

Open Source Middleware for the Cloud

Stratos

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Technical Lead and Product Manager

Roadmap

What is a PaaS?

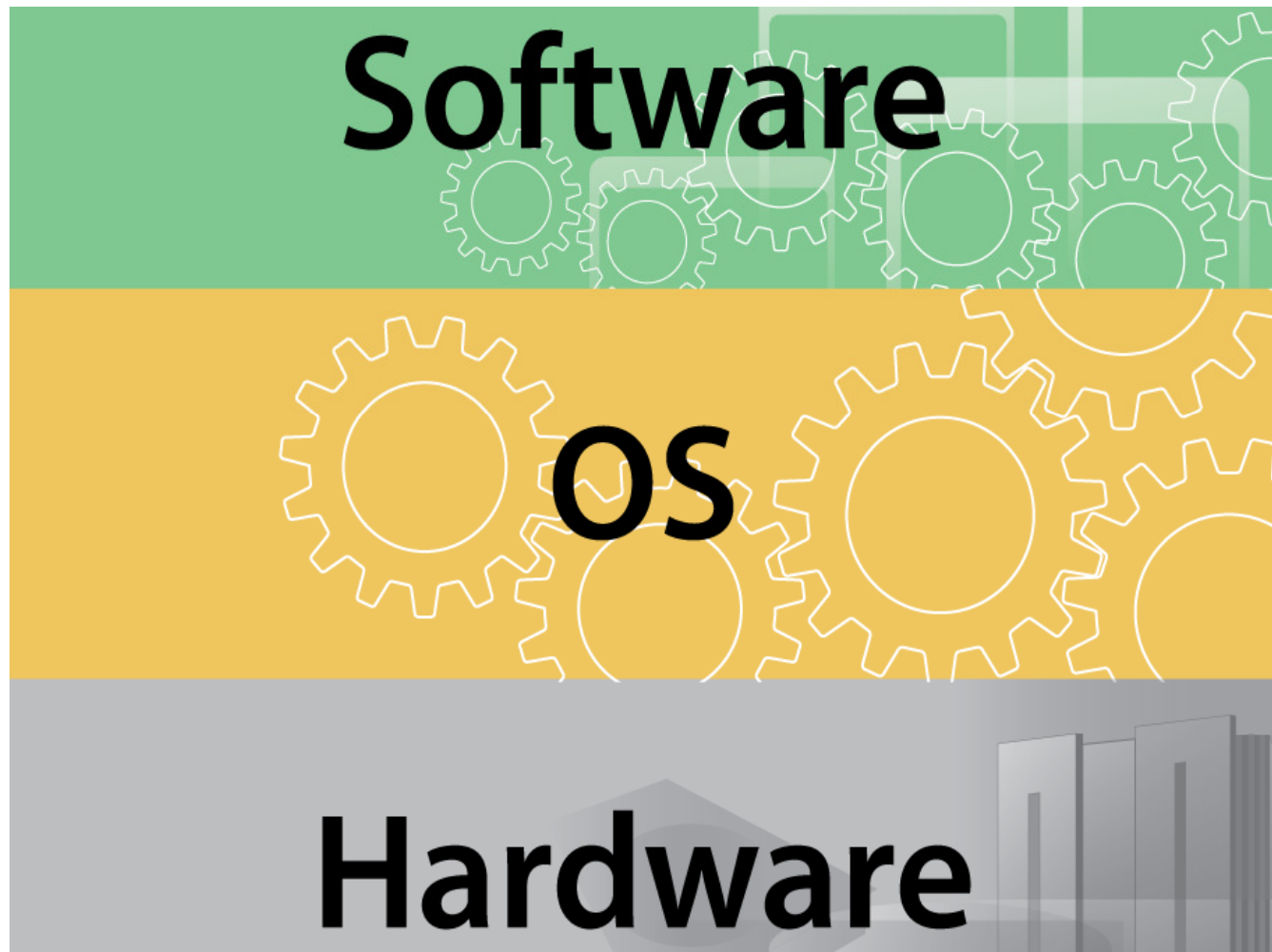
What are the differentiations?

How is the market evolving?

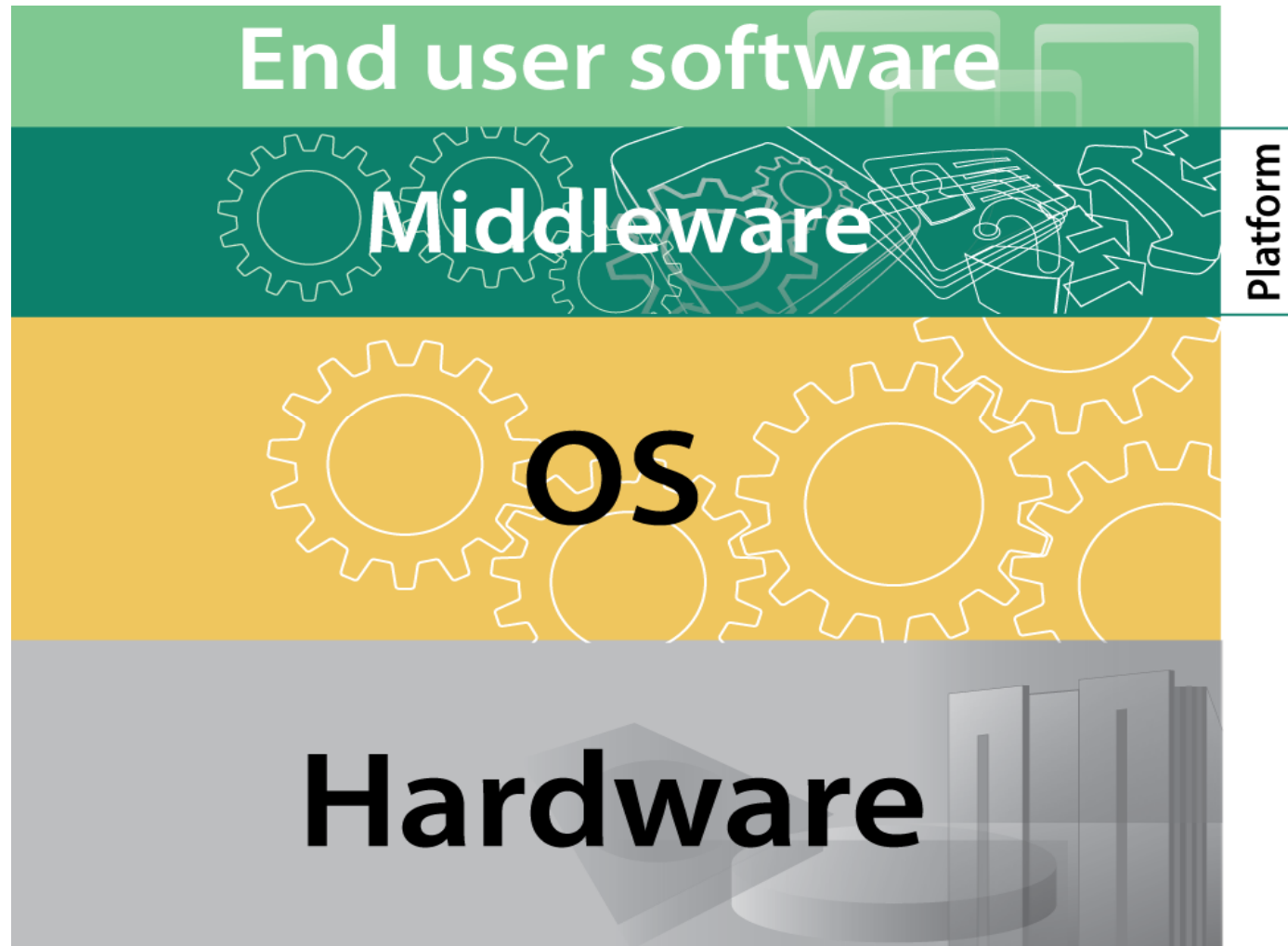
What to look for?

What is Stratos?

What is a middleware Platform?



What is a middleware Platform?



What is Platform as a Service?

SaaS

The top layer of the diagram is light blue and contains the text 'SaaS'. In the background, there are several overlapping icons of laptops or tablets, representing software applications.

PaaS

The middle layer is light blue and contains the text 'PaaS'. The background features a complex network of blue gears and arrows, symbolizing platform services and infrastructure.

IaaS

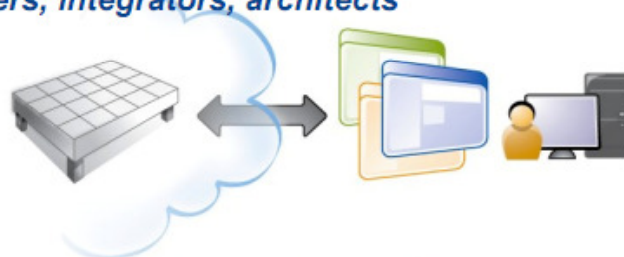
The bottom layer is light blue and contains the text 'IaaS'. The background shows a row of server racks, representing Infrastructure as a Service.

The Key Players

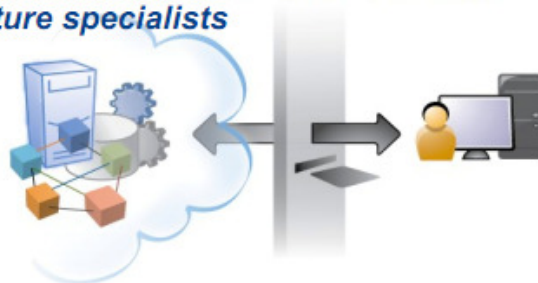
Software as a Service: Applications *For end-users*



Platform as a Service: Middleware *For developers, integrators, architects*



Infrastructure as a Service: Servers, Storage *For infrastructure specialists*



What to look for in a PaaS (1/2)

- Lean
 - All the on-premise benefits are magnified in a cloud
 - Efficiency that is valuable in fixed deployment is *invaluable* in large dynamic deployments!
- Available on private, public, on-premise
 - Getting locked into a specific public PaaS will have long term repercussions
 - Open Source is a huge protection against this
- The correct set of core “services”
 - Not just App Server, but Identity, Registry, Data, Cache, ESB, BPMS, Billing, Logging, etc

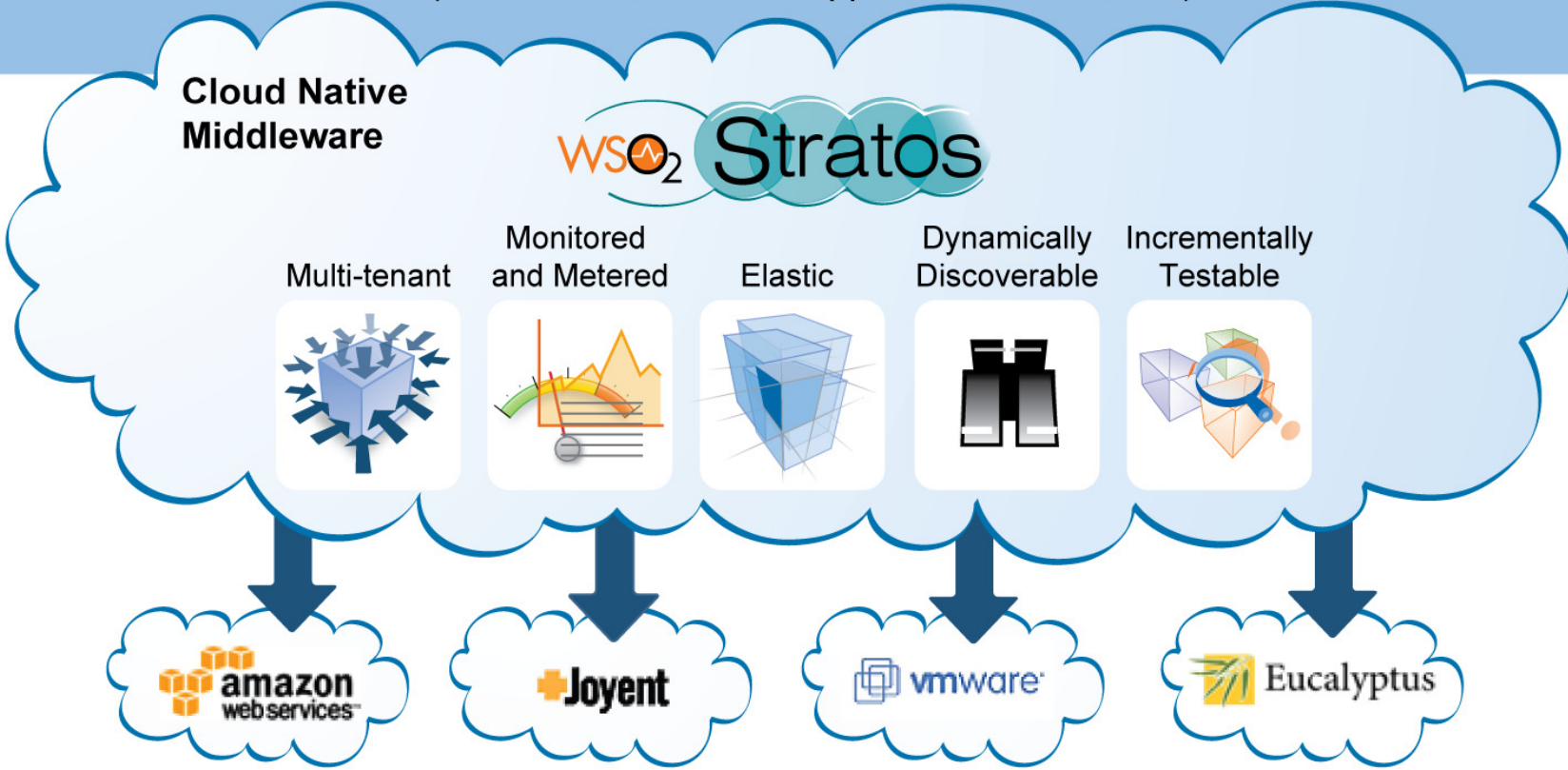
What to look for in a PaaS (2/2)

- Open Standard interfaces to common services
- Self-service, multi-tenancy, elasticity, metering, incremental deployment and testing
- Offers a basis for both single-tenant and multi-tenant models
 - Lots of tenants each with their own stuff, and/or
 - One application that is offered to all or many tenants

Cloud Native Middleware



Industry Standard Programming Model
(BPEL, ESB, Java webapp/services, XML, etc)



Cloud Middleware Platform and PaaS

- A PaaS requires an underlying software base
 - Cloud Middleware Platform (CMP)
 - Cloud Enabled Application Platform (CEAP)
- Not all PaaS have redistributable CMPs
- The benefit of having a CMP is choice:
 - Run your own PaaS in a private cloud
 - More than one PaaS provider
- Open source PaaS / Open source CMP fights lock-in
- WSO2's CMP = Stratos
- WSO2's PaaS = StratosLive

Stratos Overview

- A full middleware platform available as a service, with self service
 - Fast provisioning
- Based on OSGi
 - Modular, componentized, standard
- Multi-tenant, Elastic, Metered and Billed
 - Effective and powerful
- Available under the Apache License
 - Open Source, Open License, Open Development

StratosLive

- <http://stratoslive.wso2.com>

Complete PaaS

- Gartner is forecasting that it will be 2015 before vendors have true, integrated, complete CMP & PaaS frameworks
- We believe Stratos & StratosLive is that today!

Services available in Stratoslive

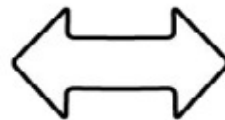
The screenshot displays the WSO2 Stratos Live management interface. At the top left is the WSO2 logo, and at the top right is the 'WSO2 Stratos Live' branding. A navigation menu on the left lists various configuration options: Account, Users and Roles, Key Stores, Data Sources, Services, Theme, Logo Management, and Server Roles. The main content area is titled 'Activate your Cloud Services' and lists ten services, each with an icon, a name, a 'Deactivate' button, and a 'Powered by' indicator.

Service Name	Deactivate Button	Powered by
Enterprise Service Bus	Deactivate	Enterprise Service Bus
Application Server	Deactivate	Application Server
Data Services Server	Deactivate	Data Services Server
Governance Registry	Deactivate	Governance Registry
Identity Server	Deactivate	Identity Server
Business Activity Monitor	Deactivate	Business Activity Monitor
Business Process Server	Deactivate	Business Process Server
Business Rules Server	Deactivate	Business Rules Server
Mashup Server	Deactivate	Mashup Server
Gadget Server	Deactivate	Gadget Server
Complex Event Processing Server	Deactivate	Complex Event Processing Server
Message Broker	Deactivate	Message Broker

WSO2 Carbon & Stratos

On-Premise

- WSO2 Enterprise Service Bus
- WSO2 Application Server
- WSO2 Data Services Server
- WSO2 Governance Registry
- WSO2 Identity Server
- WSO2 Business Activity Monitor
- WSO2 Business Process Server
- WSO2 Business Rules Server
- WSO2 Mashup Server
- WSO2 Gadget Server



PaaS : Private, Hybrid, Public Clouds



One Enterprise Platform wherever you need it:

WSO2 Carbon



On Premise:

- In Production at Fortune 1000 companies
- Handling 1bn transactions/day
- The only modular open source middleware stack
- Everything you need to build Enterprise Applications
- From Core Logic to Mobile Apps

WSO2 Stratos



In Private Cloud:

- A single managed platform
- Elastic, Self-Service, Multi-tenant
- Accelerates your private cloud beyond virtual machines to provide real Enterprise Cloud Services
- Use only what you need

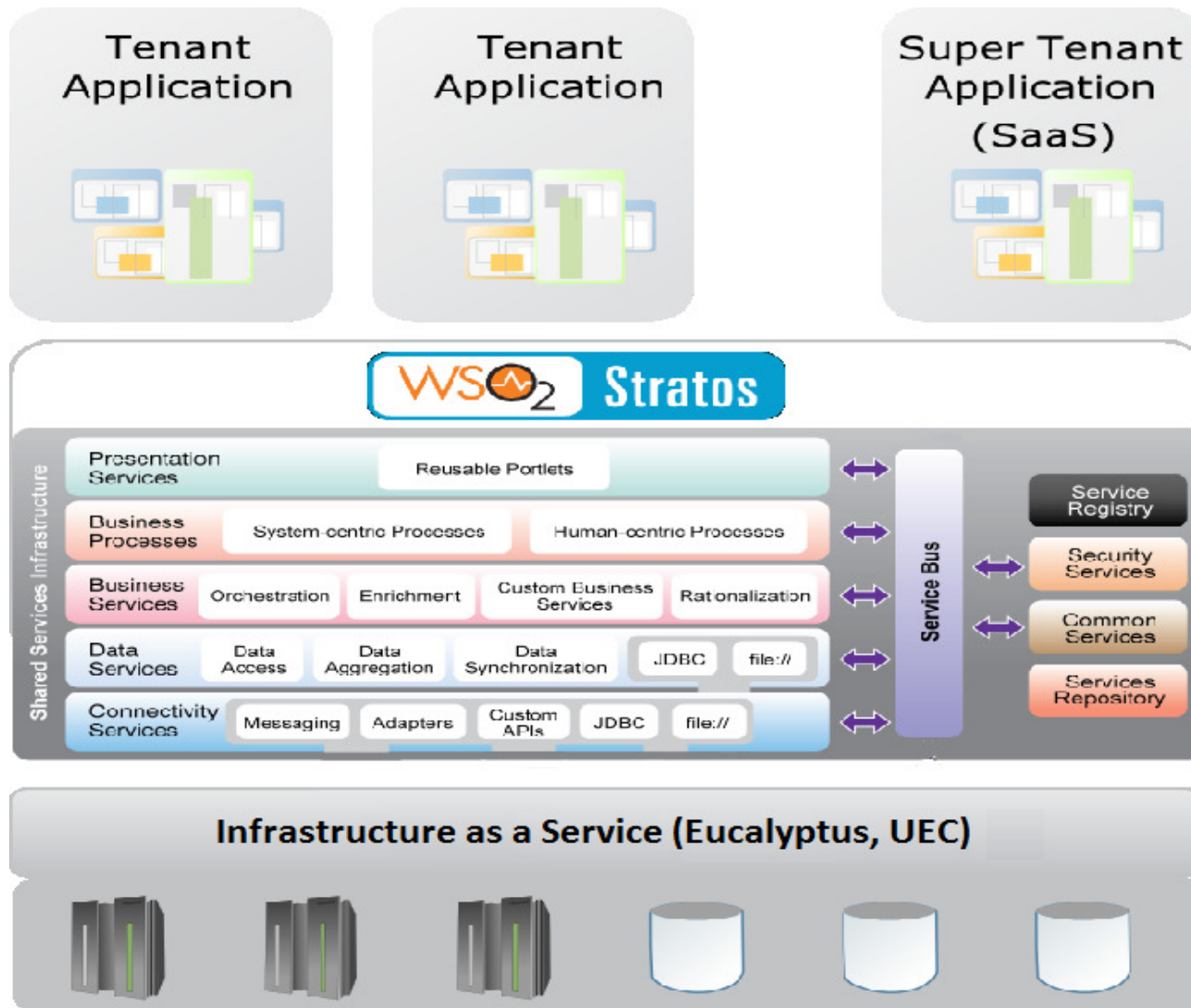
WSO2 StratosLive

As a Service in the Public Cloud:

- We manage, run and maintain your application platform
- Complete Pay as you Use
- ESB-as-a-Service
- Governance-as-a-Service
- Identity-as-a-Service
- With appropriate SLAs and simple monthly billing

- A single code continuum
- Completely modular based on OSGi
- Complete Enterprise SOA Architecture:
 - AppServer, ESB, Governance, Portal, BPMS, BAM, Identity and more
- Supported 24x7 with phone, web and full SLAs

User Experience of Stratos

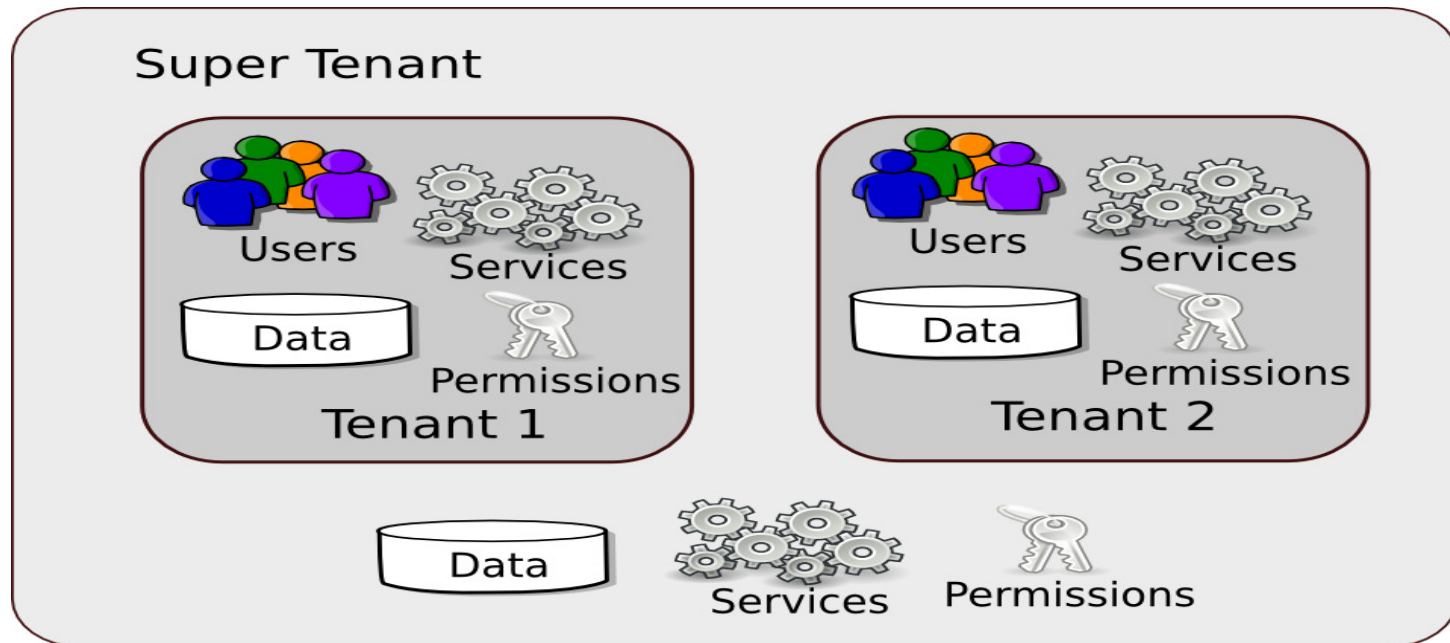


Multi-tenancy

Multi-tenancy

- Three possible ways
 - Machine per tenant
 - VM per tenant
 - Share machine/VM across tenants
- Challenges
 - Data isolation
 - Logic isolation
 - Security

Achieving Tenant Isolation

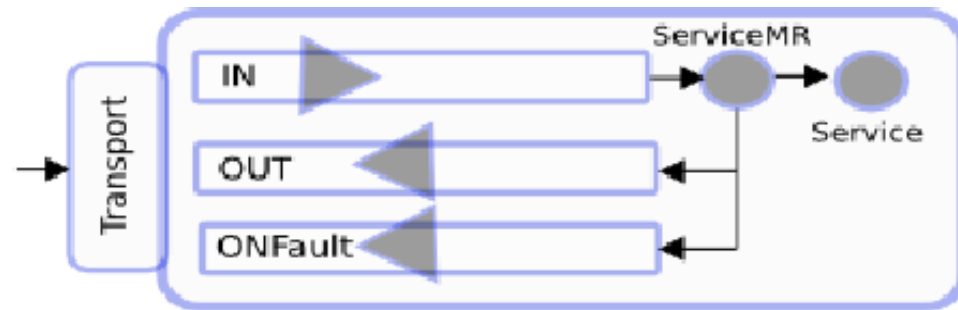


- Each Tenant is given a Security Domain
- Each domain may have its own User Store and Permissions, thus have a set of users and permissions enabling users to access resources
- Each domain is isolated and do not have access to other domains

Achieving Execution Isolation



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Axis Context

- Axis2 have stateless executions and keep all state in a Context.
- Different contexts are created for each tenant
- Lazy loaded

Security

- Tenants cannot write code with privilege operations
 - Otherwise tenants can write malicious code
 - Tenants can't write to file system
 - Java Security Manager can be used to prevent it
 - Sandbox environment, similar to applets
- Only allow privilege operations to codes signed by a particular key

Identity

Every tenant has access to an Identity Service

WSO2 Stratos Identity - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://identity.cloud.wso2.com/t/shankar-test1.com/carbon/admin/index.jsp?loginStatus=true

WSO2 Stratos Identity

WSO2 Identity as a Service Beta

Signed-in as: shankar@shankar-test1.com | Sign-out | Docs | About

Help

Identity & Entitlement quick start dashboard

- User Profile**
Update your user profile or add multiple user profiles. The value from your profile will be used to populate your Information card and OpenID profiles.
- OpenID**
This OpenID can be used with any OpenID relying party which trusts your domain for login.
- Information Card**
This card can be used with any identity selector that supports Microsoft CardSpace specifications and will allow you to login to web applications that support information card logins.
- SAML 2.0 Single Sign-On**
Use WSO2 Identity Server for Single Sign-on configuration. Service Providers can be added and removed.
- Multifactor Authentication**
Use WSO2 Identity Server to Enable XMPP based multi-factor
- Users and Roles**
WSO2 Identity Server enables you to manage users and roles in your system.
- Relying Parties**
Manage your Relying Parties with WSO2 Identity Server.
- Key Stores**
Manage your Key Stores with WSO2 Identity Server

Find: Next Previous Highlight all Match case

Done

Identity Server / Service


- Each tenant is identified by the @tenant-domain
- Each tenant admin can choose to manage their tenants user store either within the Stratos-internal LDAP store or using an external LDAP
- Bulk import
- Each tenant user has a OpenId/Infocard as well as SAML2 tokens
 - Single-signon & Single-Signoff
- SAML2 is used across the Stratos deployment to ensure a smooth transition (single sign-on) between Stratos services
 - SAML2 is also available as sign-on for webapps, gadgets and other user-deployed content

Google Authentication

- Enable sign into Stratos using Google Apps username/password.
- For successful sign in using Google Apps,
 - If a tenant does not exist, it will be created with the same name as Google Apps domain. The IdP of this domain is Google Apps

Login with Google Apps Domain

Or login using Google Apps Account



Enter Google App domain

Google™ Google Apps for

Sign in to manage
Belajar

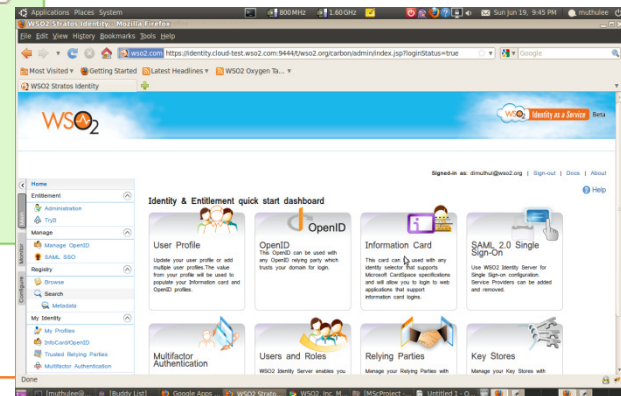
Username:

@example.com

Password:

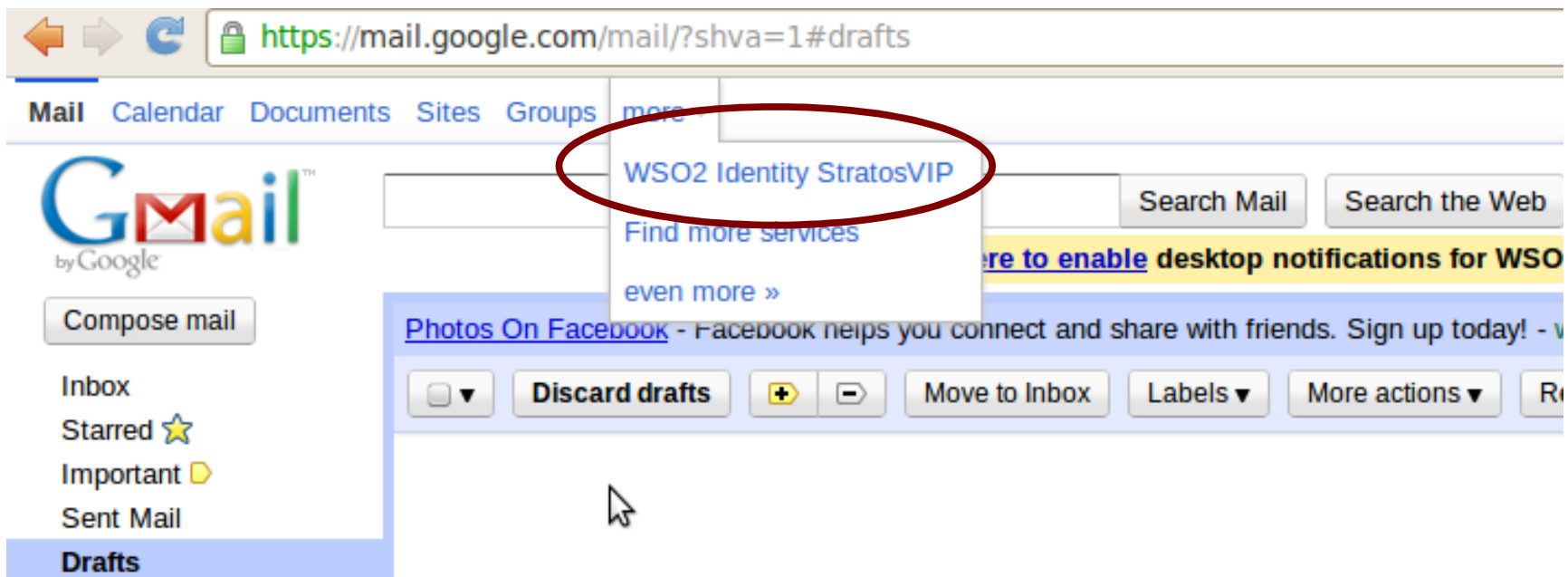
Stay signed in

[Can't access your account?](#)



Direct Access From Gmail

- Google Apps administrator can add Stratos to your domain. Direct access to Stratos.

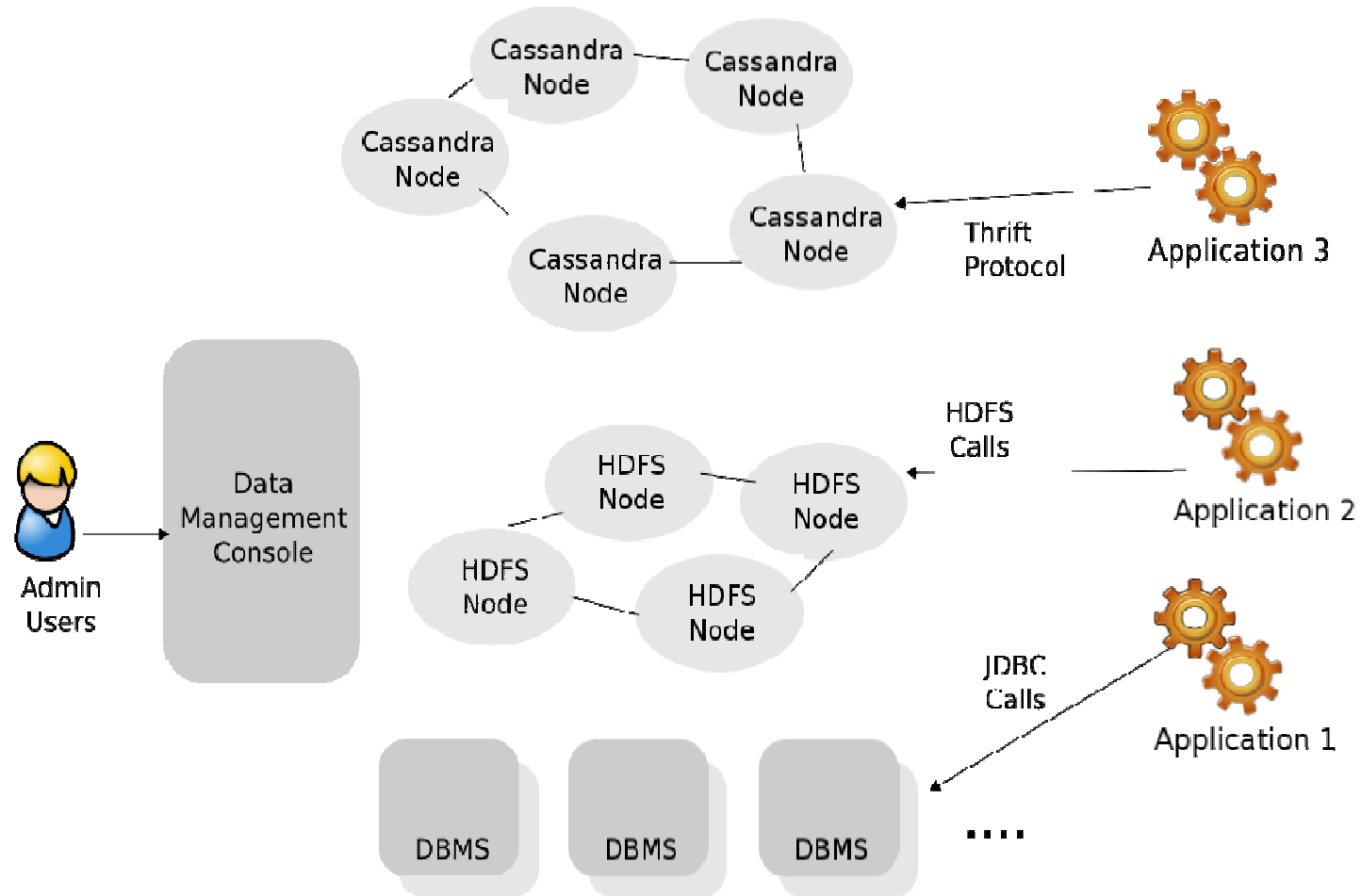


Cloud Data Solutions

WSO2 Cloud Data Solutions

- WSO2 Data Server
 - Carbonized Cassandra Cluster
 - Database cluster
 - Carbonized HDFS Cluster
- <Data> PaaS Offerings
 - Apache Cassandra as a Service
 - Relational Database as a Service
 - HDFS as a Service
- We are also planning MapReduce as a Service as Future work.

Polyglot Data Architecture



Creating a database



Signed-in as: admin@temp.au

Home > Add Database

New Database

Database Server Instance Name*

WSO2_RSS

Database Name*

db1

Create

Cancel

Creating a Database



Signed-in as: admin@temp

Home > Databases

Databases

Database Name	Database Server Instance Name	Tenant Domain	Database URL
tempaadb1_temp_au	WSO2_RSS	SUPER_TENANT	jdbc:mysql://rss3.crik244zrfxc.us-east-1.rds.amazonaws.com/tempaadb1_temp_au
finalrssdb_temp_au	WSO2_RSS	SUPER_TENANT	jdbc:mysql://rss3.crik244zrfxc.us-east-1.rds.amazonaws.com/finalrssdb_temp_au
tempdb_temp_au	RDS1	temp.au	jdbc:mysql://wso2-rnd-db1.cd3cwezibdu8.us-east-1.rds.amazonaws.com/tempdb_temp_au

[+ Add Database](#)

Explore your database

Signed-in as: admin@t

Database Console





Database Console interface showing connection details and execution options.

Connection: jdbc:mysql://wso2-md-db1.cd3c...
MySQL 5.1.50-log

Max rows: 1000 | Auto complete: Normal

Run (Ctrl+Enter) | Clear | SQL statement:

Important Commands

	Displays this Help Page
	Shows the Command History
	Executes the current SQL statement
	Disconnects from the database

Sample SQL Script

Elasticity

Elasticity

- Fault tolerance, High availability and scalability
- Traditional solution: Buying safety-net capacity
- Better Solution: Scale up and down
- Pay for the actual use
- Elastic, Service & tenant aware load balancer

Metering & Billing

Metering

- Each services collects
 - Number of service calls
 - Request/response bandwidth
 - Registry bandwidth (upload, download)
 - Total registry space usage
- Send above to BAM publishers, which sends the data to the BAM Service
- BAM summarizes periodically
- Summarized data will be accessible by Stratos Manager

Throttling

- Restrict tenants from using more than the allocated resources, depending on the usage plan
 - Number of users per tenant
 - Storage space
 - Number of requests to webapps, services etc

Stratos Billing

- Scheduled invoice generation
- Ability to view past invoices and the current(interim) invoice
- Securely pay the invoice via Paypal
- Notifies the customer via email on received payments
- Notifies the super-admin on customers exceeding the credit limit
- Presents a summary view to the super-admin



Federal Tax ID 87-0750575

INVOICE

JUN 2011

INVOICE NO: 18

800 West El Camino Real Suite 180,
Mountain View, CA 94040
Tel: (408) 754 7388
Fax: (408) 689 4328
Email: billing@wso2.com

Invoice Date: 2011/06/20
Invoice period start date: 2011/06/07
Invoice period end Date: 2011/06/20

Particulars	Value (USD)
Charges for subscriptions	
Subscription Type: Medium	
Active since: 2011/06/06	
Active until: This is your current active subscription	
Subscription for package	\$20.00
Payment details	
You don't have any payment details for this period.	
Invoice Summary	
Brought forward	\$1.50
Total cost	\$20.00
Total payments	\$0.00
Carried forward	\$21.50

Padmika Dissanaikie,
Director- Finance



▼ [Log in to my PayPal account](#)

Email

PayPal password

[Forgot your email address or password?](#)



Payment Details	
PayerId	8SS5N8TLTAE4Y
First name	Test
Last Name	User
Amount	21.50 USD

Please click Confirm to confirm your payment or Cancel to go back to the invoice page



Federal Tax ID 87-0750575

800 West El Camino Real Suite 180,
Mountain View, CA 94040
Tel: (408) 754 7388
Fax: (408) 689 4328
Email: billing@wso2.com

Thank you. Your payment was completed successfully.	
Transaction ID	43Y09851SC864051K
Invoice ID	18
Amount	21.50 USD

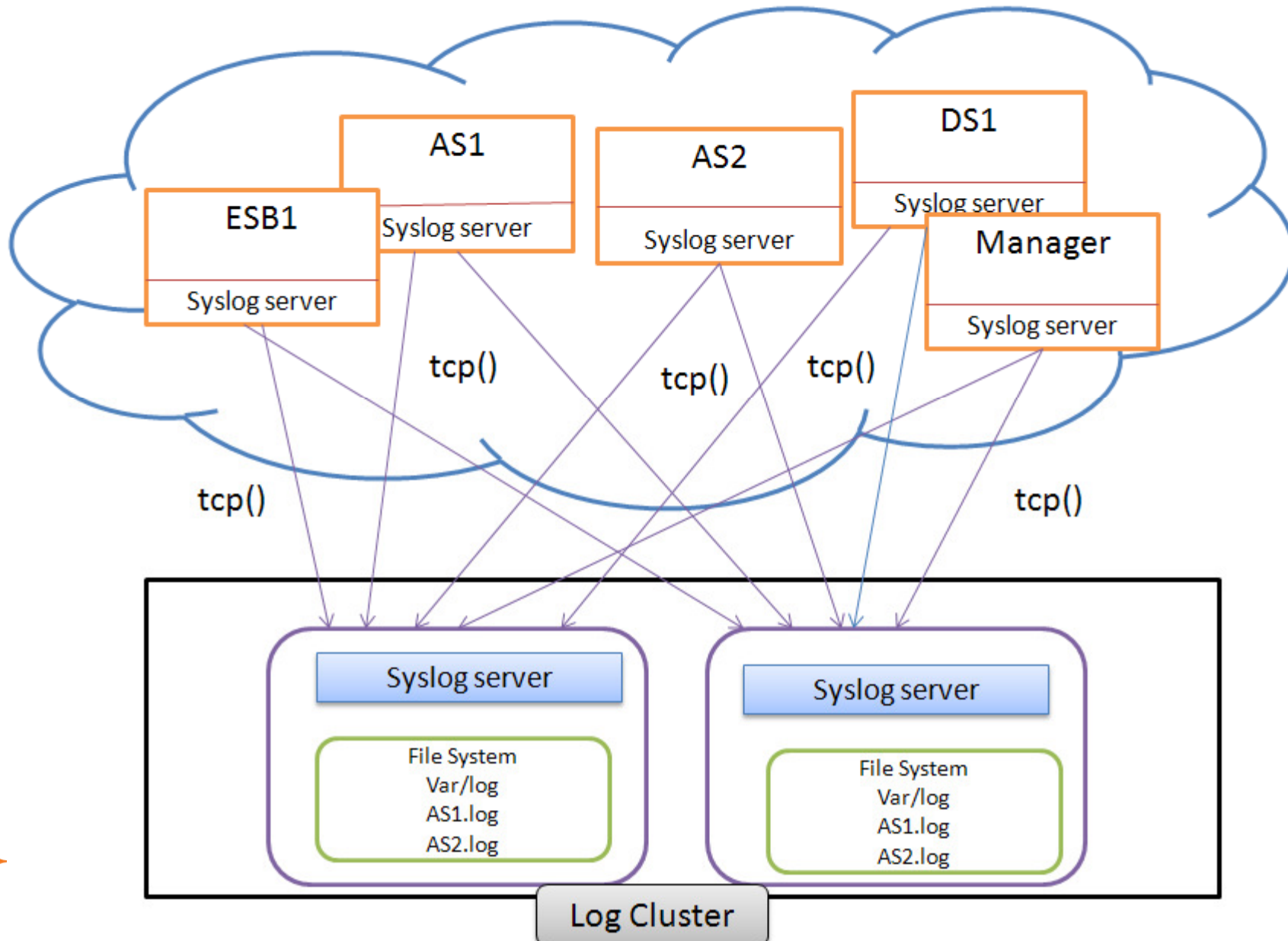


Logging

Distributed Logging

- Every service and custom applications logs are captured by the log4j/commons loggings settings
- Logs are partitioned & stored by tenant
- Logs are sent to the Manager service via syslog
- Logs are then viewable / downloadable by tenant admins

MT-Logging Deployment Architecture







Log Viewer – Stratos Manager {Super-Tenant}

System Logs

Logs are taken from the remote log hosted server.

Tenant Domain	<input type="text" value="hasiniY.com"/>	<input type="button" value="Get Tenant Logs"/>	Service Name	<input type="text" value="WSO2 Stratos Data Services Server"/>
---------------	--	--	--------------	--

File Name	Date	File Size	Action
WSO2 Stratos Data Services Server.log	09-Jun-2011 09:13	74K	 View  Download
WSO2 Stratos Data Services Server.log.1.gz	08-Jun-2011 12:05	2.7K	 Download
WSO2 Stratos Data Services Server.log.2.gz	06-Jun-2011 05:23	1.2K	 Download

Log Viewer – Stratos Data Services Server {Tenant User}




Signed-in as: admin@poohdedoo.com | [Sign-out](#) | [Docs](#) | [About](#)

[Home](#) > [Monitor](#) > [System Logs](#)

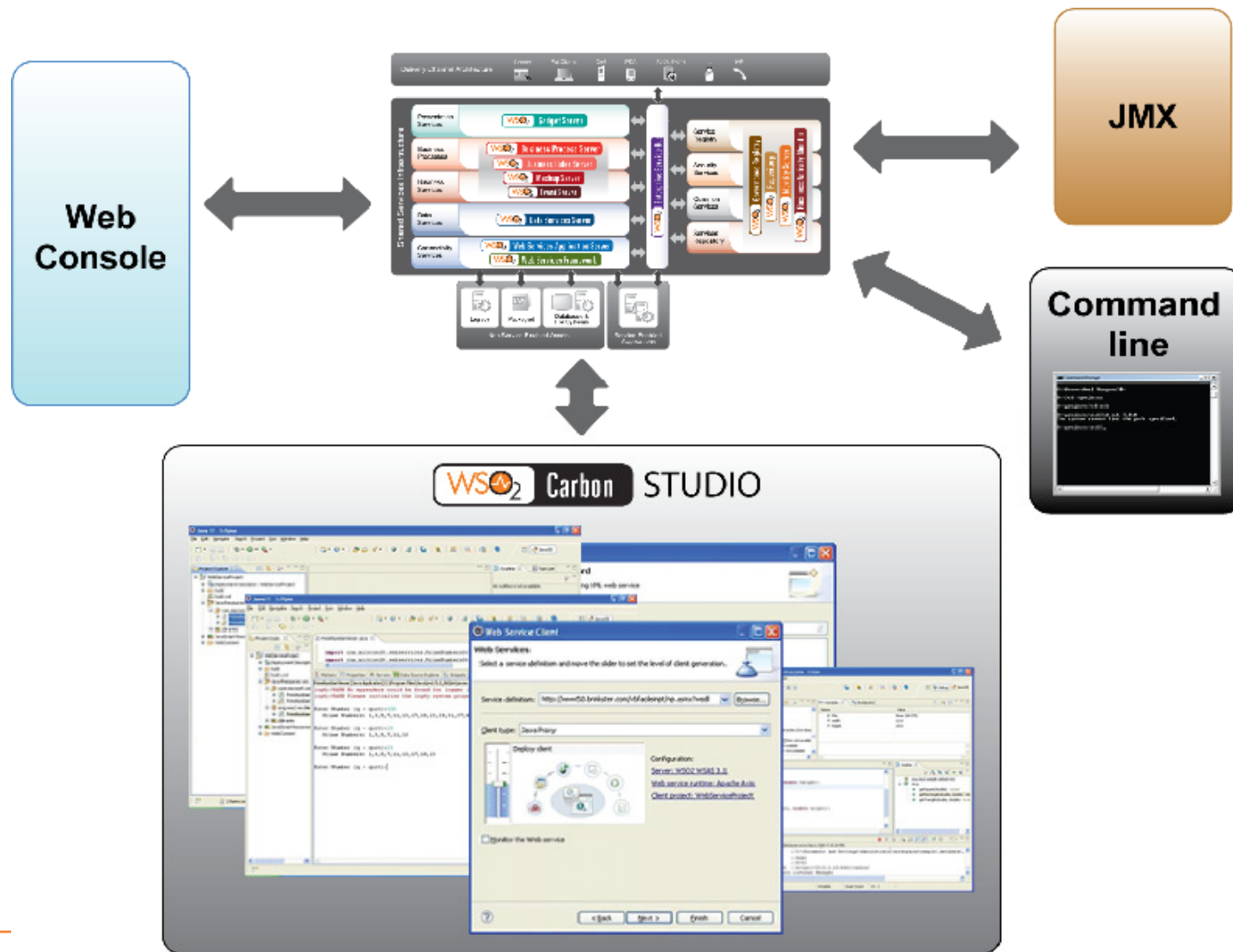
[? Help](#)

System Logs

Logs are taken from the remote log hosted server.

File Name	Date	File Size	Action
WSO2 Stratos Data Services Server.log	16-Jun-2011 05:09	94K	 View  Download
WSO2 Stratos Data Services Server.log.1.gz	06-Jun-2011 05:54	1.4K	 Download

Tooling



Questions?



<http://www.flickr.com/photos/oberazzi/>

THANK YOU!