

# HP UDC:

## A comprehensive technical overview

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# Goal and Objectives

## ■ Goal

- A comprehensive view of how the components that make up the HP UDC (Utility Data Center) Architecture actually work and operate from the perspective of the Administrator and Operators of the UDC

## ■ Objectives

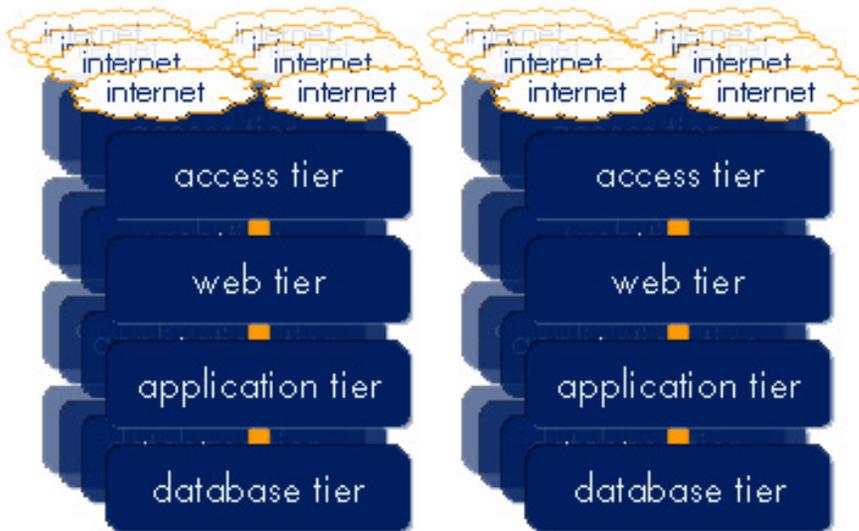
- The HP UDC solution from a “selective” utility controller technical perspective
- To understand what makes up the “certain” aspects of the HP UDC solution and how it works
- Look at the HP UDC from the outside in
- Look at the HP UDC from the inside out

# Agenda

- Overview of the HP UDC Value Proposition:
  - The Business Case
  - High Level Overview and Conceptual View
- An introduction to UDC definitions, concepts and terminology
- An overview of the UDC Components & Architecture
  - Components, Network, Storage, Security and Management
- But what does a UDC really look like?
- A UDC “farm” Portal Administrator’s view
- A Utility Controller Portal Administrator’s view
- A “farm controllers” view of the UDC
- Summary

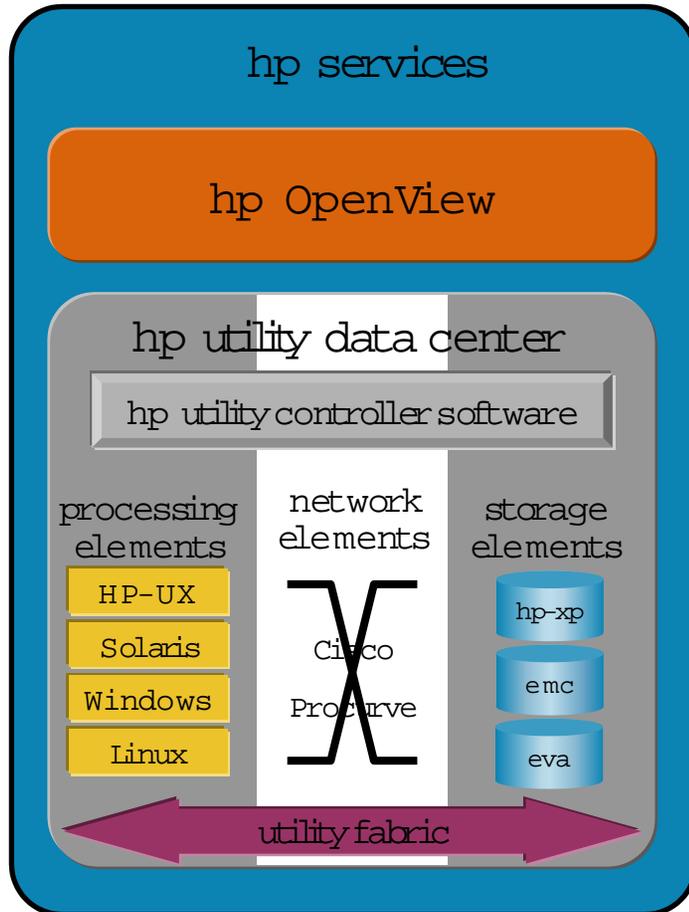
# HP UDC Business Case

## challenges of the traditional data center



- expensive to operate
  - manual labor intensive deployments & changes of IT environments
  - inefficient asset utilization because lack of data center wide load balancing
  - development and support of homegrown mgmt apps
- inflexible, complex architecture
  - “fixed” architecture for each service
  - highly complex overall architecture to accommodate each service’s needs
  - difficult to scale because of evolutionary growth
- error prone, unreliable & slow
  - human factor in every change request
  - slow introduction of new services or infrastructures
  - no data center wide high availability
  - lacks integrated management view of all services

# hp utility data center

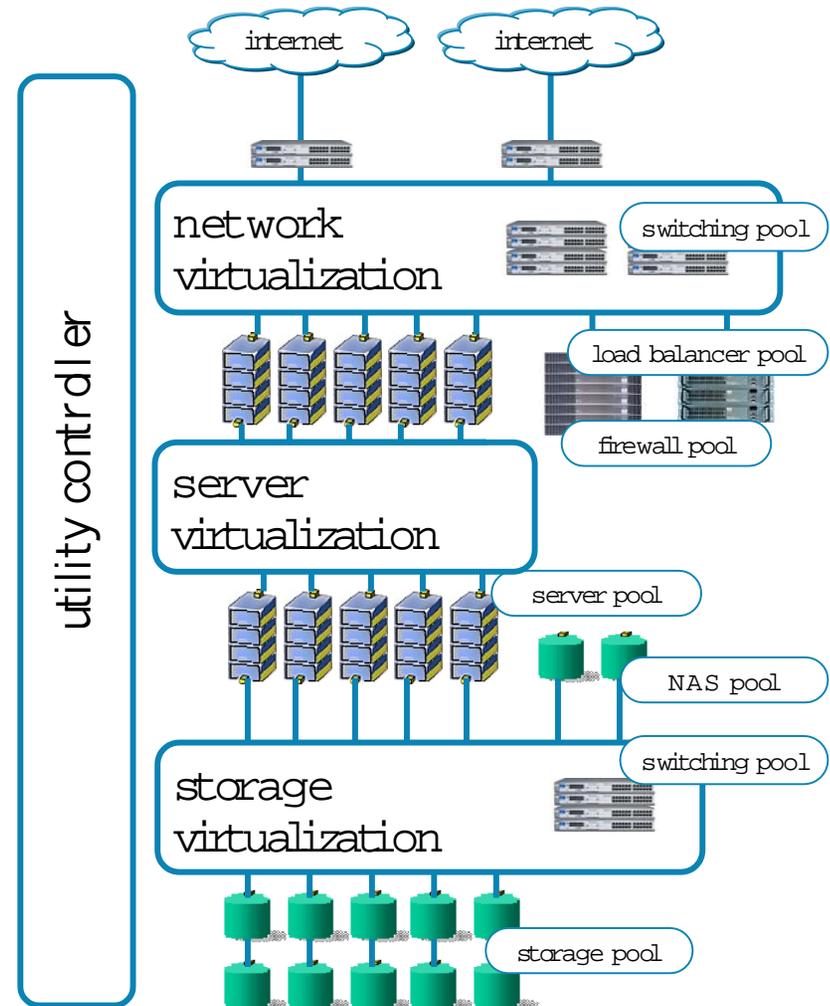


- virtual programmable data center
- utility controller software for dynamic service and application provisioning
- pre-certified processing, networking and storage elements as pools of shared and traded resources
- utility fabric for infrastructure provisioning on demand

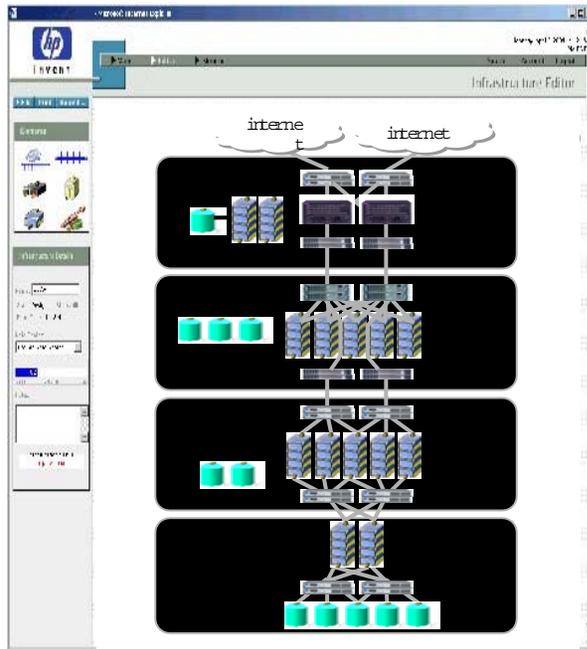
# hp utility data center

fully integrated S/W & H/W solution that enables provisioning of virtual application environments to optimize asset utilization and effectively utilize administrative staff

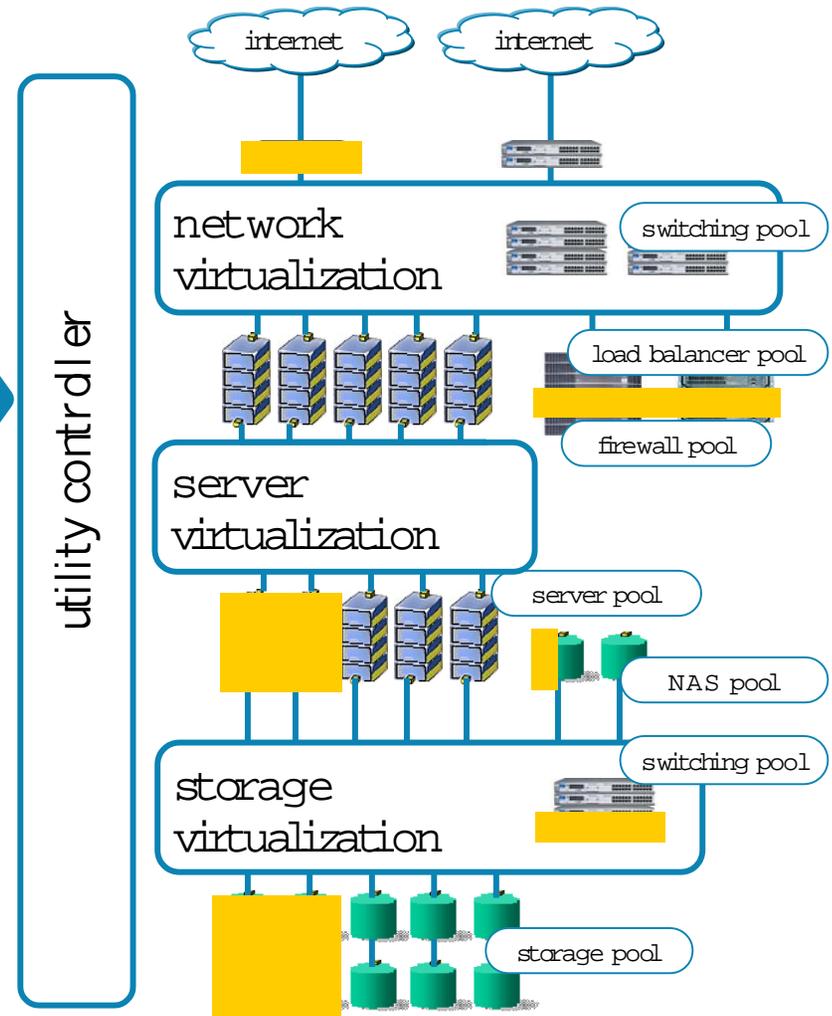
1. wire once  
all components are wired once to support virtual allocation of resources for the entire system
2. resource virtualization  
all networking, storage, and server components are wired once, and can be allocated and reallocated many times without having to rewire any physical components.
3. utility controller  
simple user interface allows administrators to architect new systems and activate them using available resources



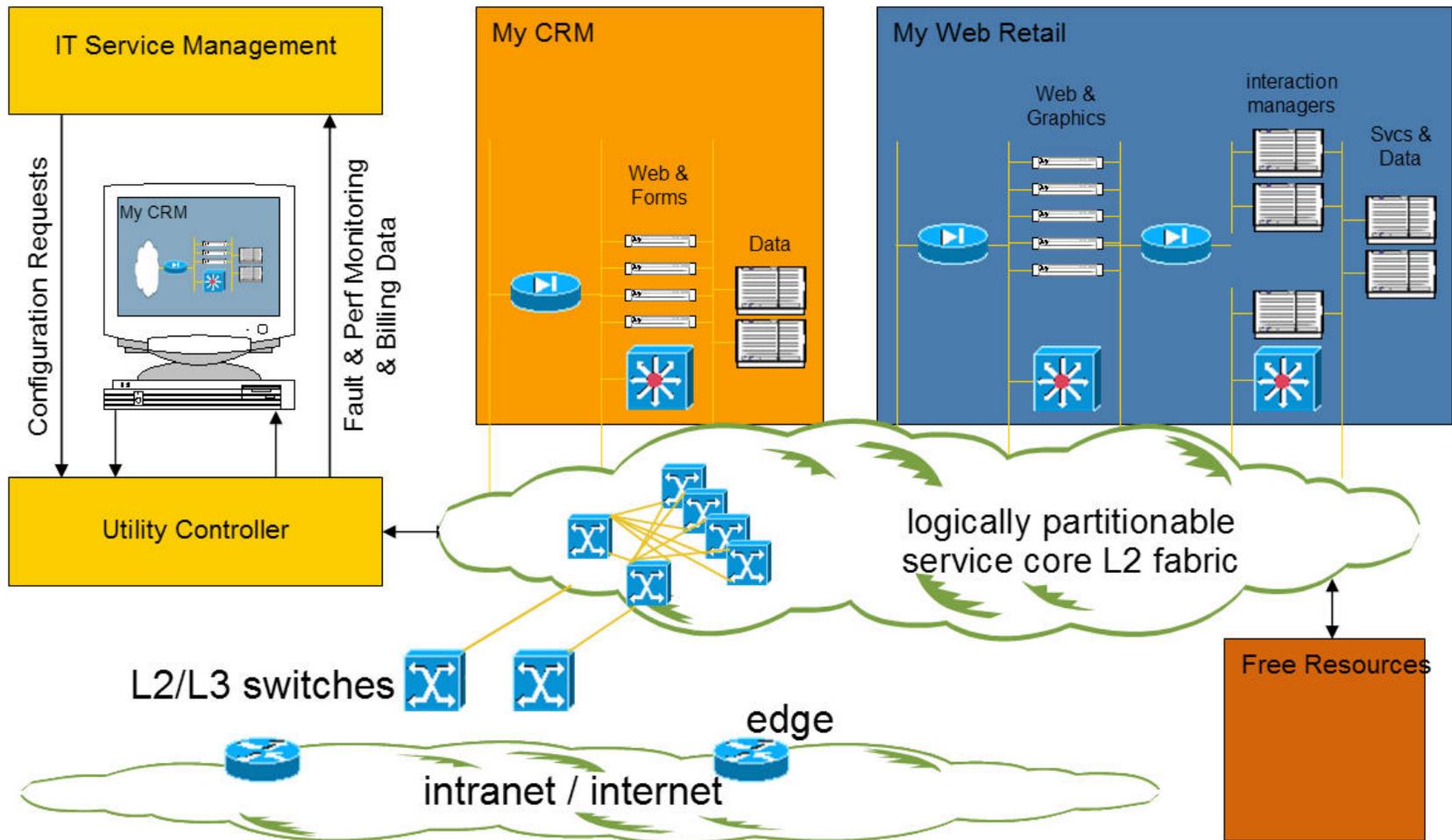
# first, architect a new service in a simple web interface...



...then activate it in the utility data center



# Utility Data Center in Action



# An introduction to the UDC definitions, concepts and terminology



- Utility Data Center (UDC)
  - HP's scalable and customizable computing infrastructure utility that is used to create a wide variety of server farms. Permits customization of security perimeters, distinct network topologies, and software configuration. Consists of a pre-wired, pre-integrated, pre-tested pool of physical resources (the service core resource pool); and a management infrastructure layer (the utility controller).
- Wire Once, or Don't touch the wires!
- Physical Configuration Once, or If it's not broken don't touch it!
- Plan ahead, be pro-active not re-active

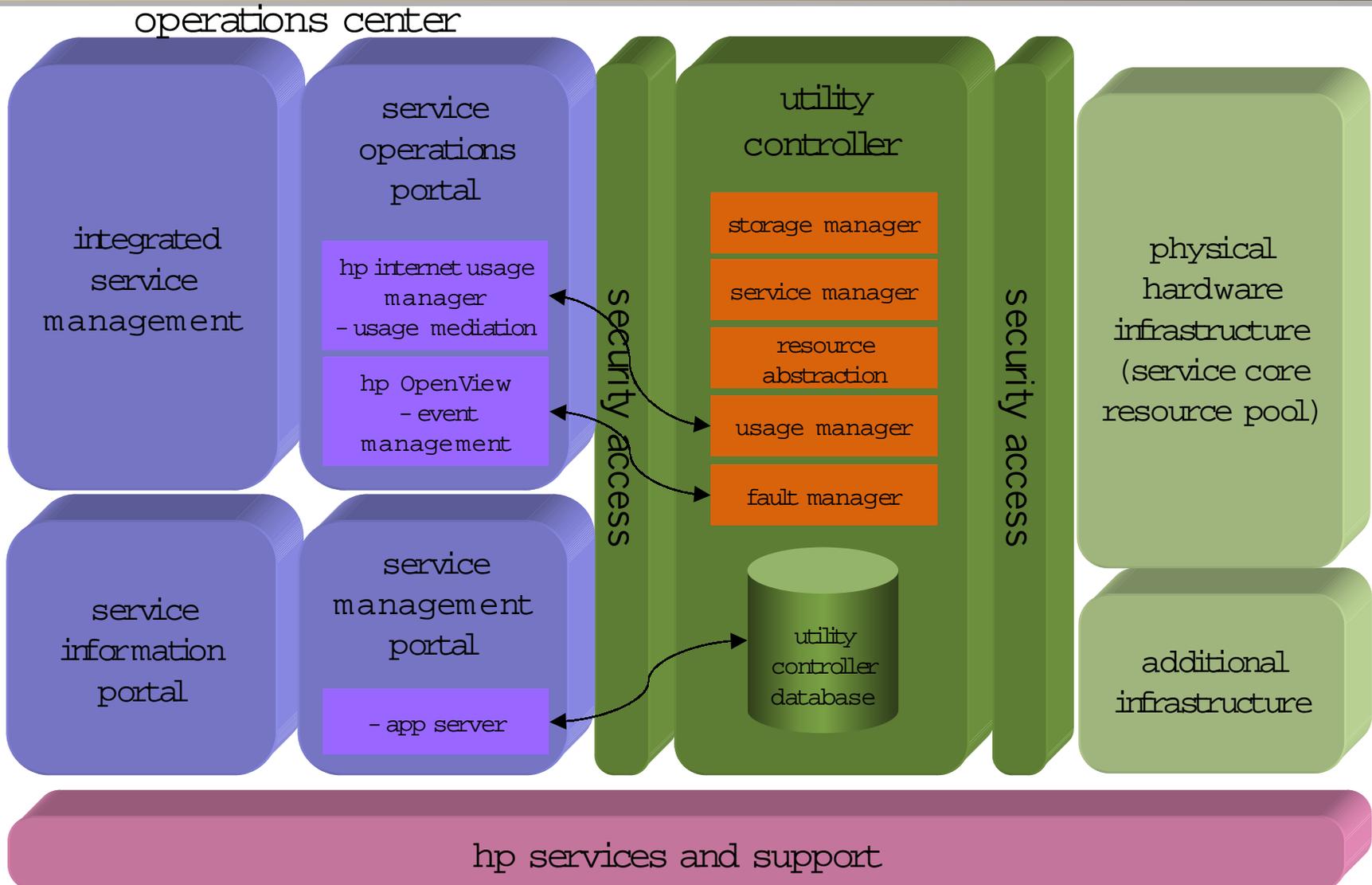
# An introduction to UDC

## definitions, concepts and terminology (con't)



- Terminology (enough to get us through the presentation)
  - UDC Portal(s), UDC Administrator, UDC Farm Administrator
  - Farms, Farm Controller, Farm Server, Farm Manager
  - Service Core
  - Common Services Manager (CSM)
  - Resource Pools
  - VLAN
  - SAN
  - OVO
  - Backhaul
  - .....

# HP utility data center solution architecture



# HP UDC “Selected” areas of discussion

- What we will cover:
  - Utility Controller
  - Components
  - Architecture
  - Interaction
  - Physical Hardware
  
- What we will not cover:
  - Operations Center
  - Integrated Service Management
  - Service Operations Portal
  - Service Information Portal
  - Service Management Portal

# Overview of the HP UDC “controller” Components and Architecture

- Components
- Service Core
- Service Core Resource Pools
- Utility Controller Management Servers
- Segment and Farm Managers
- Portal Users Tasks
- Common Services Management
- UC OVO Manager Of Managers
- Services Management and Utility Controllers Portal
- Network Common Services
- Trust Domains
- Storage/Backup/SAN
- Network/LAN
- Farm Maintenance Tasks

# HP's Utility Data Center – the real thing!

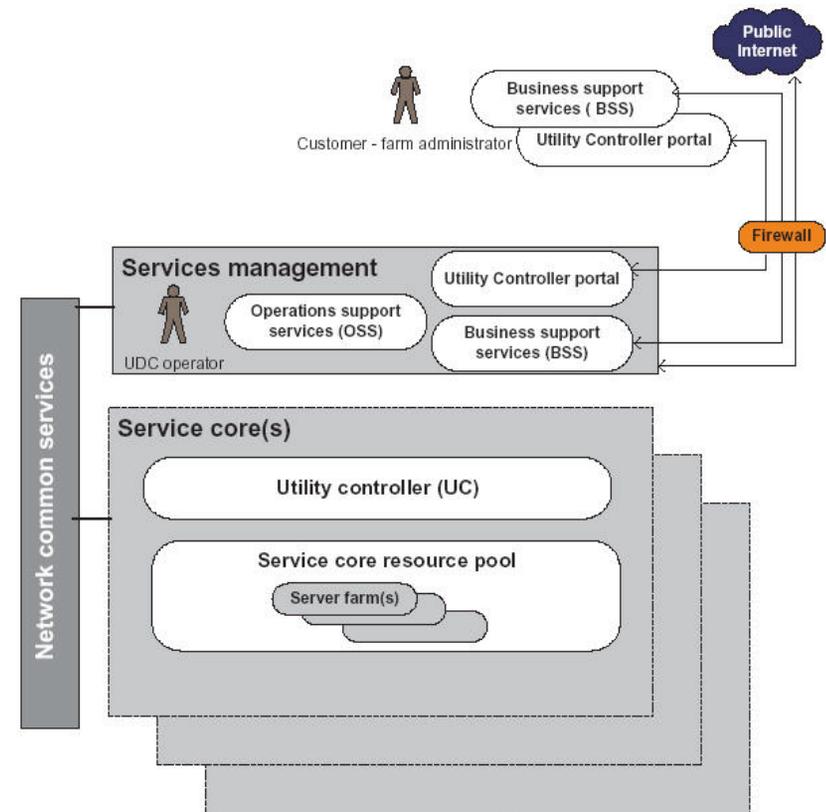


# UDC Physical Rack Types and Components

- UDC Racks
  - Management
  - Backup
  - Operations
  - Fabric
  
- Resource Pool Racks
  - Servers
  - Appliances
  
- Common Rack Components “infrastructure”
  - Rack, Rack Network Switches, SAN Gateway’s, Terminal Servers & PDU’s (power distribution units)

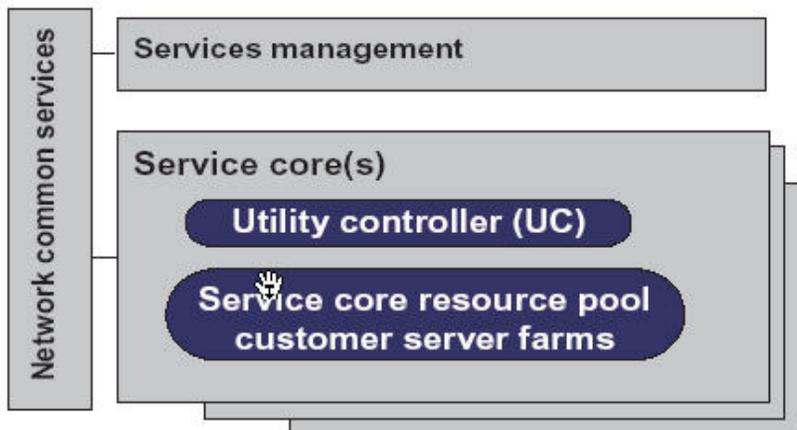
# HP UDC Components

- Service cores
  - Service core resource pool
    - Server Farms
  - Utility Controller
- Services Management
  - UC Portal
  - Operations Support Systems (OSS)
  - Business Support Systems (BSS)
  - UDC operator
- Network Common Services
- Customer/Farm Administrator

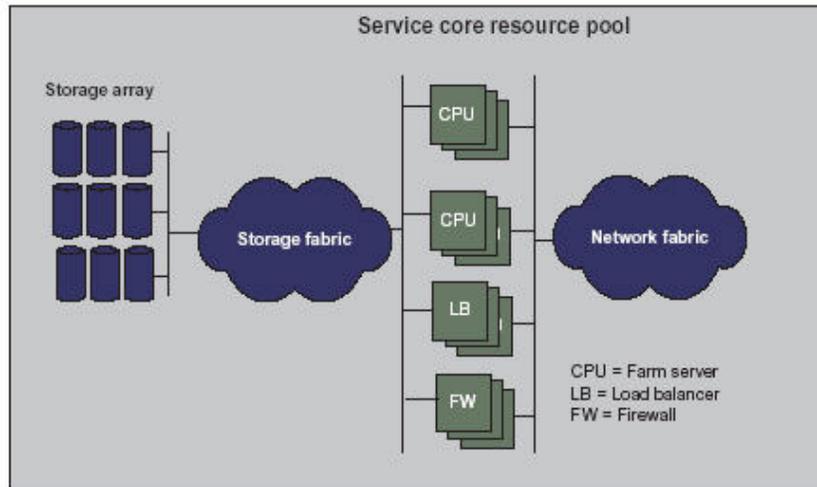


# HP UDC Service Core

- HP UDC Service Core
  - Utility Controller
  - Management Software
  - Service Core Resource Pool
  - Customer Server Farms
  - Infrastructure
    - Networking
    - Storage
    - Physical Resources
  - Custom Farms Components
    - Servers
    - Firewalls
    - Load Balancers
    - VPN's (via Backhaul)
  - Network Common Services

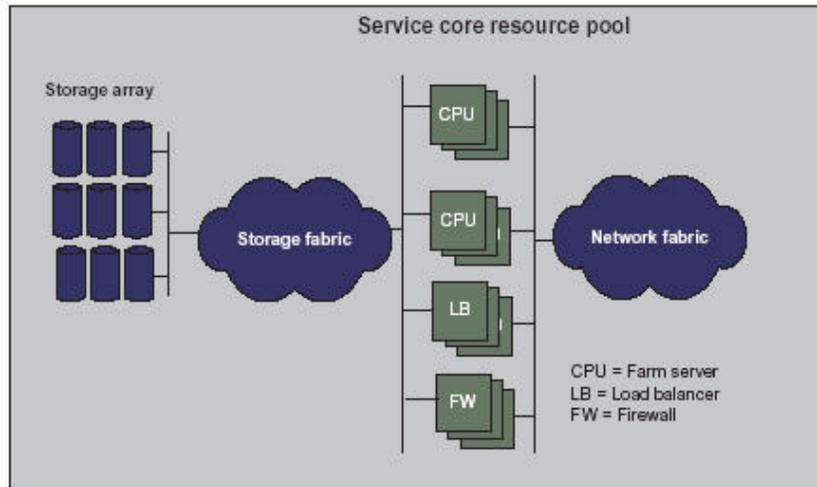


# HP UDC Service Core Resource Pool



- Service Core Resource Pool
  - Physical Resources
  - Racks
    - Server
      - Farm Servers
      - SAN Gateways
      - Network Switches
    - Appliance
      - Load Balancers
      - Firewalls
    - Management
      - Network switches and routers
      - Management servers
      - SAN switches
    - Storage
      - SAN switches (pre-wired to servers thru SAN gateways to one or more disk arrays)
    - Backup
      - Tape Libraries
      - Data movers
      - SAN switches
- Service Core Storage Fabric
  - Data SAN
  - Backup and Management SAN
- Storage Arrays
- Service Core Network Fabric

# HP UDC Service Core Resource Pool (con't)

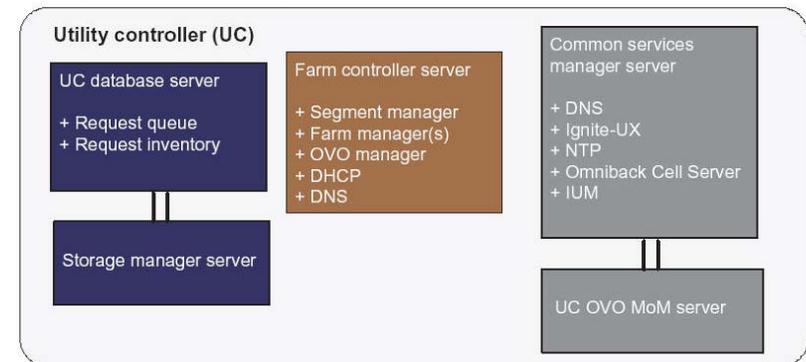


- Storage Arrays
  - ie. XP 128 or XP 1024
  - Logical volumes (RAID 5)
  - All farm server storage
    - Server images
    - Swap
    - Files systems
    - Database files
  - UC Management Servers
    - Local Storage
    - Storage Array (SG clusters)
- Service Core Network Fabric
  - VLAN (virtual network)
  - LAN (physical)
    - Tier1: L2/L3 switch/router 1GB
    - Tier2: L2 switch 1GB
    - Tier3: L2 switch 100MB
- Backup and Restore

# UDC Utility Controller Management Servers

- UC data base
  - Utility Controller Data Base (UCDB)
    - Request Queue
    - Resource Inventory
      - Tables and relationships for all devices in a Service Core and their connection topology, state for all devices and connections
- Storage Manager
  - Configuration of Service Core SAN
  - Management of
    - Stored images
    - Backup processes for
      - Farms
      - Individual servers
      - Monitors request queue in UCDB for SAN configuration
      - image delivery
      - backup requests
- Farm Controller
  - Segment manager
  - Farm manager
  - OVO manager
  - DHCP and DNS

Utility controller management servers

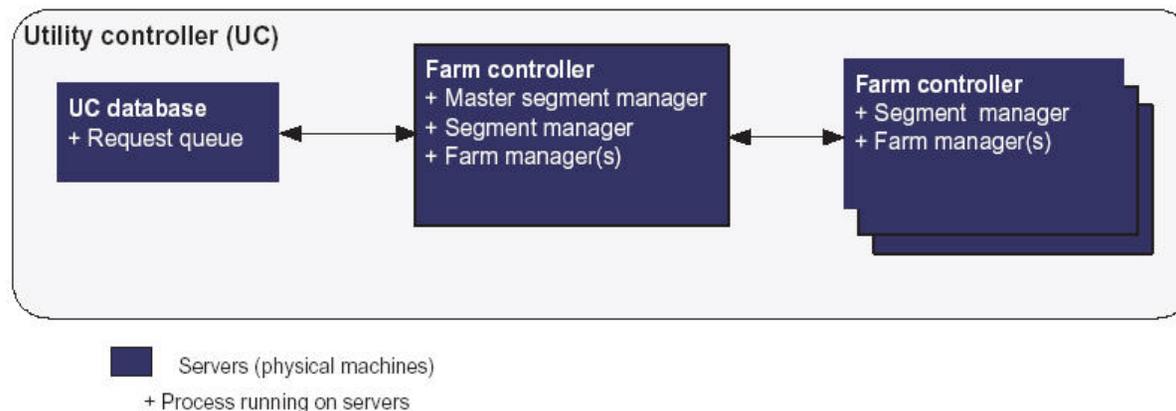


|| Clustered UC management servers  
+ Process running on servers

# HP UDC segment and farm managers

- Farm managers
  - Responsible for all functions required to activate, update and de-activate a farm
  - Configuring devices associated with each farm (i.e. switches, firewalls and load balancers) and saving config info in the UCDB
  - Managing storage info (i.e. requesting STM to transfer system image)
  - Signaling the farm controller OVO manager to configure the farm servers
  - Executing commands from the farm server
  - Responding to OVO events (i.e. farm state change, device replacement requests)
- OVO manager
  - Collects and forwards fault and performance events from OVO agents on the farm servers
  - Forwarded to the OVO MoM
- DHCP
  - Farm manager retrieves IP addresses from the UCDB and DHCP server assigns to the primary network interface and OVO assigns other interfaces after startup
- DNS
  - Local name resolution for all servers managed by the farm managers (for requests it cannot resolve, it forward to the Common Services Manager)

## Segment managers and farm managers



# UDC portal user tasks

## Utility Controller Portal: Operations tasks:

- Track, manage, and transition farms
- Manage news and service contracts
- Support farm admins
- Manage system and account images
- Configure supported hardware details
- Configure supported service cores and their properties

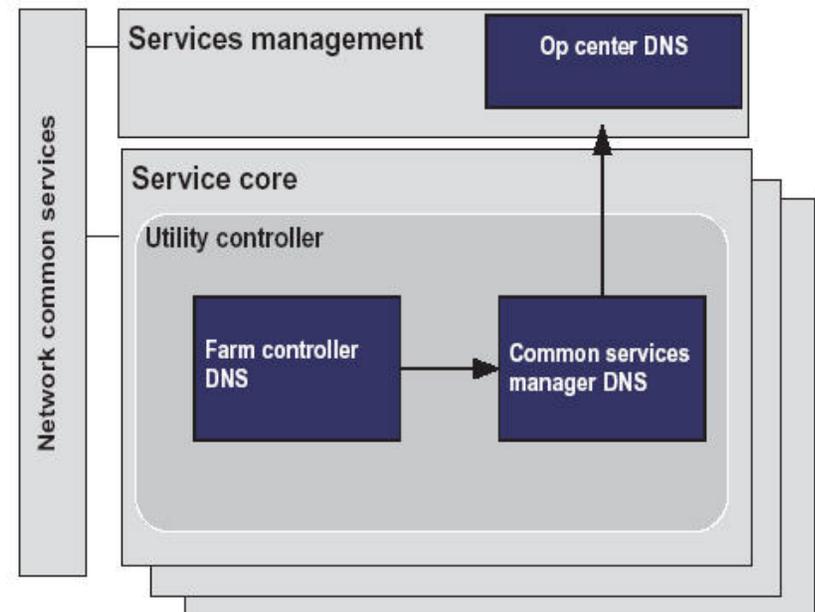
## Utility Controller Portal (GUI)

## Utility Controller Portal: Farm Admin tasks:

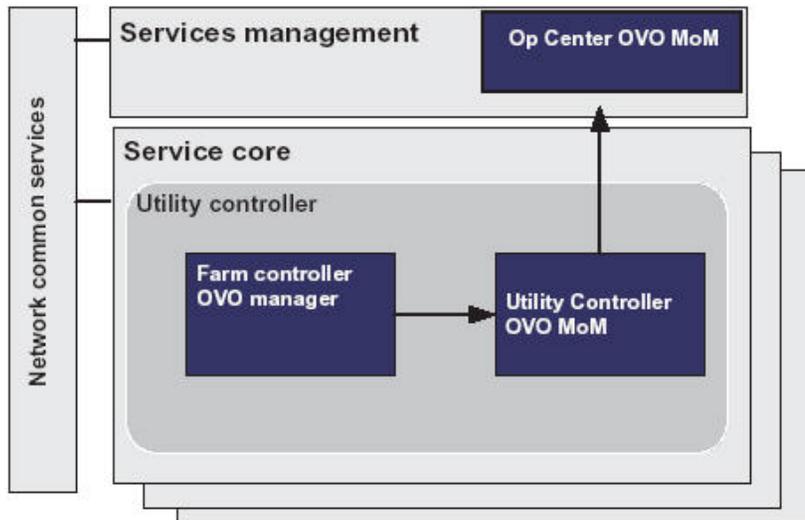
- Design and implement custom farms
- Configure servers, load balancers, firewalls
- Create and deploy server software images
- Update and monitor active farms

# Common Services Management

- Common Services Manager
  - DNS
    - Name resolution for all servers in the UC
    - Provides external name resolution for requests generated by DNS servers within farm controllers
  - Ignite-UX
    - Recovery images for HP-UX management servers
    - Ignite images stored in the storage array via the SAN
  - NTP
    - Time for all of the management servers
  - HP Omniback Cell Server
    - Backup coordination between data movers and tape libraries
    - Communicates to OVO MoM
  - IUM device data collection
    - Server and appliance usage
    - Storage usage data
    - Forwards to the IUM aggregator in the operations center



# UC OVO Managers Of Managers



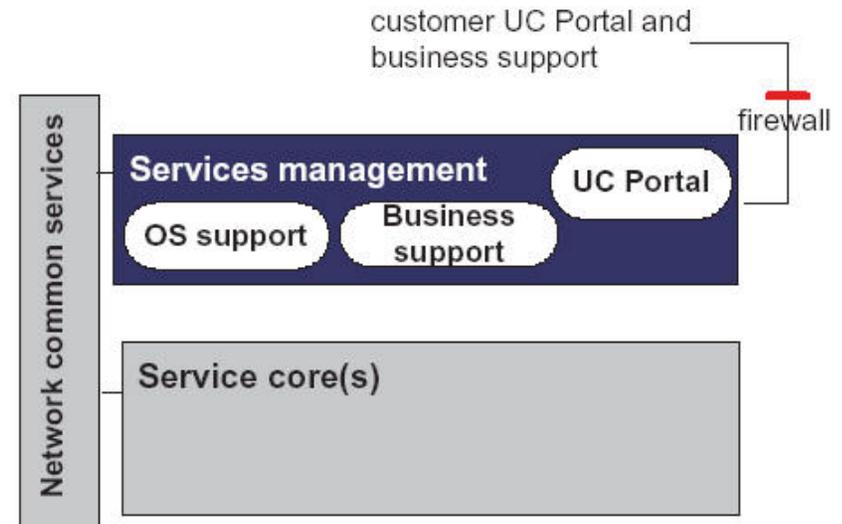
- Utility Controller (UC) OVO MoM
  - Correlates and filters
    - Fault and performance data
  - Source OVO managers on Farm Controllers
  - Sends Information to Operations Center OVO MoM
- Operations Center OVO MoM
  - Can monitor multiple Service Cores
- Farm Controller OVO manager
  - Manages farm servers

# Services management and Utility Controller Portal

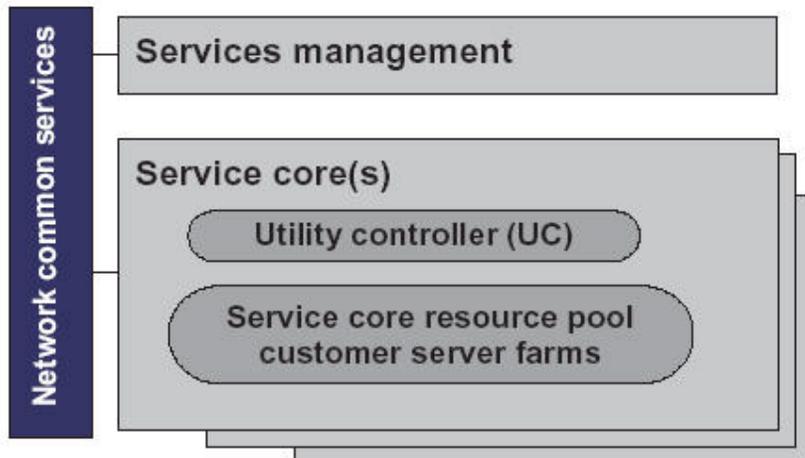
- Service Management
  - Operations Support Systems
    - HP OpenView Service Desk (reference implementation)  
Trouble/work tickets
    - HP Internet Usage Manager
  - Business Support Systems
    - Web Order Entry
    - “custom billing” (reference)

Note: Architected with an “open communications fabric” for HP ISM (per services integration)

- Utility Controller portal
  - Farm creation and design
  - Farm updates/modification
  - Farm management
    - Monitor
    - Alarms
  - Two portal views/roles
    - Farm Administrator
    - Data Center Administrator



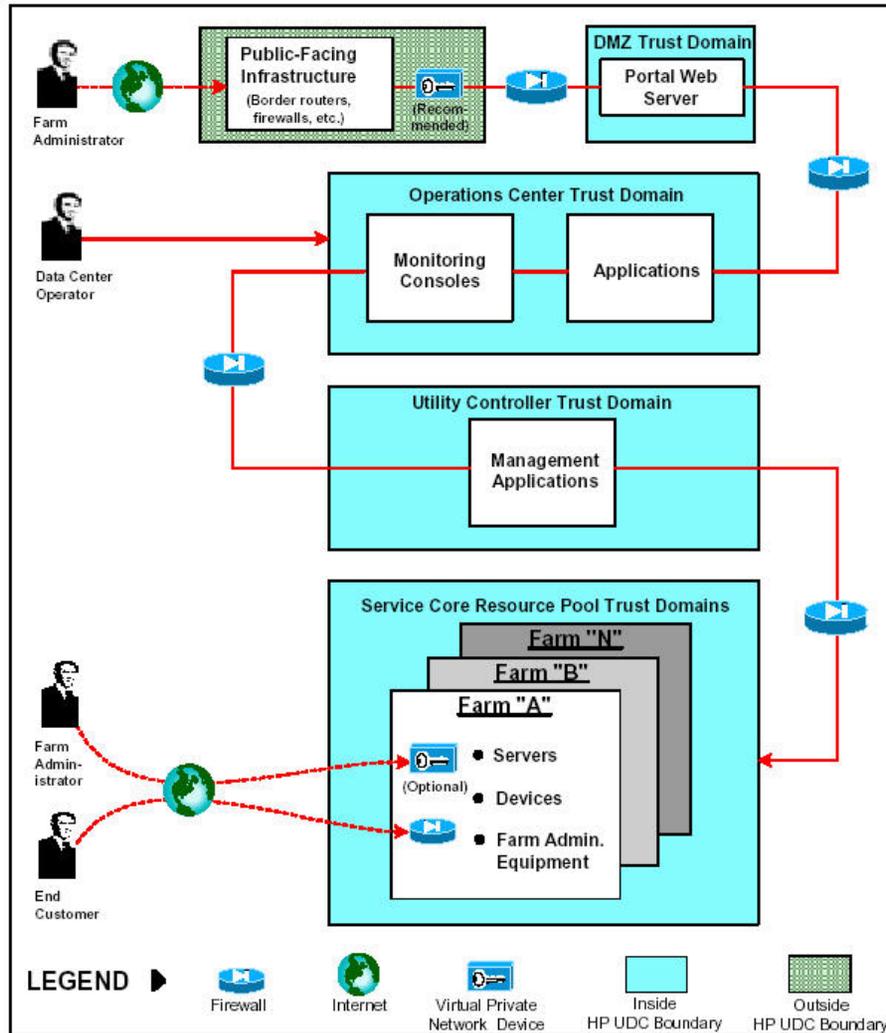
# Network Common Services



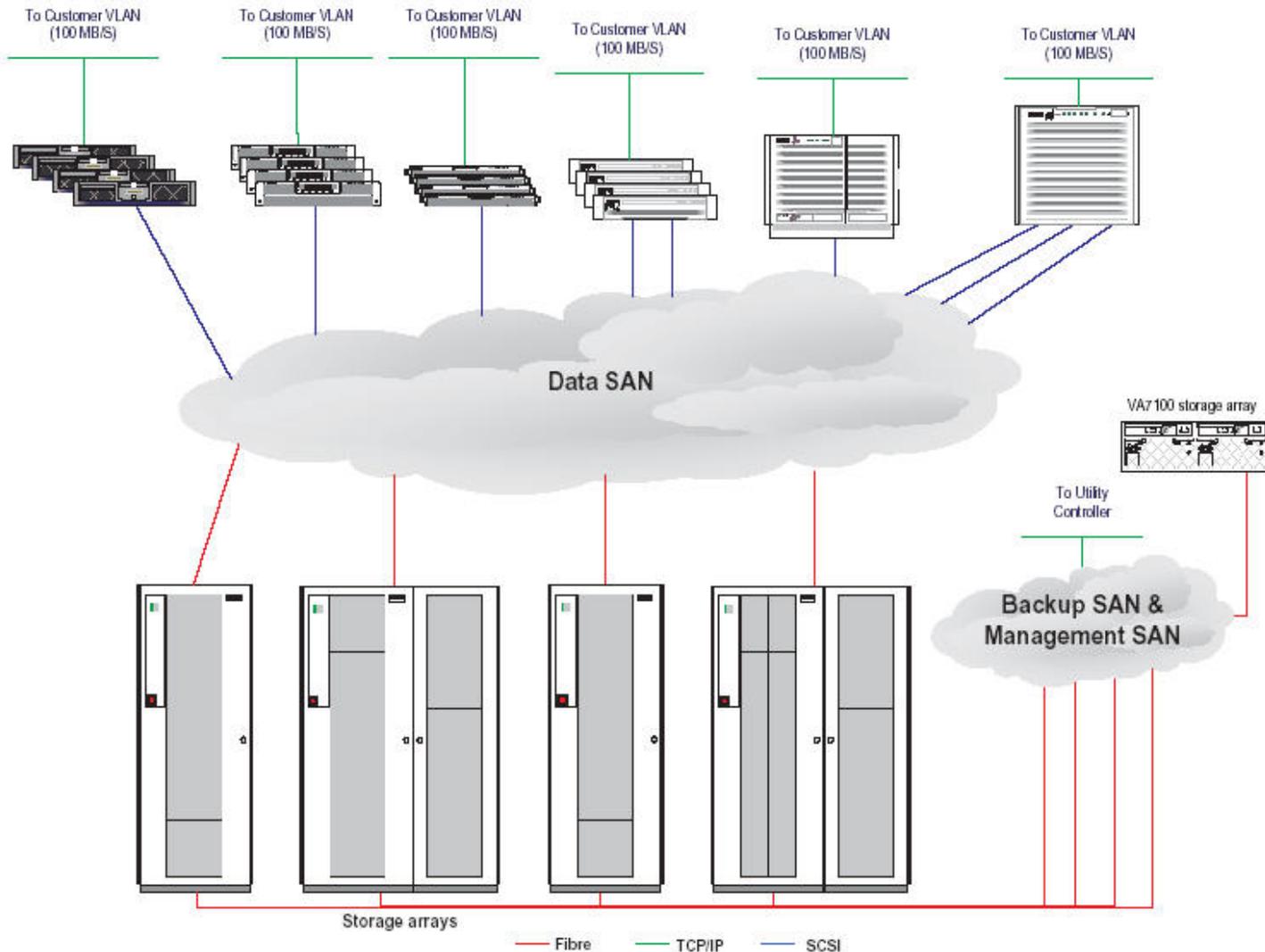
- Network Common Services
  - Backbone Infrastructure
  - Connectivity to
    - All service cores
    - Operations center
    - Public Internet
  - Farms can have IP addresses available from the public Internet/intranet
  - “edge” routers provide connections
  - Data Center Administrators set up “public” IP addresses and enter into UCDB
  - Routing infrastructure exists to the UDC Service Core Tier 1 network switches

# HP UDC trust domain architecture: Conceptual Overview

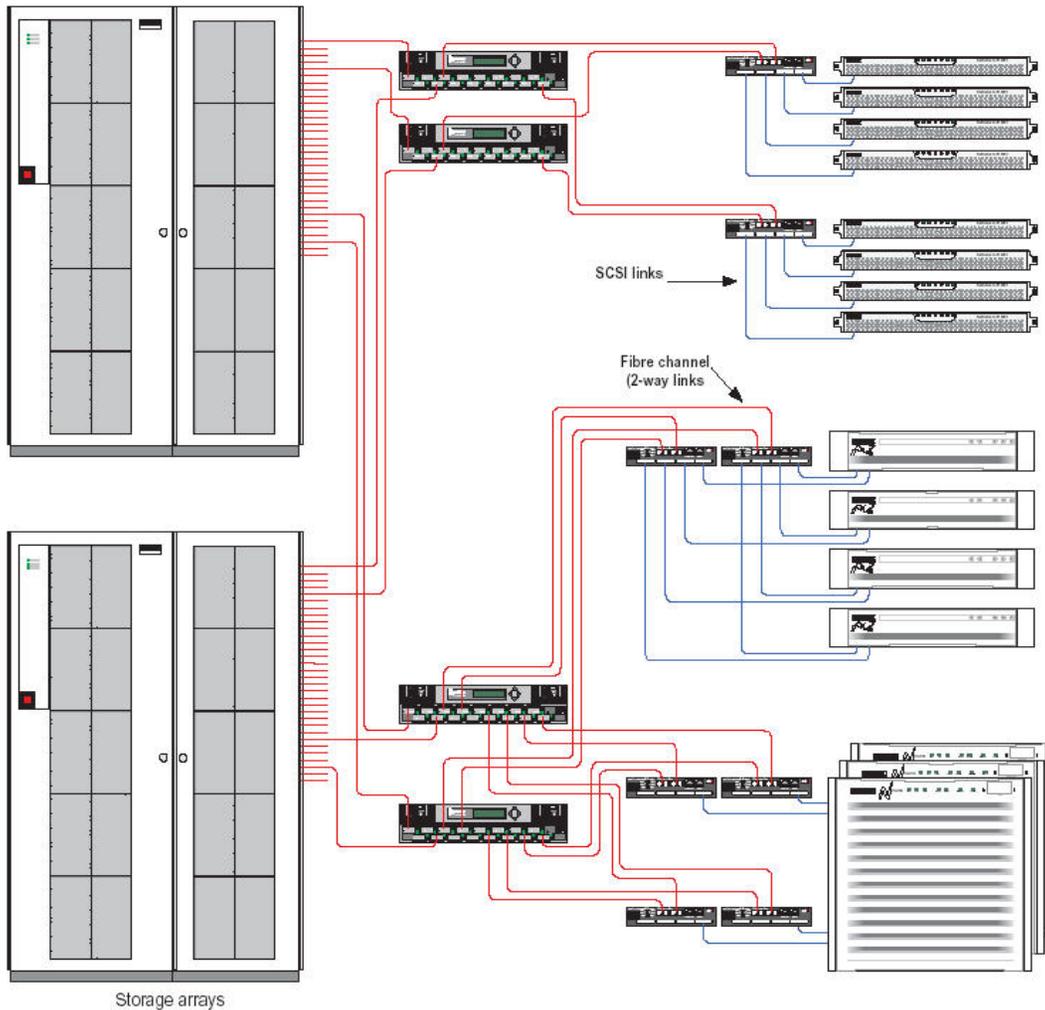
Conceptual overview of the HP UDC trust domain architecture



# Service Core SAN

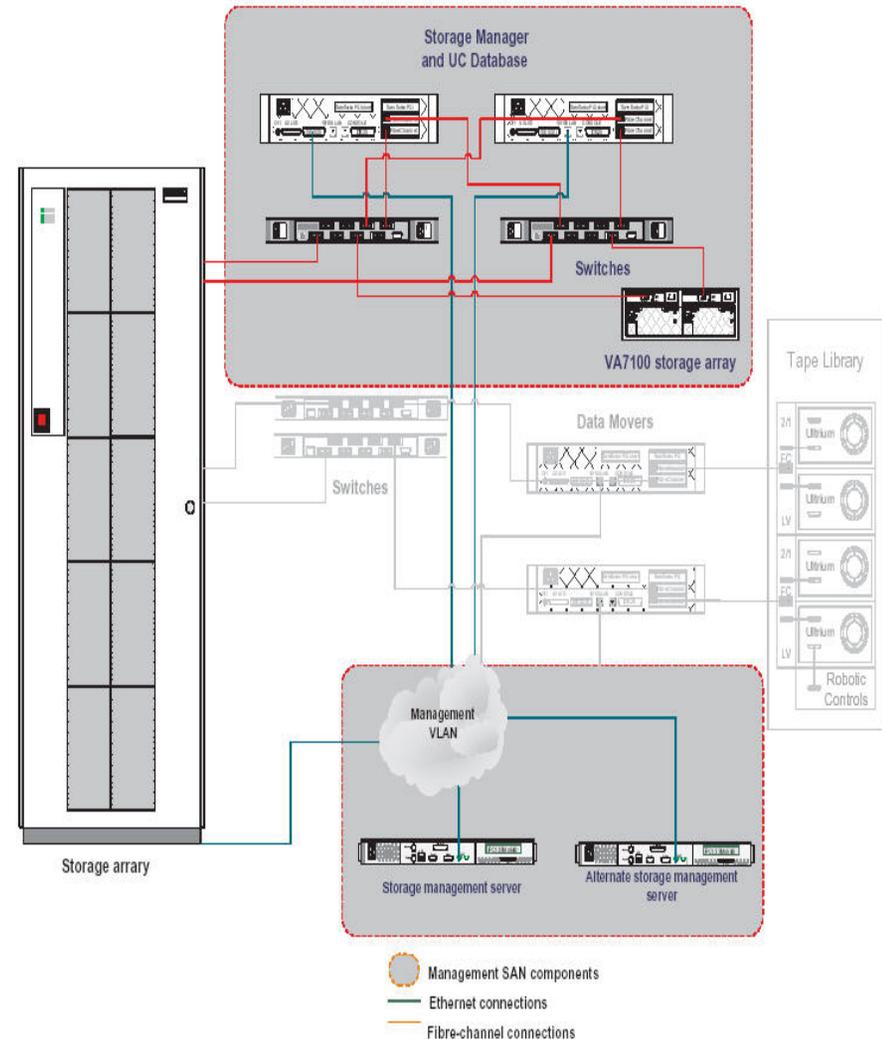
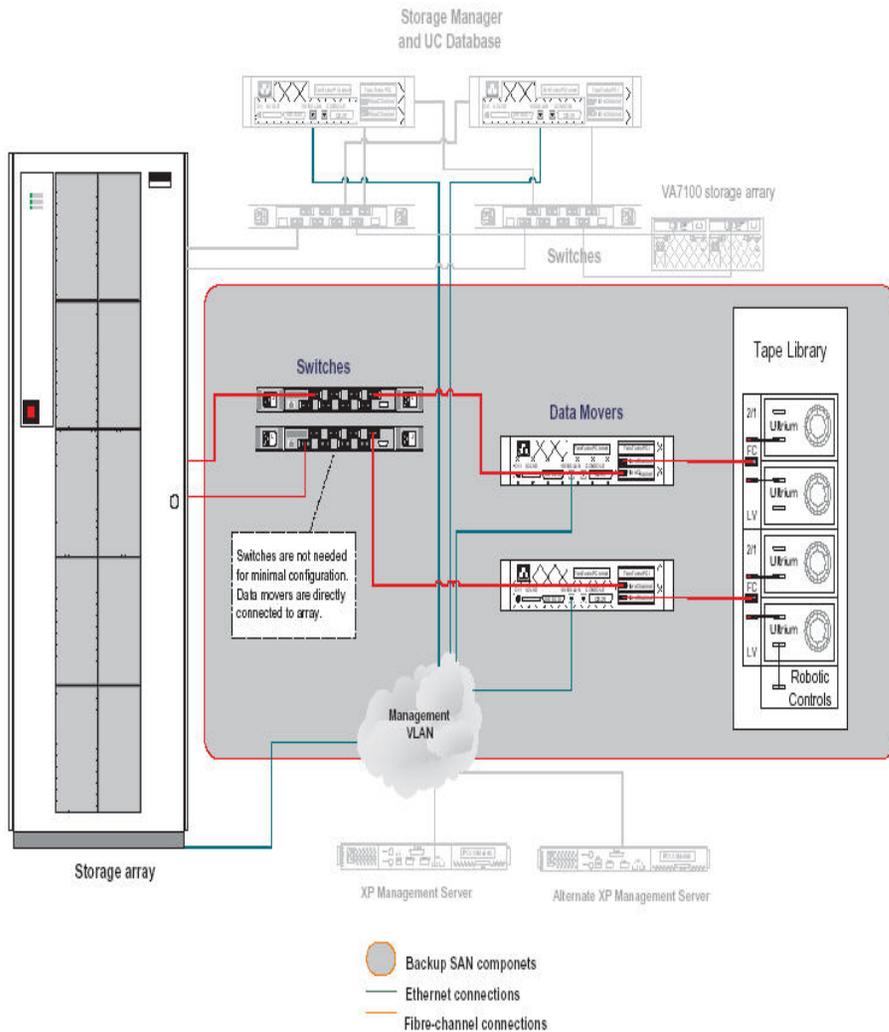


# Mixed Data SAN Environment



- Thin Servers
  - Single connection
  
- Mid-Range Servers
  - Two connections
  
- High-End Servers
  - Four connections

# Backup SAN & Management SAN

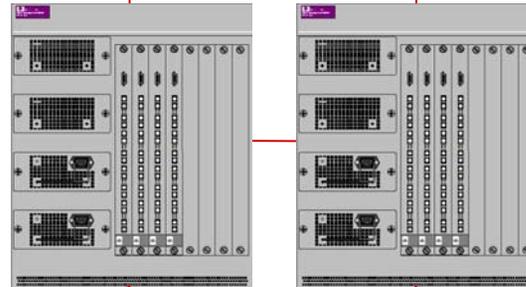


# UDC LAN fabric

Tier 1 Switches perform routing and switching function

Tier 1

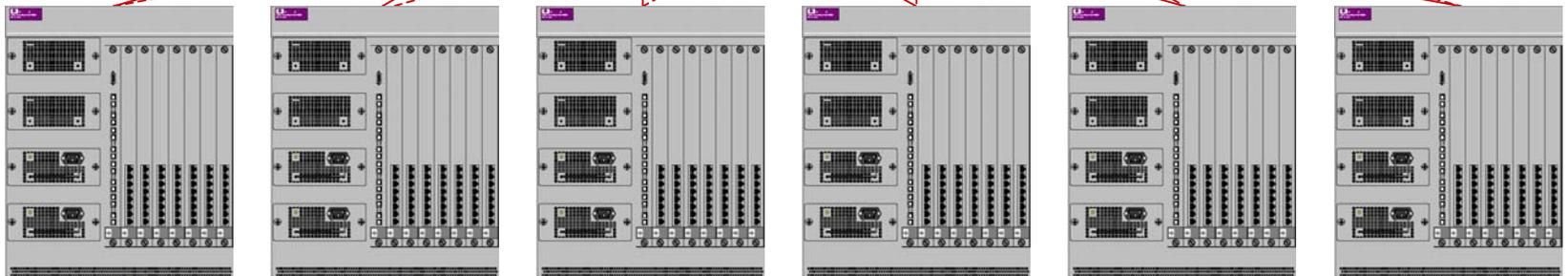
To Data Center



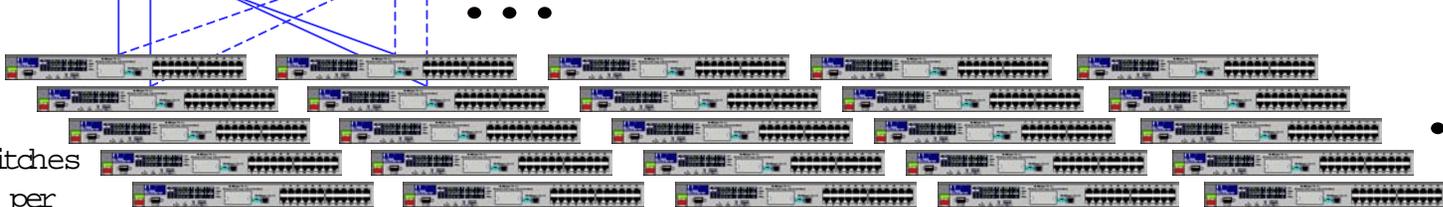
- 1 Gig (1000baseT)
- 4 x 1 Gig (fiber)
- - - Stand-by
- - - Stand-by

Tier 2 Switches perform switching function only

Tier 2



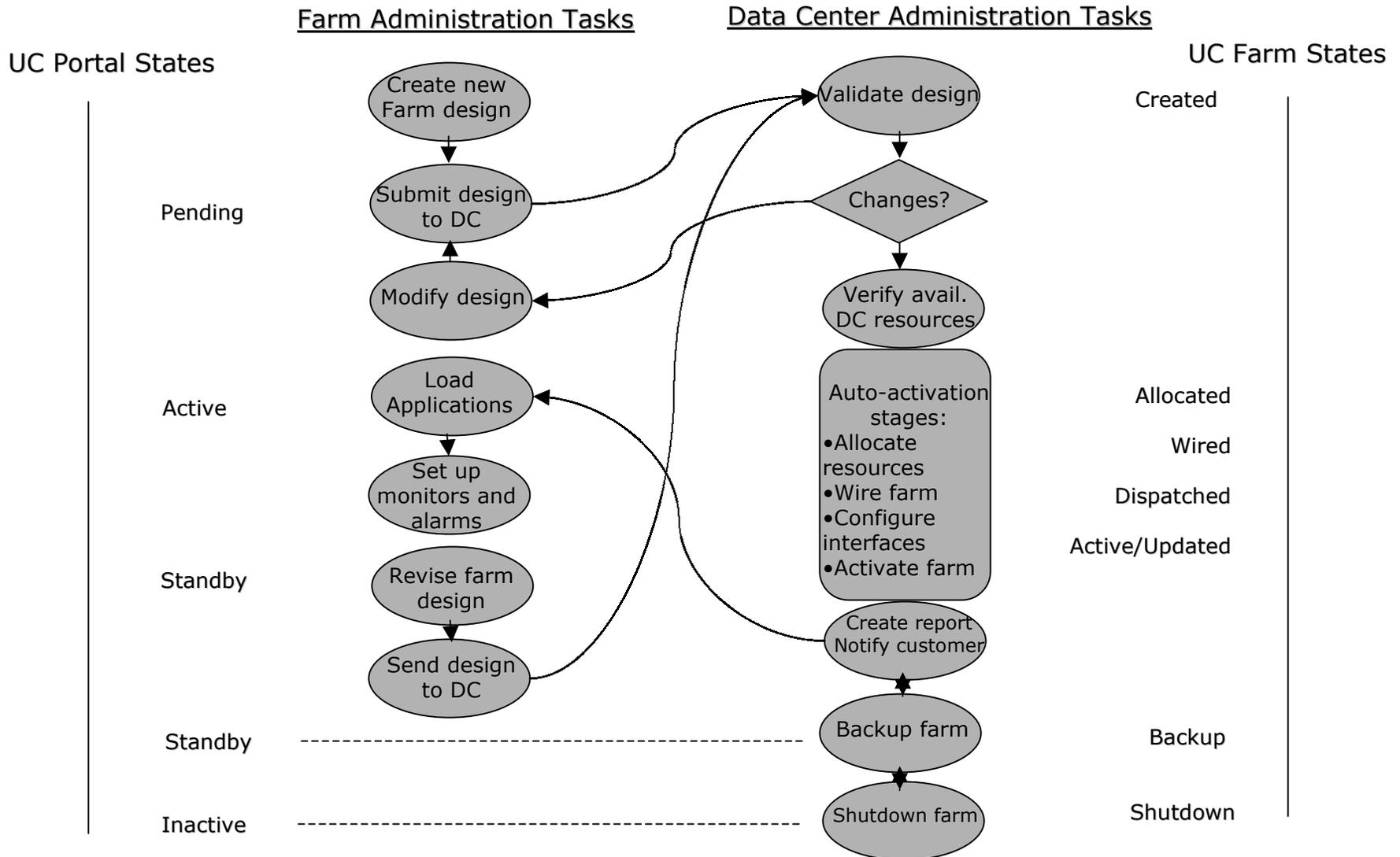
Tier 3 =  
Rack Switches  
(up to 56 per  
Tier 2 pair)



# Farm and HP UDC Interaction

- Farm Maintenance Tasks
- HP UDC “farm” portal administration view
- UC Portal Administrator’s view
  - Select Views
- A “farm controller’s” view of the HP UDC, or what happens after a farm is submitted?
- Overview of a select number of farm controller/manager commands

# Farm Maintenance Tasks



# A UDC "farm" portal administrators view

The screenshot displays the HP UDC 'farm' portal administrators view. The interface includes the HP logo and 'invent' tagline, navigation tabs for 'Main', 'Editor', and 'Monitor', and user options for 'Help', 'Account', and 'Logout'. The 'Editor' tab is active.

**Elements Panel:** Contains icons for network components such as a globe, a bus, a switch, a server, and a monitor.

**Farm Details Panel:**  
Name: threeTierFarm  
State: Design Status: ●  
Service Type: Not Set  
Service Core: Pseudo Service Core  
Requests:  
Last Request Completed: 4/25/03 4:17:00 PM MDT  
Request Status: Ready to take new request.  
Resources:  
2132 SU / hr  
0 HP lp2000r  
0 HP rp2450  
0 HP rp5470  
4 HP rp7400

**Network Diagram:** A three-tier network architecture. At the top is 'myinternet' connected to 'firewall1'. Below the firewall are two subnets: 'subnet1' and 'subnet2'. 'subnet1' contains 4 'apps' servers and 'subnet3' contains 2 'dbsrv' servers. 'subnet2' contains a 'webbalance' and 'subnet4' contains 2 'webs' servers. A 'balancer1' is connected to the 'dbsrv' and 'webs' servers.

# A UC Portal Administrator's view

- A UDC administrators view (partial)
  - Farms search
  - Farms Pending Transactions
  - Farms Change State
  - Disk Image System Edit List
  - Hardware Types Edit List
  - Service Contract Types Create
  - Service News Content

# A UC Portal Administrator's view

Hewlett-Packard Utility Controller Portal Administration - Microsoft Internet Explorer provided by Hewlett-Packard

File Edit View Favorites Tools Help

Back Search Favorites Media

 **Utility Controller Portal Administrator Homepage** [Logout!](#)

**Current Selections**

Account:

Farm:

Service Core:

---

**Administer**

- [-] Farms
  - [Find](#)
  - [Pending Transitions](#)
  - [Contract Parameters](#)
  - [Change State](#)
- [-] Service
  - [News Content](#)
- [-] Accounts
  - [Create](#)
  - [Remove](#)
  - [Update](#)
- [-] Users
  - [Create](#)
  - [Remove](#)
  - [Update](#)
  - [Login Status](#)
- [-] Administrators
  - [Create](#)
  - [Remove](#)
  - [Update](#)
  - [Login Status](#)
- [-] Contract Types
- [-] Disk Images
- [-] Systems

**Find Farms**

**Search Parameters**

Account	Service Core	Contract Type	Current State	Transition State
<input type="text" value="templateMgr"/>	<input type="text" value="cup2sc1"/>	<input type="text" value="QAFlex"/>	<input type="text" value="Design"/>	<input type="text" value="Ok"/>
<input type="text" value="qa"/>			<input type="text" value="Standby"/>	<input type="text" value="Pending"/>
<input type="text" value="hewlett-packard"/>			<input type="text" value="Active"/>	<input type="text" value="Replacing"/>
<input type="text" value="pcycle"/>			<input type="text" value="Inactive"/>	<input type="text" value="Error"/>

Farm Name:  (case insensitive sub-string)

Containing Element:  (case insensitive sub-string)

Containing IP Address:

# A UC Portal Administrator's view

Hewlett-Packard Utility Controller Portal Administration - Microsoft Internet Explorer provided by Hewlett-Packard

File Edit View Favorites Tools Help

Back Search Favorites Media

 **Utility Controller Portal Administrator Homepage** [Logout](#)

**Current Selections**

Account:  Go To

Farm:  Go To

Service Core:

**Administer**

- [-] Farms
  - Find
  - Pending Transitions**
  - Contract Parameters
  - Change State
- [-] Service
  - News Content
  - [-] Accounts
    - Create
    - Remove
    - Update
  - [-] Users
    - Create
    - Remove
    - Update
    - Login Status
  - [-] Administrators
    - Create
    - Remove
    - Update
    - Login Status
  - [-] Contract Types
  - [-] Disk Images
  - [-] System

**Pending Transitions**

Show farms that are pending for  all accounts  current account

Id	Name	Account	Current State	Requested State	
2	linda-test	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
5	df-q54-02	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
9	lwang-test	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
10	q22hx11	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
11	shyam-q22-13	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
12	q22	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
13	si123	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
22	q22hx11-shyam	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
24	q51-04june1	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
26	testfarm	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
27	farm1	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
28	farm2	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
30	testform	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
32	pubroute	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
44	df-fw-portal	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>
45	navq24	templateMgr	Design	Active	<a href="#">View</a> <a href="#">Change State</a>

# A UC Portal Administrator's view

Hewlett-Packard Utility Controller Portal Administration - Microsoft Internet Explorer provided by Hewlett-Packard

File Edit View Favorites Tools Help

Back Search Favorites Media

hp invent

## Utility Controller Portal Administrator Homepage

[Logout!](#)

**Current Selections**

Account:  [Go To](#)

Farm:  [Go To](#)

Service Core:

**Administer**

- [-] Farms
  - Find
  - Pending Transitions
  - Contract Parameters
  - Change State**
- [-] Service
  - News Content
  - [-] Accounts
    - Create
    - Remove
    - Update
  - [-] Users
    - Create
    - Remove
    - Update
    - Login Status
  - [-] Administrators
    - Create
    - Remove
    - Update
    - Login Status
  - [-] Contract Types
  - [-] Disk Images
  - [-] Systems

**Change State**

**Farm linda-test States:**

Current:

Previous:

Transition:

Action: [Approve](#) [Reject](#)

**State Diagram:**

```

graph TD
    Design((Design)) --> Active((Active))
    Active <--> Standby((Standby))
    Active --> Deleted((Deleted))
    Standby --> Inactive((Inactive))
    Inactive --> Deleted
    
```

# A UC Portal Administrator's view

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File Edit View Favorites Tools Help

Back Search Favorites Media

hp invent

## Utility Controller Portal Administrator Homepage

[Logout](#)

**Current Selections**

Account:  Go To

Farm:  Go To

Service Core:

**Administer**

- Remove
- Update
- Login Status
- Administrators
  - Create
  - Remove
  - Update
  - Login Status
- Contract Types
  - Create
  - Remove
  - Update
- Disk Images
  - System
    - [Edit List](#)
  - Service Core Associations
- Customer
- Hardware Types
  - Add/Remove Architectures
  - Edit List
  - Service Core Associations
- Service Cores
  - Edit List
  - Modify Properties

**System Image Management**

ID	Name	Description (Seen By User)	Architecture	Image Size (MB)		
1	linux_rp1_1p2k	<input type="text" value="Linux OSr1_1-p2000r"/>	arch_ip2000r	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
2	win2k-ip2k	<input type="text" value="Win2000-ip2000r"/>	arch_ip2000r	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
3	hpux11i-p000	<input type="text" value="HPUX 11i-p000"/>	arch_i8000	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
4	hpux11i-rp2450	<input type="text" value="HPUX 11i-rp2450"/>	arch_rp2450	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
5	hpux11i-rp2450_nas	<input type="text" value="HPUX 11i-NAS"/>	arch_rp2450	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
6	hpux11i-rp5470	<input type="text" value="HPUX 11i-rp5470"/>	arch_rp5470	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
7	hpux11i-rp7400	<input type="text" value="HPUX 11i-rp7400"/>	arch_rp7400	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
8	linux_rl_1-dl360	<input type="text" value="Linux OSr1_1-dl360"/>	arch_dl360g2	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
9	linux_rl_1-dl580	<input type="text" value="Linux OSr1_1-dl580"/>	arch_dl580	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
10	win2k-dl580	<input type="text" value="Win2000-dl580"/>	arch_dl580	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
11	win2k-dl360	<input type="text" value="Win2000-dl360"/>	arch_dl360g2	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
12	hpux11i-rp2470	<input type="text" value="HPUX 11i-rp2470"/>	arch_rp2470	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
13	hpux11i-rp2470_nas	<input type="text" value="HPUX 11i-NAS"/>	arch_rp2470	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
14	hpux11i-rp7410	<input type="text" value="HPUX 11i-rp7410"/>	arch_rp7410	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
15	win2k-dl360g3	<input type="text" value="Win2000-dl360g3"/>	arch_dl360g3	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
16	linux_rl_2-dl360g3	<input type="text" value="Linux OSr1_2-dl360g3"/>	arch_dl360g3	<input type="text" value="7042"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
NEW	<input type="text"/>	<input type="text"/>	<input type="text" value="Select One..."/>	<input type="text"/>	<input type="button" value="Delete"/>	<input type="button" value="Create"/>

# A UC Portal Administrator's view

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**Current Selections**

Account:  Go To

Farm:  Go To

Service Core:

---

**Administer**

- Logon Status
- Administrators
  - Create
  - Remove
  - Update
  - Login Status
- Contract Types
  - Create
  - Remove
  - Update
- Disk Images
- System
  - Edit List
  - Service Core Associations
- Customer
  - Edit List
  - Service Core Associations
- Hardware Types
  - Add/Remove Architectures
  - [Edit List](#)
  - Service Core Associations
- Service Cores
  - Edit List
  - Modify Properties

**Hardware Management**

ID	Name	Description	Type	Architecture	Service Units (SU)		
2	cpu-1p2000r	<input type="text" value="HP 1p2000r"/>	Server	arch_1p2000r	<input type="text" value="10"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
3	cpu-rp2450	<input type="text" value="HP rp2450"/>	Server	arch_rp2450	<input type="text" value="42"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
4	cpu-rp5470	<input type="text" value="HP rp5470"/>	Server	arch_rp5470	<input type="text" value="107"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
5	cpu-rp7400	<input type="text" value="HP rp7400"/>	Server	arch_rp7400	<input type="text" value="372"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
6	cpu-j6000	<input type="text" value="HP j6000"/>	Server	arch_j6000	<input type="text" value="29"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
8	fw-genericgeneric	<input type="text" value="Cisco PIX Firewall"/>	Firewall	fw	<input type="text" value="14"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
9	lb-genericgeneric	<input type="text" value="Foundry ServerIron XL"/>	Load Balancer	lb	<input type="text" value="15"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
10	bh-genericgeneric	<input type="text" value="Generic Backhaul"/>	Backhaul	backhaul	<input type="text" value="45"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
11	bh-hpsa3110	<input type="text" value="HP sa3110 VPN"/>	Backhaul	backhaul	<input type="text" value="0"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
12	cpu-rp2470	<input type="text" value="HP rp2470"/>	Server	arch_rp2470	<input type="text" value="19"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
14	cpu-dl580	<input type="text" value="HP DL580"/>	Server	arch_dl580	<input type="text" value="150"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
15	cpu-rp7410	<input type="text" value="HP rp7410"/>	Server	arch_rp7410	<input type="text" value="150"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
16	cpu-dl380g2	<input type="text" value="HP DL380G2"/>	Server	arch_dl380g2	<input type="text" value="26"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>
17	cpu-dl380g3	<input type="text" value="HP DL380G3"/>	Server	arch_dl380g3	<input type="text" value="26"/>	<input type="button" value="Delete"/>	<input type="button" value="Update"/>

NEW

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**Current Selections**

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Farm:  Go To

Service Core:

**Administer**

- Users
  - Create
  - Remove
  - Update
  - Login Status
- Administrators
  - Create
  - Remove
  - Update
  - Login Status
- Contract Types
  - Create**
  - Remove
  - Update
- Disk Images
- System
  - Edit List
  - Service Core Associations
- Customer
- Hardware Types
  - Add/Remove Architectures
  - Edit List
  - Service Core Associations

**Create Contract Type**

**Contract Parameters**

Name:

Description:

Minimum System:

Maximum System:

**Flex Permissions for Active Farms**

Resource Type	Remove	Create
Local Disk	<input type="checkbox"/>	<input type="checkbox"/>
Server Group	<input type="checkbox"/>	<input type="checkbox"/>
Firewall	<input type="checkbox"/>	<input type="checkbox"/>
Subnet	<input type="checkbox"/>	<input type="checkbox"/>
Disk Image	<input type="checkbox"/>	<input type="checkbox"/>
Server	<input type="checkbox"/>	<input type="checkbox"/>
Backhaul	<input type="checkbox"/>	<input type="checkbox"/>
Load Balancer	<input type="checkbox"/>	<input type="checkbox"/>

\*check the box to give permissions for the resource.

**WARNING: A maximum value can be set on Load balancers, Firewalls and Servers ONLY!**

# A UC Portal Administrator's view

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**Current Selections**

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Farm:

Service Core:

**Administer**

- [-] Farms
  - Find
  - Pending Transitions
  - Contract Parameters
  - Change State
- [-] Service
  - News Content**
  - [-] Accounts
    - Create
    - Remove
    - Update
  - [-] Users
    - Create
    - Remove
    - Update
    - Login Status
  - [-] Administrators
    - Create
    - Remove
    - Update
    - Login Status
  - [-] Contract Types
  - [-] Disk Images
  - [-] Custom

**News Contents**

**Categories:**

**Preview:**

Articles:

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Link Title:

Article Title:

Byline:

Publish Date:     :

Content:

Note: If you use <table> in the article, or the Preview doesn't look right, please specify "homeStoryText" as your CSS.

# A “farm controllers” view of the UDC, or what happens after a farm is submitted!



- A “farm controllers” view of the UDC
  - Show how to
    - Check a “submitted farm”
    - Resource availability
    - Activate a farm
    - Select a farm controller
    - Monitor the status of a farm being activated
    - OpenView view of an active farm <do this in the management section>
    - Farm controllers view of an active farm
    - ....
- A “select” number of UDC “farm controller” commands
  - # request
  - # device
  - # farm
  - # image
  - miscellaneous commands ....

# The request command: request (1) < from a farm controller >



- request command used to manage action requests inside the Utility Controller. Most interactions within a UC are performed by queuing requests. The request command is used to list requests and perform certain operations on them.
- # request -l <displays the active requests in the system>
- # request -f <all requests for a farm>
- Requests can be in a number of different states: queued, in-progress, blocked, done, deleted or internal\_error.

# The device command: device(1) <from a Farm Controller>

- Used to manage physical devices in the resource pool. Provides for creating, deleting and updating devices, their properties and interconnections. Also allows for the listing of device details and query devices based on their properties
  
- # device -LF
  - Display all free devices
  
- # device -LF -t cpu
  - Display all free devices of type 'cpu'
  
- # device -LF -t cpu -M SUN -O 420R
  - Display all free devices of type 'cpu', make 'SUN' and model '420R'

# # device -LF -t cpu

```
# ./device -LF -t cpu
DEVICE_ID ROLE          STATUS   FARM_ID   TYPE
200114101 uccs        FREE    -         cpu (hp rp2470)
200114102 uccs        FREE    -         cpu (hp rp2470)
200114601 comv        FREE    -         cpu (hp d1360g2)
200114602 comv        FREE    -         cpu (hp d1360g2)
200627001 RPS         FREE    -         cpu (hp rp2450)
200627003 RPS         FREE    -         cpu (hp rp2450)
200627007 RPS         FREE    -         cpu (hp rp2450)
200627008 RPS         FREE    -         cpu (hp rp2450)
200627009 RPS         FREE    -         cpu (hp rp2450)
200627010 RPS         FREE    -         cpu (hp rp2450)
200627011 RPS         FREE    -         cpu (hp rp2450)
200627012 RPS         FREE    -         cpu (hp rp2450)
200725001 RPS         FREE    -         cpu (hp lp2000r)
200725005 RPS         FREE    -         cpu (hp lp2000r)
200725006 RPS         FREE    -         cpu (hp lp2000r)
200725009 RPS         FREE    -         cpu (hp lp2000r)
200725011 RPS         FREE    -         cpu (hp lp2000r)
200828001 RPS         FREE    -         cpu (hp rp5470)
200828002 RPS         FREE    -         cpu (hp rp5470)
200828004 RPS         FREE    -         cpu (hp rp5470)
201030002 RPS         FREE    -         cpu (hp j6000)
201030006 RPS         FREE    -         cpu (hp j6000)
201030007 RPS         FREE    -         cpu (hp j6000)
201030008 RPS         FREE    -         cpu (hp j6000)
24 devices found.
#
```

# # device -L -t [lb fw]

```
# ./device -L -t lb
DEVICE_ID ROLE      STATUS  FARM_ID  TYPE
200520001 lb          FREE    -        lb (foundry fcslb8x1)
200520002 lb          FAILED  -        lb (foundry fcslb8x1)
200520003 lb          FREE    -        lb (foundry fcslb8x1)
200520004 lb          FREE    -        lb (foundry fcslb8x1)
200520005 lb          USED    10000123 lb (foundry fcslb8x1)
5 devices found.
# ./device -L -t fw
DEVICE_ID ROLE      STATUS  FARM_ID  TYPE
200115001 mgmnt_fw  USED    -        fw (cisco pix515)
200115101 mgmnt_fw  USED    -        fw (cisco pix515)
200519001 resource_fw ON      10000121 fw (cisco pix515)
200519002 resource_fw ON      10000180 fw (cisco pix515)
200519003 resource_fw ON      10000127 fw (cisco pix515)
200519004 resource_fw FREE    -        fw (cisco pix515)
200519005 resource_fw FREE    -        fw (cisco pix515)
200519006 resource_fw FREE    -        fw (cisco pix515)
200519007 resource_fw FREE    -        fw (cisco pix515)
200519008 resource_fw FREE    -        fw (cisco pix515)
200519009 resource_fw FREE    -        fw (cisco pix515)
200519010 resource_fw ON      14268   fw (cisco pix515)
12 devices found.
#
#
#
#
#
```

# # device -L -t cpu

```

DEVICE_ID  ROLE      STATUS   FARM_ID   TYPE
200114001  FC        USED     -         cpu (hp rp2470)
200114002  FC        USED     -         cpu (hp rp2470)
200114101  uccs     FREE     -         cpu (hp rp2470)
200114102  uccs     FREE     -         cpu (hp rp2470)
200114601  comv     FREE     -         cpu (hp dl360g2)
200114602  comv     FREE     -         cpu (hp dl360g2)
200627001  RPS      FREE     -         cpu (hp rp2450)
200627002  RPS      ON       9404      cpu (hp rp2450)
200627003  RPS      FREE     -         cpu (hp rp2450)
200627004  RPS      ON       9404      cpu (hp rp2450)
200627005  RPS      ON       9404      cpu (hp rp2450)
200627006  RPS      ON       9404      cpu (hp rp2450)
200627007  RPS      FREE     -         cpu (hp rp2450)
200627008  RPS      FREE     -         cpu (hp rp2450)
200627009  RPS      FREE     -         cpu (hp rp2450)
200627010  RPS      FREE     -         cpu (hp rp2450)
200627011  RPS      FREE     -         cpu (hp rp2450)
200627012  RPS      FREE     -         cpu (hp rp2450)
200725001  RPS      FREE     -         cpu (hp lp2000r)
200725002  RPS      ON       9999      cpu (hp lp2000r)
200725003  RPS      ON       11910     cpu (hp lp2000r)
200725004  RPS      FAILED   -         cpu (hp lp2000r)
200725005  RPS      FREE     -         cpu (hp lp2000r)
200725006  RPS      FREE     -         cpu (hp lp2000r)
200725007  RPS      OFF      2404     cpu (hp lp2000r)
200725008  RPS      ON       14268     cpu (hp lp2000r)
Standard input
201030001  RPS      ON       14268     cpu (hp j6000)
201030002  RPS      FREE     -         cpu (hp j6000)
201030003  RPS      FAILED   -         cpu (hp j6000)
201030004  RPS      ON       14268     cpu (hp j6000)
201030005  RPS      ON       106       cpu (hp j6000)
201030006  RPS      FREE     -         cpu (hp j6000)
201030007  RPS      FREE     -         cpu (hp j6000)
201030008  RPS      FREE     -         cpu (hp j6000)
45 devices found.
Standard input: END

```

# The farm command: farm(1) <from the farm controller>

- farm(1) command used to perform farm management operations. Used to carry out various operations on a farm. These operations include creation, activation, update, deactivation and deletion of a farm. The command interacts with the UC Software to carry out the various farm operations requested.
- Selected farm(1) options
  - # farm -a < activates a farm>
  - # farm -d < de-active a farm>
  - # farm -p < ping a farm to get it's current status>
  - # farm -l < list details of all or specified farm>
  - # .....

# # farm -l

```
# ./farm -l
FARM_ID      FARM_NAME      CUSTOMER      STATE      ISTATE      ERROR      OWNER
10000121     TestRes_200519001 qe           ACTIVE     ACTIVE       0          SM: fcb1
10000123     TestRes_200520005 qe           NEW        ALLOCATED    0          SM: fcb1
10000125     TestRes_21100402 qe           ACTIVE     ACTIVE       0          SM: fcb1
10000127     TestRes_200519003 qe           ACTIVE     ACTIVE       0          SM: fcb1
10000144     TestRes_200828001 qe           INACTIVE   DEACTIVATED 0          -
10000180     TestRes_200519002 qe           ACTIVE     ACTIVE       0          SM: fcb1
106          j6000-6        lkruty       NEW        DISPATCHED   50         SM: fcb1
11910        HH-6406-1363   qe-sahana10  NEW        DISPATCHED   50         SM: fcb1
14268        HH-8401-1371   qe-debbyfu68 STANDBY    DISPATCHED   50         SM: fcb1
17354        HH-6409-1335   qe-ganravi54 INACTIVE   DEACTIVATED 0          -
19645        HH-6405-1361   qe-sahana45  INACTIVE   DEACTIVATED 0          -
19941        HH-10401-1357 qe-ganravi41 INACTIVE   DEACTIVATED 0          -
2404         Q2404          naveen       NEW        WIRED        40         SM: fcb2
540          q24hx04        amit         STANDBY    STANDBY      0          SM: fcb1
7402         san-s1-d1-7402 jshieh2      ACTIVE     ACTIVE       0          SM: fcb1
7406         san-s1-d2-7406 jshieh6      ACTIVE     ACTIVE       0          SM: fcb1
7408         san-s1-d2-7408 jshieh8      NEW        IDLE        100        SM: fcb1
788111      rp2450farm_788111 stress       INACTIVE   DEACTIVATED 0          -
9404         q09x04         kprabhu      ACTIVE     ACTIVE       0          SM: fcb1
9407         df-q0907-j6000 debbyfu      INACTIVE   DEACTIVATED 0          -
94071        df-q0907-j6k-2 debbyfu      INACTIVE   DEACTIVATED 0          -
9999        citrix_3_lp2k  mjjen        ACTIVE     ACTIVE       0          SM: fcb1
#
#
#
#
```

# The image command: image(1) <from the farm controller>

- image – create, delete and get information on OS images. The image command creates, deletes and gets information on all images in the Service Core. Images are either system images or customer created images. All images have a unique name for a customer.
- Options (select list, not inclusive)
  - -c Create a new image with the give name, disk location, OS, size (in MB), architecture and description.
  - -u Update the image
  - -d Delete the image
  - -l display information about the image
  - -s Specifies that the image is a system image
  - -v Displays more detailed information about the image

# # image -ls

```
# ./image -ls
```

IMAGE_ID	IMAGE_NAME	CUSTOMER	DISK_VOL_ID	SIZE	OS
1	hpux11i-rp2450-rel1.1	__uc__	205122201/0,0	7042	HPUX
2	win2k-lp2k.old	__uc__	205122201/0,1	7042	Windows
3	linux_r1_1-lp2k	__uc__	205122201/0,2	7042	Linux
4	hpux11i-rp2450	__uc__	205122201/0,4	7042	HPUX
5	hpux11i-rp5470.r1.1	__uc__	205122201/0,e	7042	HPUX
6	hpux11i-rp7400.old	__uc__	205122201/0,f	7042	HPUX
23	win2k-lp2k	__uc__	205122201/0,83	7042	Windows
25	hpux11i-rp7400	__uc__	205122201/0,10	7042	HPUX
163	hpux-custom	__uc__	205122201/0,22	7042	HPUX
181	hpux11i-rp5470	__uc__	205122201/0,30	7042	HPUX
205	hpux-custom2	__uc__	205122201/0,60	7042	HPUX
208	hpux11i-j6000create	__uc__	205122201/0,82	7042	HPUX
228	hpux11i-j6000	__uc__	205122201/0,44	7042	HPUX

# # image -l

```
# ./image -l
```

IMAGE_ID	IMAGE_NAME	CUSTOMER	DISK_VOL_ID	SIZE	OS
1	hpux11i-rp2450-rel1.1	__uc__	205122201/0,0	7042	HPUX
2	win2k-lp2k.old	__uc__	205122201/0,1	7042	Windows
3	linux_r1_1-lp2k	__uc__	205122201/0,2	7042	Linux
4	hpux11i-rp2450	__uc__	205122201/0,4	7042	HPUX
5	hpux11i-rp5470.r1.1	__uc__	205122201/0,e	7042	HPUX
6	hpux11i-rp7400.old	__uc__	205122201/0,f	7042	HPUX
15	Q8h03-03win2k.tagged	qe-debbyfu0	205122201/0,c	7042	Windows
23	win2k-lp2k	__uc__	205122201/0,83	7042	Windows
25	hpux11i-rp7400	__uc__	205122201/0,10	7042	HPUX
163	hpux-custom	__uc__	205122201/0,22	7042	HPUX
181	hpux11i-rp5470	__uc__	205122201/0,30	7042	HPUX
182	test_rp2450	jjjen	205122201/0,2b	7042	HPUX
205	hpux-custom2	__uc__	205122201/0,60	7042	HPUX
208	hpux11i-j6000create	__uc__	205122201/0,82	7042	HPUX
228	hpux11i-j6000	__uc__	205122201/0,44	7042	HPUX
244	Q8401-03hpux11i-j6000.tagged	qe-debbyfu64	205122201/0,3f	7042	HPUX
263	Q8401-03hpux11i-j6000.tagged	qe-debbyfu68	205122201/0,37	7042	HPUX
301	firewall1@15425_STANDBY	qe-debbyfu25	-	2795	Firewall
302	Q8401-03hpux11i-j6000.tagged	qe-debbyfu25	205122201/0,16	7042	HPUX

# # image -lv 307

```
Description: firewall1@211778
Created      : 2003-07-09
Image Contents:
=====
Written by enable_15 at 12:12:50.641 UTC Wed Jul 9 2003
PIX Version 6.2(2)
nameif ethernet0 outside security0
nameif ethernet1 inside security100
nameif ethernet2 intf2 security10
nameif ethernet3 intf3 security15
nameif ethernet4 intf4 security20
nameif ethernet5 intf5 security25
enable password rwt5UQJihEq2/Qae encrypted
passwd 2KFQnbNIdI.2KYOU encrypted
hostname firewall1
fixup protocol ftp 21
fixup protocol http 80
fixup protocol h323 h225 1720
fixup protocol h323 ras 1718-1719
fixup protocol ils 389
fixup protocol rsh 514
fixup protocol rtsp 554
fixup protocol smtp 25
fixup protocol sqlnet 1521
fixup protocol sip 5060
fixup protocol skinny 2000
names
access-list for_outside permit tcp 15. . . 255.255.255.240 host 15. . . eq
```

# Additional farm controller commands

- # getcustomer(1) display IP addresses used by a customer (report). Lists all IP addresses used by a customer, or given an IP address list the customer and farm using it.
- # app\_report(1) list applications currently running in the Utility Controller report. Applications in this context means all segment and farm managers, the storage manager and most commands.
- # devtype(1) list device types, roles and attributes (report) used to list device types( ie cpu, rtr, pwr, lb, fw, diskarray, jup, nic, hba, backhaul, nas, ....), their roles and names of various device attributes as used by the Utility Controller software.
- # lfr(1) list the resources allocated to a farm. (config) displays all resources that are allocated to a farm, the information is presented in terms of the farm description in the FML.

# Additional farm controller commands

- # `configure_security(1)` UDC security configuration command. (`security`, `config`, `lockdown`) performs the security lockdown and enablement procedures for the current system based on installed software. Done during installation time and immediately after any patch management activities.
- # `movefarms(1)` migrate farms from a failed Farm Controller
- # `replacedevice(1)` replace physical device(s) allocated to a farm (`config`) replaces a physical device used in a farm with another device of the same type. Helpful in manually replacing a device for maintenance purposes or due to some unexpected failure.
- # `snapshot(1)` create a snapshot of the OS image on a device (`system`, `fw` or `lb`).
- # `subnet(1)` manage subnet information (IP addresses, subnet group memberships, ...) in the Utility Controller Database (`config`).
- # `subnetgroup(1)` manage subnet group information in the Utility Controller DataBase.

# Summary / Review

- Overview of the HP UDC Value Proposition:
  - The Business Case
  - High Level Overview and Conceptual View
- An introduction to UDC definitions, concepts and terminology
- An overview of the UDC Concepts & Architecture
  - Components, Network, Storage, Security and Management
- But what does a UDC really look like?
- A UDC “farm” Portal Administrators view
- A Utility Controller Portal Administrator’s view
- A “farm controller’s” view of the UDC
- Where to go for more information

## More Information & Reference's

- Where to go for more information on
  - HP UDC and HP Utility Computing
    - <http://www.hp.com/go/hpudc/>
  - Grid Computing
    - <http://www.hp.com/go/grid/>
  - HP and Opsware Press Release
    - <http://www.hp.com/hpinfo/newsroom/press/2003/030602f.html>
  - hp utility data center with utility controller software \*\*
    - hp udc system administration guide 1.1 release



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