LET'S
BUILD
TOMORROW
TODAY

Cisco Customer Collaboration Architectural Vision

Michael Lepore, Tod Famous

BRKCCT-1009

Cisco live!

Disclaimer

The Cisco products, service or features identified in this document may not yet be available or may not be available in all areas and may be subject to change without notice. Consult your local Cisco business contact for information on the products or services available in your area. You can find additional information via Cisco's World Wide Web server at http://www.cisco.com. Actual performance and environmental costs of Cisco products will vary depending on individual customer configurations and conditions. This is a confidential Cisco Internal launch document and not for external distribution.

Agenda

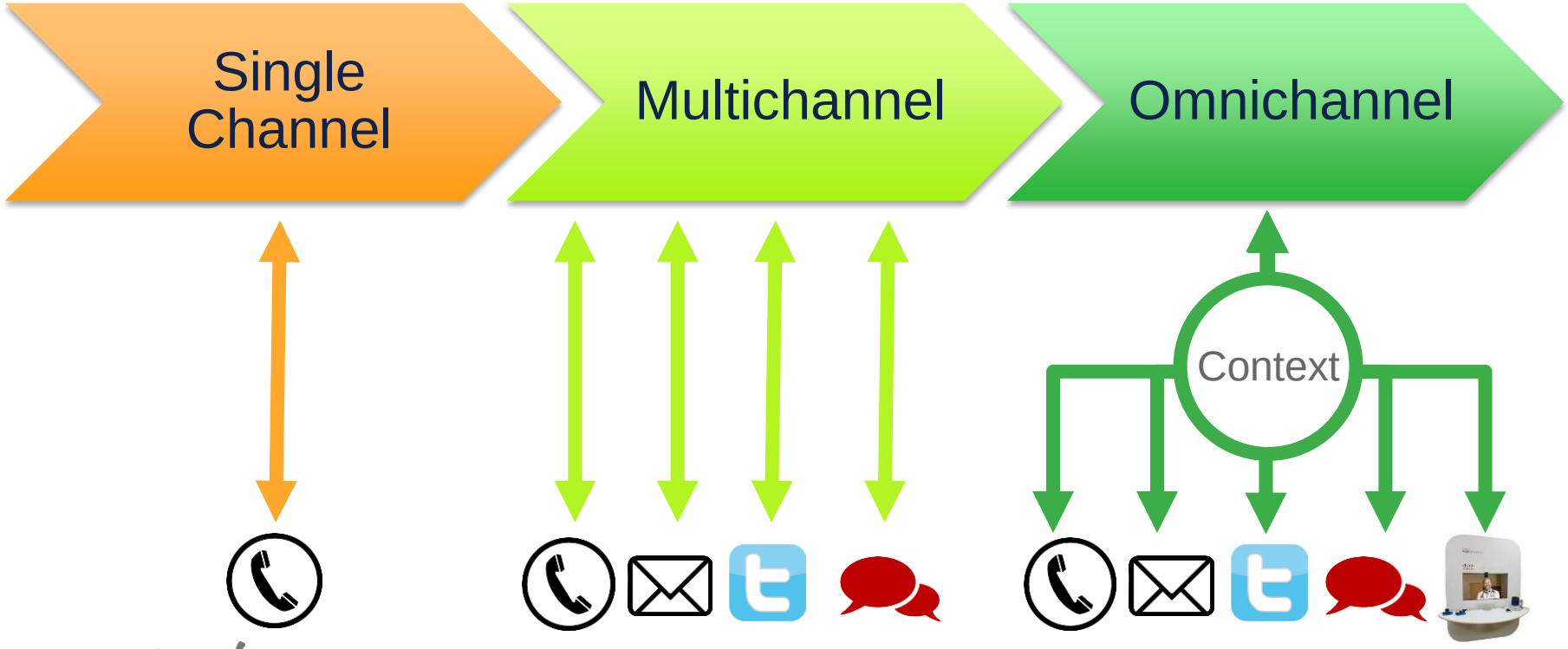
- Disruptive Solutions
  - OmniChannel
    - Mobile, Video
    - Context
  - Cloud Evolution
    - HCS, Cloud Extensions
  - DevOps
- Architectural Evolution
  - UI Architecture
  - Cloud Evolution
    - Cloud Basics
    - Context Architecture
- Technological Building Blocks
- Q&A

Disruptive Solutions

Omnichannel … is viewing the experience through the eyes of your customer … across all channels so that it is seamless, integrated and consistent

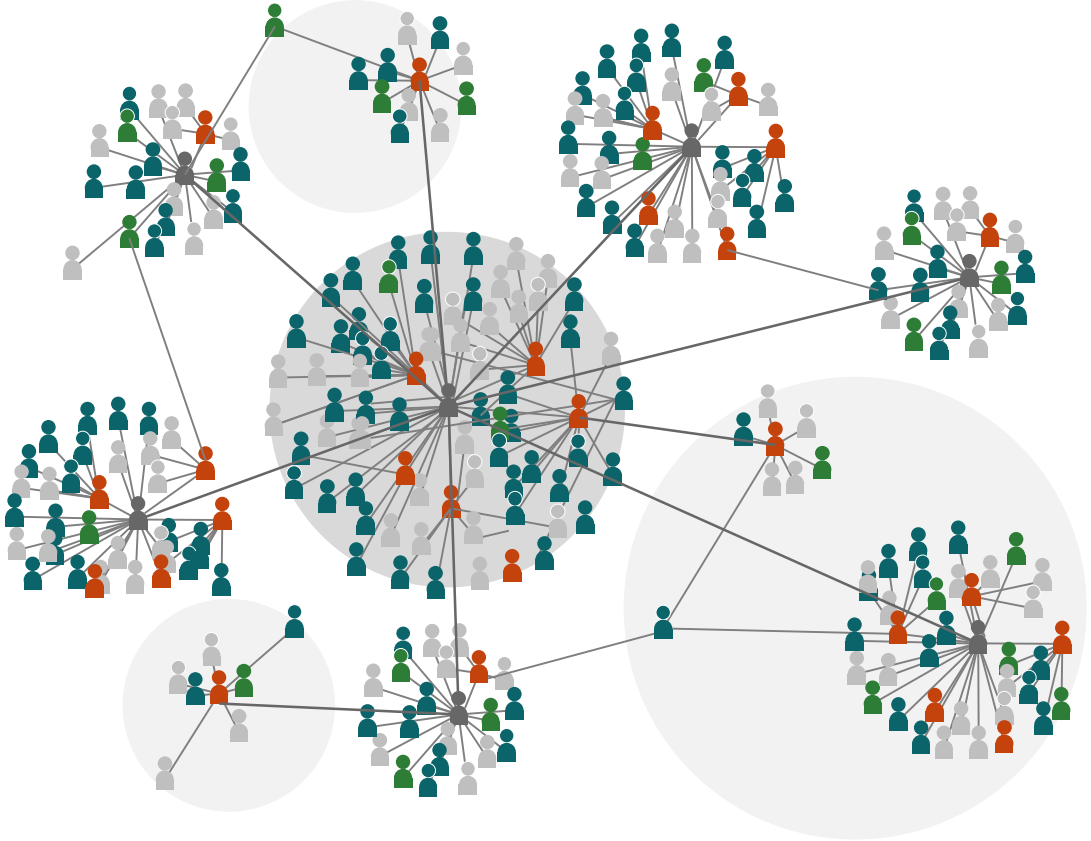
John Bowden, Senior Vice President of Customer Care, Time Warner Cable

Omnichannel = Multichannel + Context

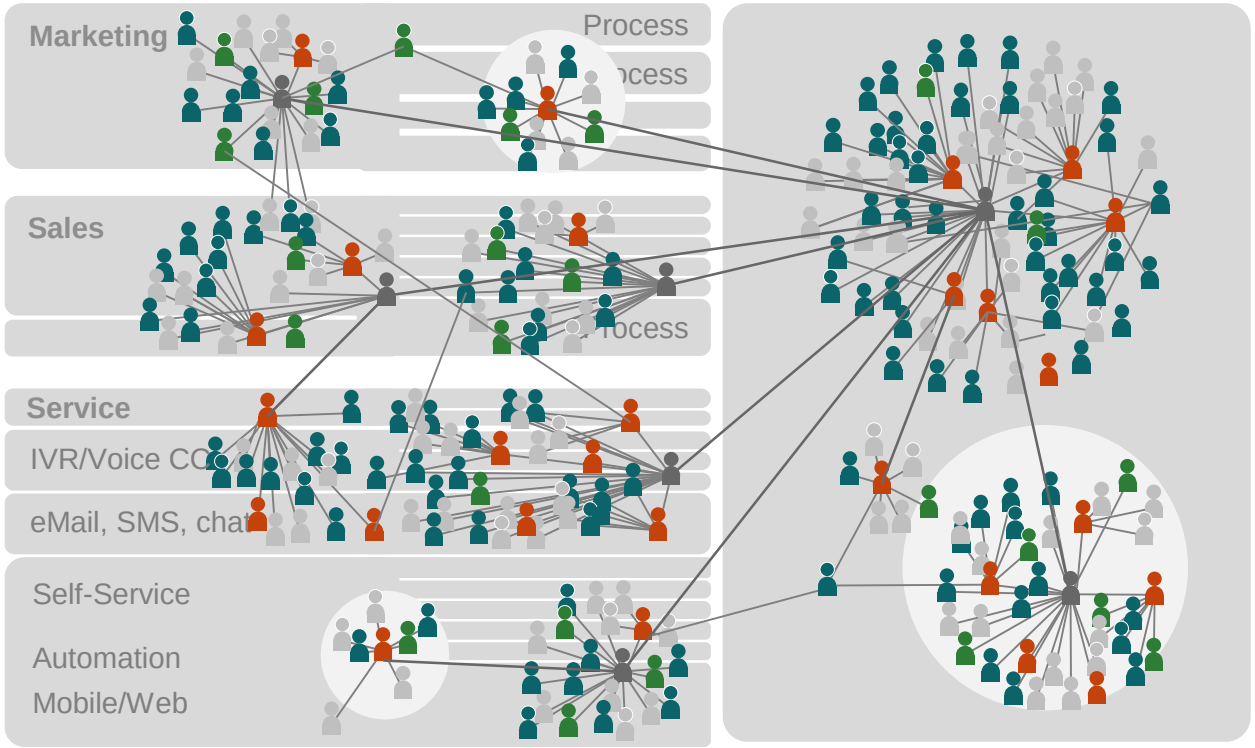


How do I get what I want?

How do I get what I want?



How do I get what I want?



?

Simple

Marketing

Sales

Service

IVR/Voice CC

eMail, SMS, cha

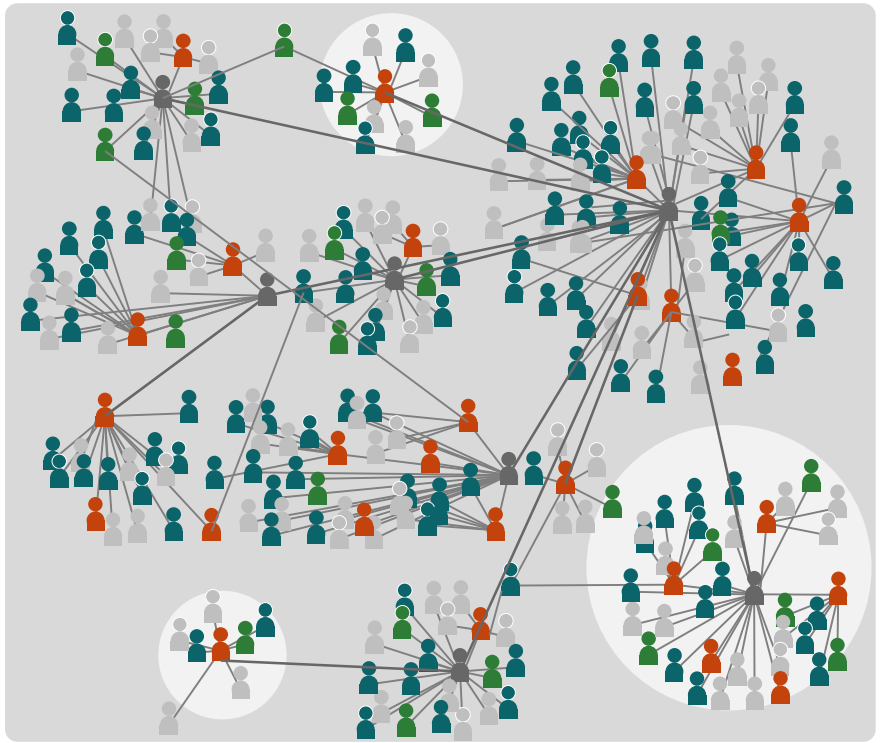
Self-Service

Automation

Mobile/Web

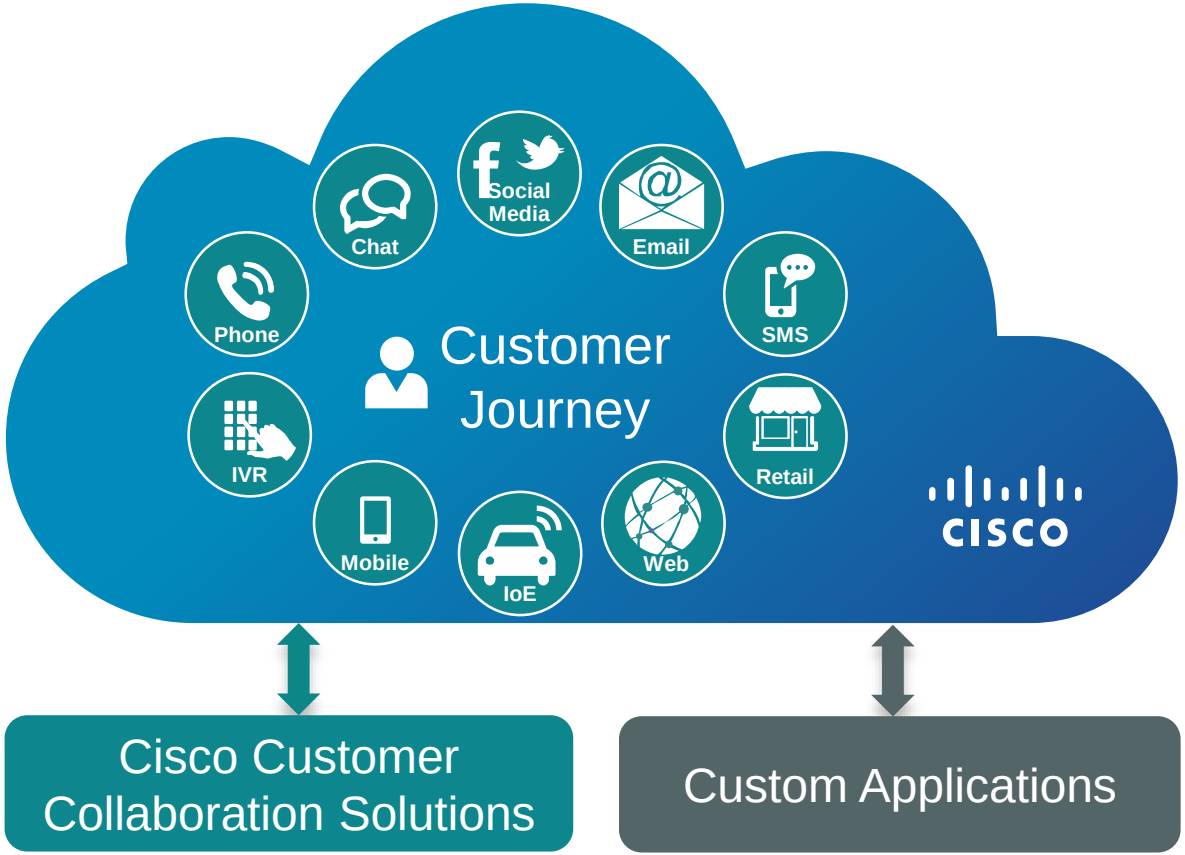
Context

Customer Contact Platform



Context Service

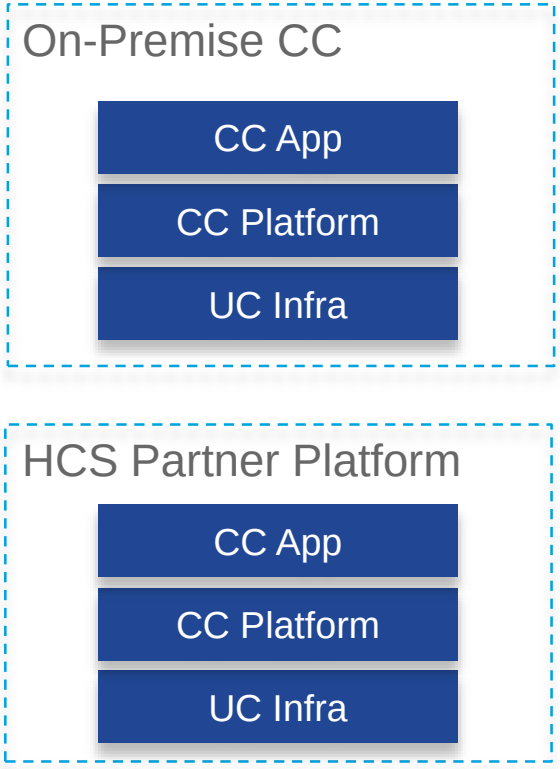
Unify customer journeys, across time, medium, people, process and outcome



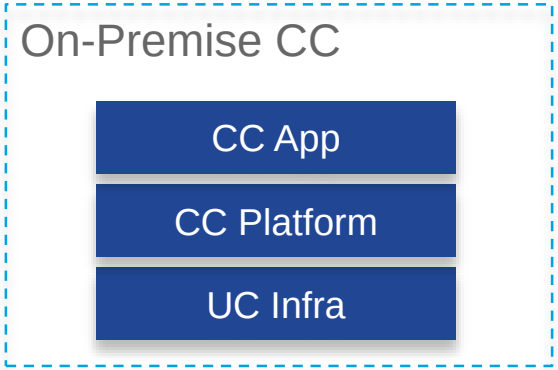
Cloud is about how you do computing, not where you do computing

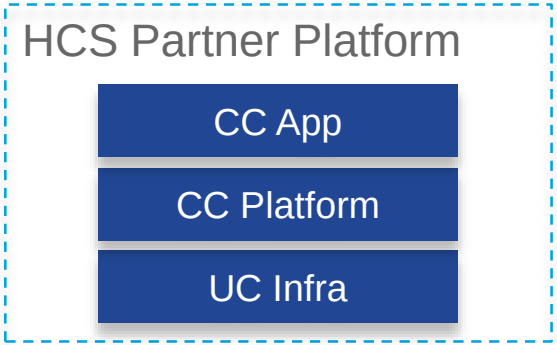
Paul Maritz
CEO, VMware

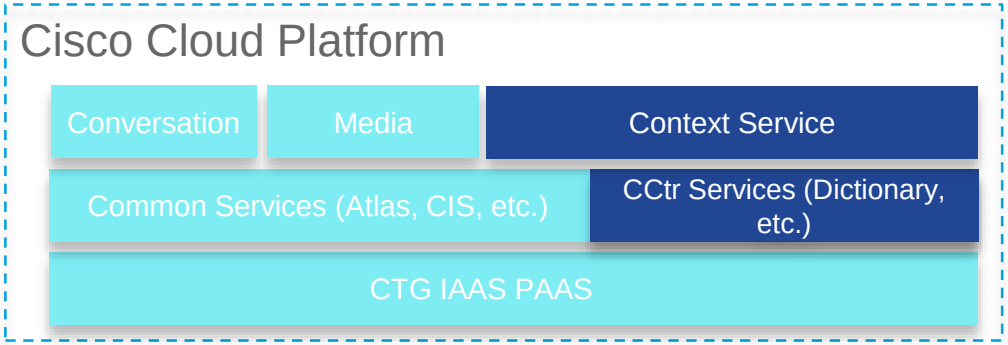
Contact Center Cloud Strategy



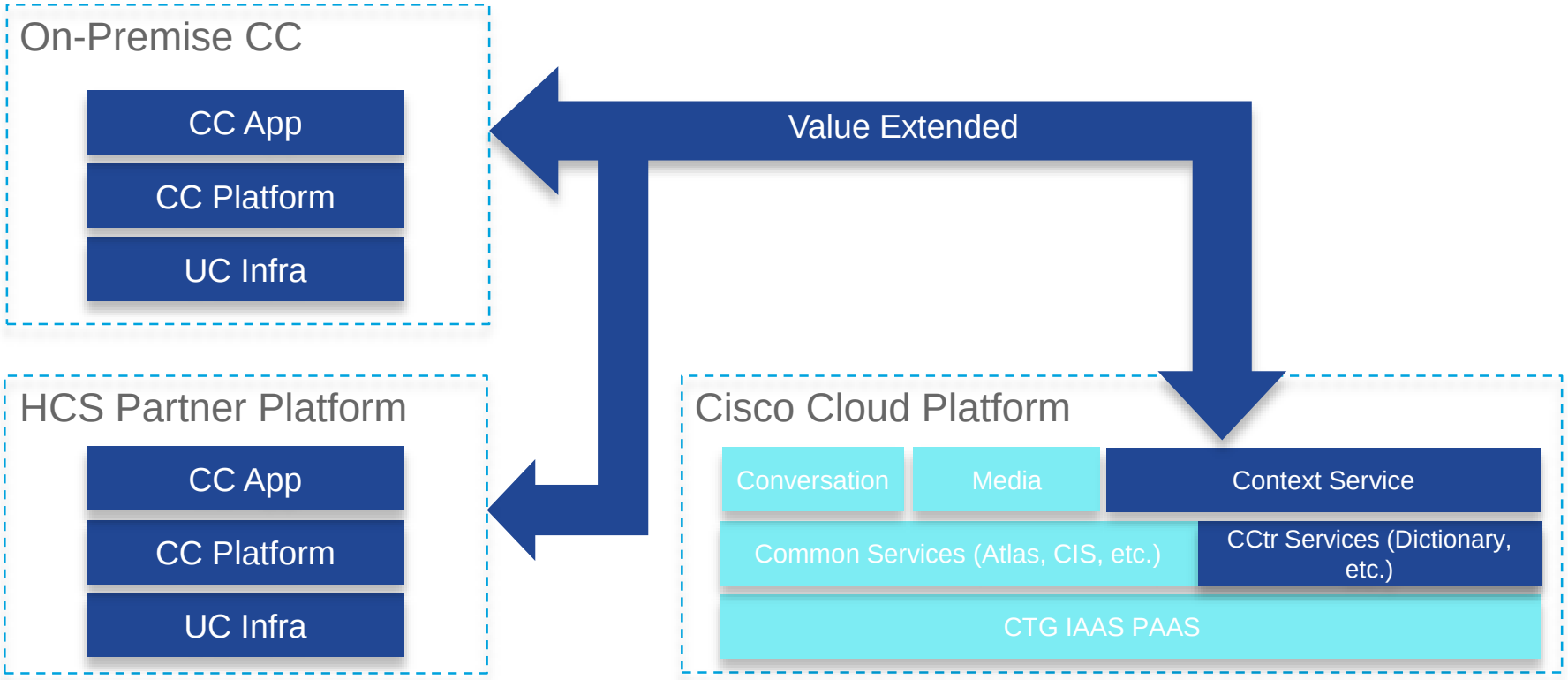
Contact Center Cloud Strategy



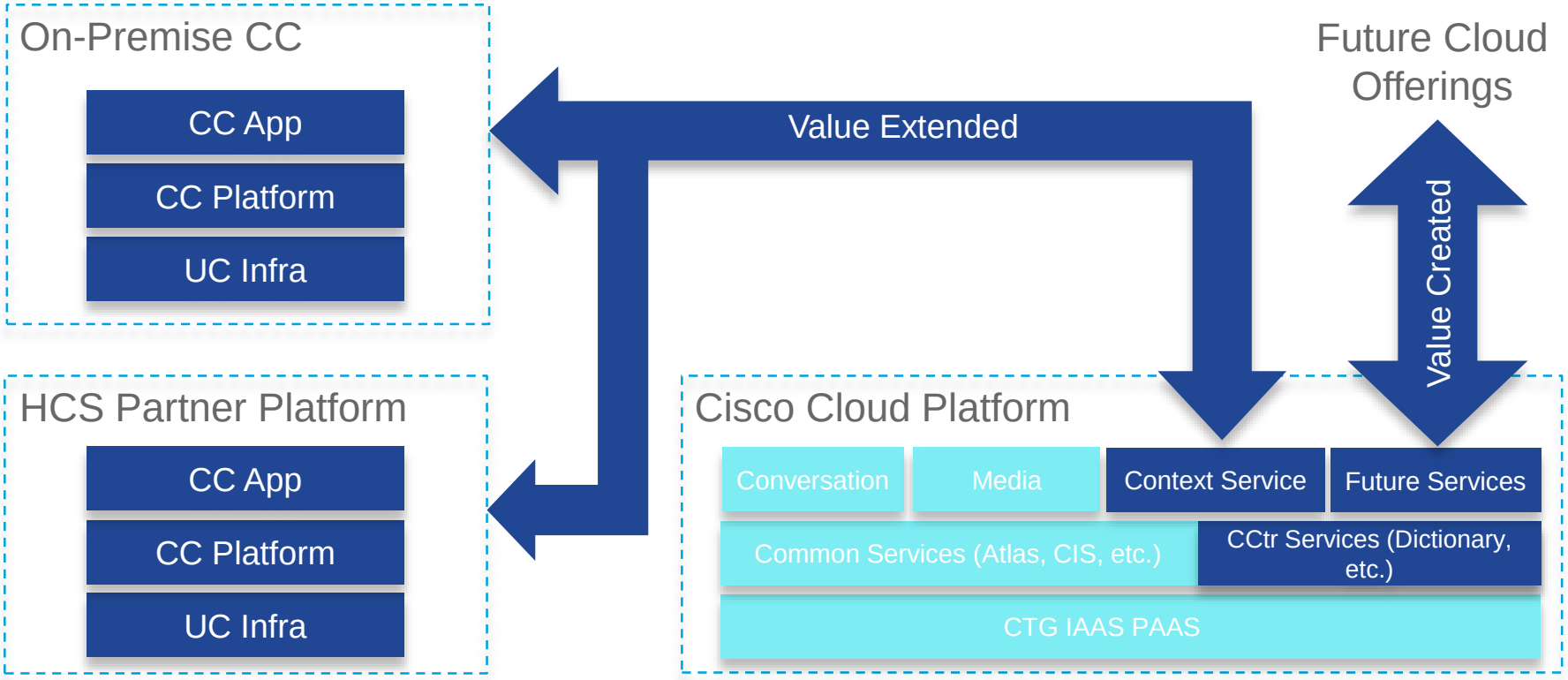




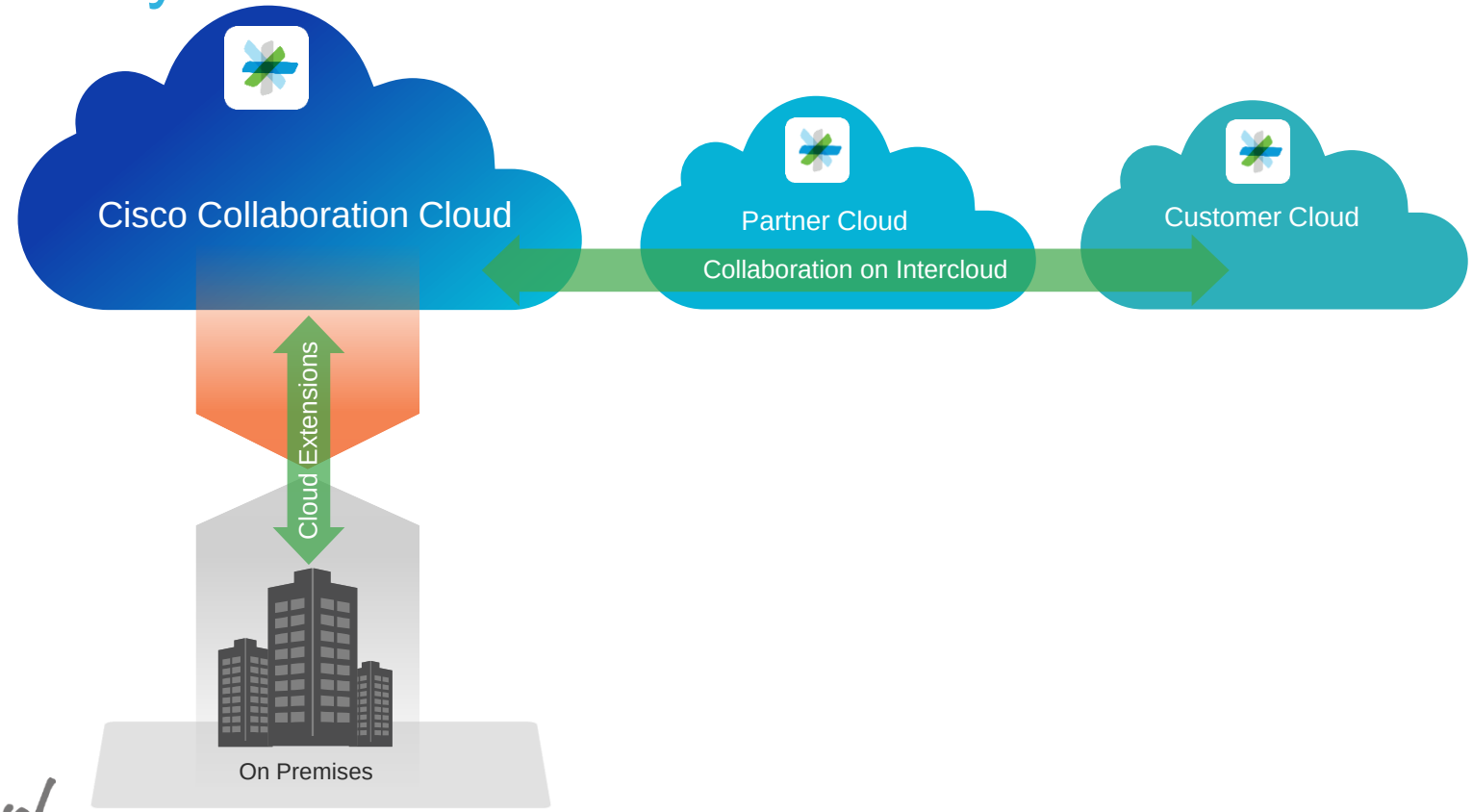
Contact Center Cloud Strategy



Contact Center Cloud Strategy

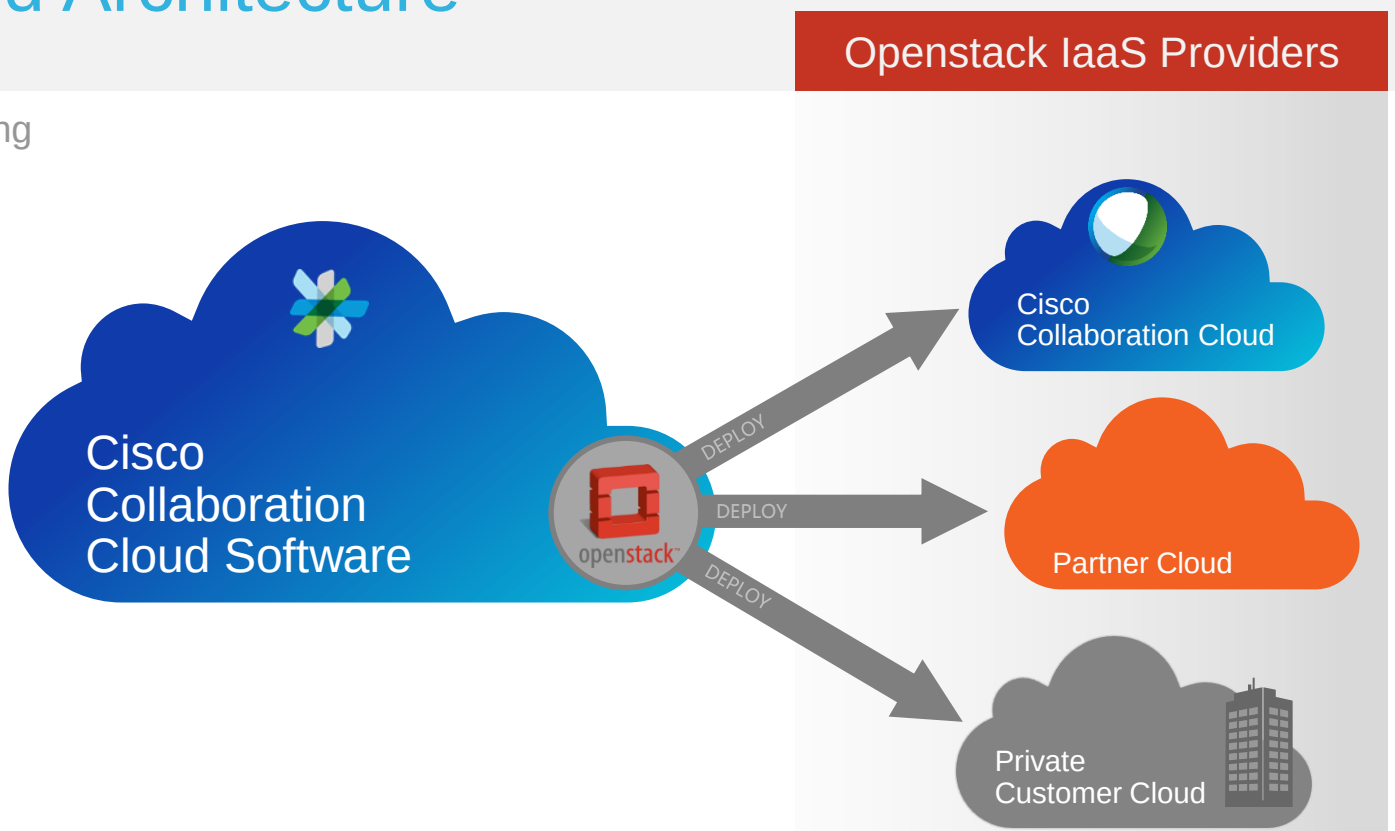


Cisco's Hybrid Architecture



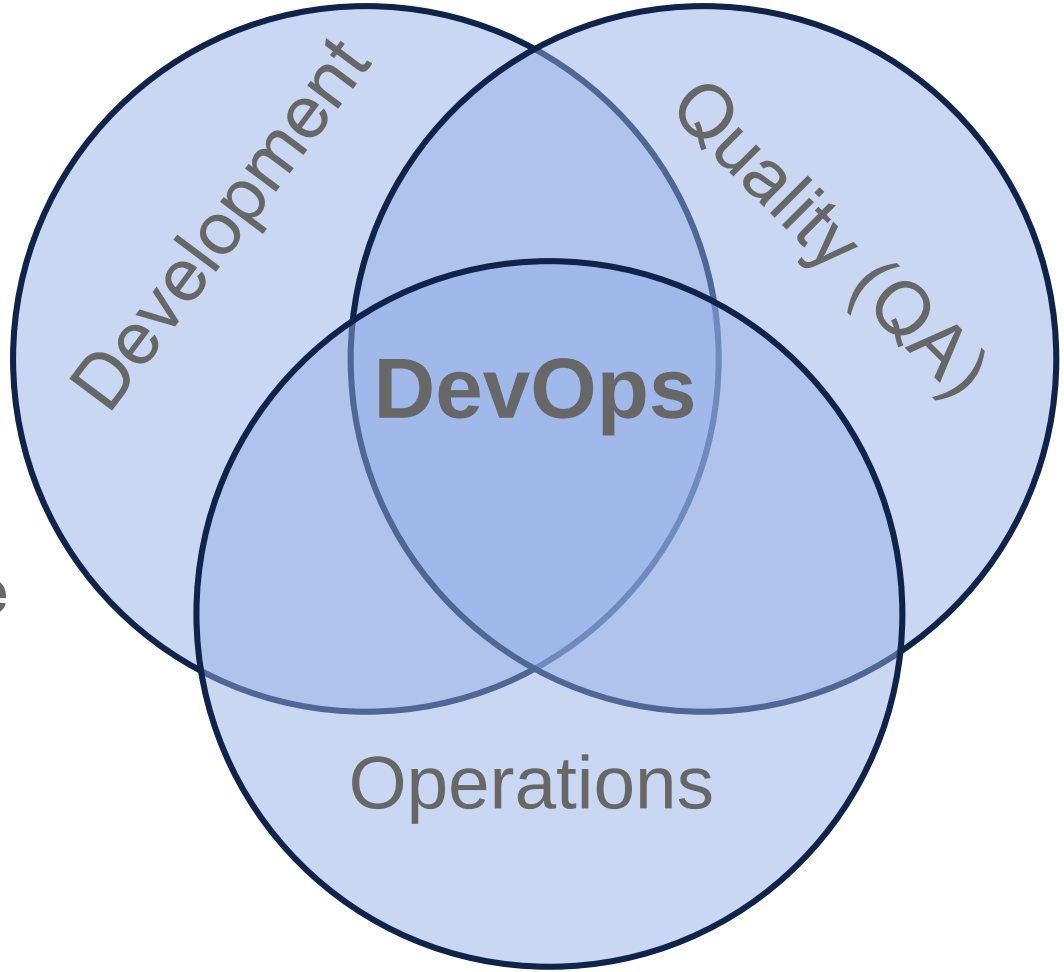
Cisco Cloud Architecture

A New Type of Bursting

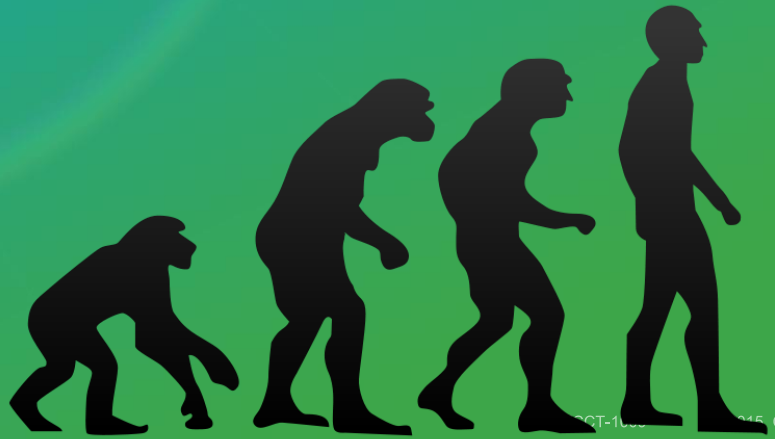


DevOps

- Application of Agile concepts to Operations and Development
- “Pipelines” of software development
- Organization and Technology



Architectural Evolution



User Interface Architecture

Principals drive Technology Choices

Standards Based

Thin client

- HTML5, JavaScript, CSS

Extensible

- REST APIs
- OpenSocial Gadgets

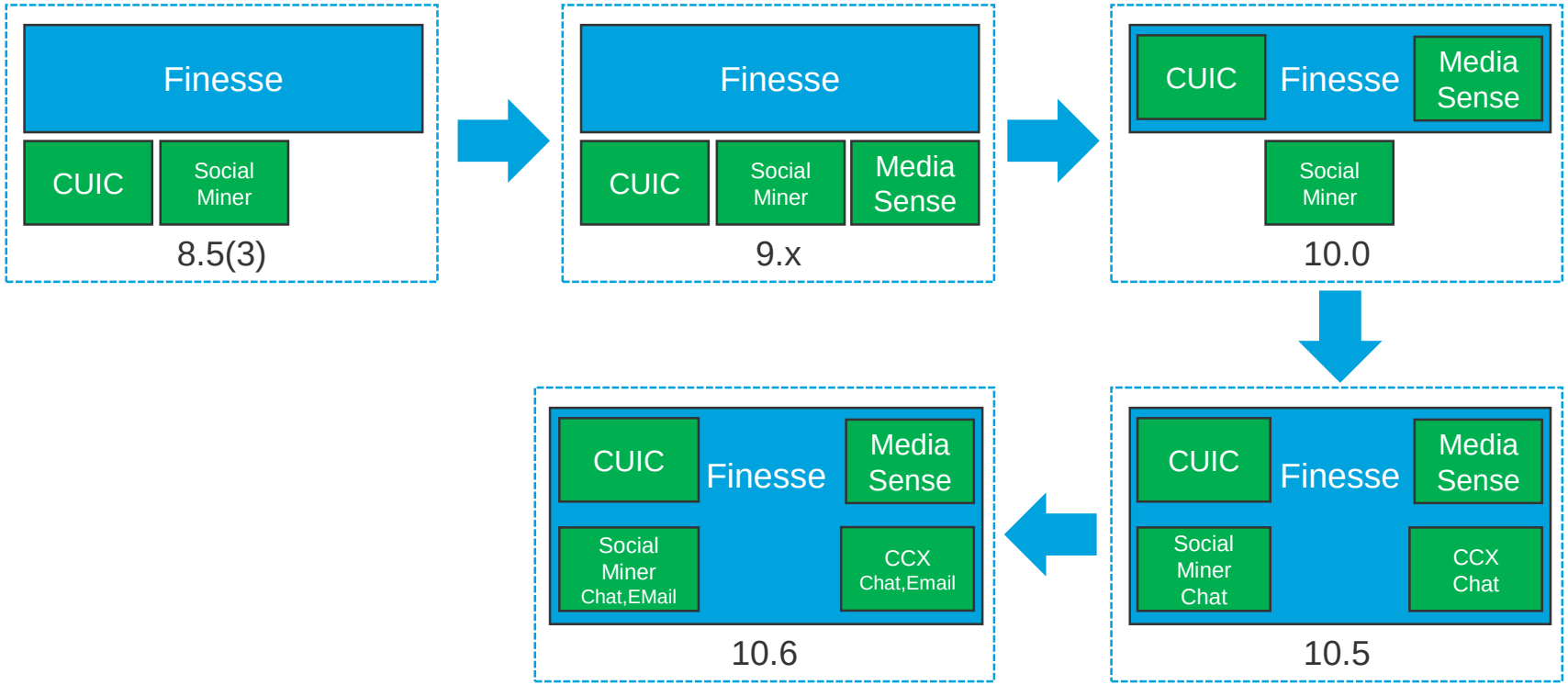
Coherent role-driven applications

- Admin, Agent/Supervisor and Reporting User applications
- Bootstrap, Common JavaScript (JQuery Based)

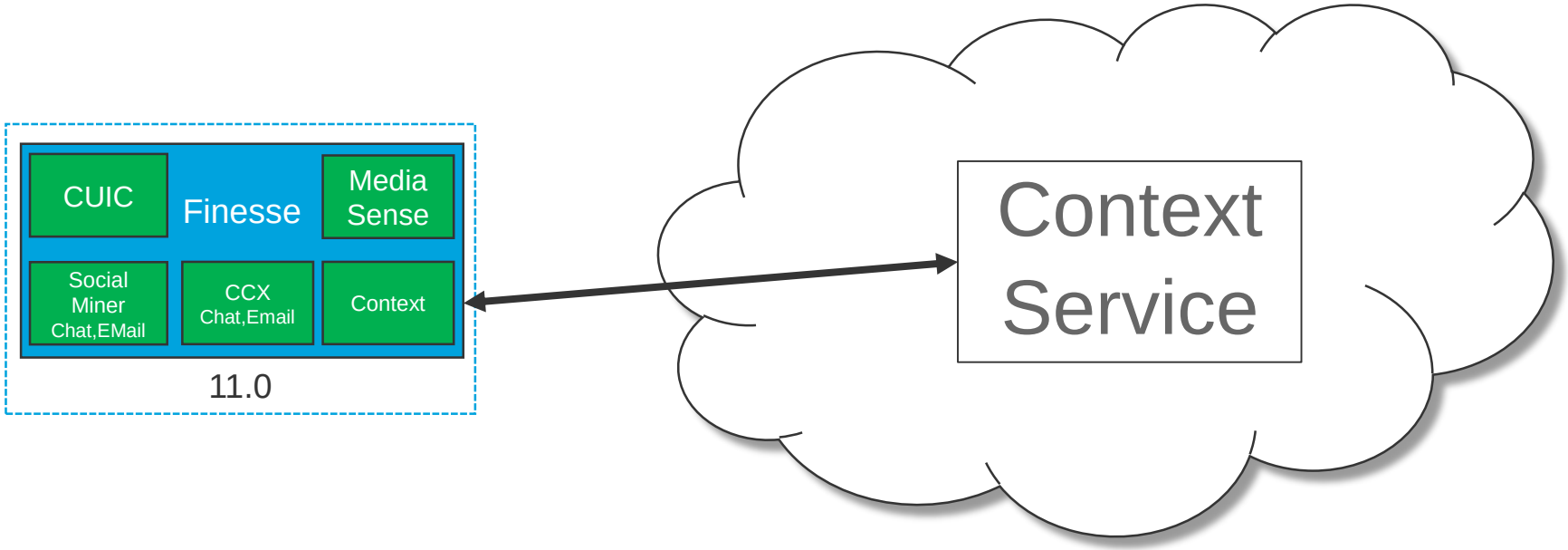
Decoupled but Integrated

- OpenSocial Gadgets
- Common infrastructure to share across implementations

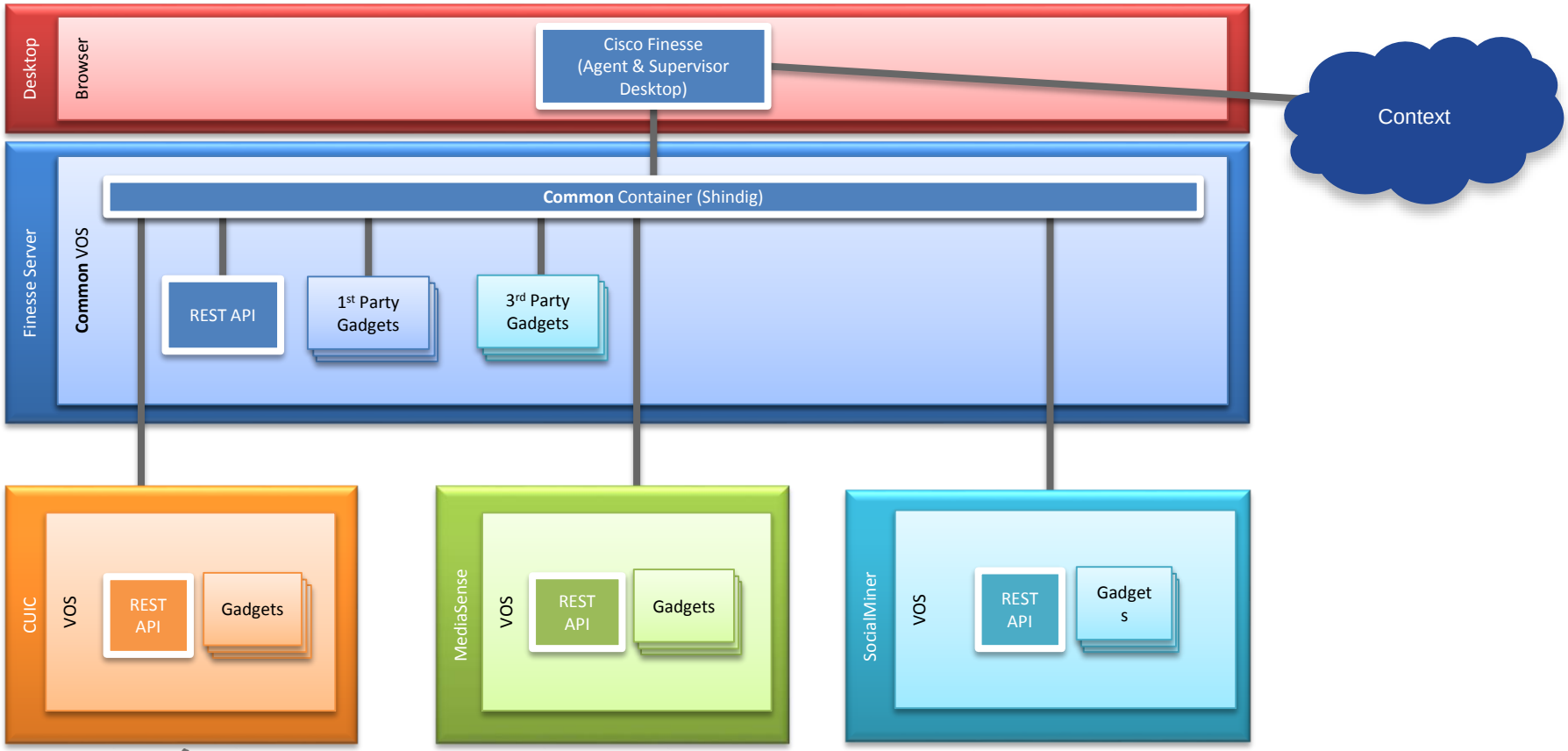
Cisco Finesse = Agent/Desktop Evolution



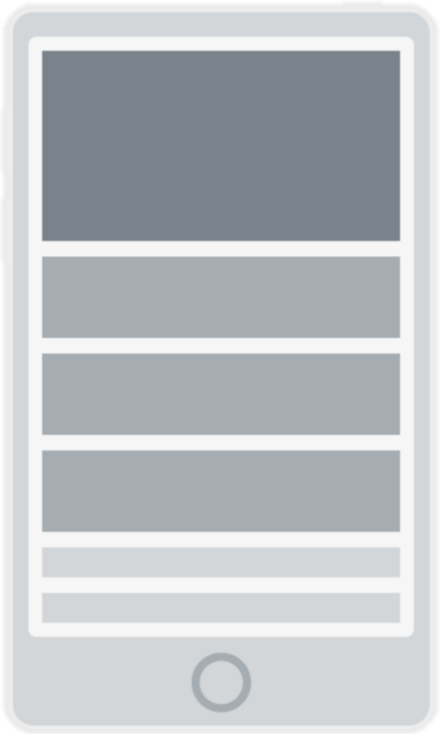
Finesse 11.0 – Extending Finesse to the Cloud



Cisco Finesse Architecture



Responsive Design – Media Queries



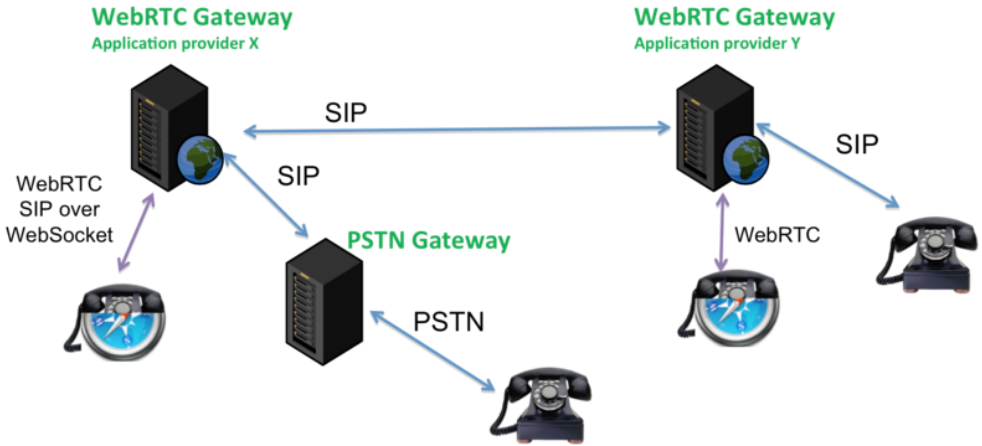
CSS: Media Queries

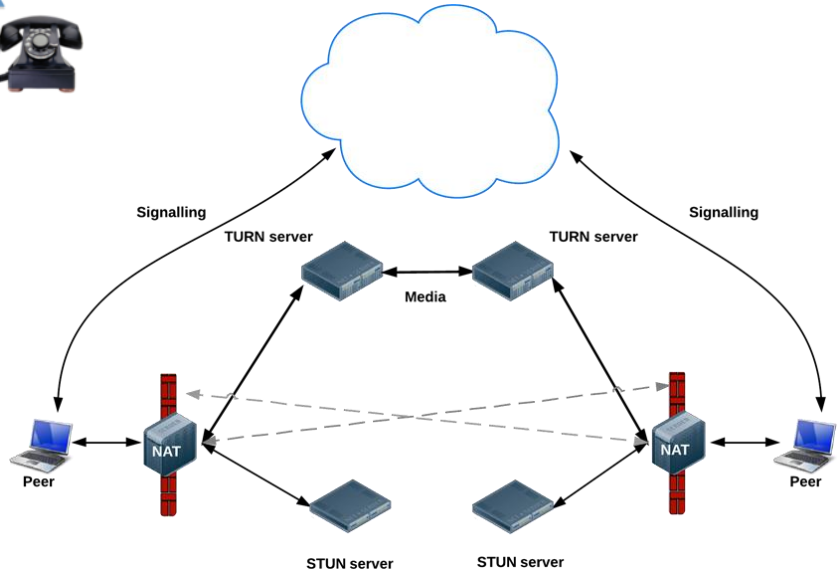
```
<!-- CSS media query on a link element -->
<link rel="stylesheet" media="(max-width: 800px)" href="example.css" />

<!-- CSS media query within a stylesheet -->
<style>
@media (max-width: 600px) {
  .facet_sidebar {
    display: none;
  }
}
</style>
```

https://developer.mozilla.org/en-US/docs/Web/Guide/CSS/Media_queries

WebRTC – Browsers as Endpoints





Cisco Remote Expert Mobile High Level Architecture

RE Mobile Client SDK

RE Mobile Client SDK

Customer

Voice & Video

Co-browse App Share

Web Gateway

REM Media Broker

REM App Server

REM Admin Console

Expert Assist

Finesse Agent Desktop

CUBE & CUCM

Media Endpoint

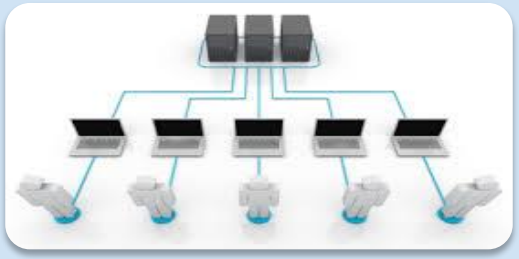
Expert

Cloud Evolution

Cloud Characteristics

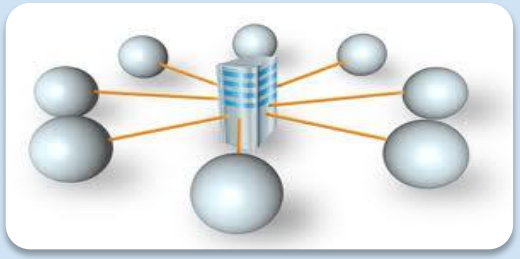
Cloud-Scale

- Application independent scale
- More servers, not bigger servers
- Elasticity



Security

- Data Security
- Encryption



Availability

- Metrics and Logging
- Reliability
- Always Available

3 Cloud Service Delivery Models

Software as a Service - SaaS

- Context Service, CRM, Virtual Desktops, File Sharing, etc

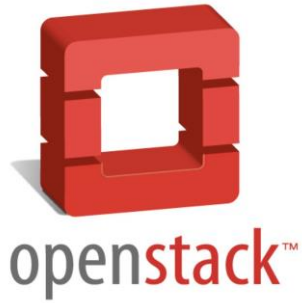
Platform as a Service – PaaS

- Application Execution Environments, Databases, Message Busses, etc

Infrastructure as a Service - IaaS

- VMs, Networks, Storage

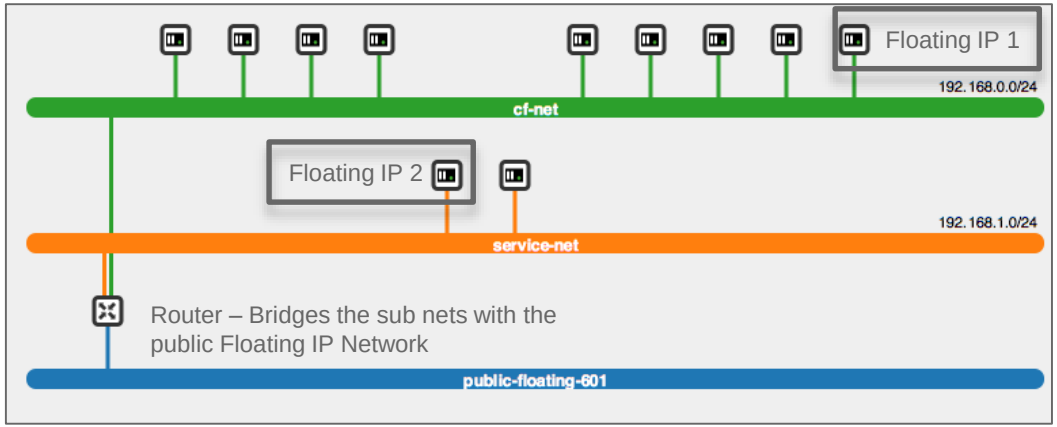
What is OpenStack



- A Free Open Source IaaS Platform
- Multiple Related Projects
  - Horizon (UI), Neutron (Networking), Nova (Compute), Swift (Object Storage), Cinder (Block Storage), etc.
- What it provides
  - A coherent interface that allows for provisioning resources
  - Tenant Isolation
    - Isolate resources (not HW) to a user (or set of users)

IaaS Concepts

- Floating IP's, Software Networks, and Security Rules
  - Software Defined Subnets
  - Virtual Public IP's that can be associated with a Virtual Machine via NAT
    - Limit Access: Ingress and Egress Rules



Direction	Ether Type	IP Protocol	Port Range	Remote
Egress	IPv4	Any	-	0.0.0.0/0 (CIDR)
Ingress	IPv4	TCP	443 (HTTPS)	0.0.0.0/0 (CIDR)
Ingress	IPv4	TCP	80 (HTTP)	0.0.0.0/0 (CIDR)
Egress	IPv6	Any	-	::/0 (CIDR)
Ingress	IPv4	ICMP	-	0.0.0.0/0 (CIDR)
Ingress	IPv4	UDP	68	0.0.0.0/0 (CIDR)

Application Design

Cloud Applications 101: Platform as a Service

Remove the complexity of cloud development

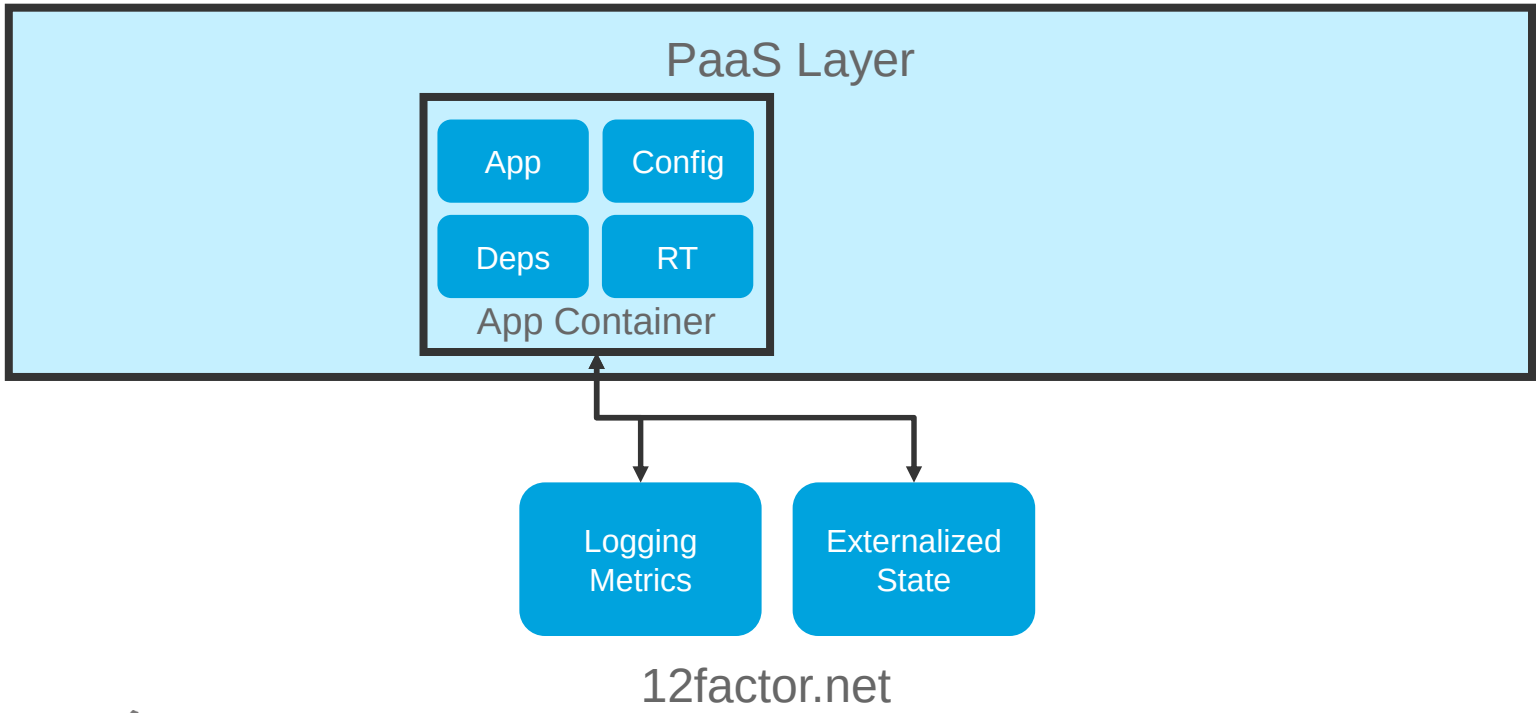
Framework for “cloudy” software

- Scale
- Reliability
- Serviceability
- Isolation
- Deployment, Lifecycle Management

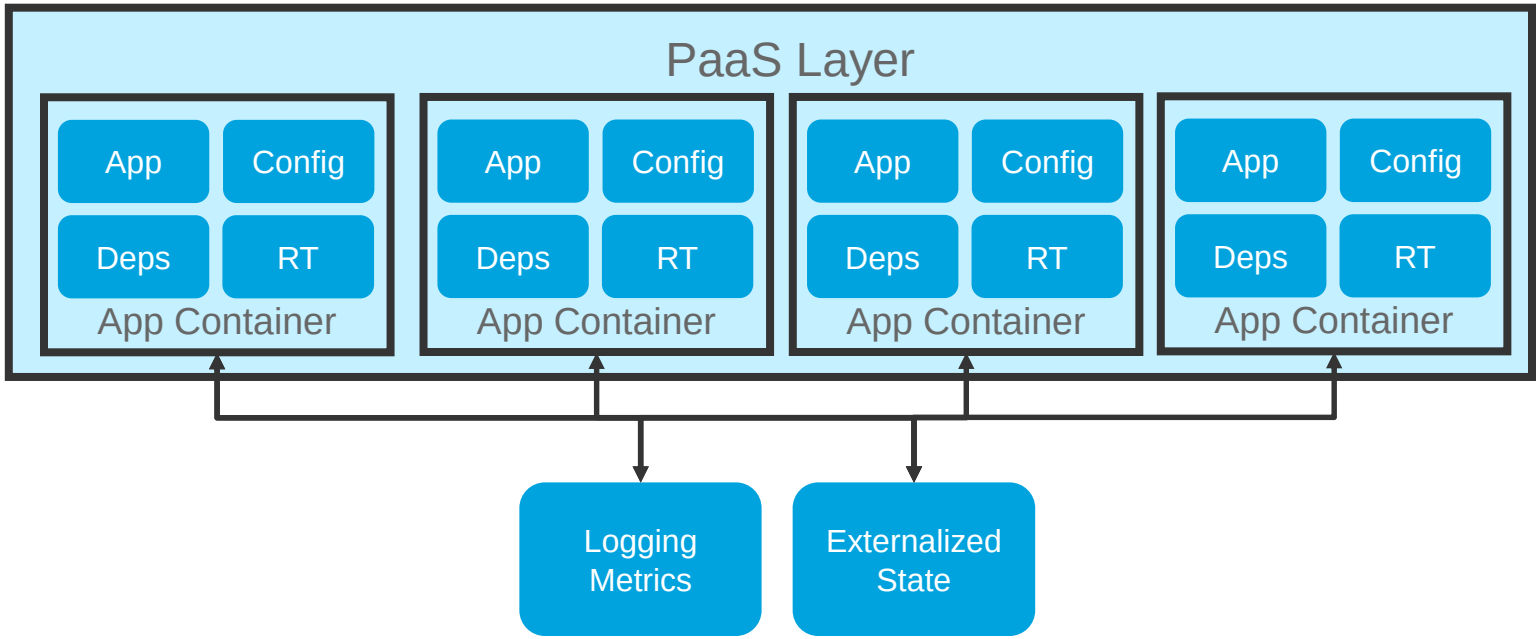
Provide Code Isolation

- IaaS, Operating Systems, Networks

Enabling Scale and Reliability: 12 factor apps

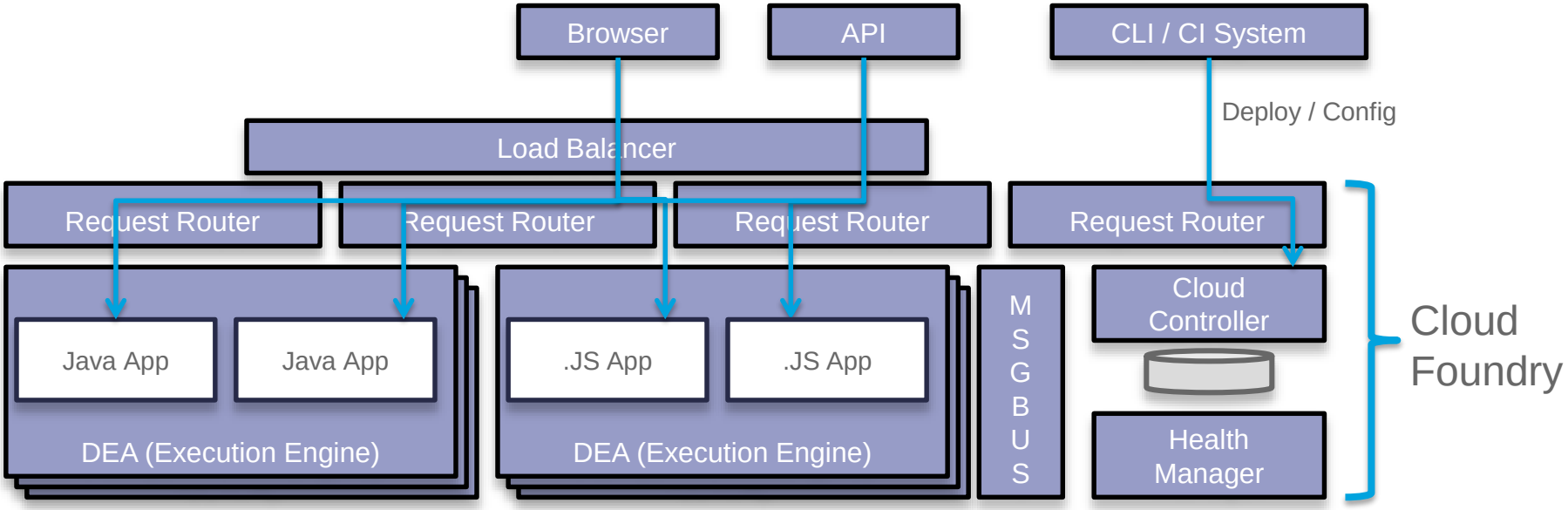


Enabling Scale and Reliability: 12 factor apps



12factor.net

Cloud Foundry Architecture



Cloud Management

Cloud Collaboration Administration

A Common Admin platform that allows customers and partners to manage Cisco Collaboration services in a simple tool with an intuitive interface

Automated provisioning & Simple User management

Reports, Analytics & System Health/ Support & Debugging

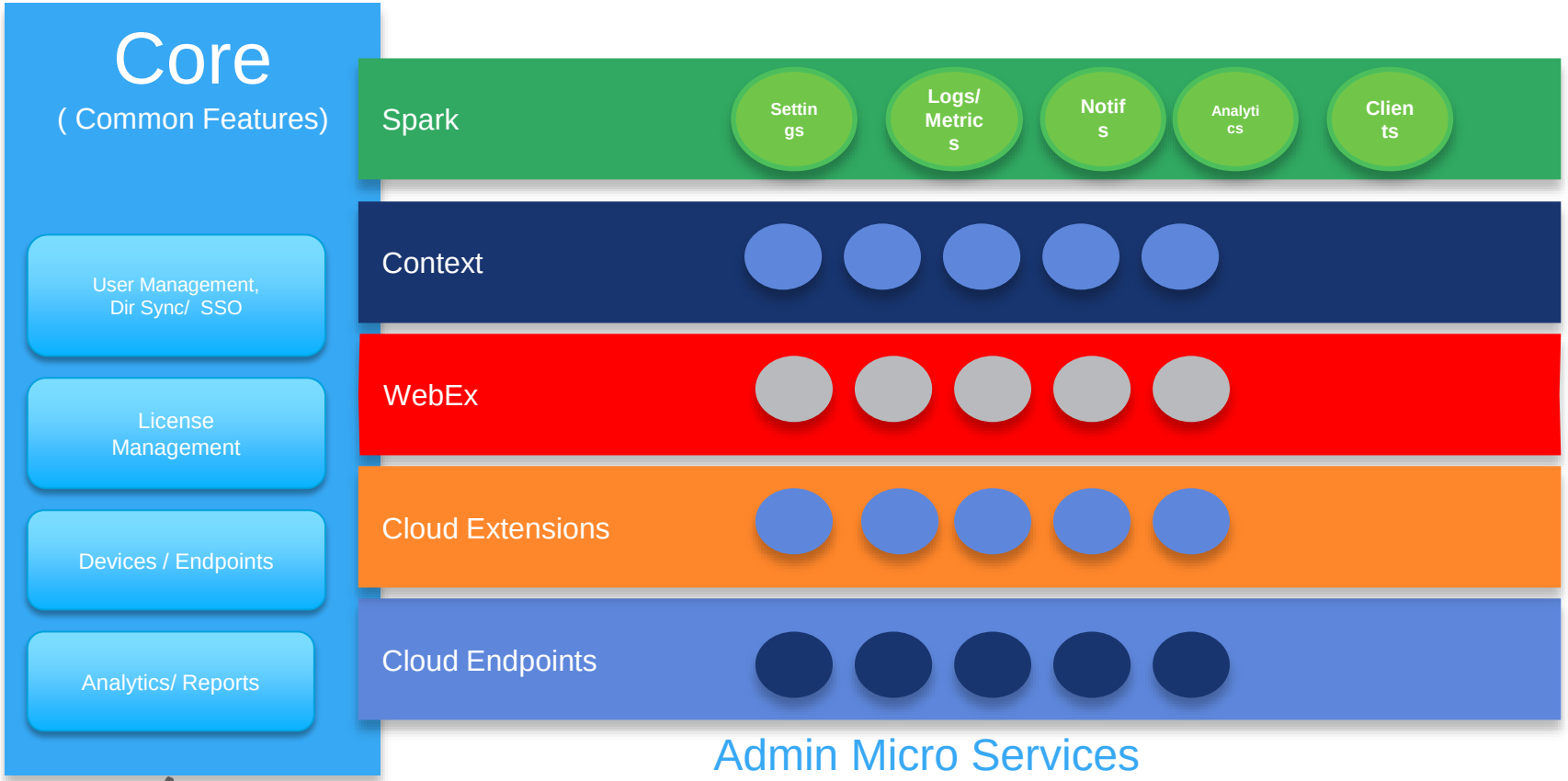
Manage Security & Policy settings

License & Account Management / Upsell

Design Considerations

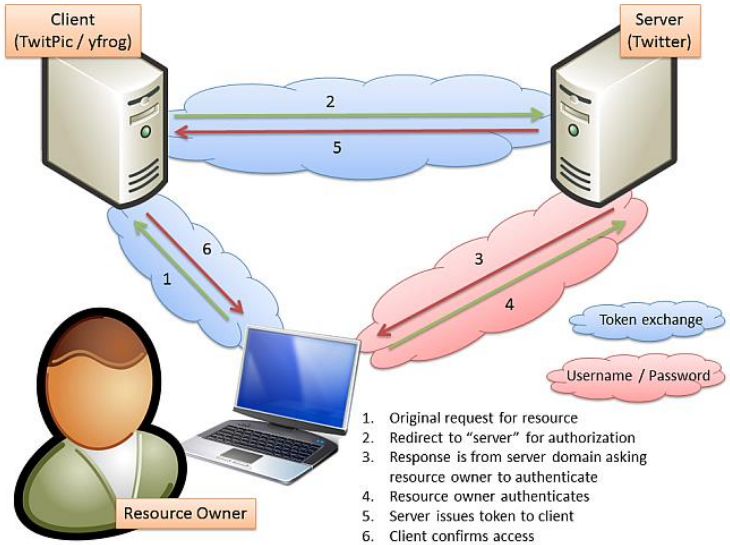
- ***Partner as a first class citizen***
- ***Automated provisioning*** *which gives an admin access to Admin Console as soon as the order is placed*
- ***First Time Wizard*** *that guides the admin through Dir Sync and SSO setup*
- ***Service and User Management –*** *One console to manage multiple services and users /entitlements*
- ***Single notification to end users*** *for all service entitlements*
- ***Support and Debugging tool*** *accessible to the relevant roles*

Architecture – Core with Micro Services

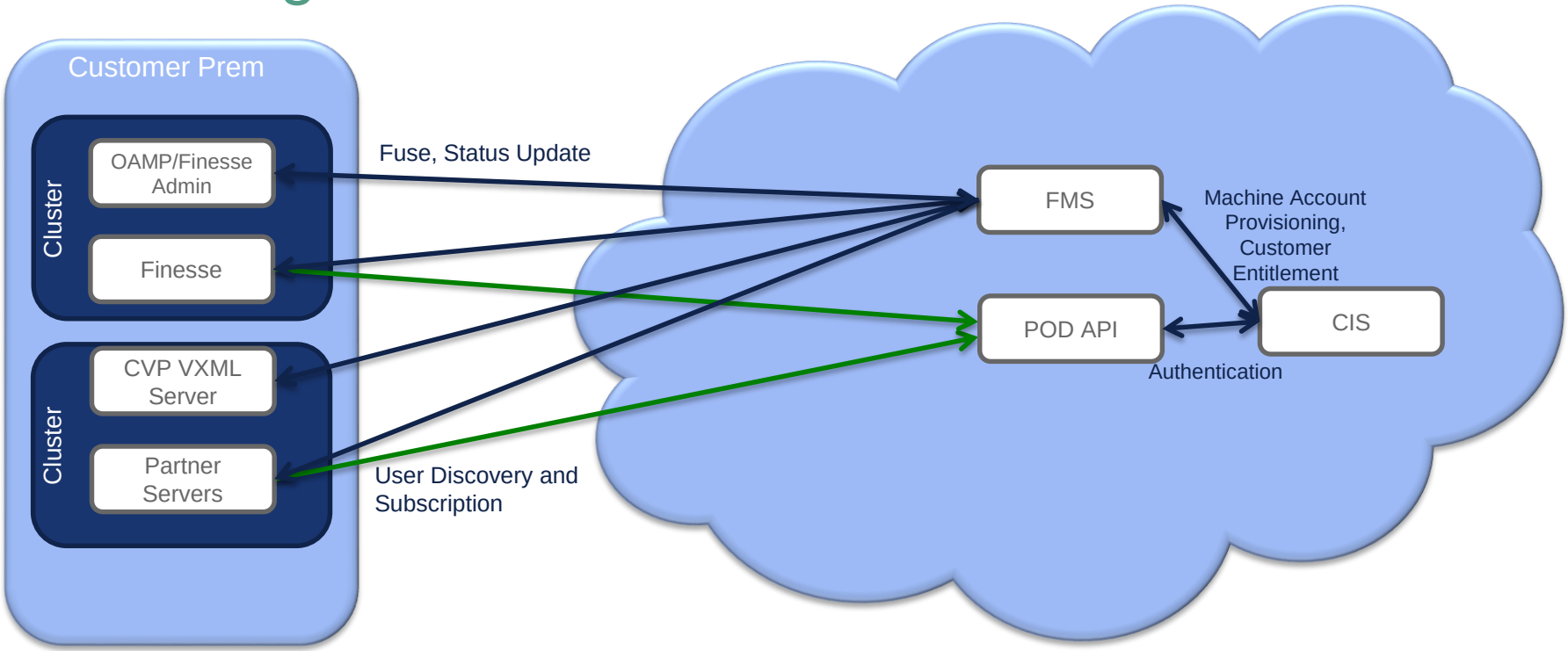


Authentication and Authorization

- Oauth / SAML with a Common Identity Server
  - Industry standard approach to authentication and authorization
  - Ability to authenticate user using their own Organization (SAML)
  - Ability to provision credentials for Oauth clients (generated client id / secret for machine accounts)

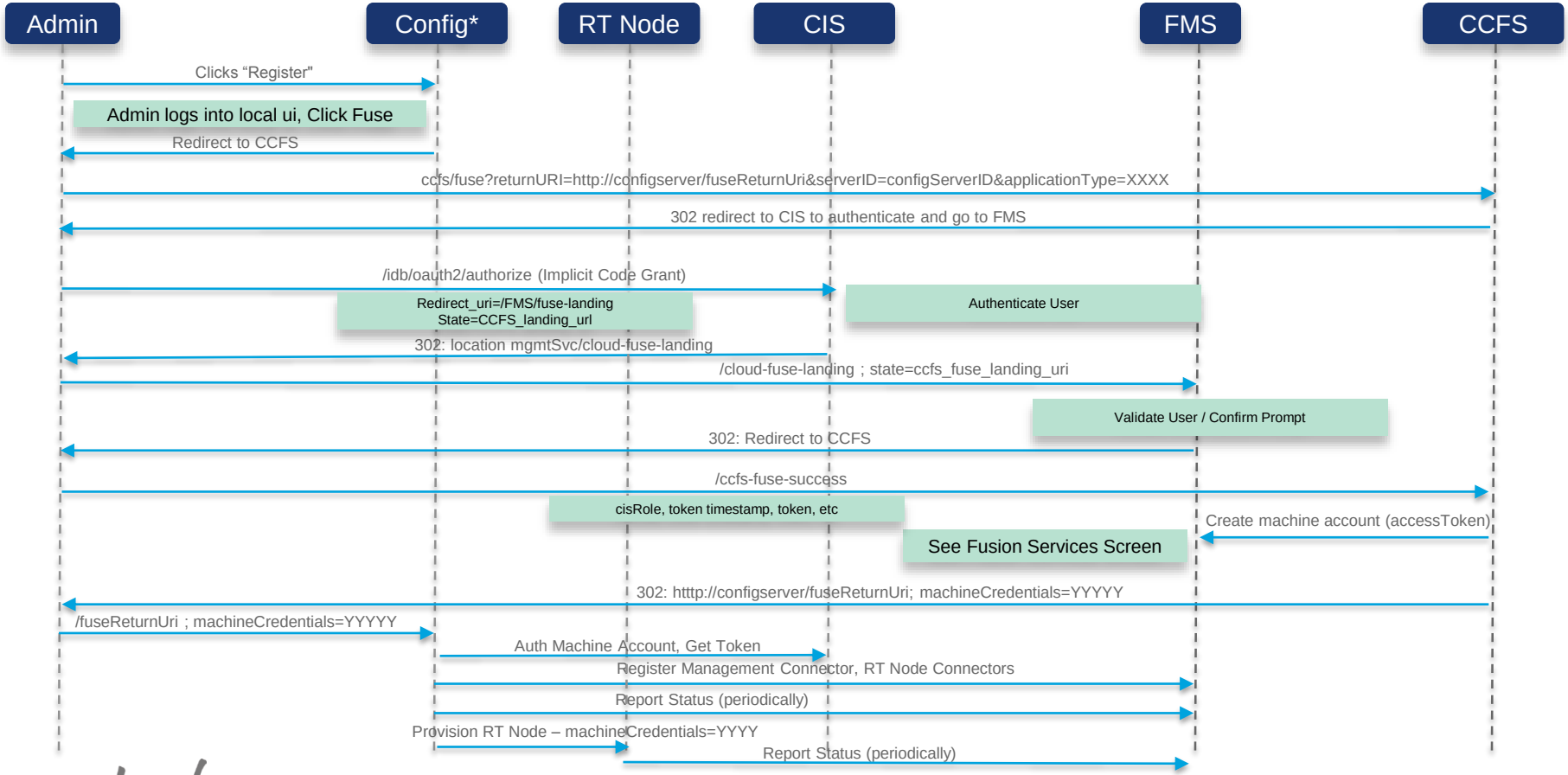


Connecting to the Cloud



Connection to the Cloud

CCFS=Contact Center Fusion Services

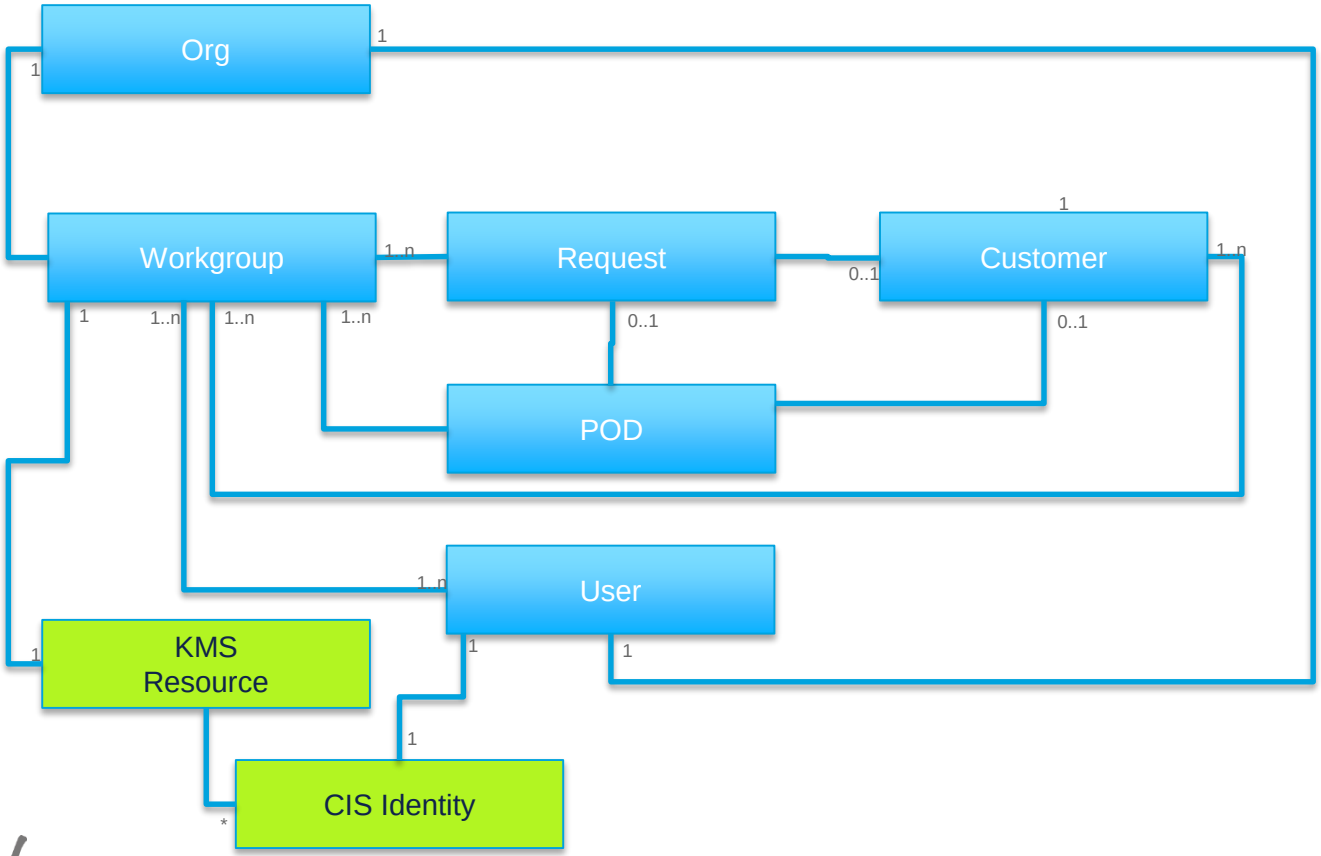


Binding to a Datacenter Pair

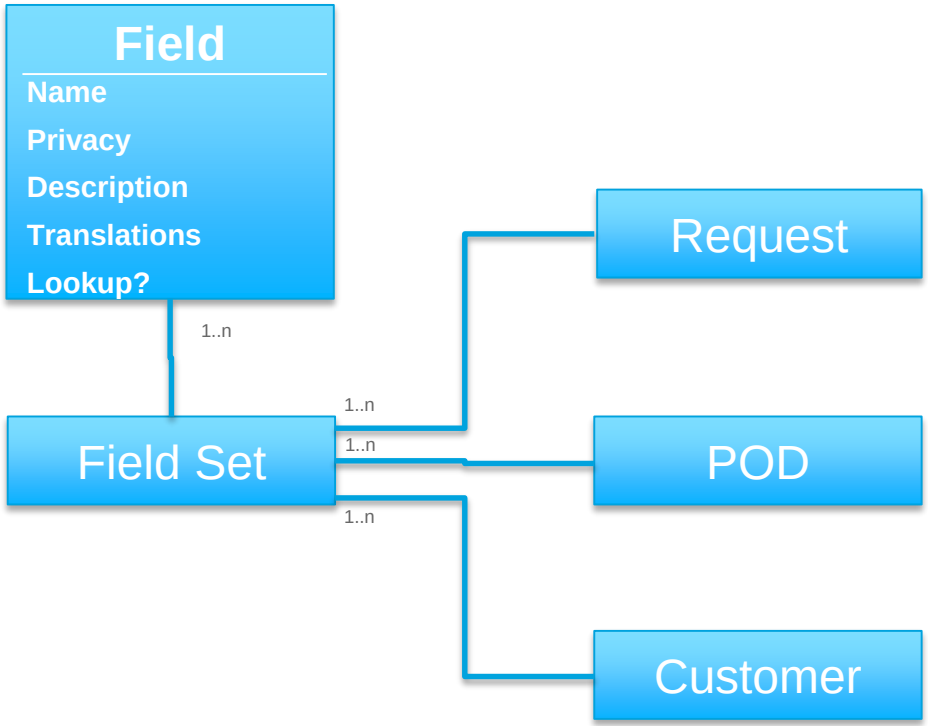
- During initial connection
- Determine data center pairs based on organization
- Each org is bound to primary/secondary DC
- Can be changed later via disconnect and reconnect

Data Model

Context Service Data Model

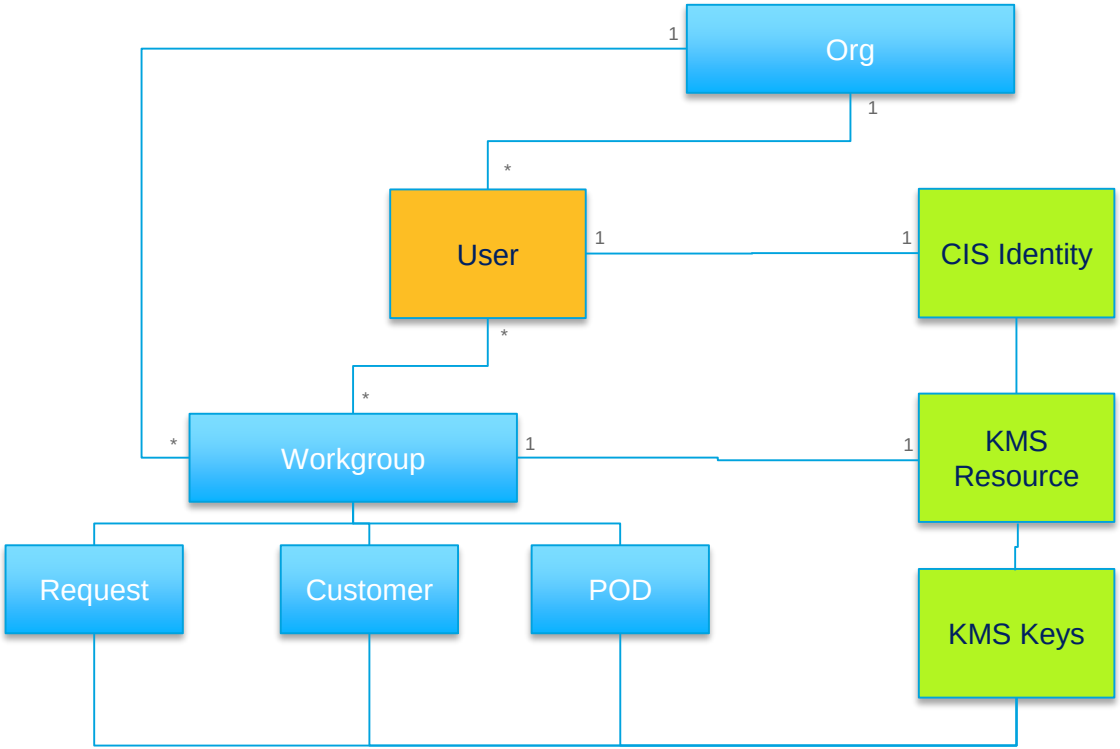


Context Service Fields and Fieldsets

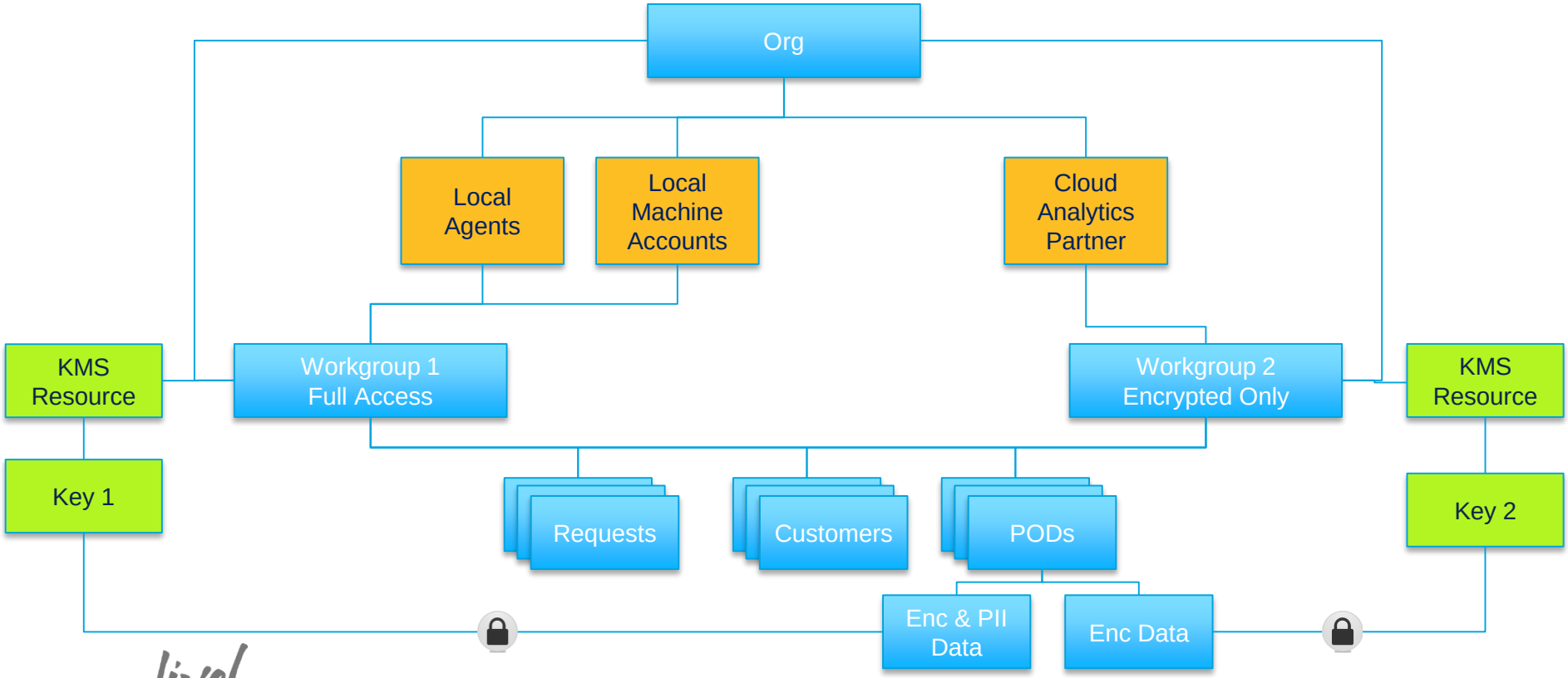


Contain data that map to 1 or more Classes
Each element adheres to the Field Definition

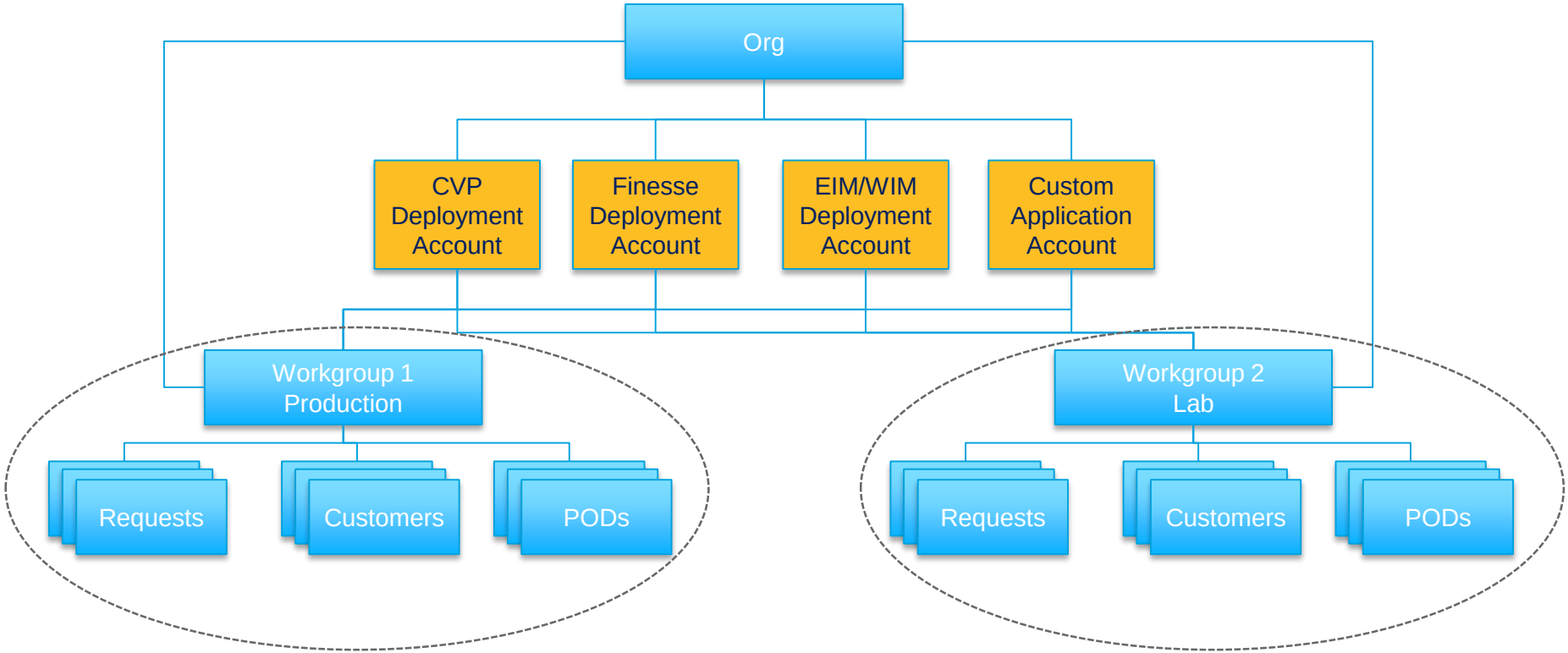
Workgroups



Workgroup Security (Partners)



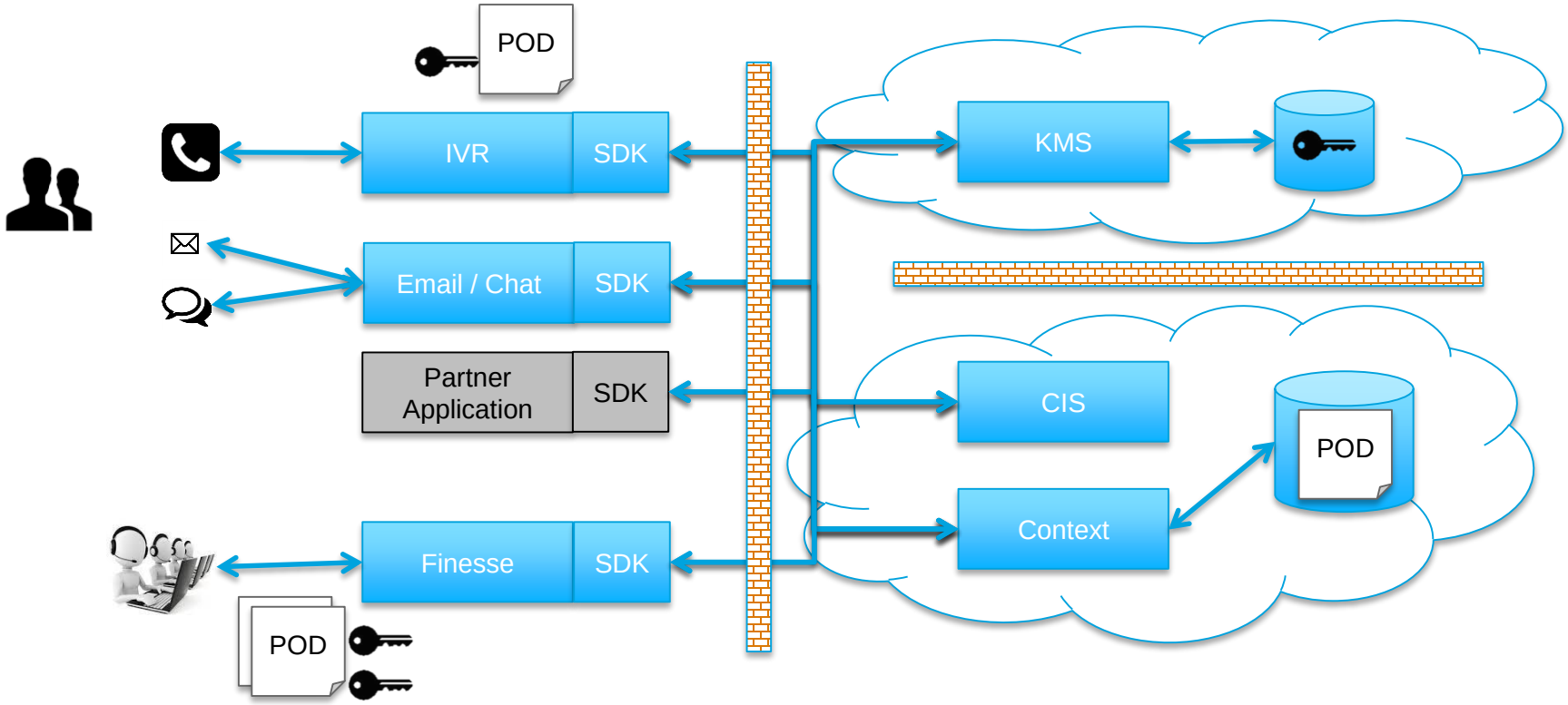
Workgroup Security (Lab/Production)



Selected when SDK is instantiated

Data Security

Cloud Context Data Security



Encryption Model Requirements

- Applies to POD, Request, Customer
- Reinforce application security with cryptographic security
- Security granted at the workgroup level
  - Encrypted and PII have separate access
  - Multiple users per workgroup
  - Multiple workgroups per user
- Utilize standard keying protocol
  - https://tools.ietf.org/html/draft-abiggs-saag-key-management-service-00

- Allow anonymized access for certain workgroups
  - Encrypted data only

Record (Customer/POD/Request)

Service Data

Created Date	10-Oct-2014
Last Modified	11-Oct-2014

UnEncrypted Data

Created Date	10-Oct-2014
State	Open

PiiData

Name	Fred Smith
Phone Number	555-867-5309
Email	fred.smith@gmail.com

Encrypted Data

Balance	25,756 points
Subject	My account

Record (Customer/POD/Request)

Service Data

Created Date	10-Oct-2014
State	Open

UnEncrypted Data

Created Date	10-Oct-2014
State	Open

PiiData

Name	Fred Smith
Phone Number	555-867-5309
Email	fred.smith@gmail.com


Client Key 1

Encrypted Data

Balance	25,756 points
Subject	My account


Client Key 2

Record (Customer/POD/Request)

Service Data

Created Date	10-Oct-2014
State	Open

UnEncrypted Data

Created Date	10-Oct-2014
State	Open

SCRs

WG1

pod.piiData	Client Key 1

KMS Key 1

pod.encData	Client Key 2

KMS Key 1

WG1

pod.encData	Client Key 2

KMS Key 2

PiiData

Name	Fred Smith
Phone Number	555-867-5309
Email	fred.smith@gmail.com

Client Key 1

Encrypted Data

Balance	25,756 points
Subject	My account

Client Key 2

Secure Content Resource (Example)

```
{
    "enc": "A256GCM",
    "key": "ZMpktzGq1g6_r4fKVdnx9OaYr4HjxPjIs7l7SwAsgsg",
    "iv":  "27YvzsYL6vphciqr",
    "aad": "2014-08-15T12:59:59Z",
    "loc”: “pod.piiData”,
    "tag": "CbtrN5UY2m1LUtGtxSkTEw"
}
```

enc – encryption algorithm

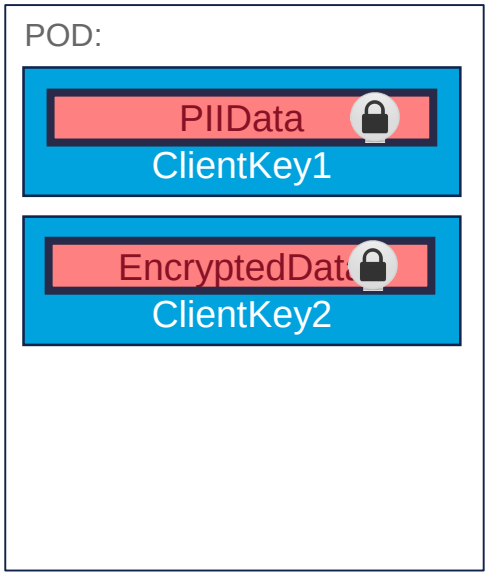
key, iv, aad – inputs to the encryption algorithm (part of the key)

loc – location of the data (JSONPath of the field that is encrypted)

tag – data validation tag – output of algorithm

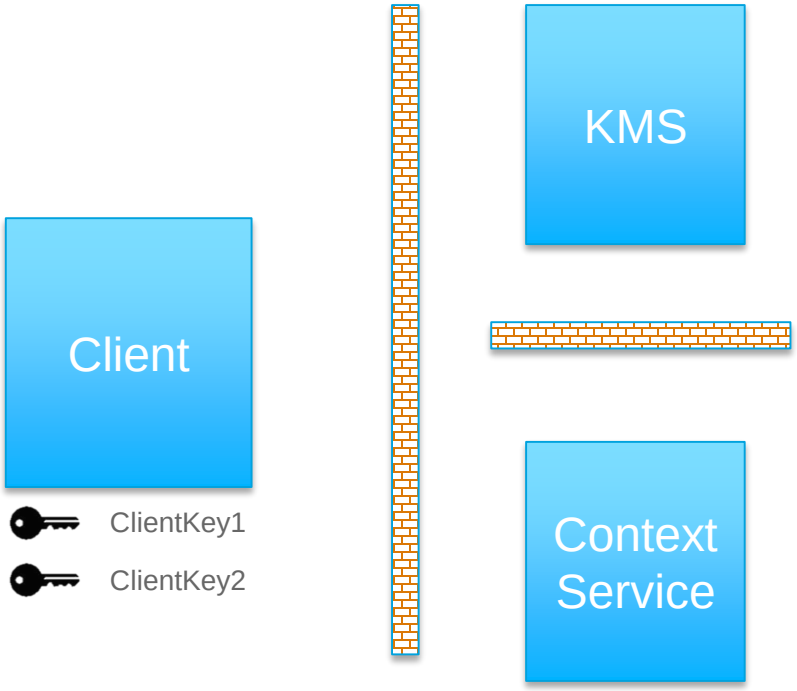
How does it work…

Create POD Flow

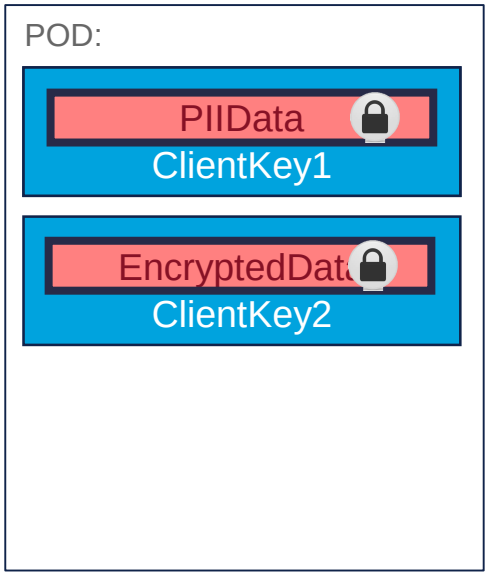


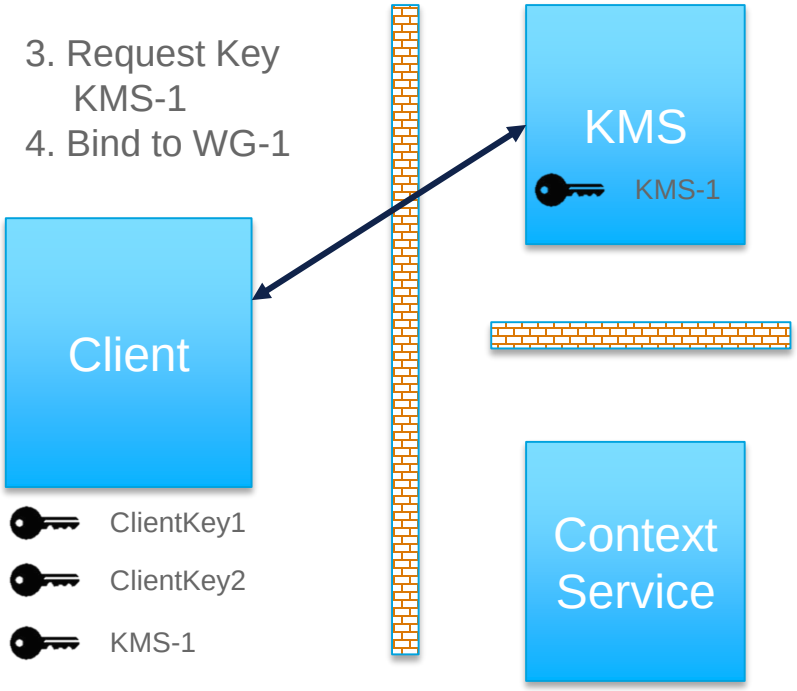
1. Create client-generated keys

2. Encrypt PII and Encrypted data with Client Keys

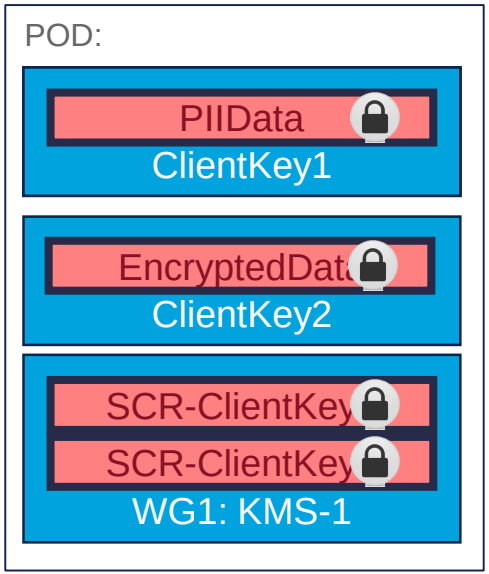


Create POD Flow (2)

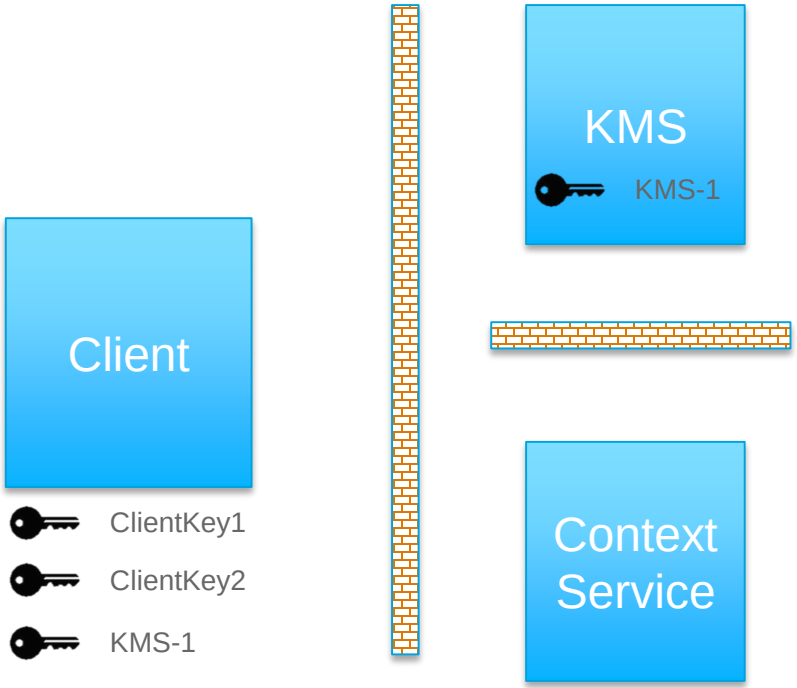




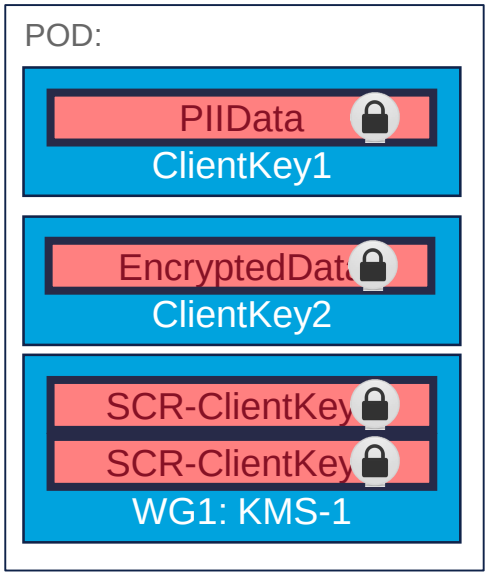
Create POD Flow (3)



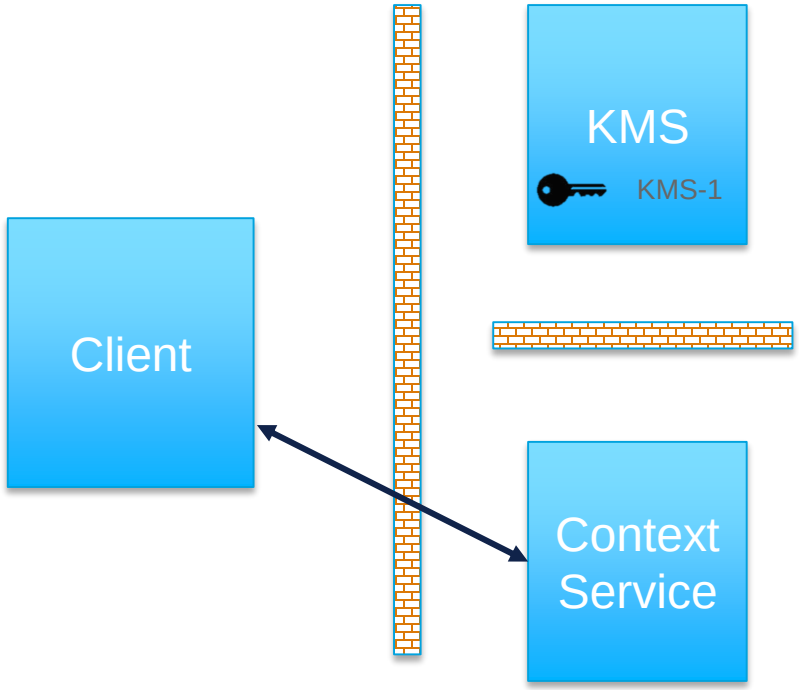
5. Create SCRs, Encrypt with KMS-1
6. Add to POD for WG-1



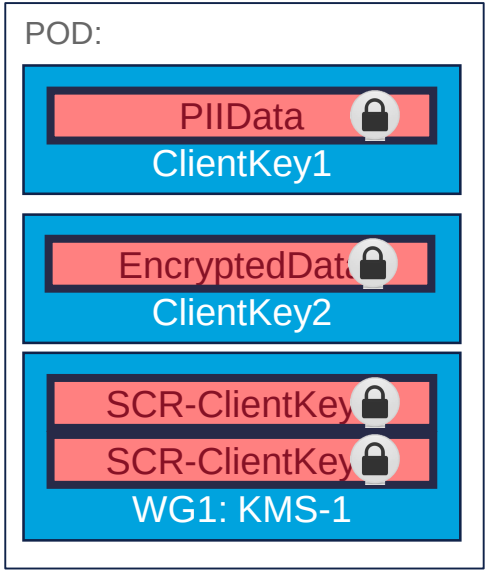
Create POD Flow (4)



8. Write POD to CS



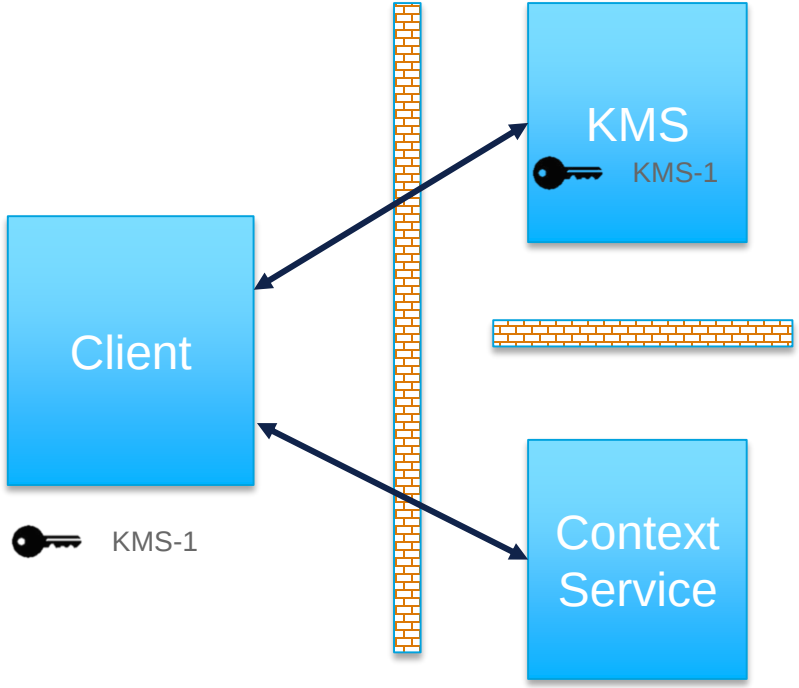
Read POD Flow



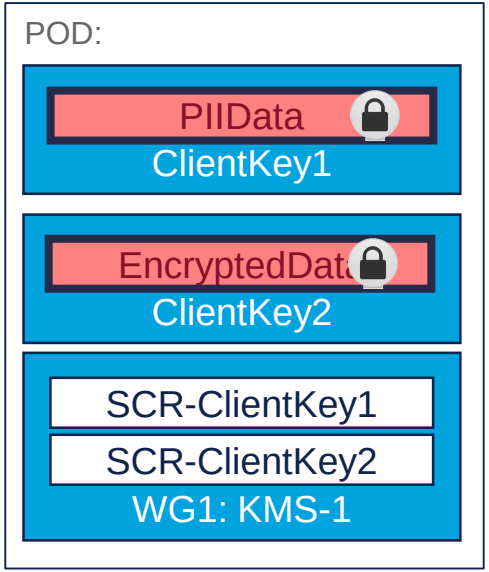
1. Read POD

2. Ask KMS for KMS-1

   Granted as WG-1 member

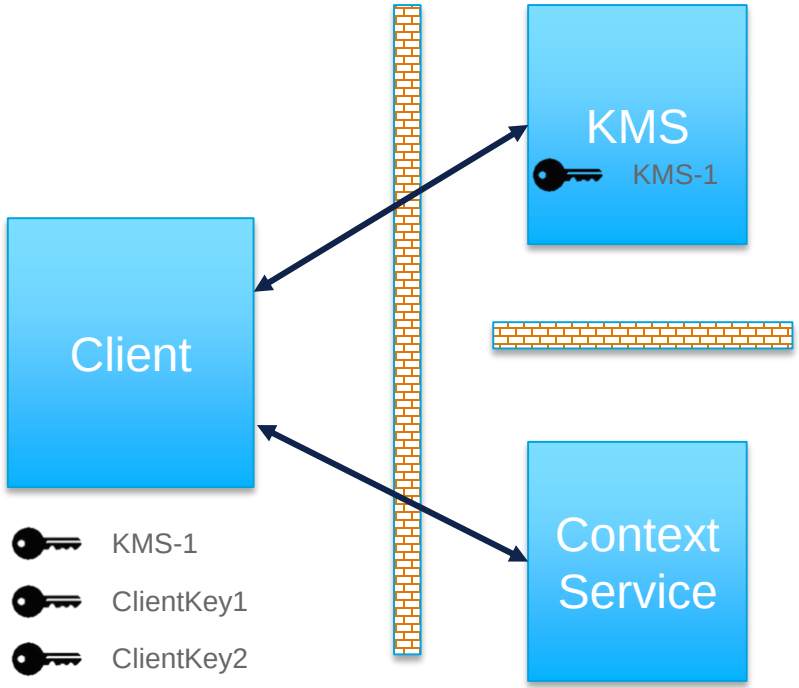


Read POD Flow (2)



3. Decrypt SCRs with KMS-1

Get ClientKey1, ClientKey2, Locations



Read POD Flow (3)

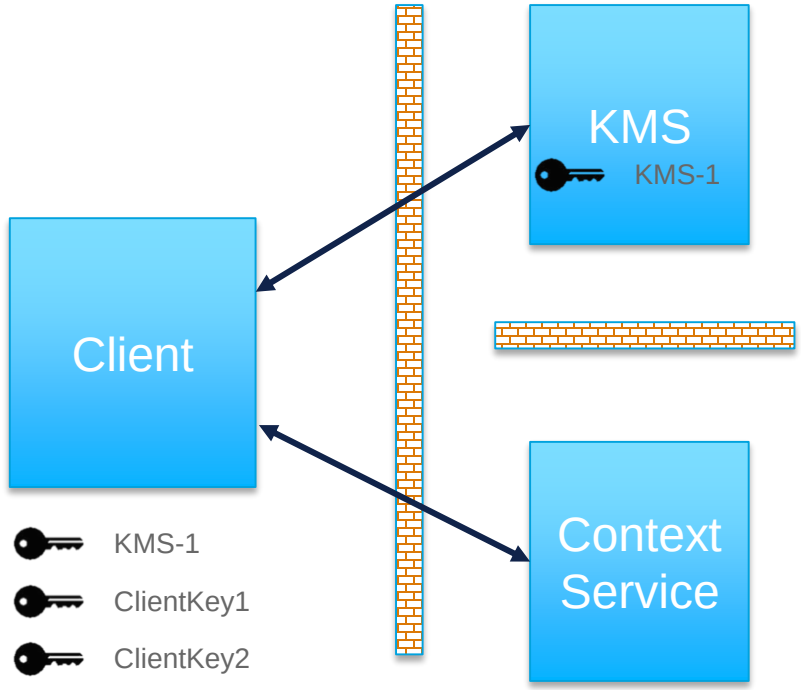
POD:

PIIData
ClientKey1

EncryptedData
ClientKey2

SCR-ClientKey1
SCR-ClientKey2
WG1: KMS-1

4. Utilize SCR's to decrypt PIIData and/or EncryptedData



Grant EncryptedData Access to WG2 Flow (1)

POD:

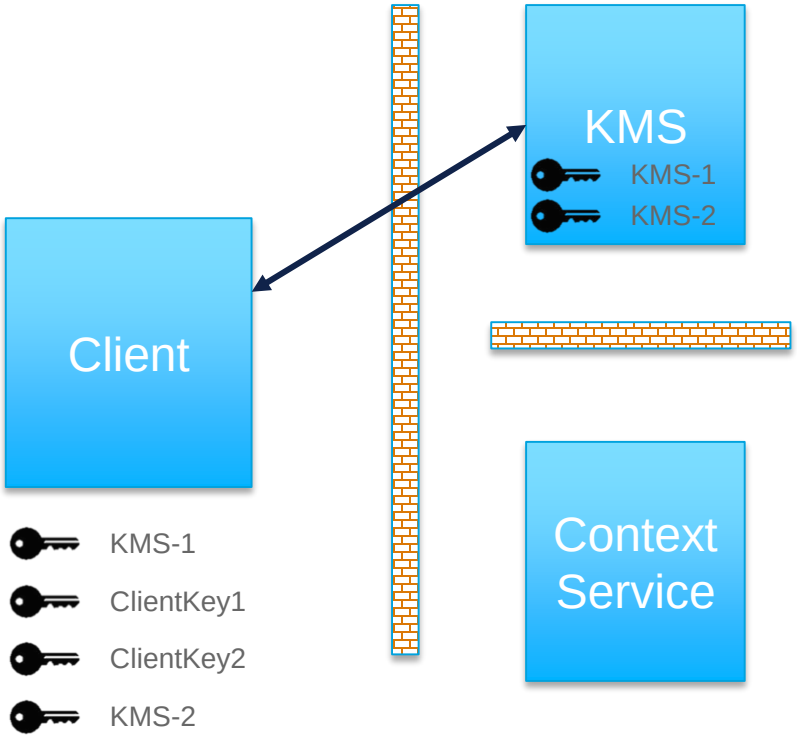
PIIData
ClientKey1

EncryptedData
ClientKey2

SCR-ClientKey1
SCR-ClientKey2
WG1: KMS-1

1. Request new KMS key KMS-2

2. Bind KMS-2 to WG2



Grant EncryptedData Access to WG2 Flow (1)

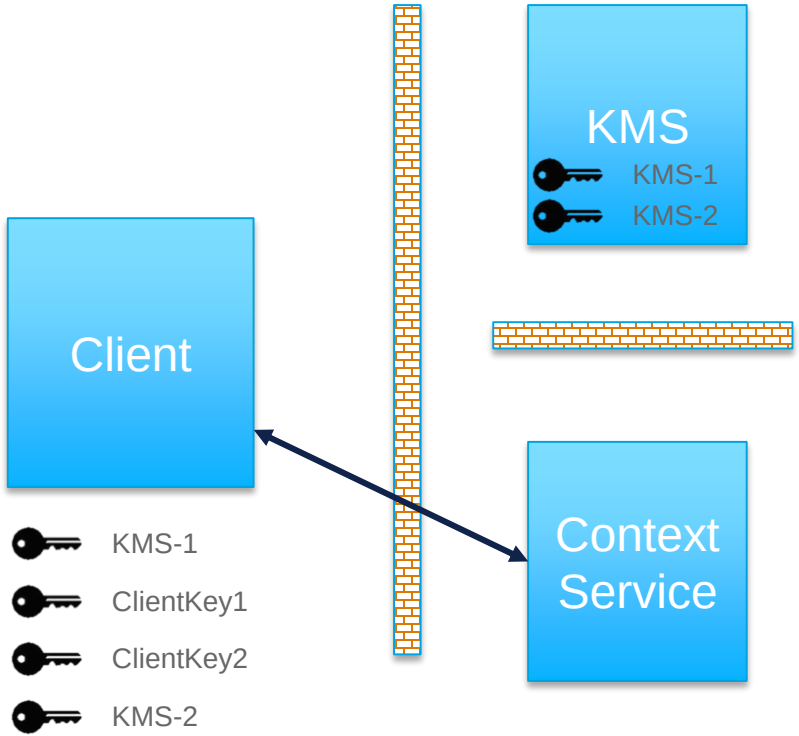
POD:

- PIIData
  ClientKey1
- EncryptedData
  ClientKey2
- SCR-ClientKey1
  SCR-ClientKey2
  WG1: KMS-1
- SCR-ClientKey2
  WG2: KMS-2

3. Re-Encrypt SCR-ClientKey2 with KMS-2

4. Add new SCR to POD

5. Update POD



Finding a customer…

Customer

Service Data

Created Date	10-Oct-2014
Last Modified	11-Oct-2014

UnEncrypted Data

Created Date	10-Oct-2014
State	Open

SCRs

WG1

pod.piiData	Client Key 1

KMS Key 1

pod.encData	Client Key 2

KMS Key 1

WG1

pod.encData	Client Key 2

KMS Key 2

PiiData

Name	Fred Smith
Phone Number	555-867-5309
Email	fred.smith@gmail.com

Client Key 1

Encrypted Data

Balance	25,756 points
Subject	My account

Client Key 2

Customer

Service Data

Created Date	10-Oct-2014
Last Modified	11-Oct-2014

UnEncrypted Data

Created Date	10-Oct-2014
State	Open

PiiData

Name	Fred Smith
Phone Number	555-867-5309
Email	fred.smith@gmail.com


Client Key 1

Encrypted Data

Balance	25,756 points
Subject	My account


Client Key 2

Customer

Service Data

Created Date	10-Oct-2014
Last Modified	11-Oct-2014

UnEncrypted Data

Created Date	10-Oct-2014
State	Open

piiHashes

HASH(name:Fred Smith)
HASH(phone:555-867-5309)
HASH(email:fred.smith@gmail.com)

PiiData

Name	Fred Smith
Phone Number	555-867-5309
Email	fred.smith@gmail.com


Client Key 1

Encrypted Data

Balance	25,756 points
Subject	My account


Client Key 2

Customer

Service Data

Created Date	10-Oct-2014
Last Modified	11-Oct-2014

UnEncrypted Data

Created Date	10-Oct-2014
State	Open

piiHashes

HASH(name:Fred Smith)
HASH(phone:555-867-5309)
HASH(email:fred.smith@gmail.com)

PiiData

Name	Fred Smith
Phone Number	555-867-5309
Email	fred.smith@gmail.com


Client Key 1

Encrypted Data

Balance	25,756 points
Subject	My account


Client Key 2

PII Lookup for Customer

1. Create query email:fred.smith@gmail.com
2. Hash query HASH(email:fred.smith@gmail.com)
3. Lookup HASH in database
4. Return results with encrypted data that client has access to

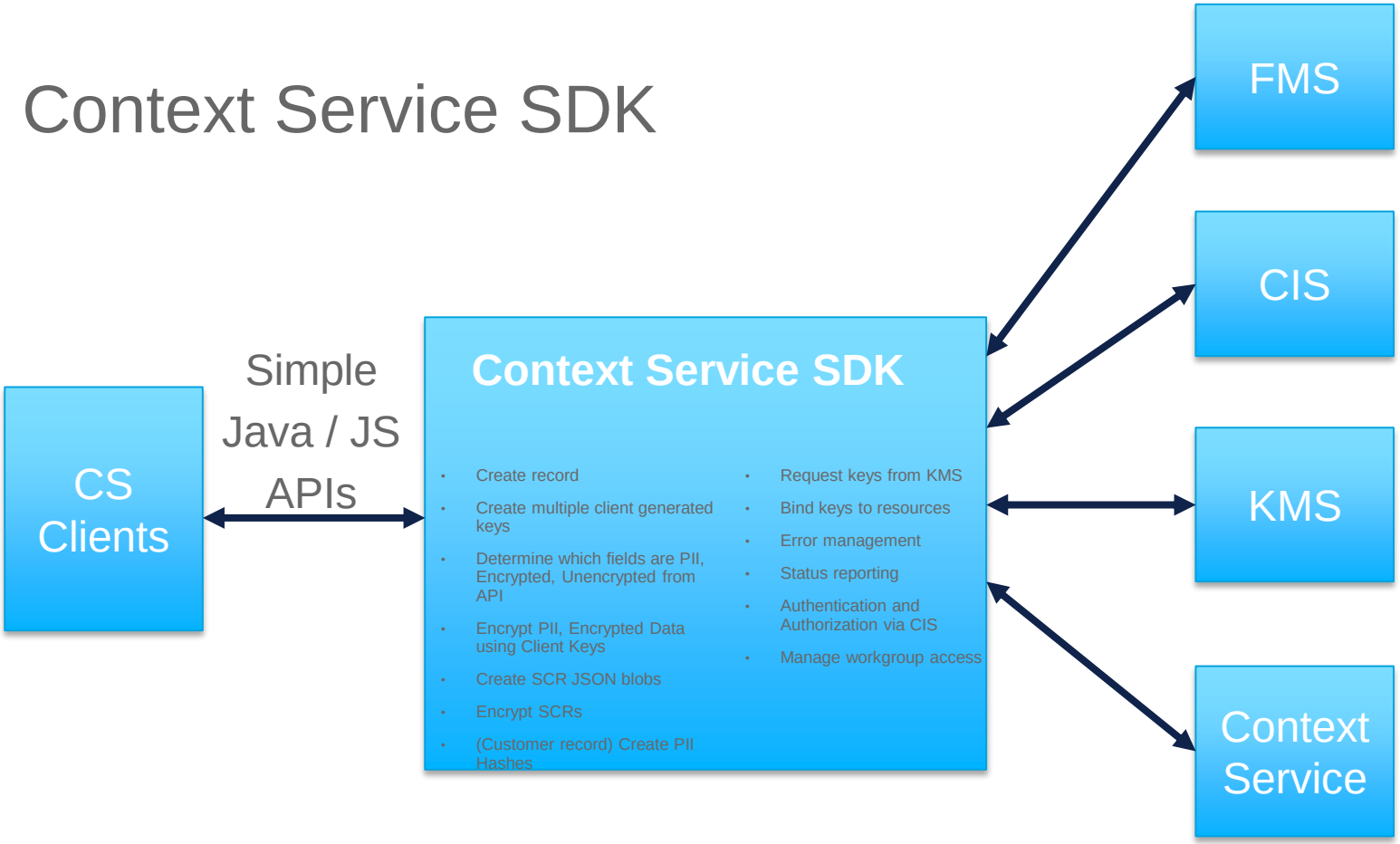
Integration

Creating data in Context Service

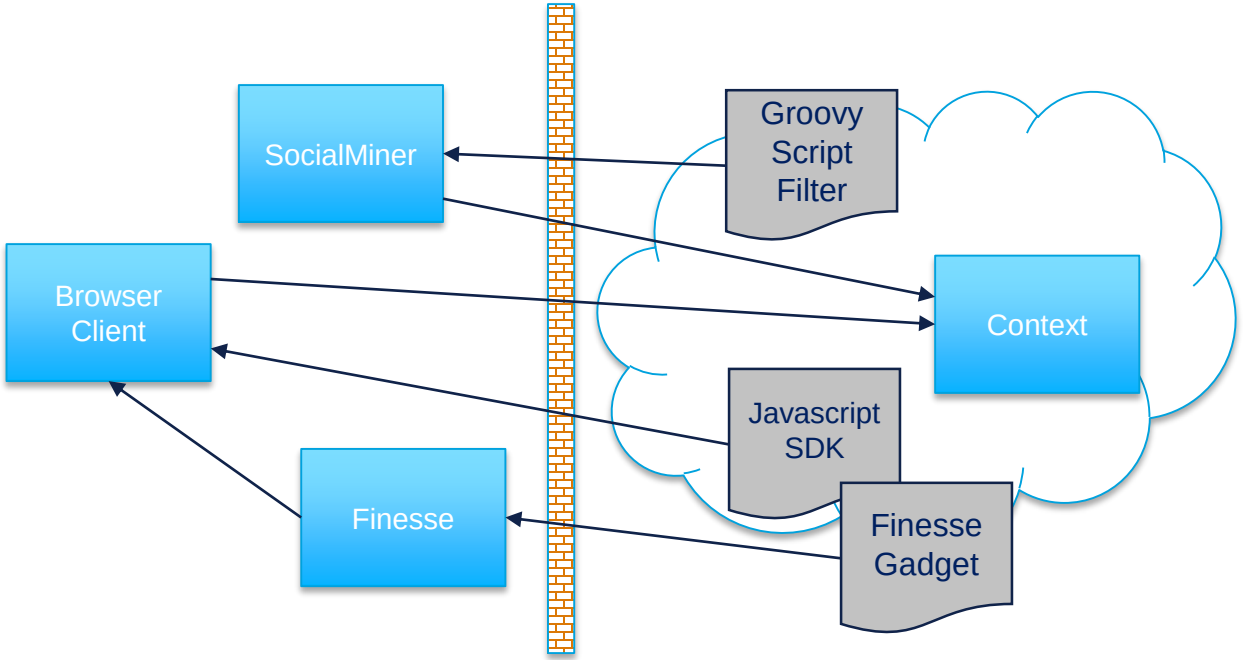
- Create record
- Create multiple client generated keys
- Determine which fields are PII, Encrypted, Unencrypted from API
- Encrypt PII, Encrypted Data using Client Keys
- Create SCR JSON blobs
- Encrypt SCRs
- (Customer record) Create PII Hashes

- Request keys from KMS
- Bind keys to resources
- Error management
- Status reporting
- Authentication and Authorization via CIS
- Manage workgroup access

Context Service SDK

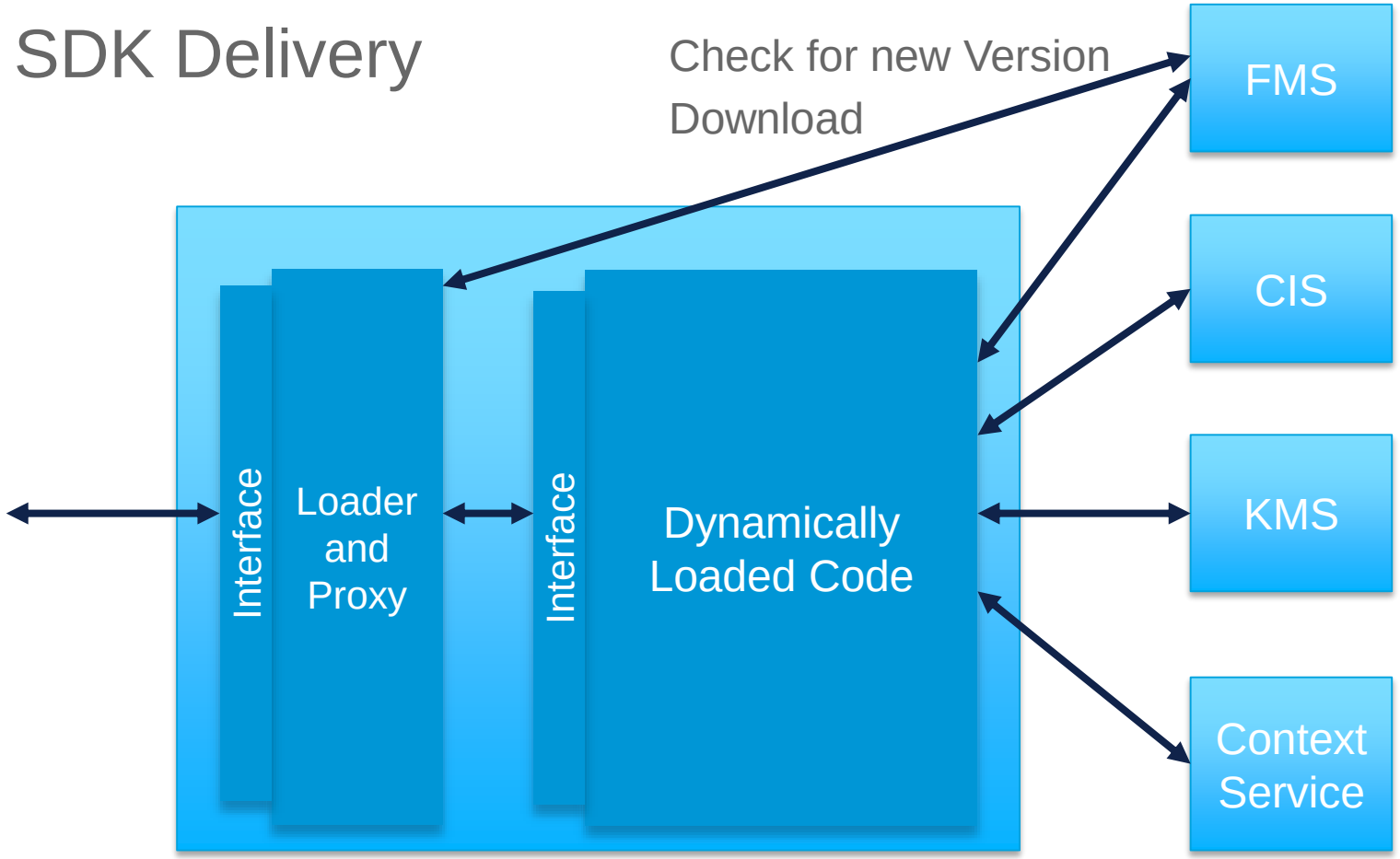


Hybrid Software Delivery

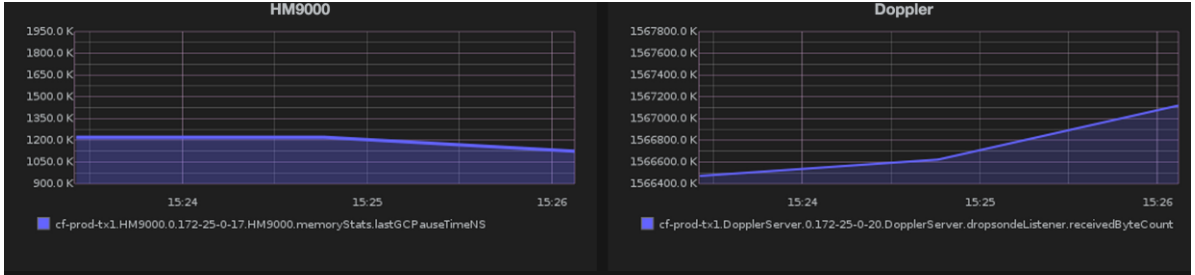


- Utilize Scripting languages to deliver features from cloud
- Allows updates via cloud
  - Controlled via feature flags
- SocialMiner Groovy Script Filter
- Finesse Gadget
  - Authentication via Finesse, CS/Key access via Browser
- JavaScript SDK

Hybrid SDK Delivery

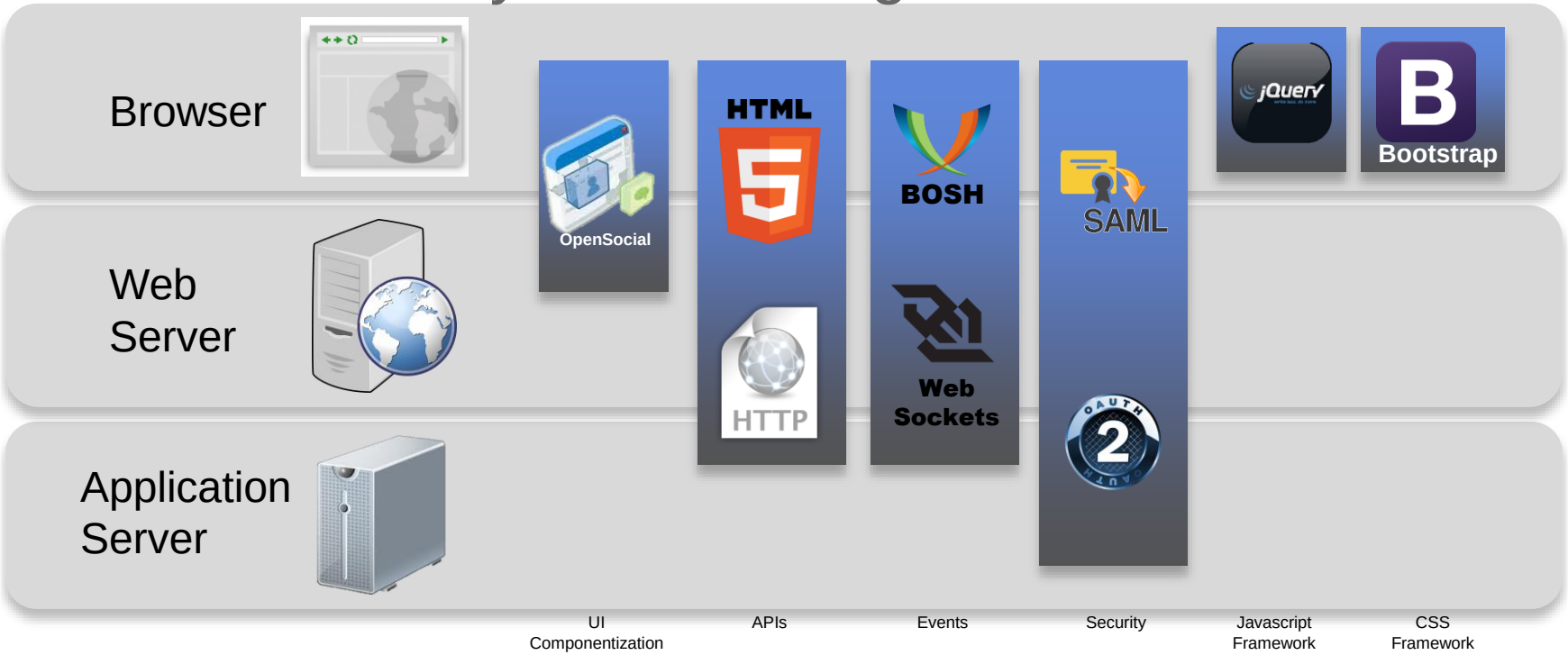


Metrics



Foundational Technologies

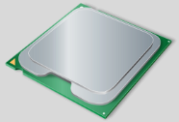
Presentation Layer Technologies



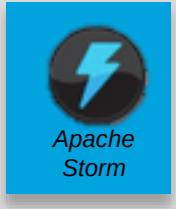
Data Layer Technologies

Application

Elastic Compute



Storage



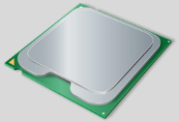
Storage | Indexing | Compute Framework | Eventing | Streaming and Input

Cloud Technologies

Platform as a Service (PaaS)

CLOUD FOUNDRY

Storage & Processing



Kafka

elasticsearch.

Cassandra

Spark

Orchestration and Operations

Graphite

kibana

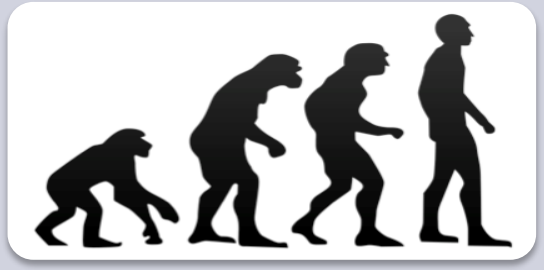
LogStash

puppet labs

Why Cisco Customer Collaboration Architecture?

Disruptive Solutions

- Internet of Everything
- Mobile / Social
- Cloud



Architectural Evolution

- Presentation Layer
- Data Services
- Asynchronous Routing

Building Blocks

- Portfolio Architecture
- Guiding Principals
- Technologies

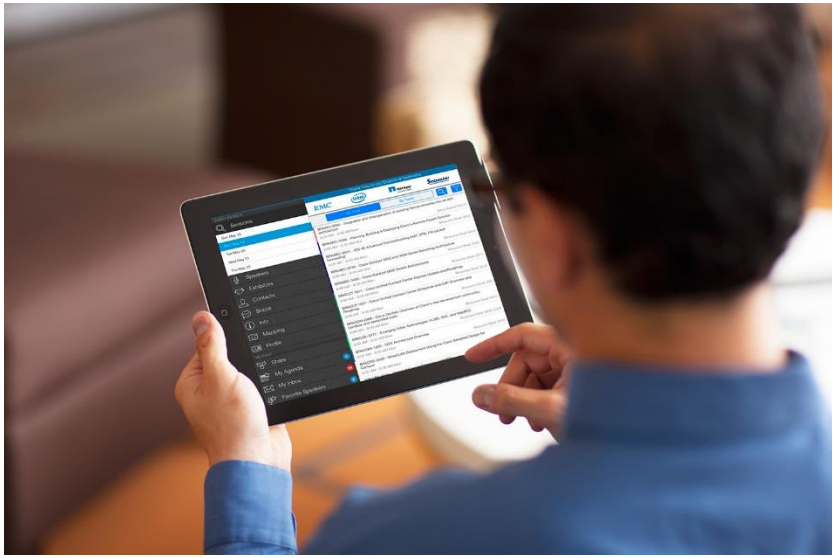
Participate in the “My Favorite Speaker” Contest

Promote Your Favorite Speaker and You Could Be a Winner

- Promote your favorite speaker through Twitter and you could win $200 of Cisco Press products (@CiscoPress)
- Send a tweet and include
  - Your favorite speaker’s Twitter handle <@TFamous>
  - Two hashtags: #CLUS #MyFavoriteSpeaker
- You can submit an entry for more than one of your “favorite” speakers
- Don’t forget to follow @CiscoLive and @CiscoPress
- View the official rules at http://bit.ly/CLUSwin

Complete Your Online Session Evaluation

- Give us your feedback to be entered into a Daily Survey Drawing. A daily winner will receive a $750 Amazon gift card.
- Complete your session surveys though the Cisco Live mobile app or your computer on Cisco Live Connect.



Don’t forget: Cisco Live sessions will be available for viewing on-demand after the event at CiscoLive.com/Online

Continue Your Education

- Demos in the Cisco campus
- Walk-in Self-Paced Labs
- Table Topics
- Meet the Engineer 1:1 meetings
- Related sessions

Thank you

TOMORROW starts here.