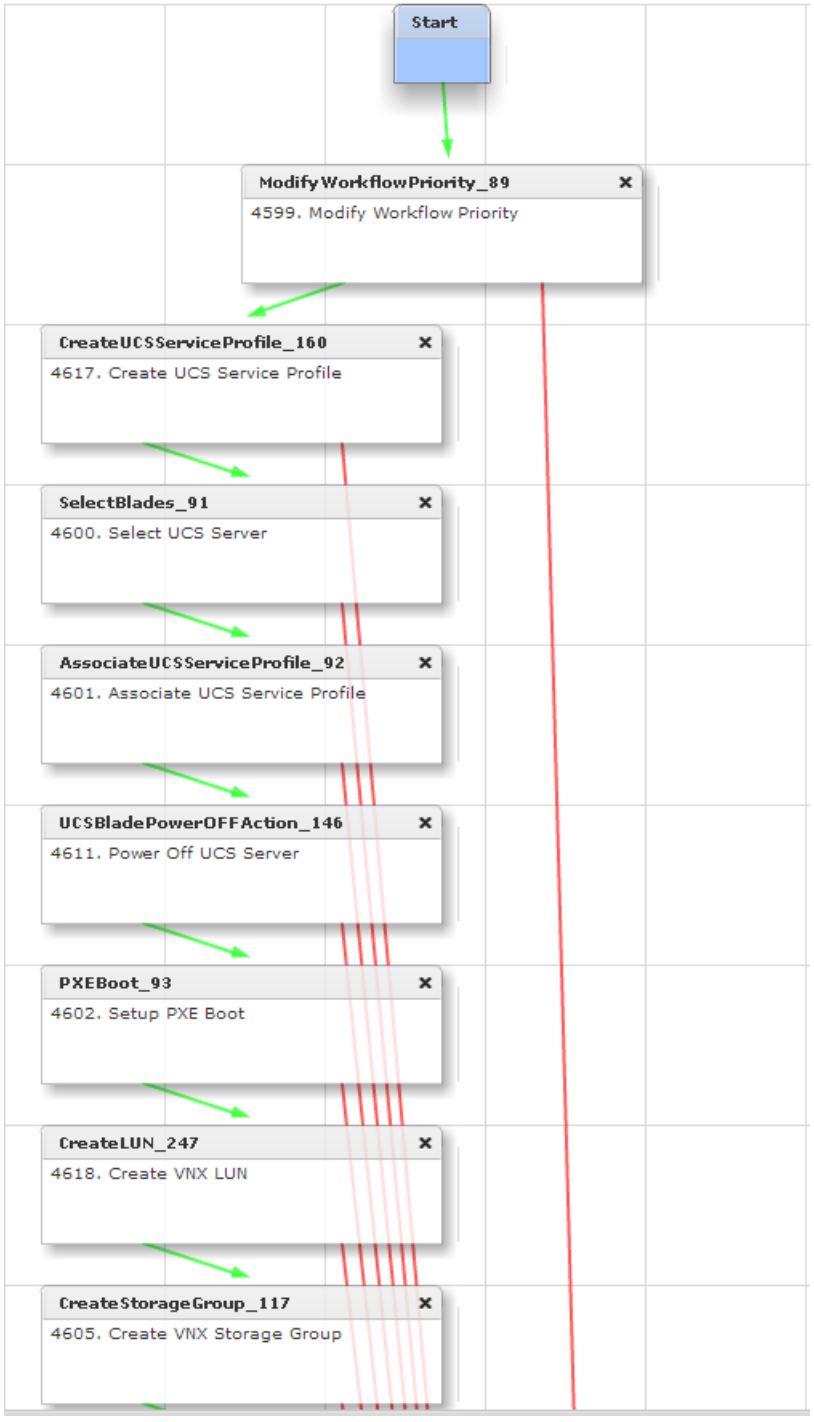
Following are the test cases used for VSPEX Validation

1. Provision Block Storage Pool
2. Baremetal ESXi5.1 SAN Boot
3. VMFS Datastore with Zone Creation
4. Baremetal Provisioning with Local Storage
5. Add LUN to Storage Group and mount as Datastore
6. Resize VNX Datastore
7. Create Filesystem and mount as NFS Datastore

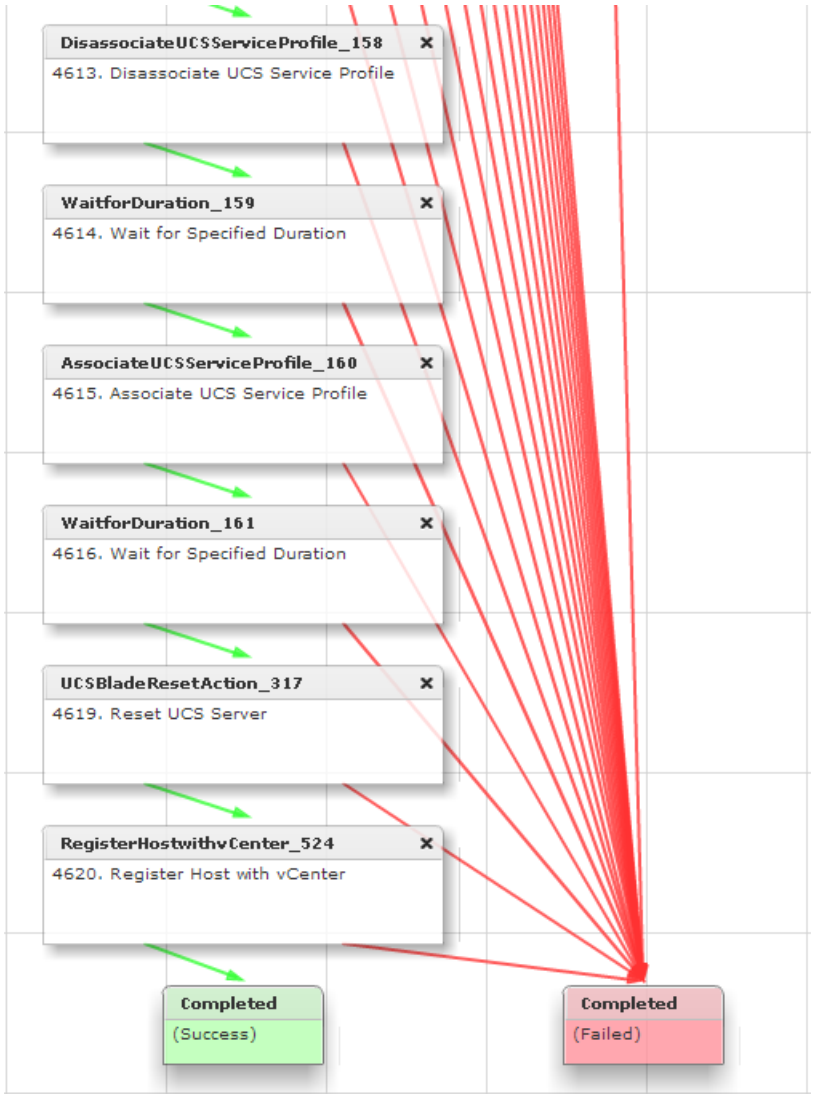
1. Provision Block Storage Pool



2. Baremetal ESXi5.1 SAN Boot

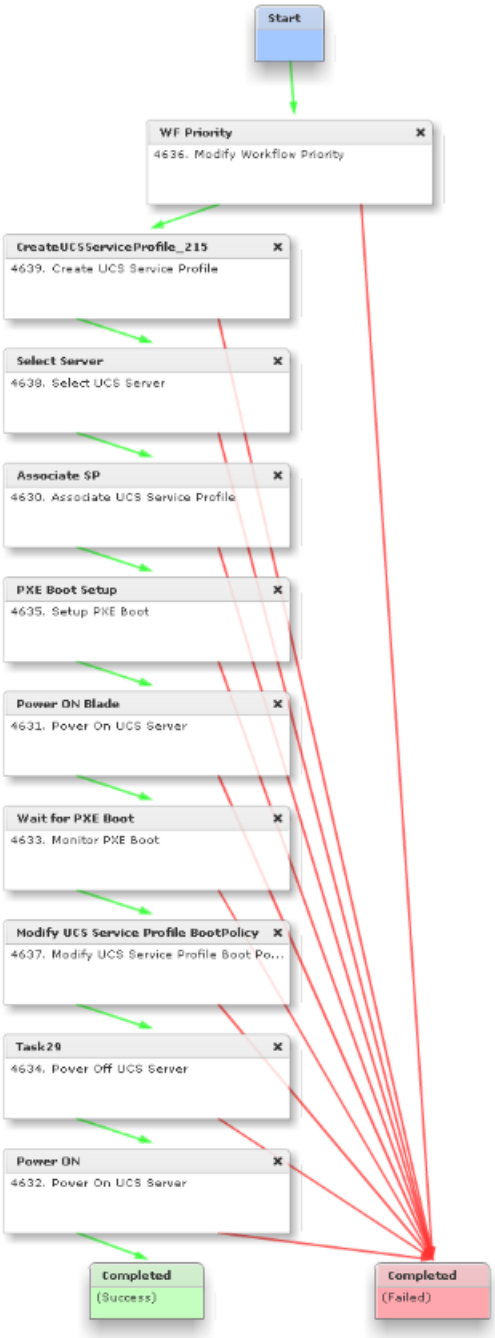



AddHostInitiatorEntry_118
4606. Add VNX Host Initiator Entry
AddHostInitiatorEntry_119
4607. Add VNX Host Initiator Entry
GenericConfigureSANZoning_706
4621. Generic Configure SAN Zoning
AddHoststoStorageGroup_121
4608. Add Hosts to VNX Storage Group
AddLUNtoStorageGroup_122
4609. Add VNX LUN to Storage Group
ModifySANTargetLUNIdofBootPolicy_120
4610. Modify UCS Boot Policy LUN ID
Reset Blade to kick off PXE
4612. Reset UCS Server
PXEBootWait_95
4603. Monitor PXE Boot
ModifyUCSServiceProfileBootPolicy_96
4604. Modify UCS Service Profile Boot Po...

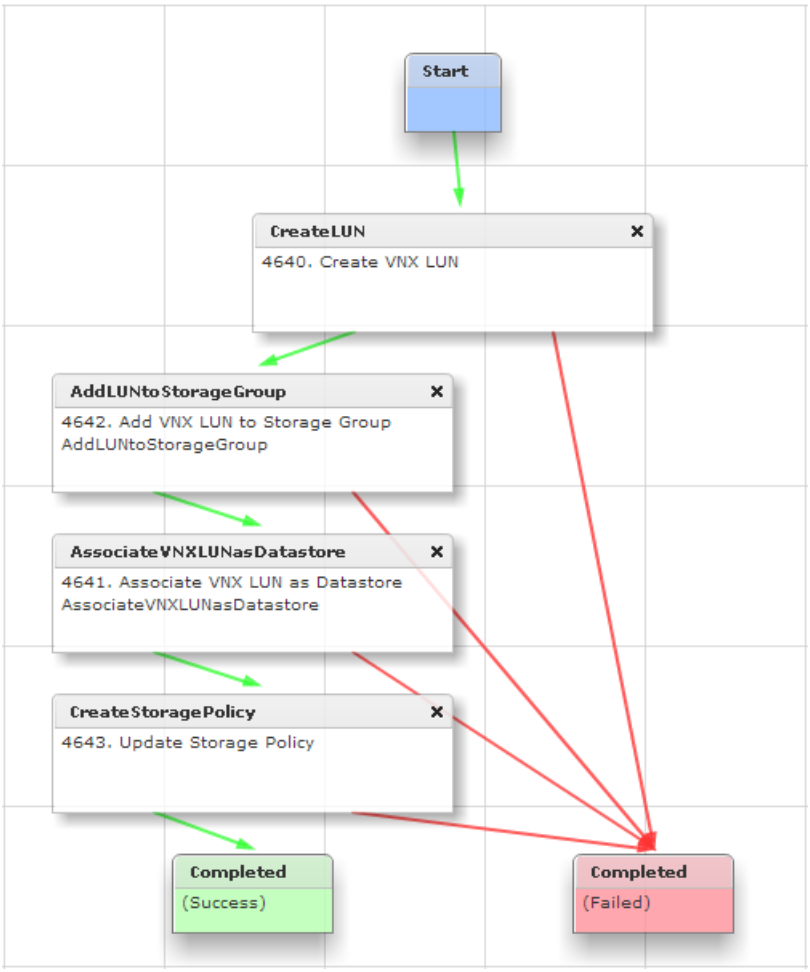

DisassociateUCSServiceProfile_158
4613. Disassociate UCS Service Profile
WaitforDuration_159
4614. Wait for Specified Duration
AssociateUCSServiceProfile_160
4615. Associate UCS Service Profile
WaitforDuration_161
4616. Wait for Specified Duration
UCSBladeResetAction_317
4619. Reset UCS Server
RegisterHostwithvCenter_524
4620. Register Host with vCenter
Completed
(Success)
Completed
(Failed)

3. VMFS Datastore with Zone Creation

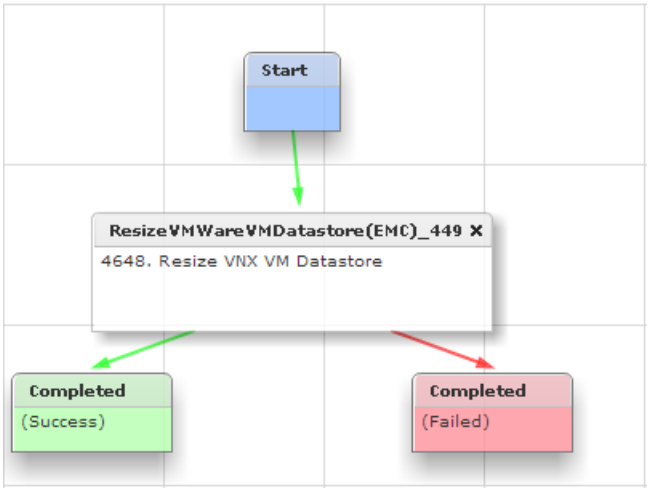
4. Baremetal Provisioning with Local Storage



5. Add LUN to Storage Group and mount as Datastore



6. Resize VNX Datastore



7. Create Filesystem and mount as NFS Datastore