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Clanavi: How to Manage Your Cloud by Drupal

02/23/2010

Yas Naoi – [yas]

DOCOMO p.a.c.t.

The Purpose of This Presentation

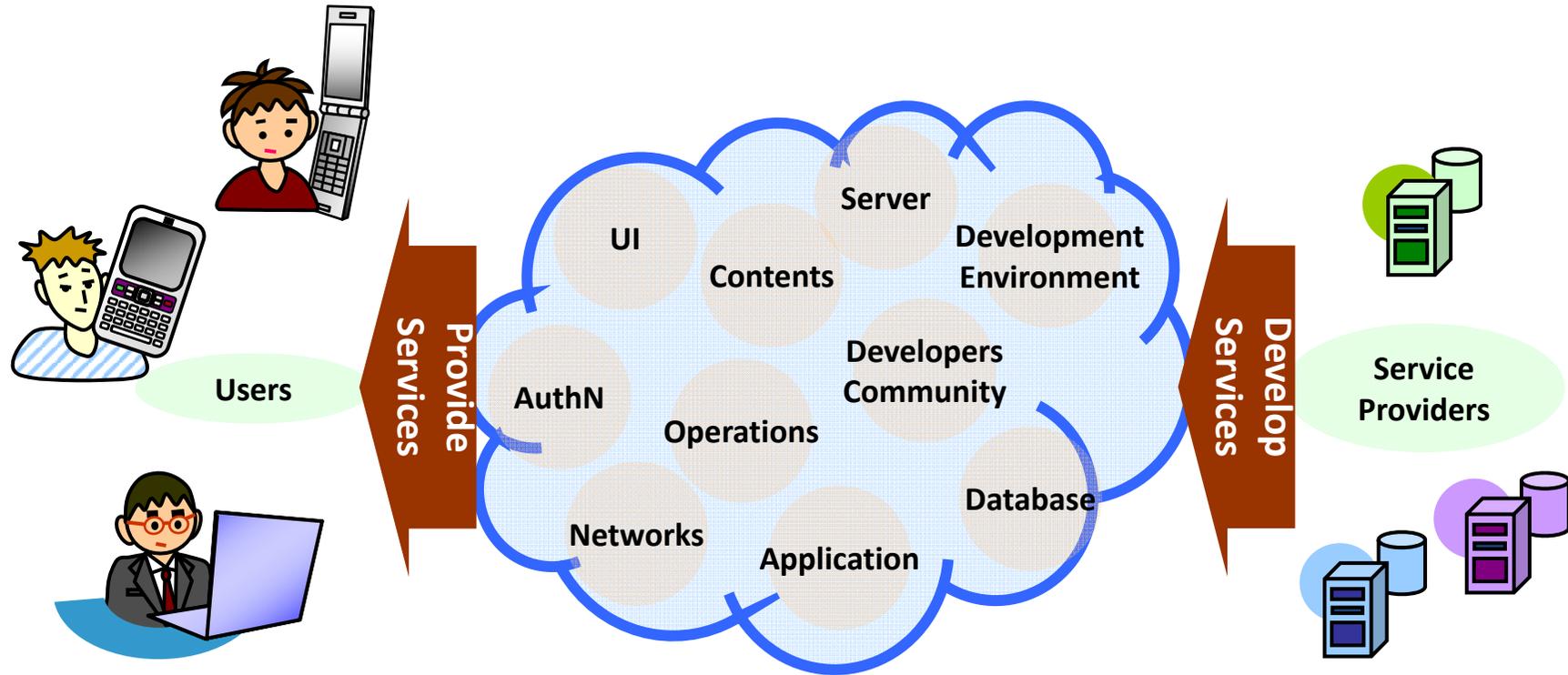
- Learn about Cloud Computing
- Introduce Clanavi
- Share Business Value
- Feedback from YOU!

Agenda

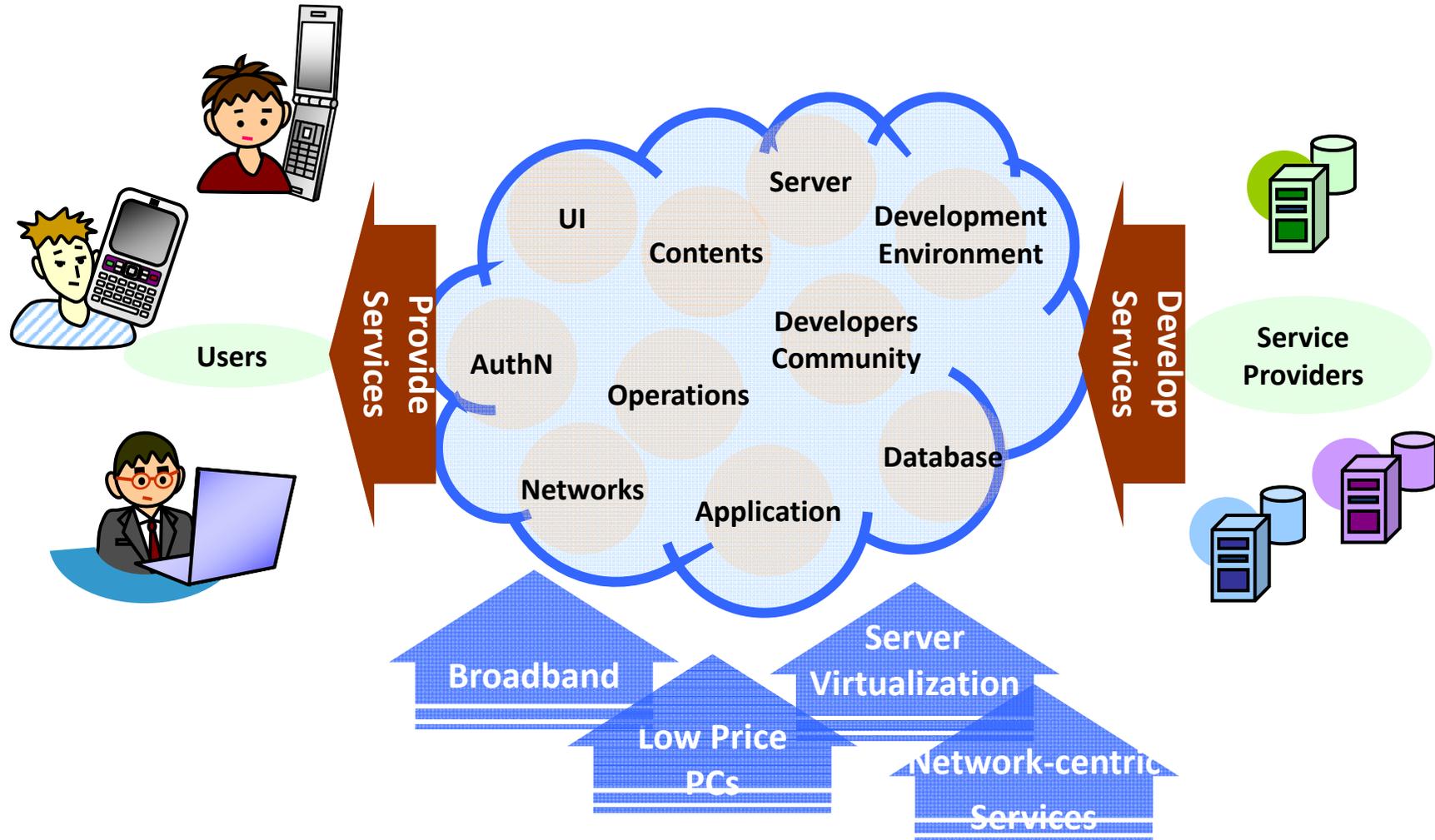
- Cloud Computing Overview
- Clanavi
- Demo
- Business Value
- Q&A

Cloud Computing Overview

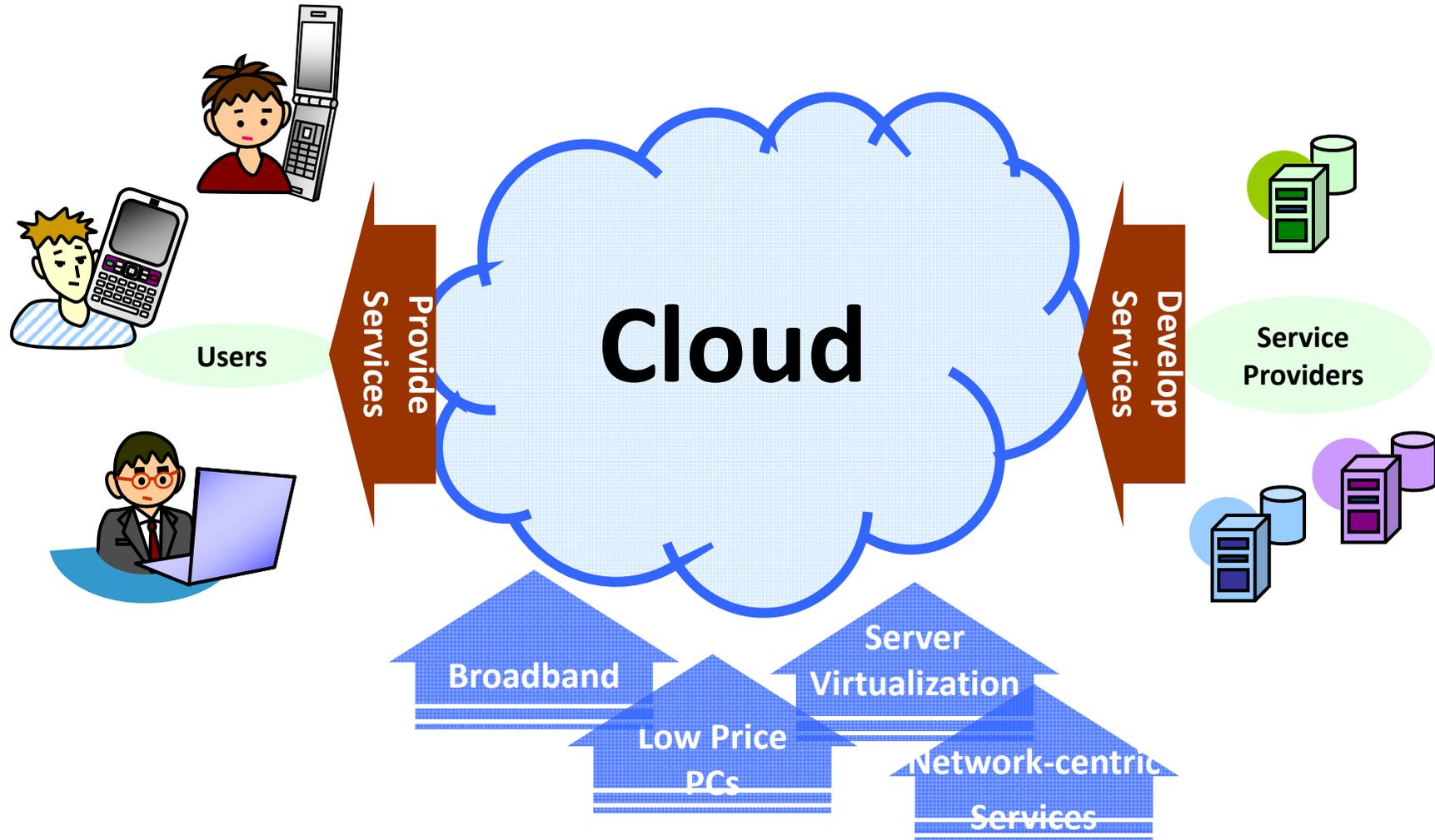
Centralized to the Internet



Centralized to the Internet



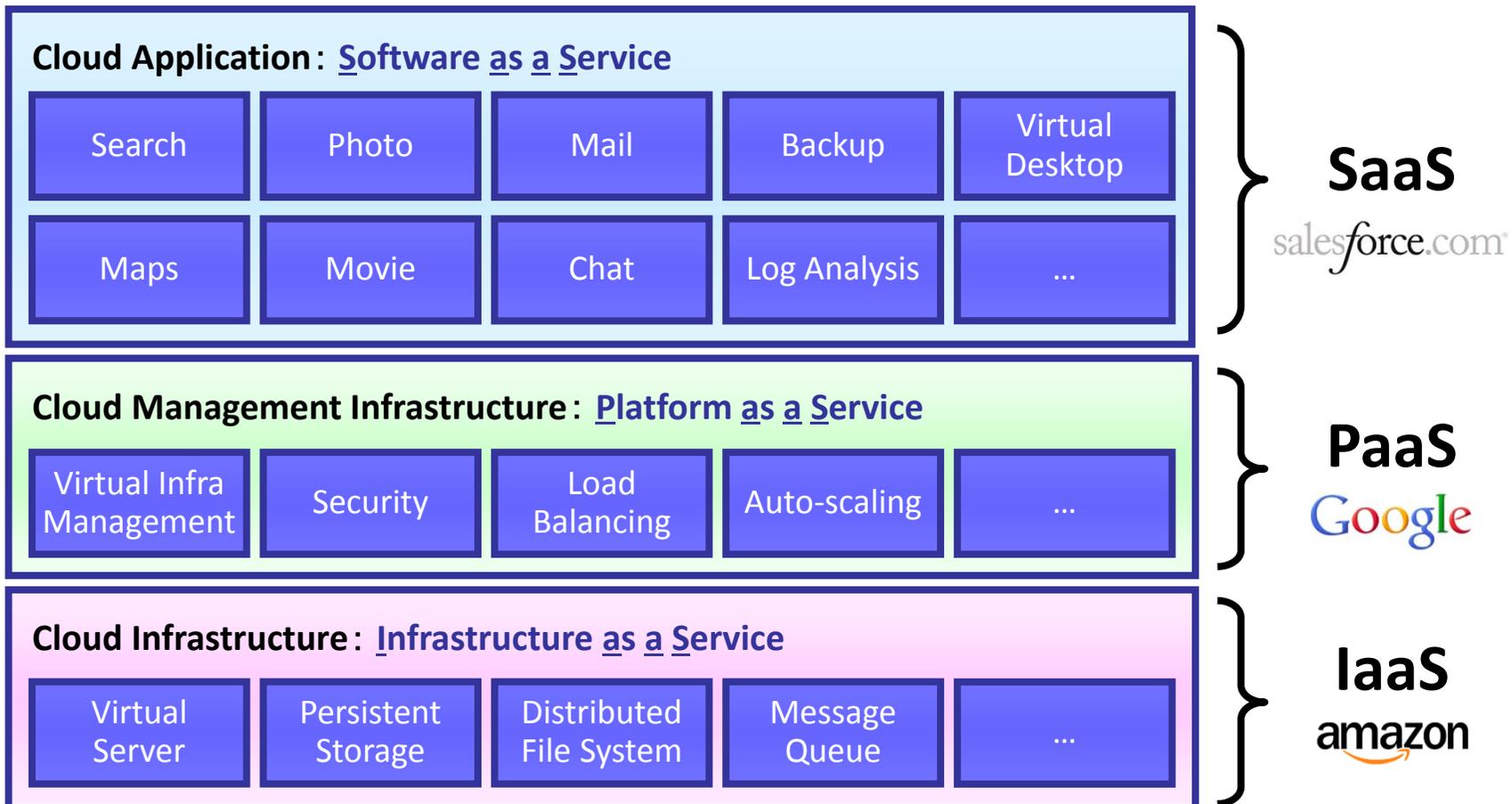
Centralized to the Internet



Cloud Computing Features

- 
- On-Demand Resources
 - Cost Reduction by Pay-as-you-go Billing / Server Consolidation
 - Easy Provisioning
 - Auto-scaling
 - Higher Productivity

Cloud Computing Architecture



Clanavi

Why Cloud for Service Providers?

- **Problems**
 - Manage Tons of Servers
 - Manage Peta-byte Class Data

Why Cloud for Service Providers?

- **Problems**
 - Manage Tons of Servers
 - Manage Peta-byte Class Data
- **Requirements**
 - Cost Reduction
 - Flexible Resource Management

Why Cloud for Service Providers?

- **Cost Reduction**
 - Open Source
 - Browser-based Easy Operations
- **Flexible Resource Management**
 - Multiple Cloud Access
 - Private
 - Public

Private Cloud Requirements

- **Browser-based UI**
 - Unified Access for Multiple Cloud

Private Cloud Requirements

- **Browser-based UI**
 - Unified Access for Multiple Cloud
- **Management**
 - Linux & Windows
 - Virtual Machine Image
 - Server Template
 - Network
 - Audit Log and Reports
 - Backup

Private Cloud Requirements

- **Browser-based UI**
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- **Security**
 - User Authentication
 - Permissions

Private Cloud Requirements

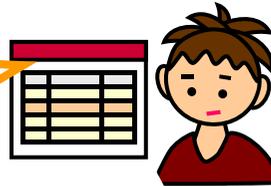
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- **Monitoring**
 - Physical Servers / Cloud Nodes
 - Virtual Machines
 - Applications

Private Cloud Requirements

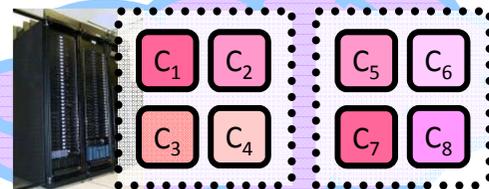
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 - Physical Servers / Cloud Nodes
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 - Applications
- **Open Source**

The Goal of Clanavi

- Unified Management Console
- Flexible Resource Management



Multiple Private Cloud



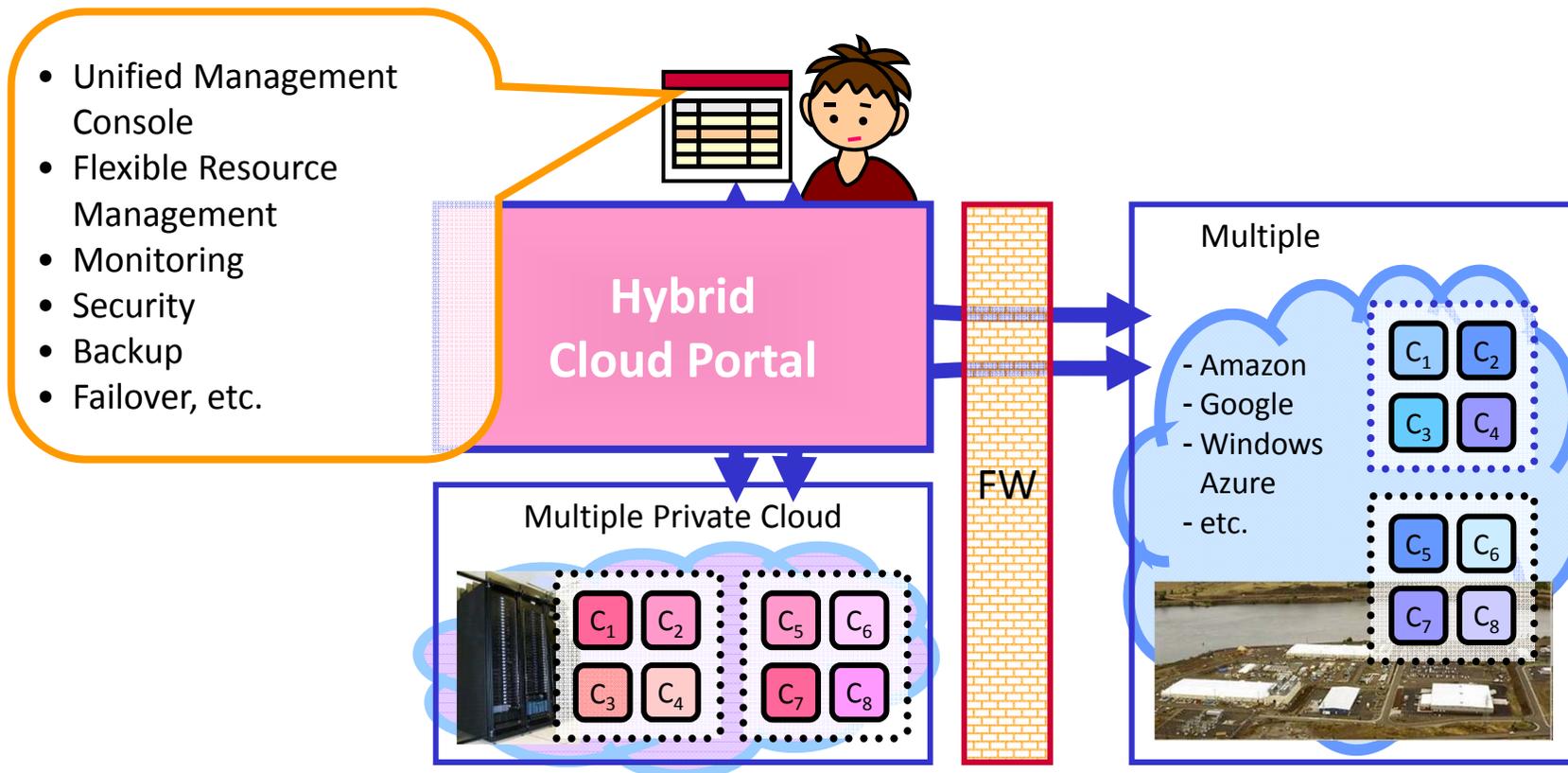
FW

Multiple Public Cloud

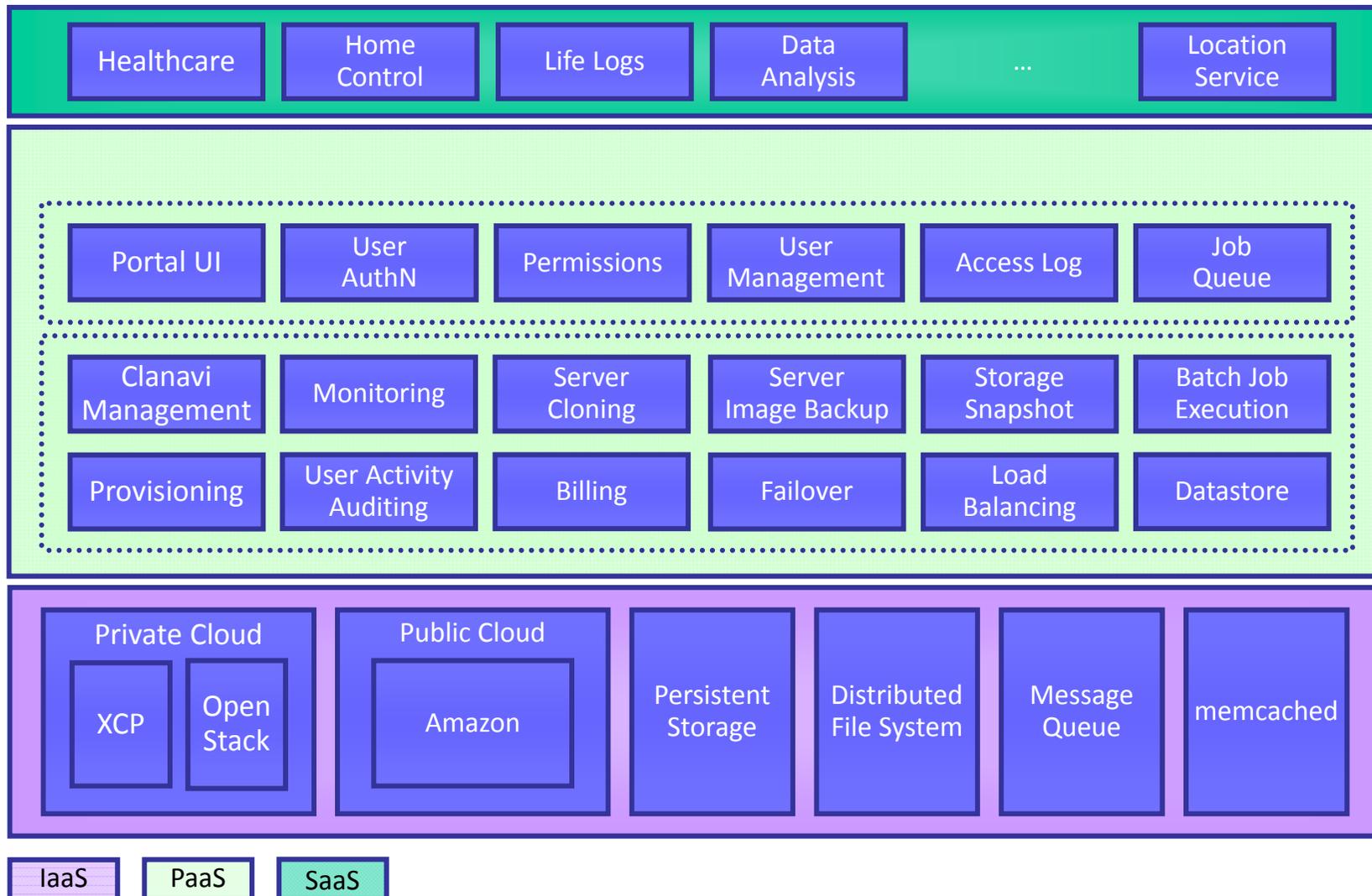
- Amazon
- Google
- Windows Azure
- etc.



The Goal of Clanavi



Architecture Overview



Why Drupal?

Why Drupal?

	Drupal + Custom Modules	Enomaly (Until Feb. 2010)
Developer	-	Enomaly
License	GPL2	AGPL3
Browser-based	Yes	Yes
Programming Language	PHP	Python
Database	MySQL	MySQL
Hypervisor Support	(Any)	KVM / Xen / etc (thru libvirt)
Install & Setup	Easy	Difficult
Functionality	(Yes)	Yes w/ Limitations
API	Drupal / REST	REST
Perspective	Users (and Admin)	Admin (and Users)
Stability	D6 Core Stable	Sometimes Database Corrupt

Why Drupal?

	Drupal + Custom Modules	Enomaly (Until Feb. 2010)	oVirt (As of Mar. 2010)
Developer	-	Enomaly	Red Hat
License	GPL2	AGPL3	GPL2
Browser-based	Yes	Yes	Yes
Programming Language	PHP	Python	Ruby on Rails Python
Database	MySQL	MySQL	PostgreSQL
Hypervisor Support	(Any)	KVM / Xen / etc (thru libvirt)	KVM / Xen /etc (thru libvirt)
Install & Setup	Easy	Difficult	Difficult
Functionality	(Yes)	Yes w/ Limitations	(Yes)
API	Drupal / REST	REST	REST (Not Exposed)
Perspective	Users (and Admin)	Admin (and Users)	Admin and Users
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Why Drupal?

	Drupal + Custom Modules	Enomaly (Until Feb. 2010)	oVirt (As of Mar. 2010)	OpenXen Manager
Developer	-	Enomaly	Red Hat	Citrix
License	GPL2	AGPL3	GPL2	GPL2
Browser-based	Yes	Yes	Yes	Yes (Recently)
Programming Language	PHP	Python	Ruby on Rails Python	Python
Database	MySQL	MySQL	PostgreSQL	N/A
Hypervisor Support	(Any)	KVM / Xen / etc (thru libvirt)	KVM / Xen /etc (thru libvirt)	Xen Only
Install & Setup	Easy	Difficult	Difficult	Easy
Functionality	(Yes)	Yes w/ Limitations	(Yes)	Yes
API	Drupal / REST	REST	REST (Not Exposed)	XAPI / XML-RPC
Perspective	Users (and Admin)	Admin (and Users)	Admin and Users	Admin
Stability	D6 Core Stable	Sometimes Database Corrupt	Implementation Immature	Sometimes Hang-up

Why Drupal?

- **Web Application Framework**

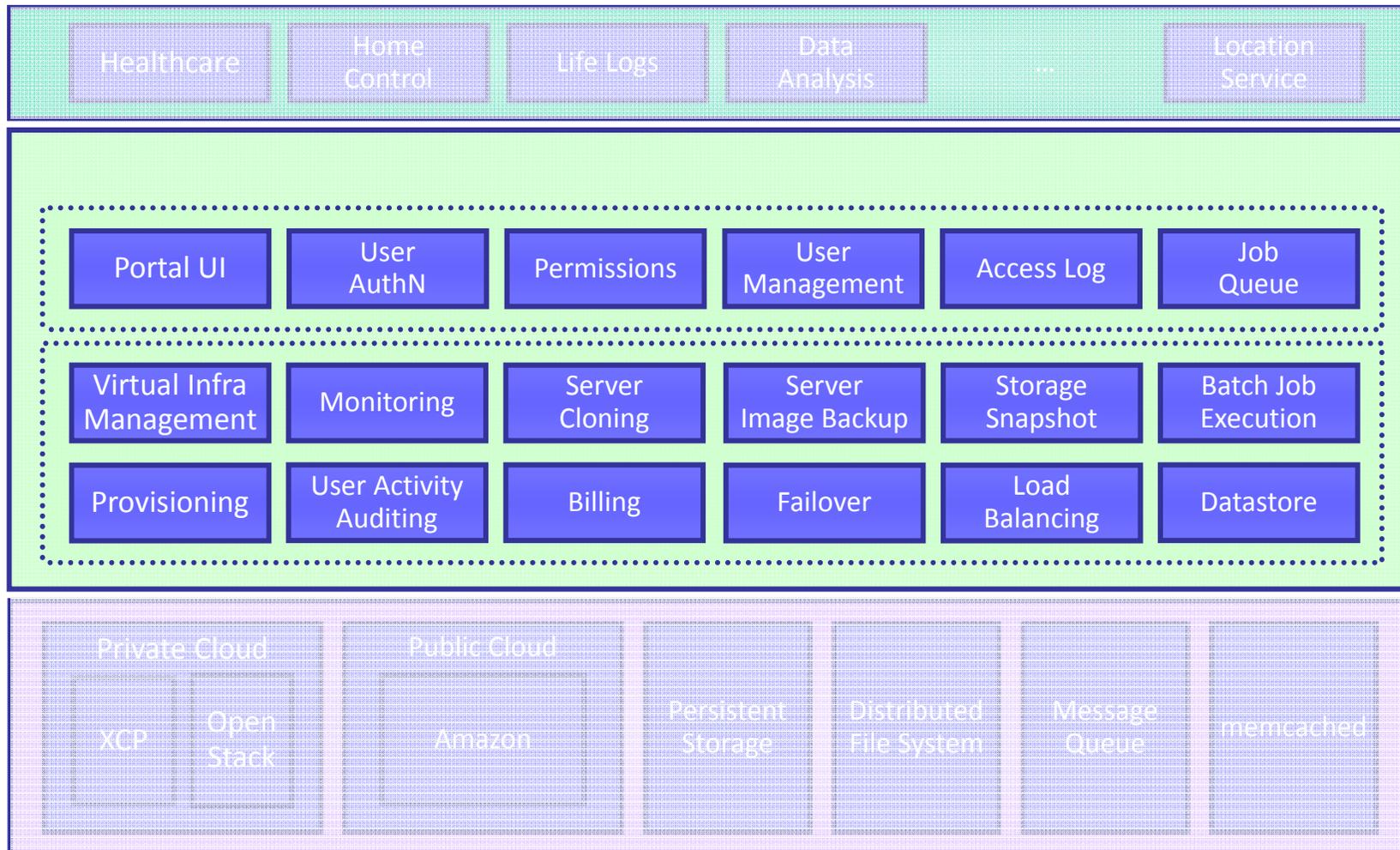
Why Drupal?

- **Web Application Framework**
 - Highly-Modularized Architecture
 - User Authentication & Management
 - Permissions
 - Key-value Pair Programming Style (Array)

Why Drupal?

- **Web Application Framework**
 - Highly-Modularized Architecture
 - User Authentication & Management
 - Permissions
 - Key-value Pair Programming Style (Array)
 - Queuing System Support (D7)
 - NoSQL Support (D7)

Architecture Overview

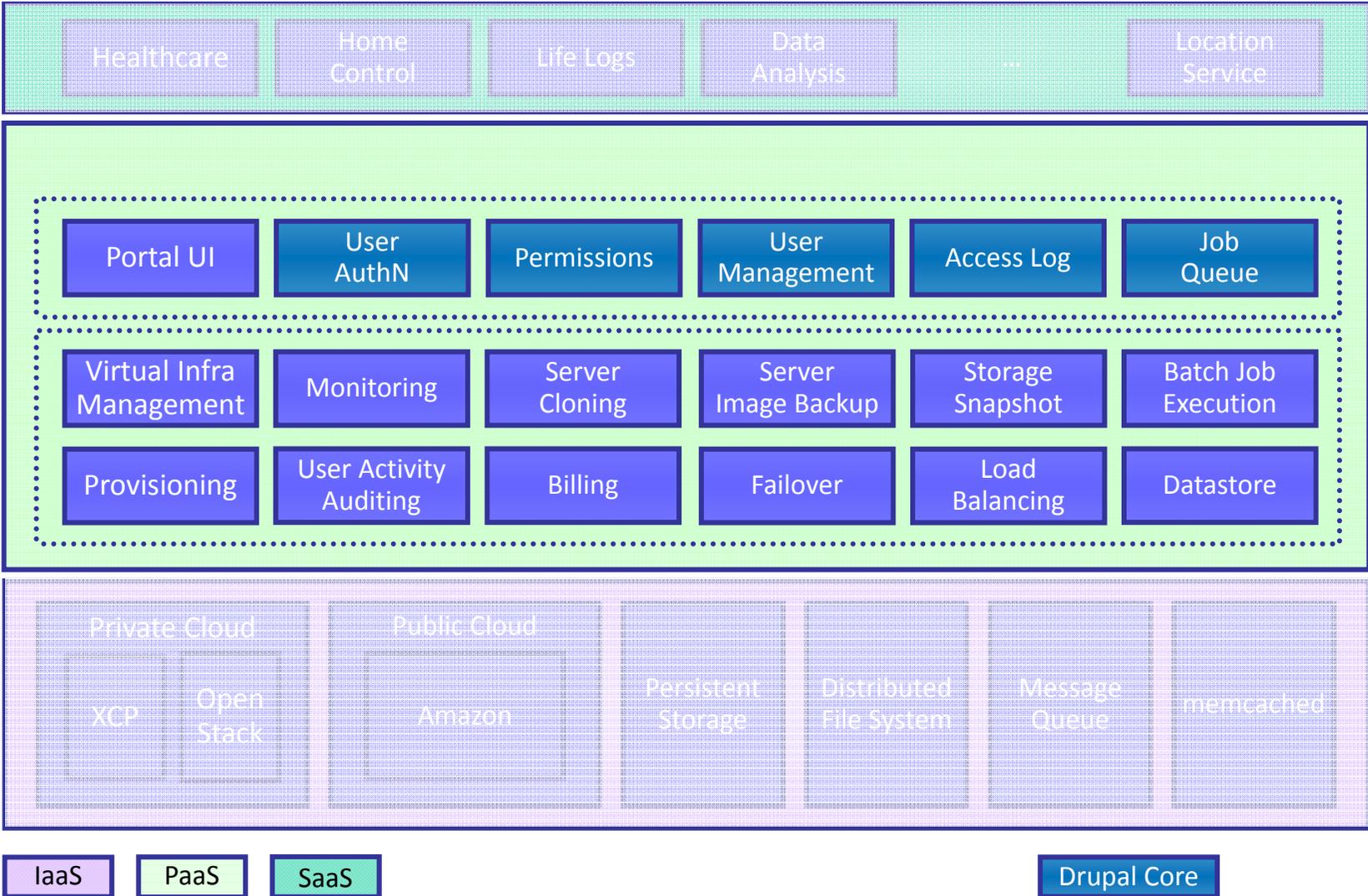


IaaS

PaaS

SaaS

Architecture Overview

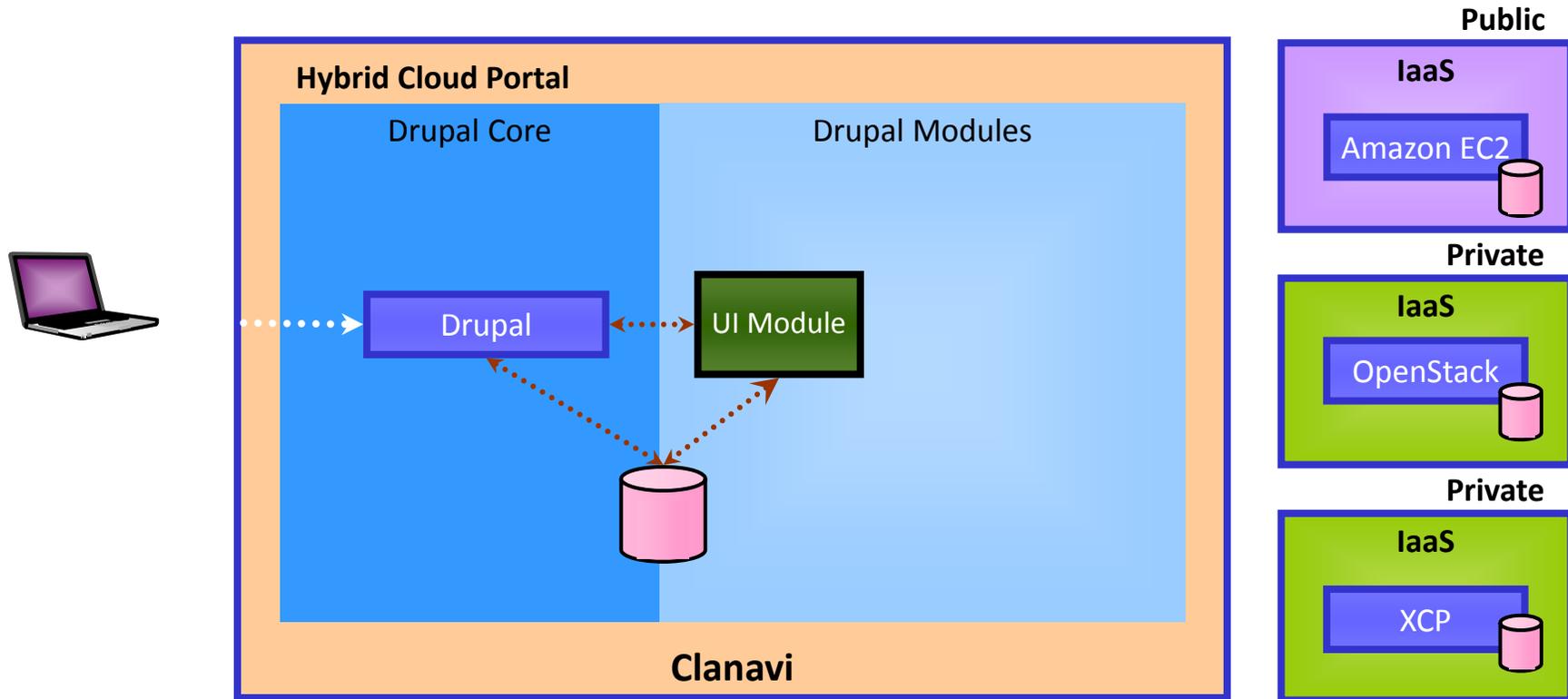


Clanavi

- Works with Multiple Cloud
 - Amazon EC2
 - XCP (Xen Cloud Platform)
 - OpenStack (Needs to Test)

Architecture

- Drupal Core as Web Application Framework

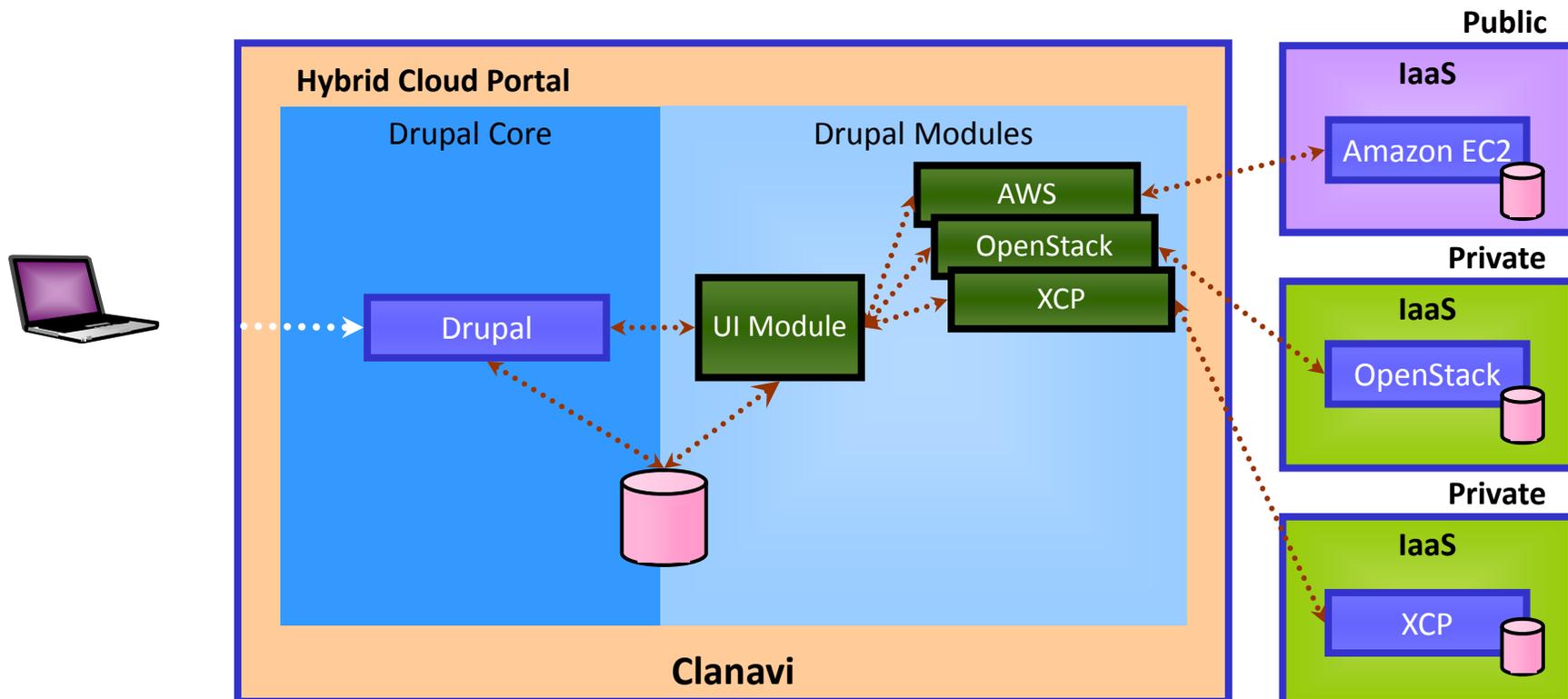


Existing Component

Development Module

Architecture

- Drupal Core as Web Application Framework
- Drupal Custom Modules for Each Cloud, Templates, etc.

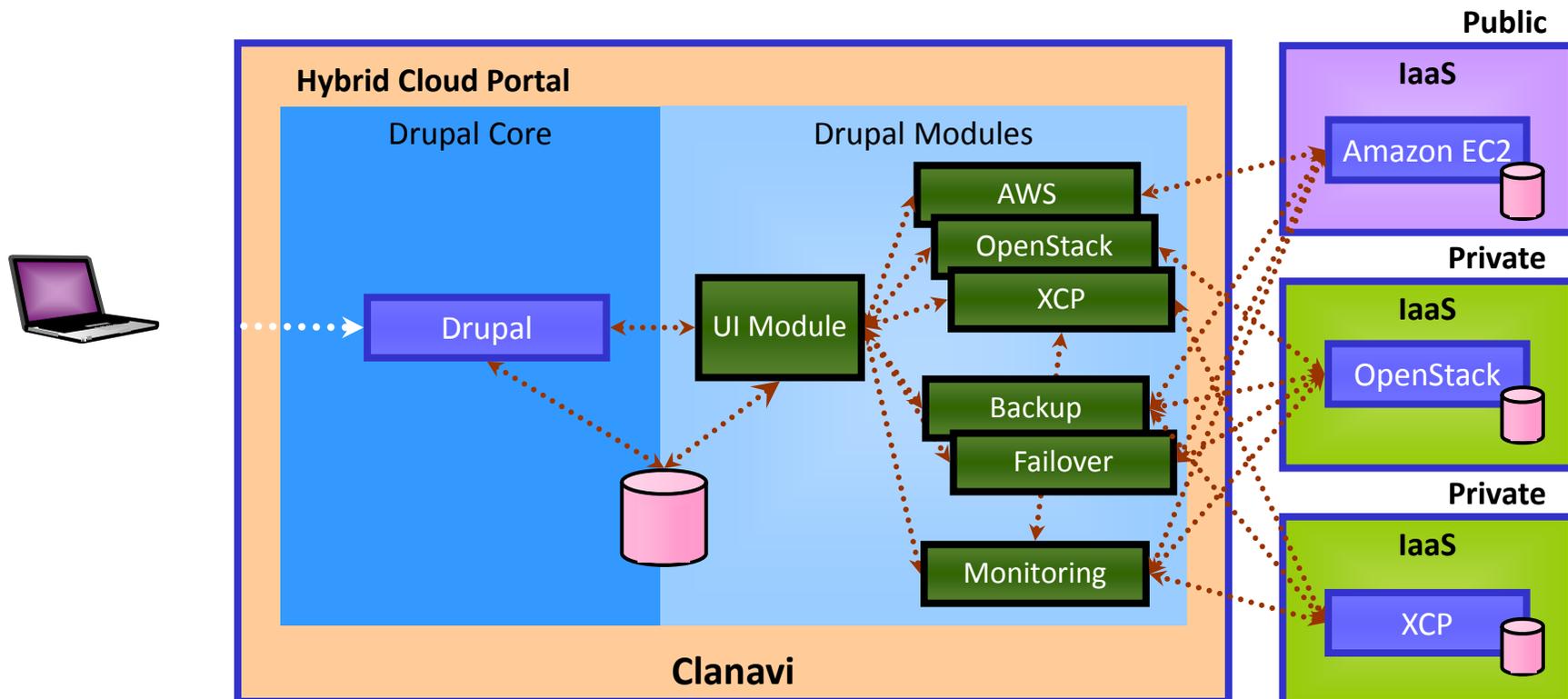


Existing Component

Development Module

Architecture

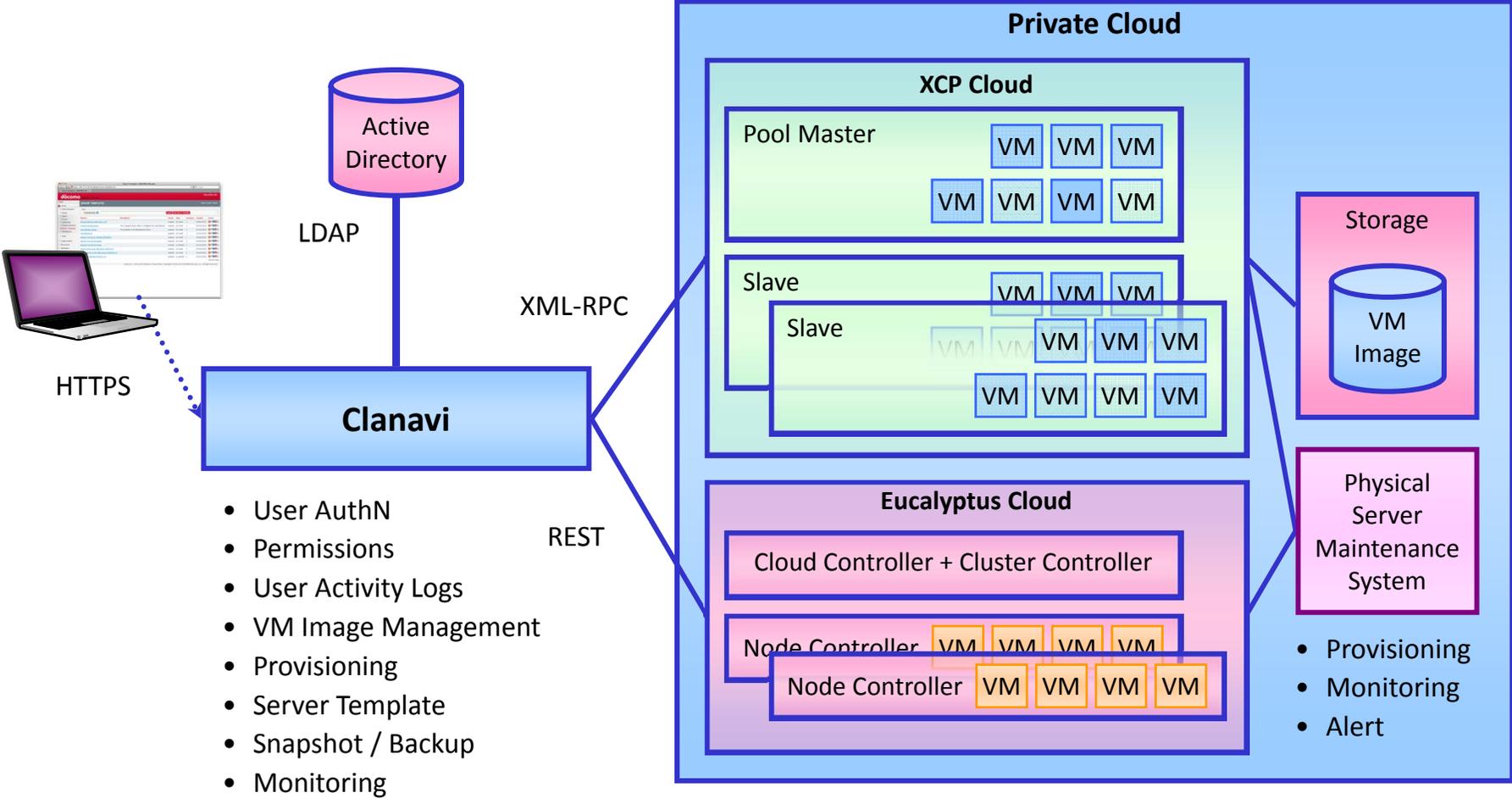
- Drupal Core as Web Application Framework
- Drupal Custom Modules for Each Cloud, Templates, etc.
- Failover by Monitoring Virtual Machines



Existing Component

Development Module

Deployment



Systems Requirements

- Drupal 6.20
- Ubuntu 10.10
- Apache 2.2
- MySQL 5.1
- PHP 5.3
- Collectd 4.8
- RRDTool 1.3
- Nagios 3.2

Modules

Category	Module Name	Description
Cloud Management	Common	● System Common Library
	Amazon	● Manage Amazon EC2
	OpenStack	● Manage OpenStack Cloud
	XCP	● Manage XCP Cloud

Modules

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Cloud Management	Common	● System Common Library
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Provisioning	Registration	● Manage Virtual Server Images
	Server Templates	● Manage Server Templates
	Cluster	● Manage Server Template Collection
	Scripting	● Manage Scripts for Automation
	Input Parameters	● Input Parameters for Running Virtual Server

Modules

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Cloud Management	Common	<ul style="list-style-type: none"> • System Common Library
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	Input Parameters	<ul style="list-style-type: none"> • Input Parameters for Running Virtual Server
Reporting	Audit	<ul style="list-style-type: none"> • User Activity Log
	Usage Report	<ul style="list-style-type: none"> • Cost Estimation Depending on Hours of Usage
	Alerts	<ul style="list-style-type: none"> • Provides Alert Functionality

Modules

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Reliability	Failover	<ul style="list-style-type: none"> Provide Failover Functionality
	Backup	<ul style="list-style-type: none"> Provide Backup Functionality

Clanavi Status

- Total 25K Steps
- Continuing Refactoring
- 11/09/2010: Uploaded to drupal.org
- <http://drupal.org/node/919966>

Problem in-the-Cloud

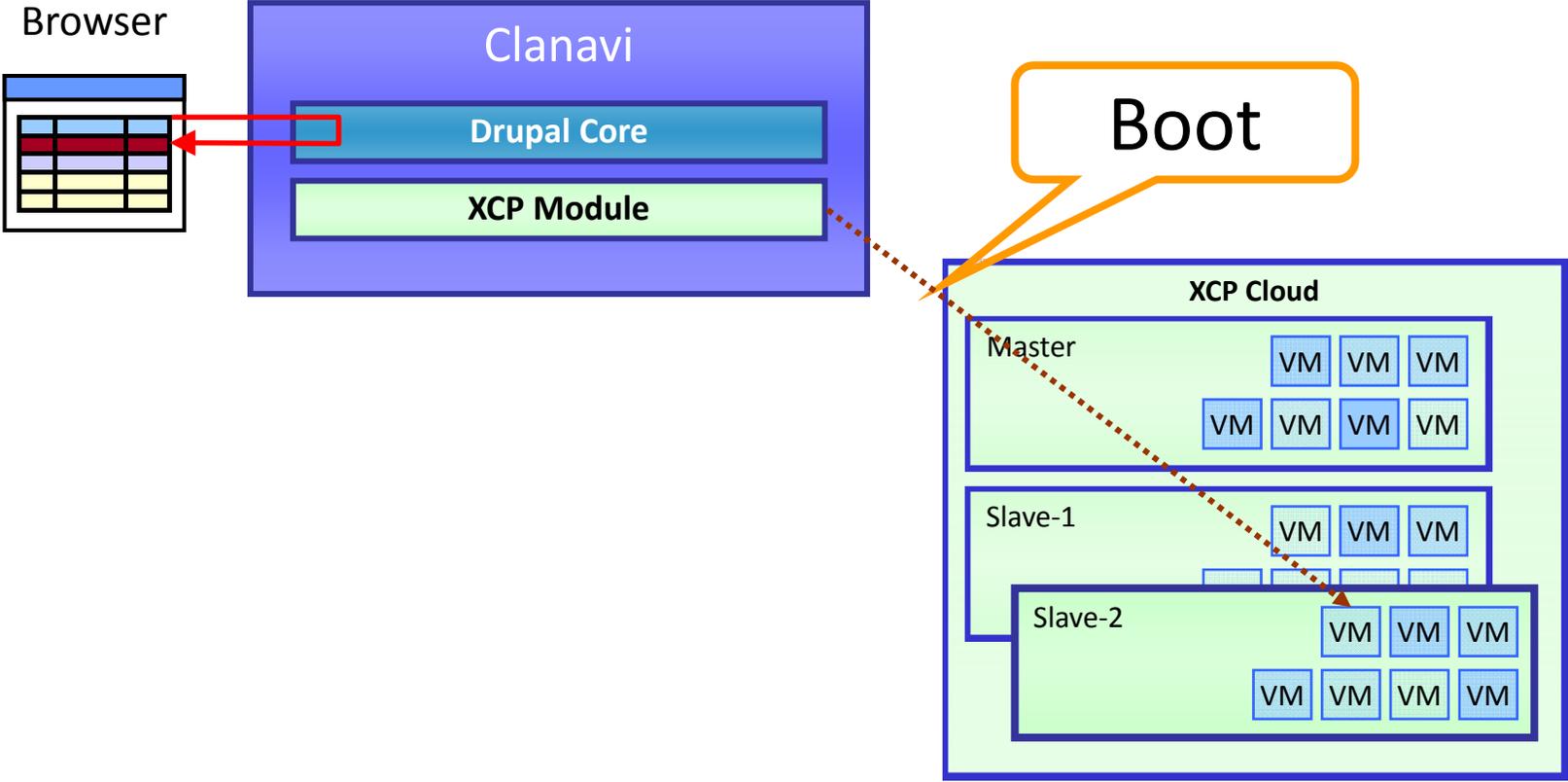
Problem in-the-Cloud

- Async Operations for VMs on Clanavi

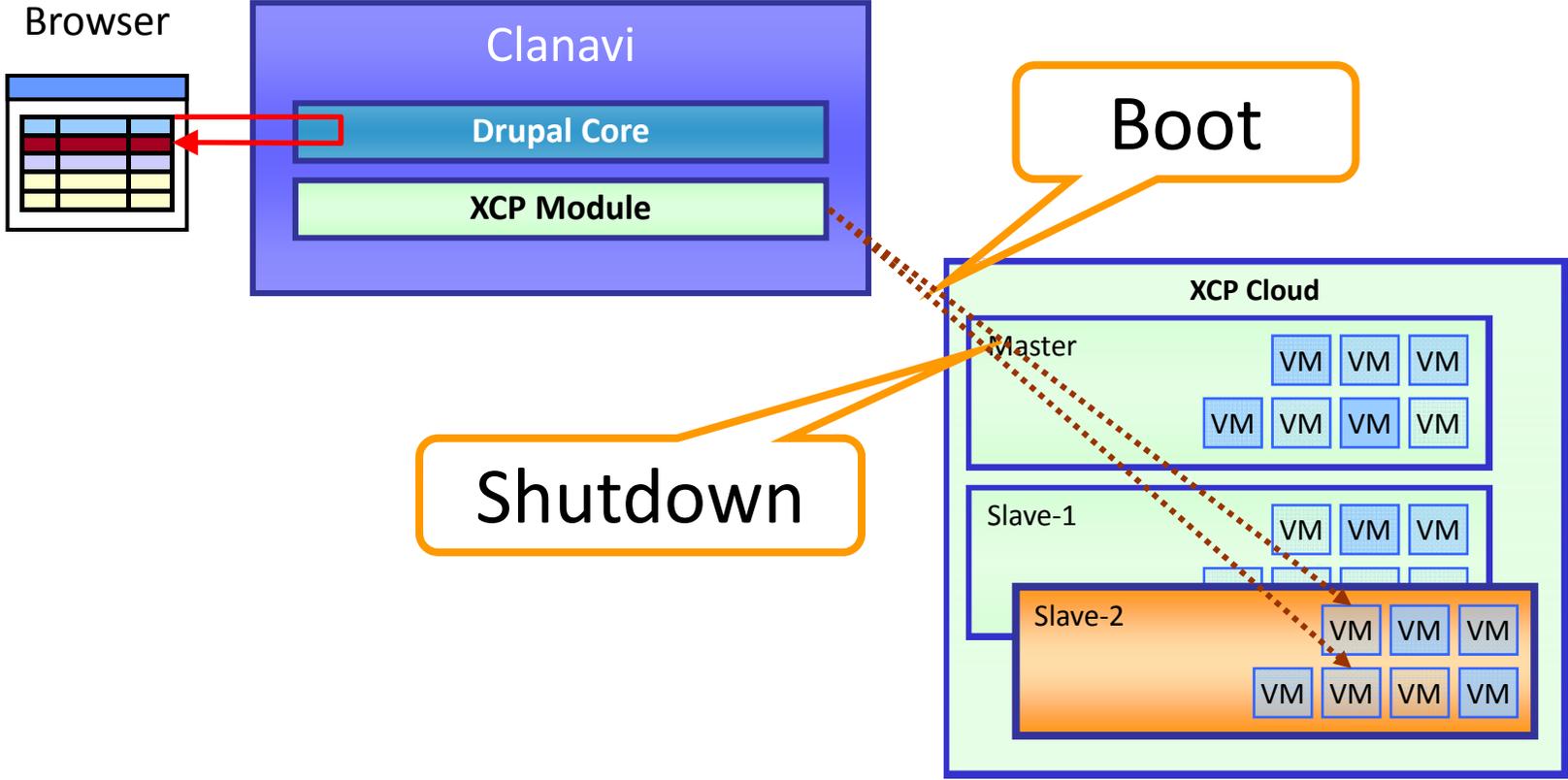
Problem in-the-Cloud

- Async Operations for VMs on Clanavi
 - Boot
 - Shutdown
 - Suspend / Resume
 - VM Backup

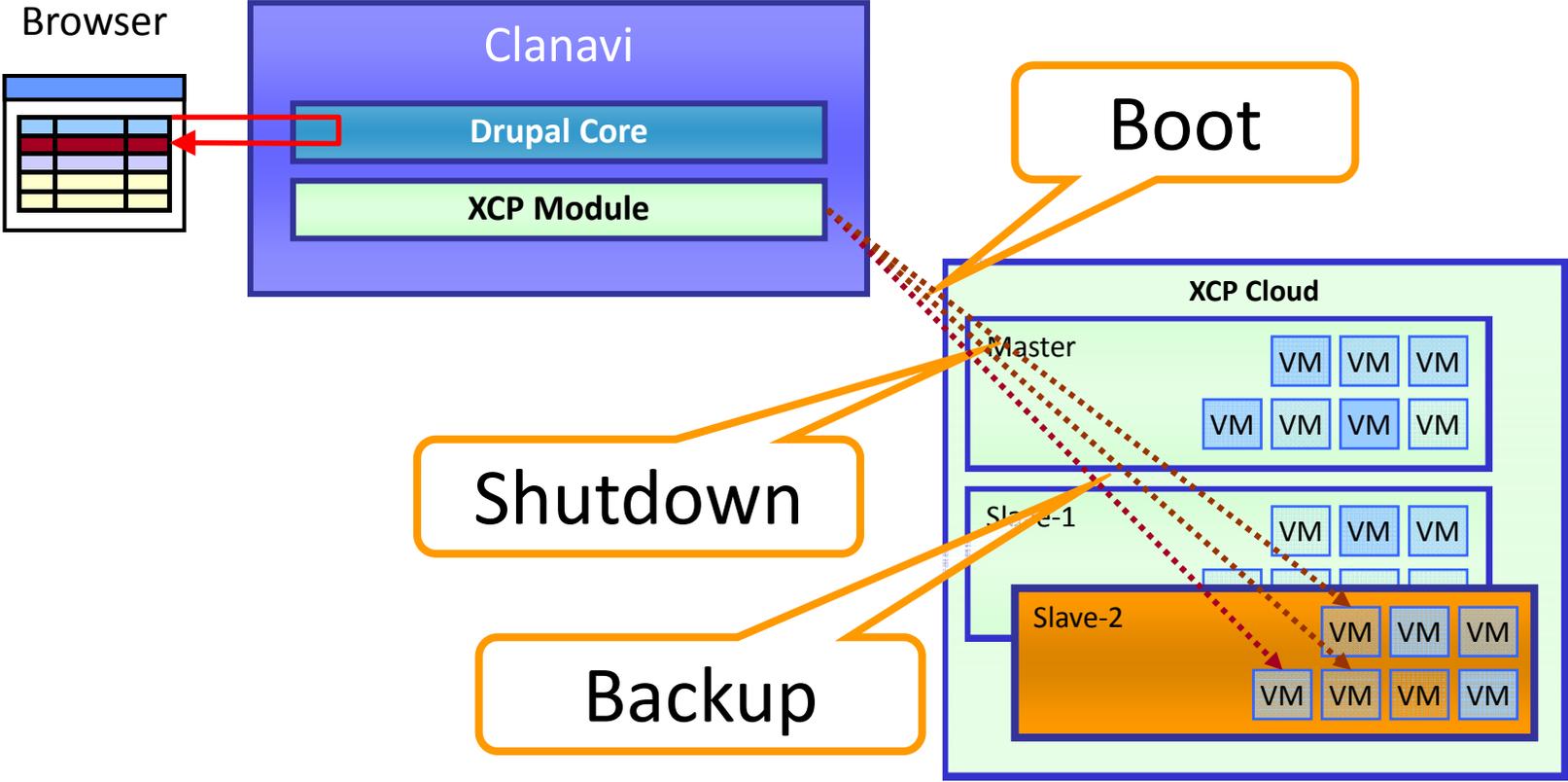
Clanavi Operation



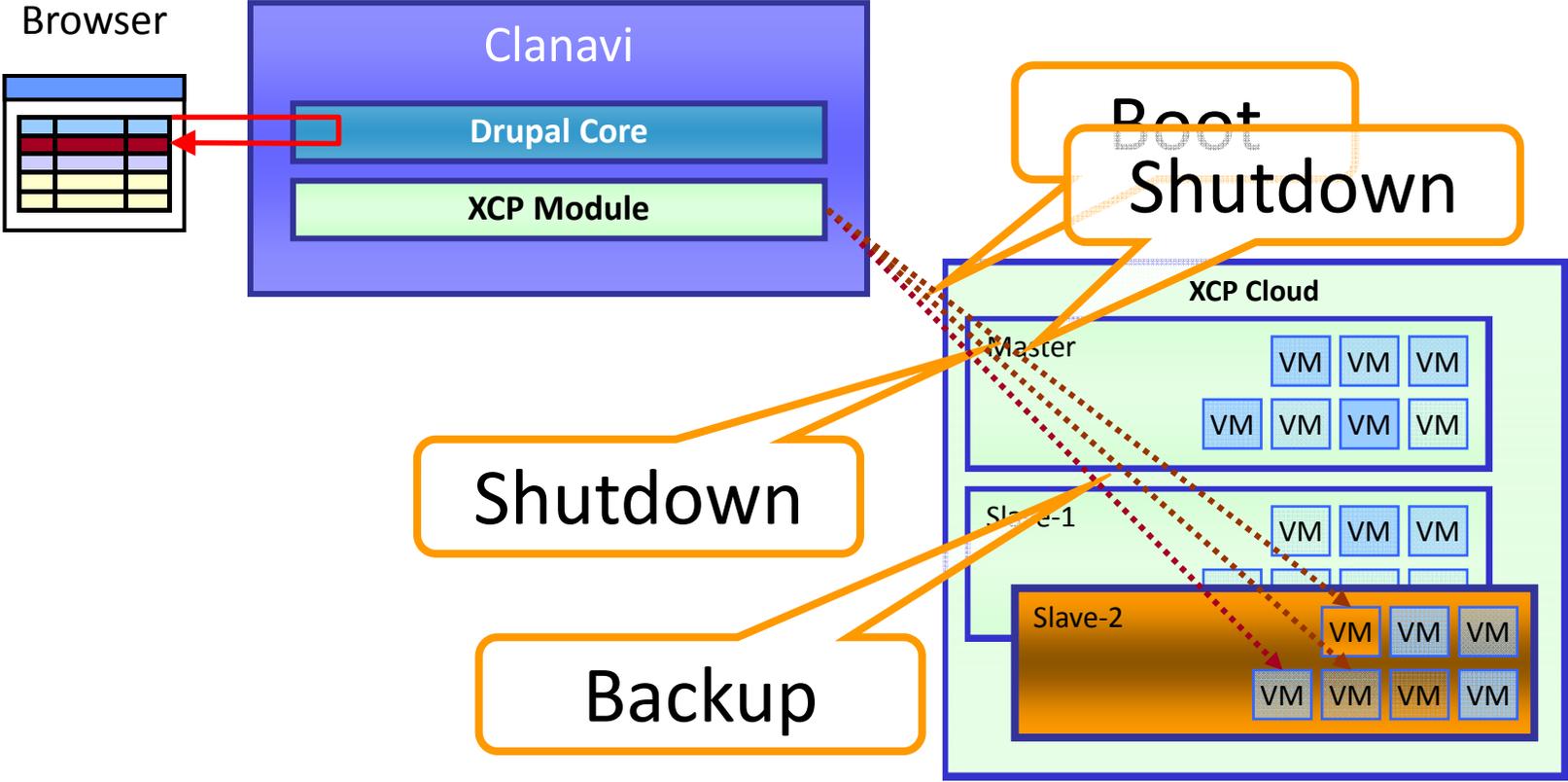
Clanavi Operation



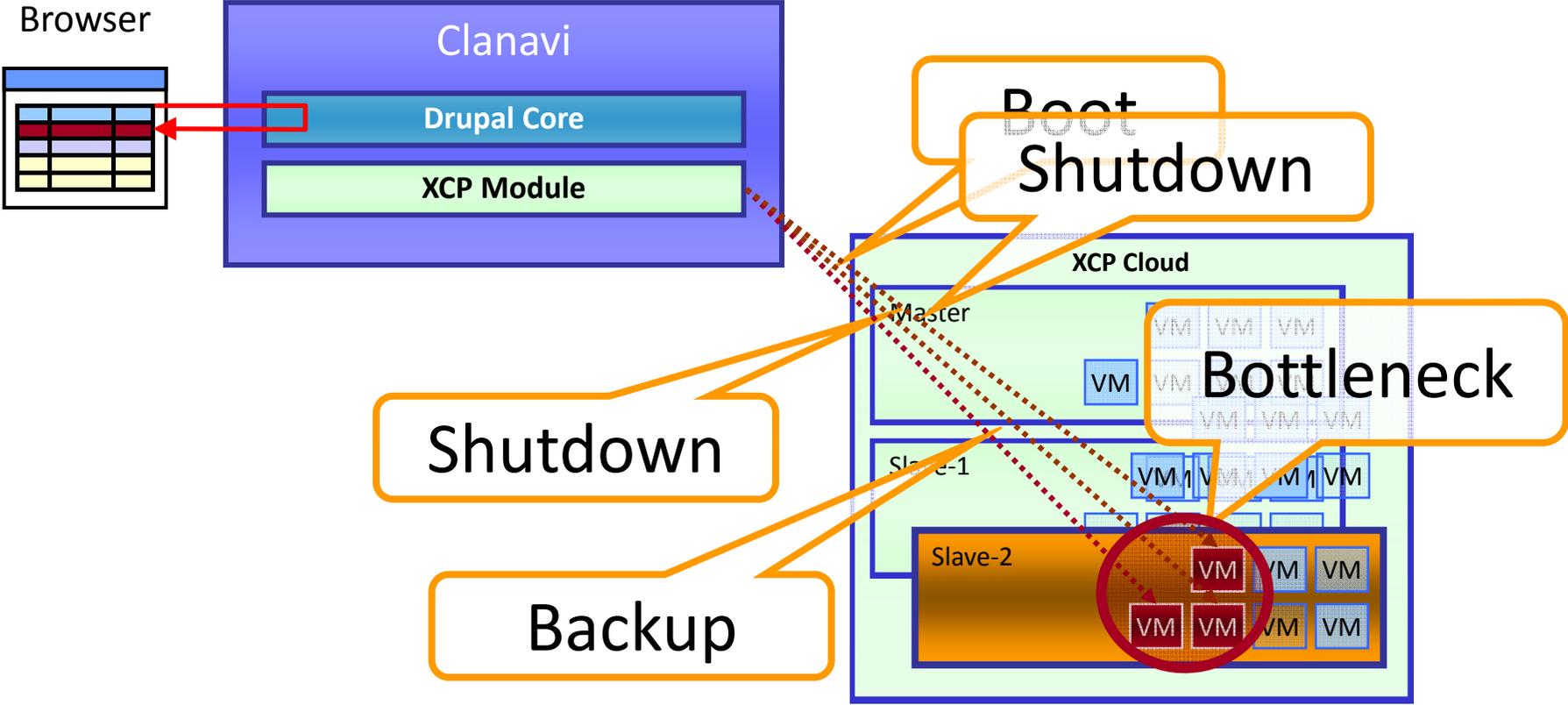
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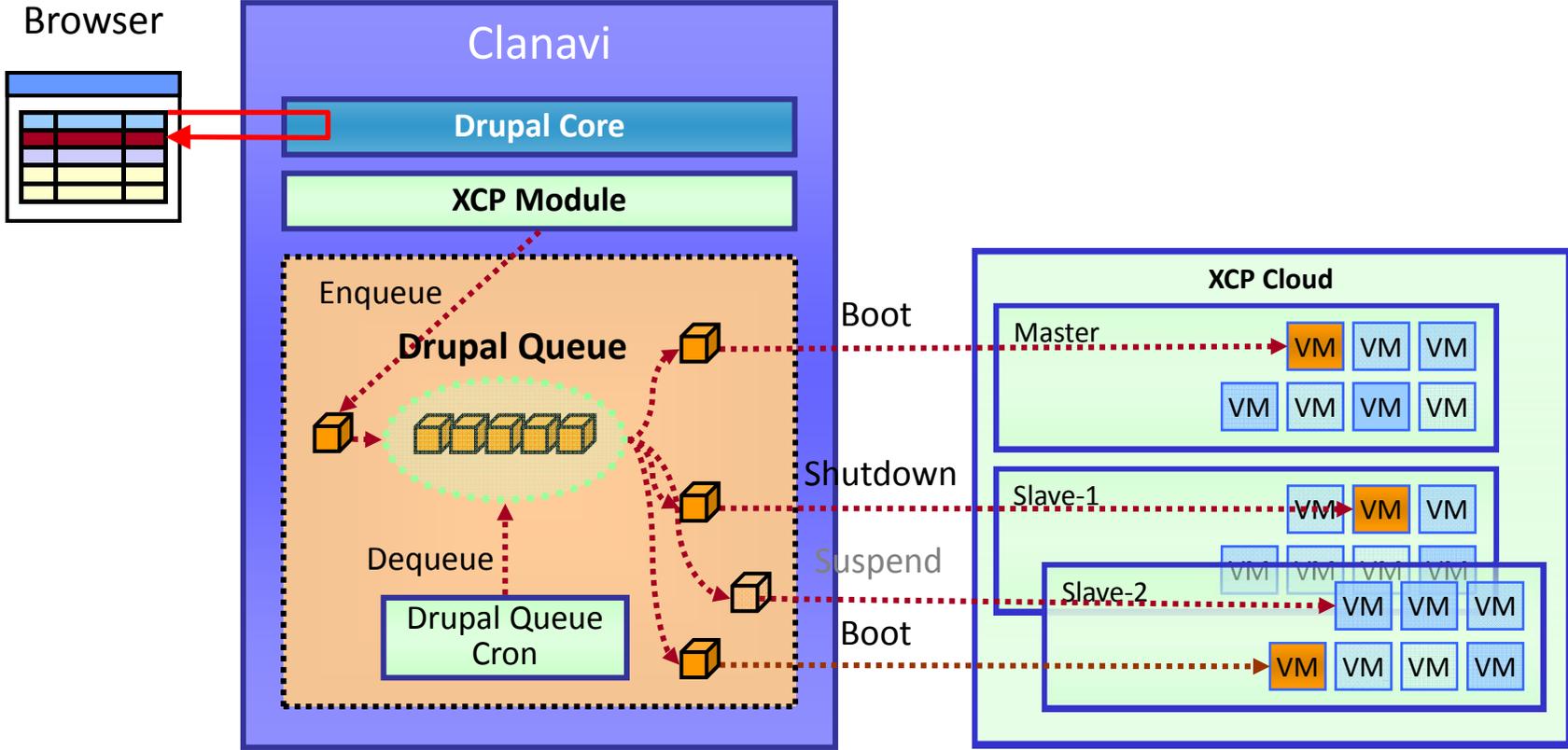
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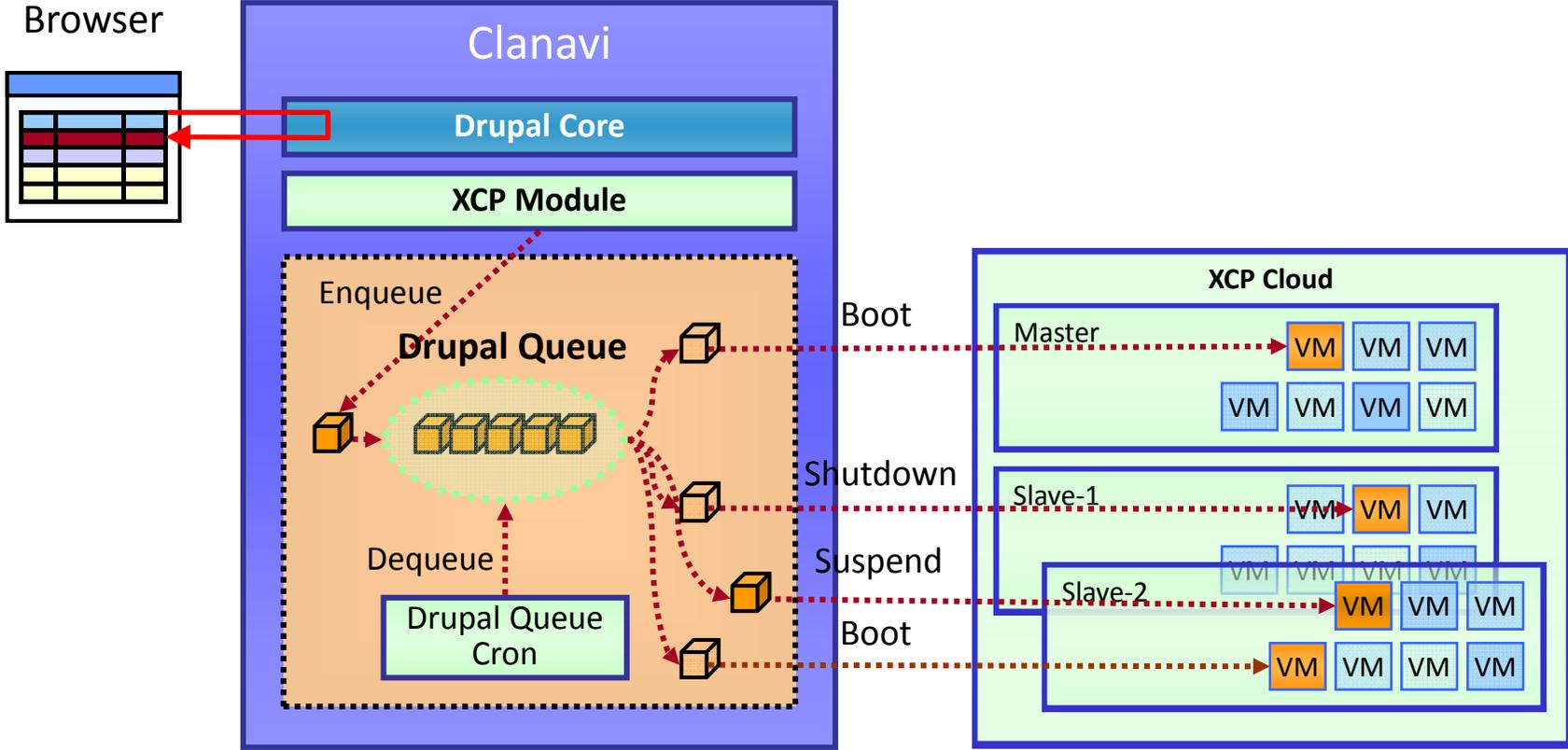
Clanavi Operation



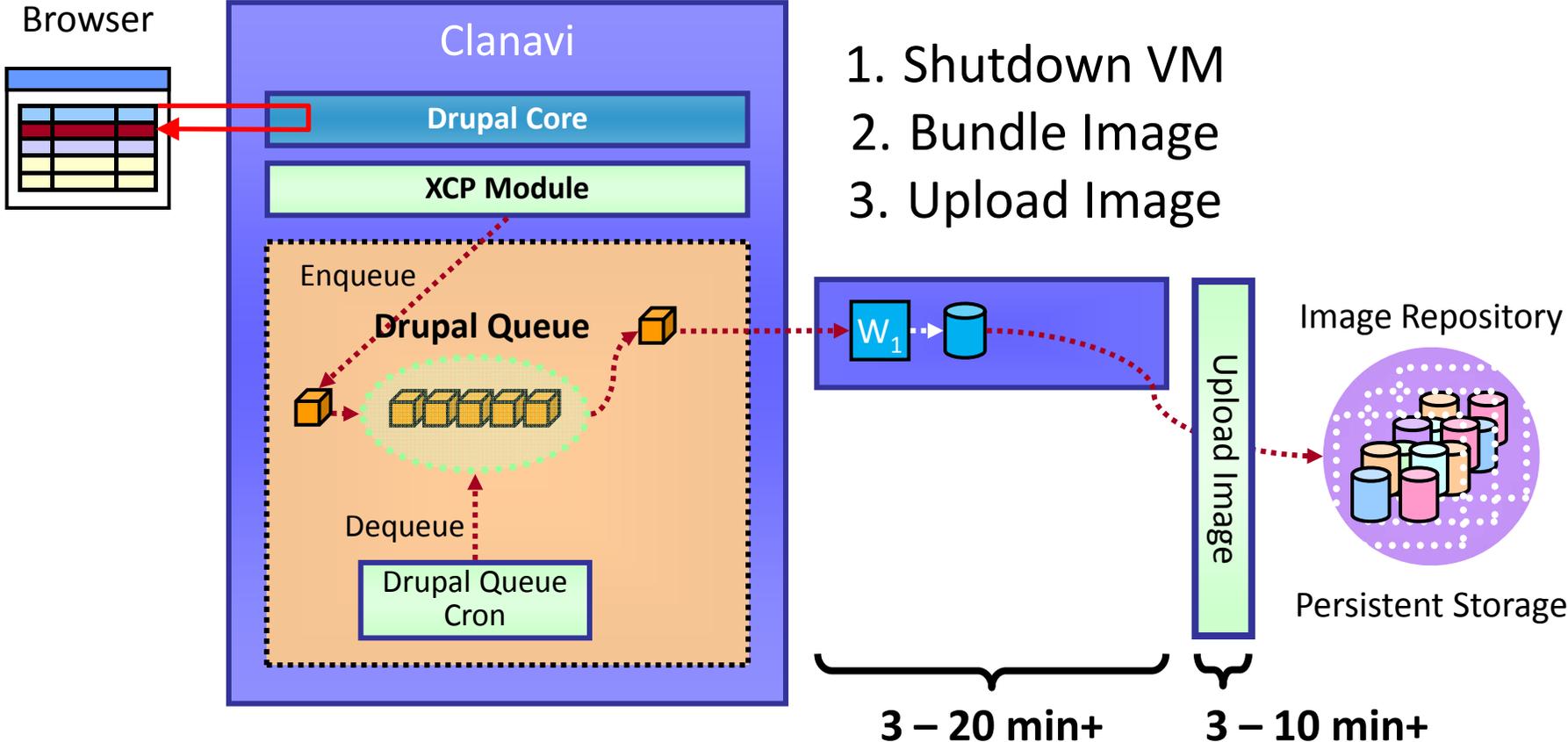
Clanavi Operation Using Drupal Queue



Clanavi Operation Using Drupal Queue



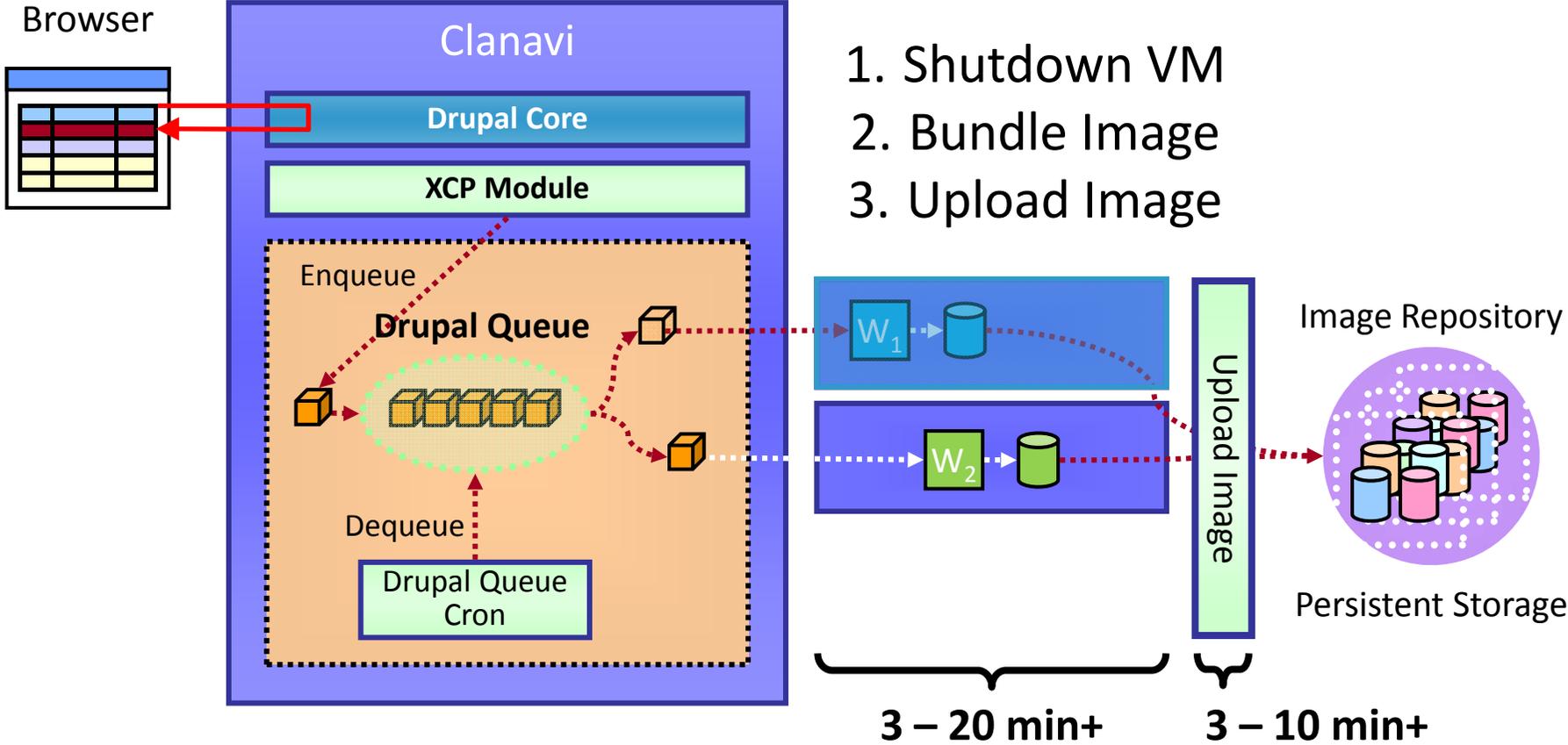
VM Image Backup Using Drupal Queue



1. Shutdown VM
2. Bundle Image
3. Upload Image

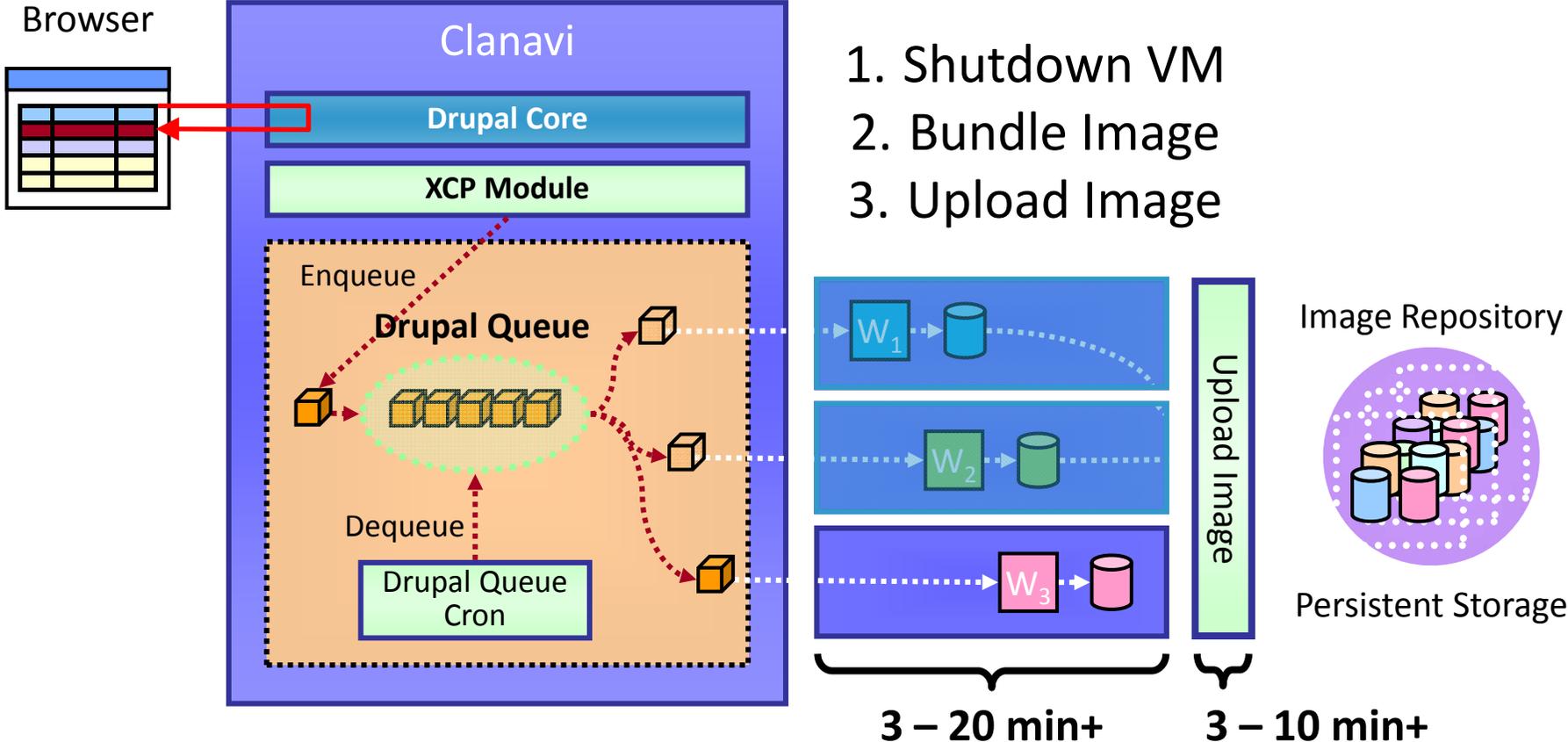
W_n ...Worker Process

VM Image Backup Using Drupal Queue



W_n ...Worker Process

VM Image Backup Using Drupal Queue



W_n ...Worker Process

Demo

Business Value by Clanavi

Cost Reduction

Cost Reduction

Traditional

Cost Reduction

Traditional

Install Windows

Cost Reduction

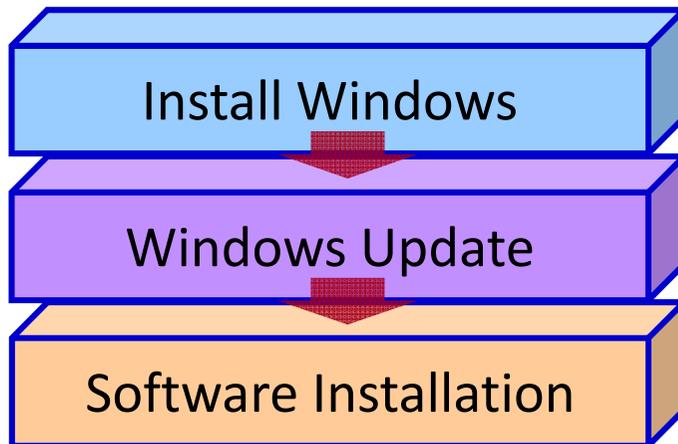
Traditional

Install Windows

Windows Update

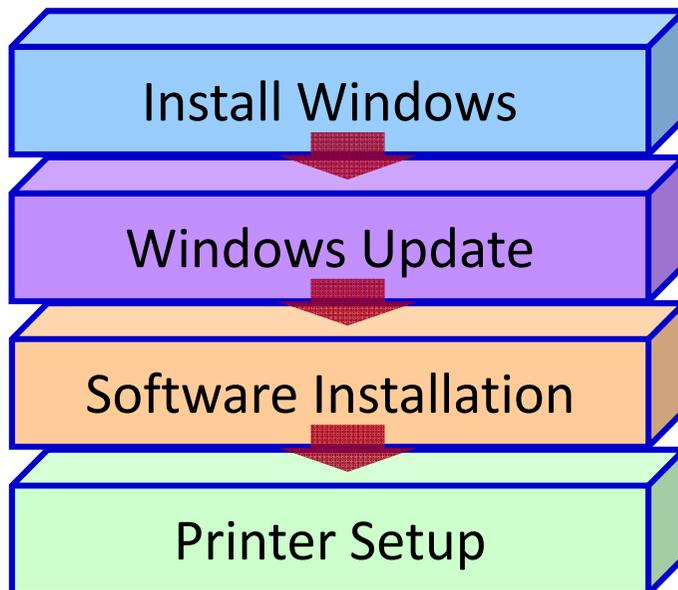
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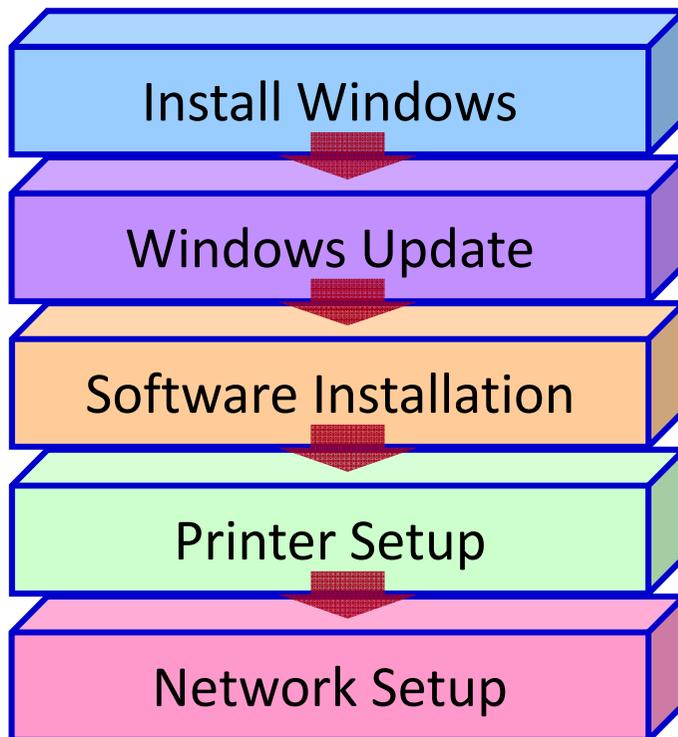
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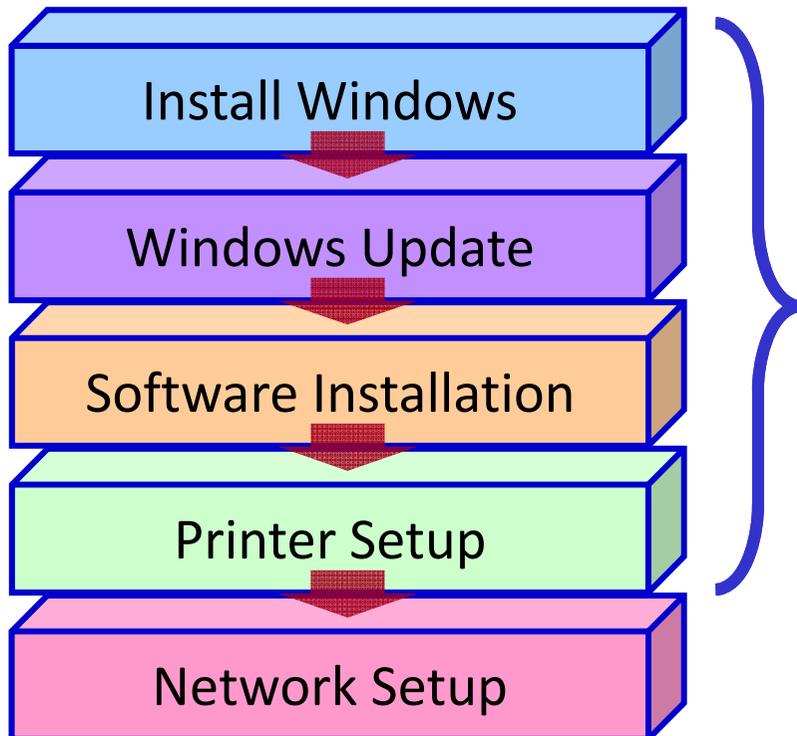
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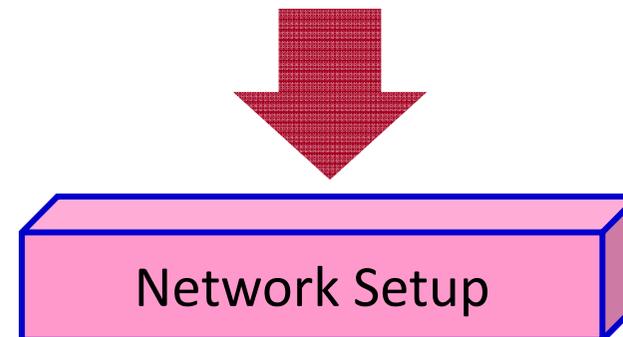
Cost Reduction

Traditional



Clanavi

Just **Copy**
a Pre-configured VM Image



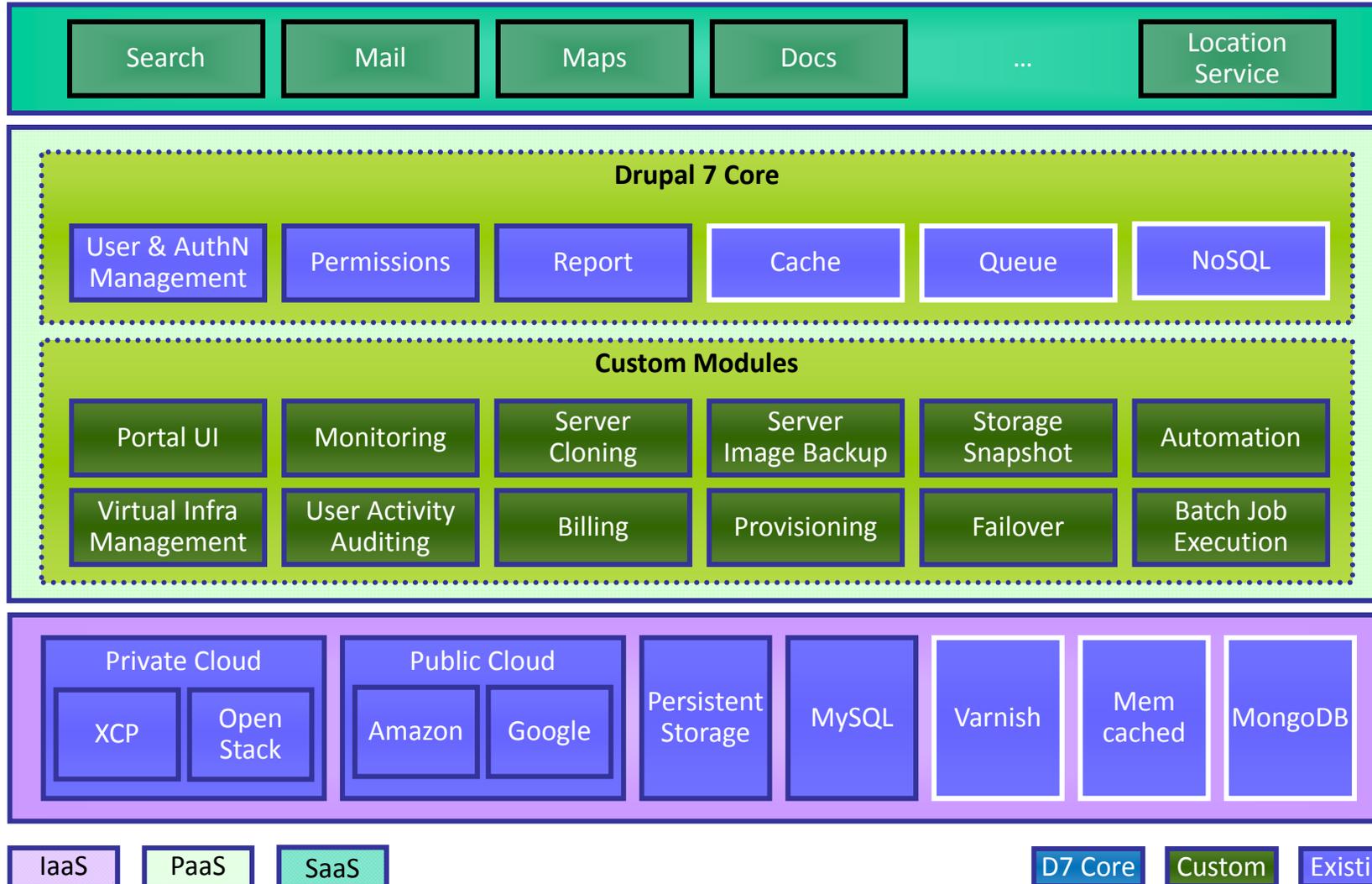
Business Value (1/2)

- **Clanavi**
 - No Promising OSS
 - Reference Model and Implementation for Cloud Management
 - Multiple Cloud Support
 - Security
 - Reliability
 - Scalability

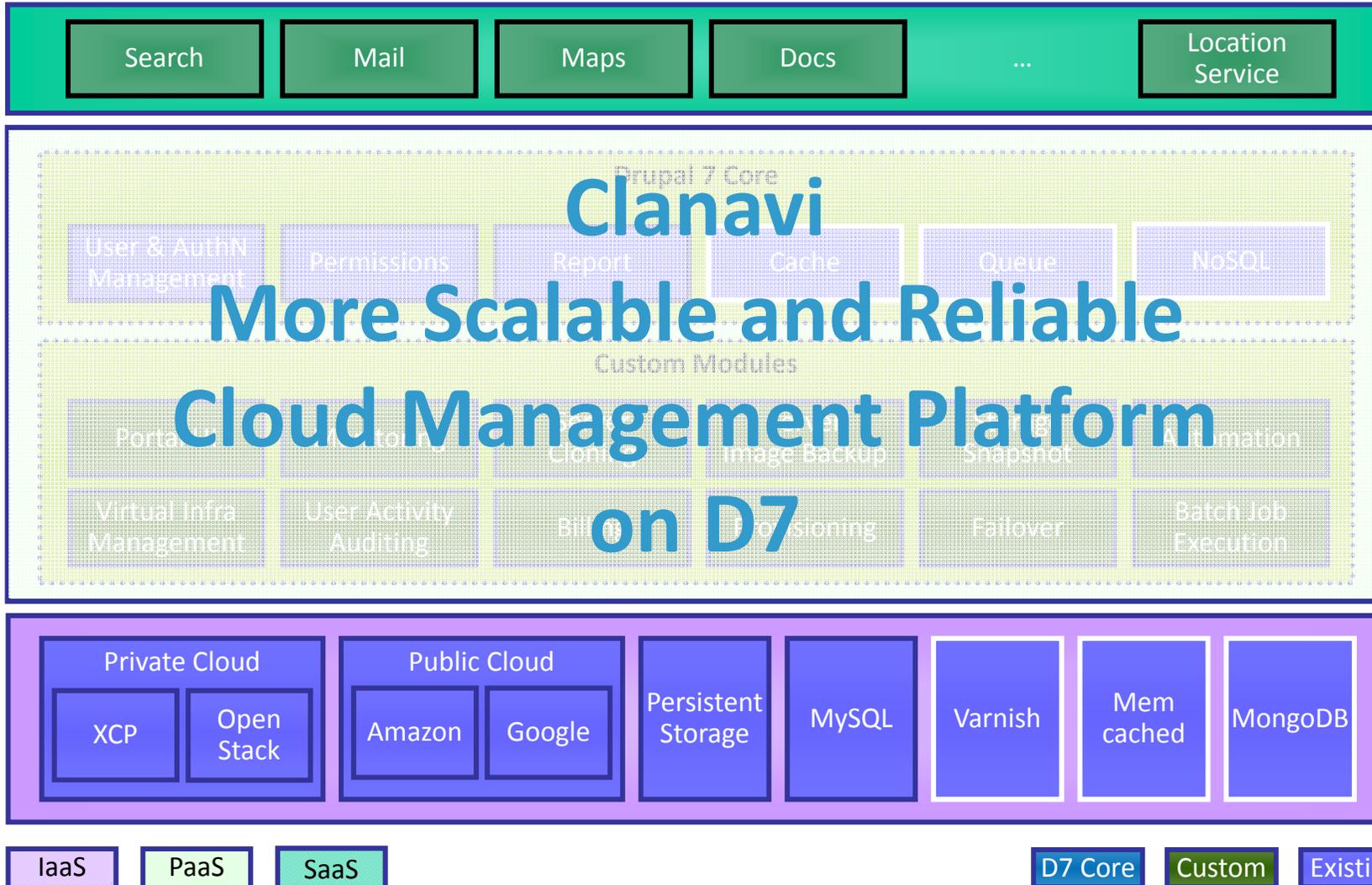
Business Value (2/2)

- **Clanavi**
 - Effective Cost Reduction of Cloud Management
 - Unified Access to Multiple Cloud
 - Easy Provisioning
 - Easy Operations

Future Direction



Future Direction



Q&A

- Download : drupal.org/node/919966
- Follow me : @yas
- Hiring : naoi@docomo-pact.com



Thank You!

“Coming together is a beginning, keeping together is a progress; working together is a success.”

- Henry Ford



Yas Naoi

naoi@docomo-pact.com

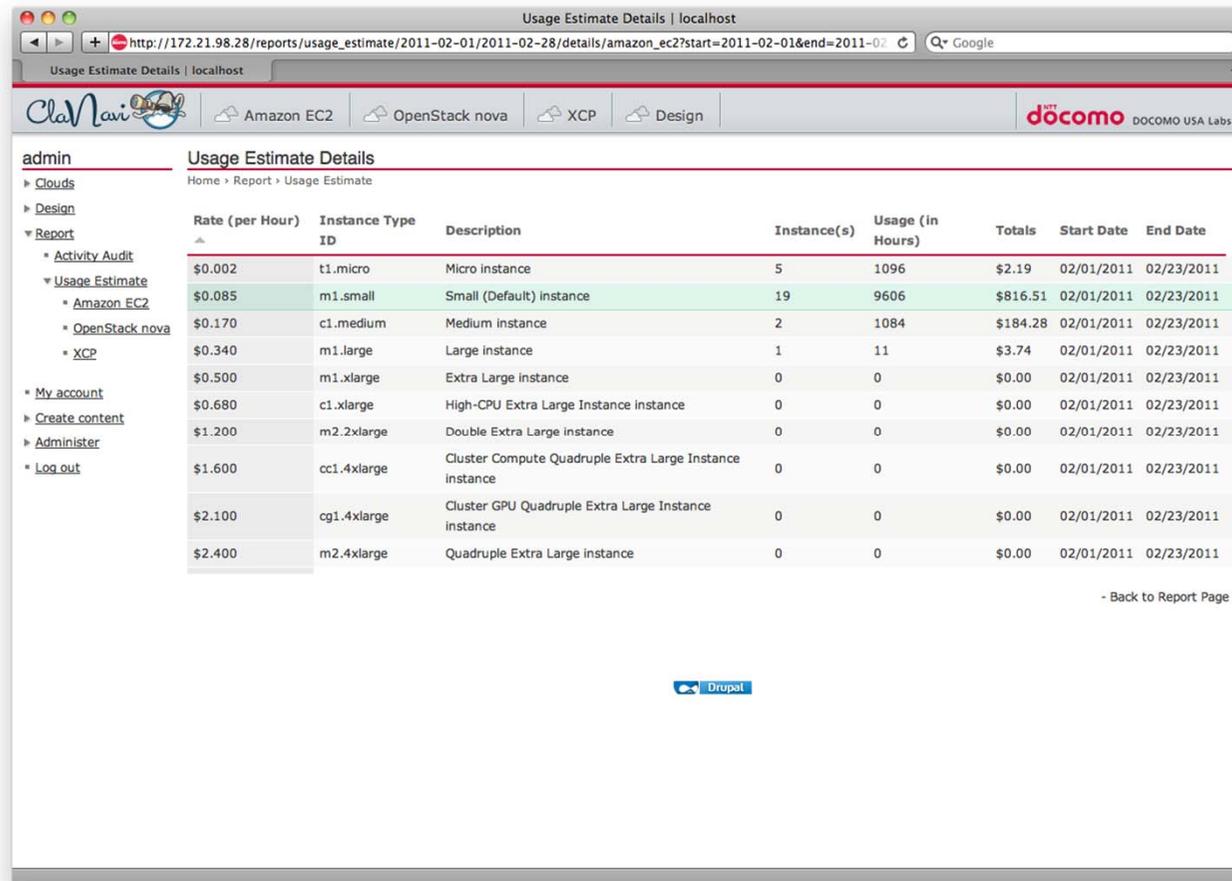
Backup

Clanavi

The screenshot displays the Amazon EC2 management console interface. At the top, there are navigation tabs for 'Amazon EC2', 'OpenStack nova', 'XCP', and 'Design'. The 'Amazon EC2' tab is active, showing a dashboard with a 'Status Chart' (a pie chart for months Mar, Apr, Feb, Jan), a 'Summary' section with key metrics, and an 'Amazon_EC2 Navigation' menu. Below the dashboard is a table of EC2 instances.

Category	Name	ID	Private IP	Status	Availability Zone	Subnet	Age
EBS Volumes	sharang-count-base	i-43047b29	ec2-174-129-21-114...	Running	us-east-1a	gsg-keypair	180.2 days
EBS Snapshots	MyCoordinator	i-f105c69d	ec2-50-16-118-112...	Running	us-east-1a	default	43 days
OpenStack nova	RAMP	i-ef69c483	ec2-50-16-144-214...	Running	us-east-1a	rparashar	33.1 days
XCP	i-91acc5fd	i-91acc5fd	ec2-75-101-204-155...	Running	us-east-1a	wkraske	14.3 days
Design	Clanavi Clone	i-6d151907	ec2-75-101-137-204...	Running	us-east-1b	root	149 days
Report	sharang-count-master	i-7d027d17	ec2-184-73-53-59...	Running	us-east-1d	gsg-keypair	180.2 days
My account	sharang-count-slave1	i-7b007f11	ec2-174-129-165-43...	Running	us-east-1d	gsg-keypair	180.2 days
Create content	sharang-count-slave2	i-79007f13	ec2-67-202-21-247...	Running	us-east-1d	gsg-keypair	180.2 days
Administer	sharang-count-slave3	i-7f007f15	ec2-184-72-158-15...	Running	us-east-1d	gsg-keypair	180.2 days
Log out	sharang-count-slave4	i-7d007f17	ec2-174-129-144-173...	Running	us-east-1d	gsg-keypair	180.2 days
	sharang-count-slave5	i-73007f19	ec2-174-129-141-66...	Running	us-east-1d	gsg-keypair	180.2 days
	sharang-count-slave6	i-71007f1b	ec2-184-72-153-128...	Running	us-east-1d	gsg-keypair	180.2 days
	sharang-count-slave7	i-77007f1d	ec2-75-101-191-177...	Running	us-east-1d	gsg-keypair	180.2 days
	sharang-count-slave8	i-75007f1f	ec2-67-202-40-253...	Running	us-east-1d	gsg-keypair	180.2 days
	sharang-count-slave9	i-4b007f21	ec2-184-72-162-12...	Running	us-east-1d	gsg-keypair	180.2 days
	sharang-count-slave10	i-49007f23	ec2-174-129-99-35...	Running	us-east-1d	gsg-keypair	180.2 days
	svn 20101125a	i-1997d374	ec2-75-101-159-238...	Running	us-east-1d	OOP	90.1 days
	i-a43108c9	i-a43108c9		Stopped	us-east-1d	root	70.4 days

Report – Usage Estimate



Usage Estimate Details | localhost

Usage Estimate Details | localhost

Clanavi Amazon EC2 OpenStack nova XCP Design docomo DOCOMO USA Labs

admin Usage Estimate Details

Home > Report > Usage Estimate

Rate (per Hour)	Instance Type ID	Description	Instance(s)	Usage (in Hours)	Totals	Start Date	End Date
\$0.002	t1.micro	Micro instance	5	1096	\$2.19	02/01/2011	02/23/2011
\$0.085	m1.small	Small (Default) instance	19	9606	\$816.51	02/01/2011	02/23/2011
\$0.170	c1.medium	Medium instance	2	1084	\$184.28	02/01/2011	02/23/2011
\$0.340	m1.large	Large instance	1	11	\$3.74	02/01/2011	02/23/2011
\$0.500	m1.xlarge	Extra Large instance	0	0	\$0.00	02/01/2011	02/23/2011
\$0.680	c1.xlarge	High-CPU Extra Large Instance instance	0	0	\$0.00	02/01/2011	02/23/2011
\$1.200	m2.2xlarge	Double Extra Large instance	0	0	\$0.00	02/01/2011	02/23/2011
\$1.600	cc1.4xlarge	Cluster Compute Quadruple Extra Large Instance instance	0	0	\$0.00	02/01/2011	02/23/2011
\$2.100	cg1.4xlarge	Cluster GPU Quadruple Extra Large Instance instance	0	0	\$0.00	02/01/2011	02/23/2011
\$2.400	m2.4xlarge	Quadruple Extra Large instance	0	0	\$0.00	02/01/2011	02/23/2011

- Back to Report Page -

Drupal