Cloud Customer Architecture for
API Management

http://www.cloud-council.org/deliverables/cloud-customer-architecture-for-api-management.htm

Webinar April 4, 2017

The Cloud Standards Customer Council
THE Customer's Voice for Cloud Standards!

- Provide customer-led guidance to multiple cloud standards-defining bodies

- Establishing criteria for open standards based cloud computing

650+ **Organizations participating**

2017 Projects

- Hybrid Integration Ref. Architecture
- **API Management Ref. Architecture**
- Security for Cloud Services Ref. Architecture
- Data Residency discussion paper
- Blockchain Ref. Architecture
- Multi-cloud Management whitepaper
- Cognitive Computing Ref. Architecture
- And more!

2016 Deliverables

- Prac Guide to Hybrid Cloud Computing
- Public Cloud Service Agreements, V2
- Cloud Security Standards, V2
- IoT Ref. Architecture
- e-Commerce Ref. Architecture
- Impact of Cloud Computing on Healthcare, V2
- Enterprise Social Collaboration Ref. Architecture

2015 Deliverables

- Web App Hosting Ref. Architecture
- Mobile Ref. Architecture
- Big Data & Analytics Ref. Architecture
- Security for Cloud Computing, V2
- Practical Guide to Cloud SLAs, V2
- Practical Guide to PaaS

2013/2014 Deliverables

- Convergence of Social, Mobile, Cloud
- Analysis of Public Cloud SLAs
- Cloud Security Standards
- Migrating Apps to Public Cloud Services
- Social Business in the Cloud
- Deploying Big Data in the Cloud
- Practical Guide to Cloud Computing, V2
- Migrating Apps: Performance Rqmnts
- Cloud Interoperability/Portability

http://cloud-council.org

Abstract & Agenda

**This talk introduces the Cloud Customer Architecture for API Management**

- **What are Cloud Solution Architectures?**

- **API Management Cloud Architecture**

- **CSCC's Cloud Reference Architecture series**
  - **Cloud Customer Architecture for e-Commerce** http://bit.ly/2camhIz
  - **Cloud Customer Architecture for IoT** http://bit.ly/2cLcomc
  - **Cloud Customer Architecture for Big Data** http://bit.ly/2crffR2
  - **Cloud Customer Architecture for Mobile** http://bit.ly/2cIYtdl
  - **Cloud Customer Architecture for Web Application Hosting** http://bit.ly/2cgTVK2
  - **Cloud Customer Architecture for Enterprise Social Collaboration** http://bit.ly/2jDiMPD
  - **Cloud Customer Architecture for Hybrid Integration** http://bit.ly/2lHlLs0

Cloud Customer Reference Architectures

- **Cloud Customer Reference Architectures are…**
  - **straightforward description of elements needed to implement particular application solutions using cloud infrastructure, cloud platforms, cloud software, and cloud services**
  - **deployment neutral (public, private, hybrid) & implementable via IaaS, PaaS, SaaS**
  - **general purpose reusable architectures as well as industry specific architectures**
  - **vendor neutral & open**

- **Important because they…**
  - **enable cloud customers to understand unique features & advantages of using cloud computing**
  - **bridge gap between understanding cloud customer needs and cloud provider offerings**
  - **provide practical guidance on how common business applications can be realized from a cloud customer role perspective**
  - **are stable anchors in a rapidly innovating cloud landscape**
  - **save time, effort & money: *be more productive***

- **Useful when…**
  - **those planning to build cloud based applications**
  - **talking with cloud providers about their offerings**
  - **understanding of the common elements and relationships in relevant solutions**

- **Target audience:**
  - **those planning on building/purchasing cloud based applications**
  - **developers, architects, managers**

- **Consistent with ISO/IEC 17789 International Standard Cloud Computing Reference Architecture**

Cloud Customer Reference Architecture for API Management

Executive Summary
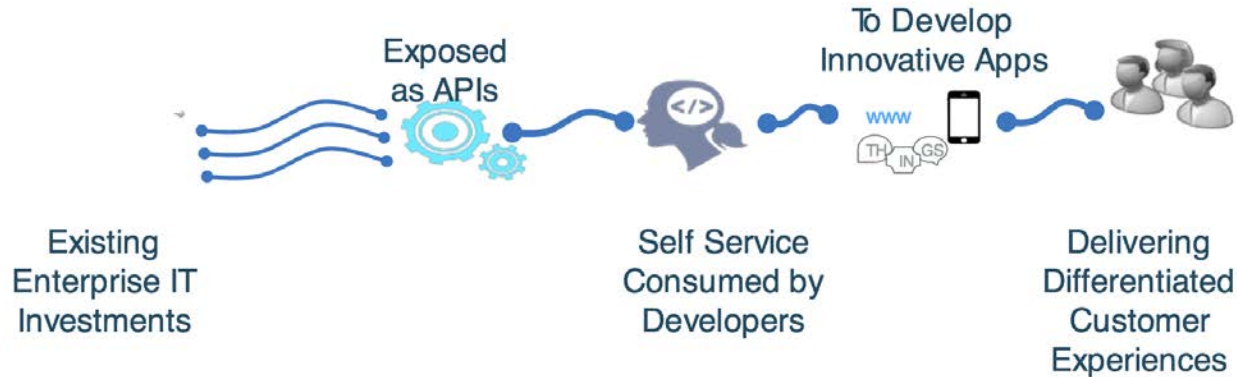
An Application Programming Interface (API)

- ... is a public persona for a company, exposing defined assets, data, or services for public consumption.

- ... is a way for services and products to communicate with each other through a documented interface.

- ... allows companies to open up data and services to external third party developers, to business partners and to internal departments within their company.

- ... can be leveraged by application developers of web and mobile apps.

Cloud Customer Reference Architecture for API Management

Key Questions

API Management Reference Architecture addresses the following questions:

- **Why?**

  The value proposition of adopting a long term API strategy and embarking on the enterprise digital transformation journey.

- **Where?**

  The principles and characteristics of a solid API Management Platform.

- **How?**

  Lifecycle approach to creating, running, managing and securing APIs.

- **Who?**

  Personas and stakeholders in API Management and their use cases.

- **What?**

  Define the architectural components and capabilities that make up a superior API Management Platform.

Cloud Customer Reference Architecture for API Management

## APIs, Cloud Computing and Enterprise Digital Transformation

Enterprises should consider five opportunities to include in their API strategy:

1. **Accelerating** in-house development to decouple / expose enterprise functionality as a reusable set of APIs for self-service consumption.

2. **Innovating** with digital applications on a cloud platform for rapid deployment and quick creation of a system of engagement to new channels.

3. **Providing** secure and controlled access to APIs from those digital applications in a hybrid cloud environment where the likes of mobile or IoT applications on a public cloud consume exposed APIs.

4. **Joining/forming** an ecosystem with a wider community of external developers and partners who will publish and consume APIs beyond enterprise boundaries.

5. **Monetizing** existing and new data and algorithms while enabling new business models.

Cloud Customer Reference Architecture for API Management

API Management: Lifecycle & Platform

API Management Lifecycle
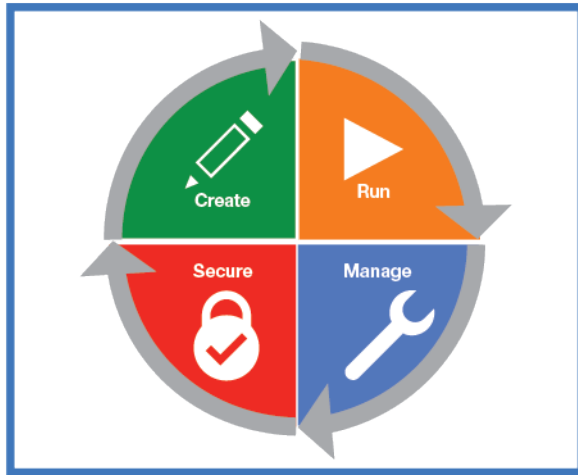
- **Create**
  Development lifecycle: design, model, test, build and deploy.
- **Run**
  Performance, scalability, load and resilience of the API runtime platform.
- **Manage**
  Publicizing, socializing, management, governance and cataloging of APIs, and user management of API consumers and providers.
- **Secure**
  Runtime security enforcement of APIs (authentication, authorization, rate limits, encryption and proxying of APIs).

API Management Platform Capabilities

- Automated, visual and coding options for creating APIs.
- Polyglot runtime support for creating microservices.
- Integrated enterprise grade clustering, management and security for polyglot runtimes.
- Lifecycle and governance for APIs, products and plans.
- Access control over API's, API plans and API products:
  - Advanced API usage analytics.
  - Customizable, self-service developer portal.
  - Support of self-service diagnostics.
  - Policy enforcement, security and control.
  - Real-time analytics.

Cloud Customer Reference Architecture for API Management

Architecture Overview

Cloud Customer Reference Architecture for API Management

Architecture Overview - *Personas*

- **App Developers**: Consumers of APIs
- **API Developers**: Creators of APIs
- **API Owners/Product Managers**
- **IT Operations**
- **End Users**: Access applications using a browser or via a mobile native app
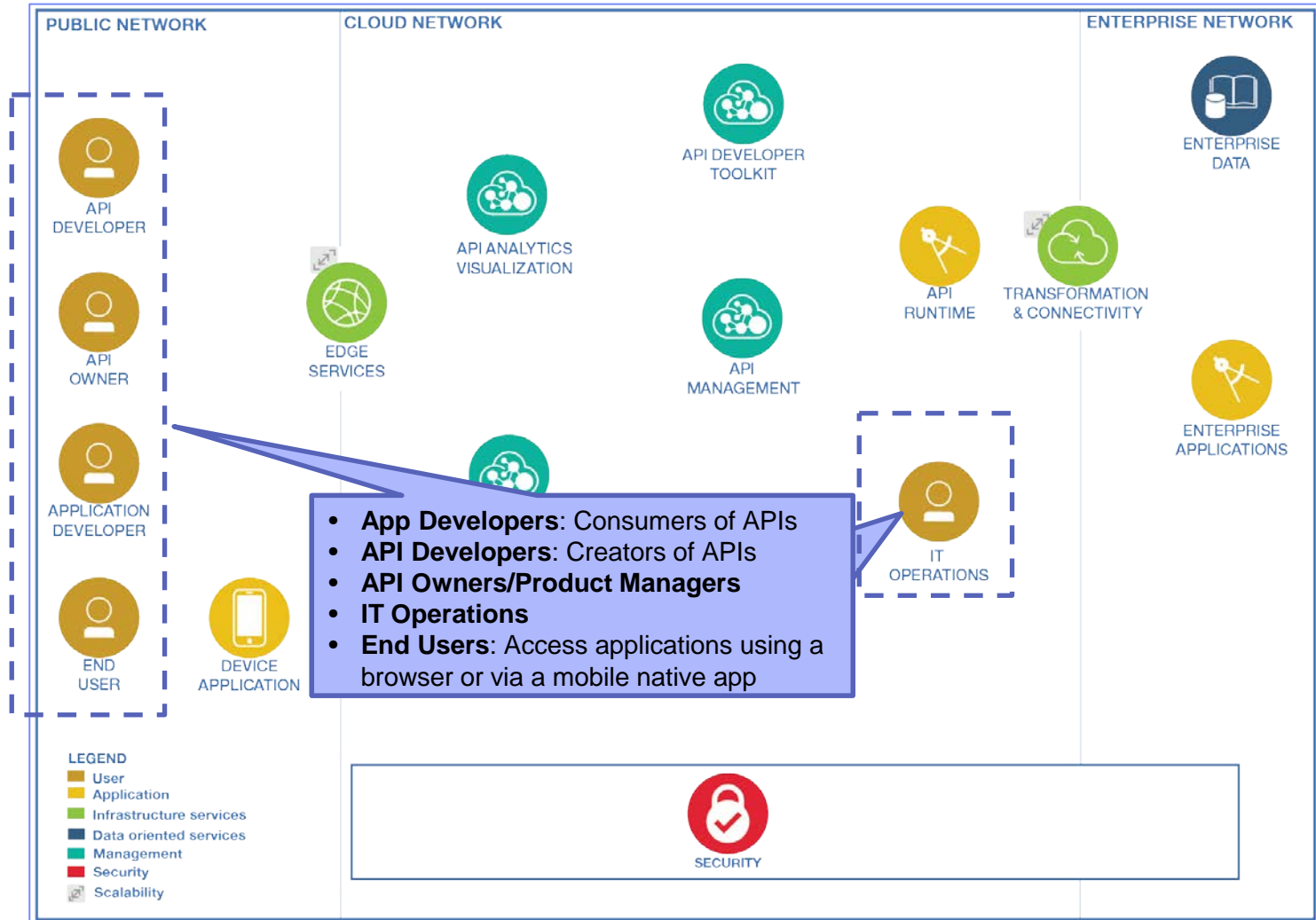
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Architecture Overview – *Business Assets*

PUBLIC NETWORK

API DEVELOPER

API OWNER

APPLICATION DEVELOPER

END USER

DEVICE APPLICATION

LEGEND
- User
- Application
- Infrastructure services
- Data oriented services
- Management
- Security
- Scalability

CLOUD NETWORK

API DEVELOPER TOOLKIT

API ANALYTICS VISUALIZATION

EDGE SERVICES

DEVELOPER PORTAL

API

TRANSFORMATION CONNECTIVITY

SECURITY

ENTERPRISE NETWORK

ENTERPRISE DATA

ENTERPRISE APPLICATIONS

Enterprise Application represents applications that run enterprise business processes and logic within existing enterprise systems.

Enterprise Data represents the one or more systems of record, for example, transactional data or data warehouses that represent the existing data in the enterprise.
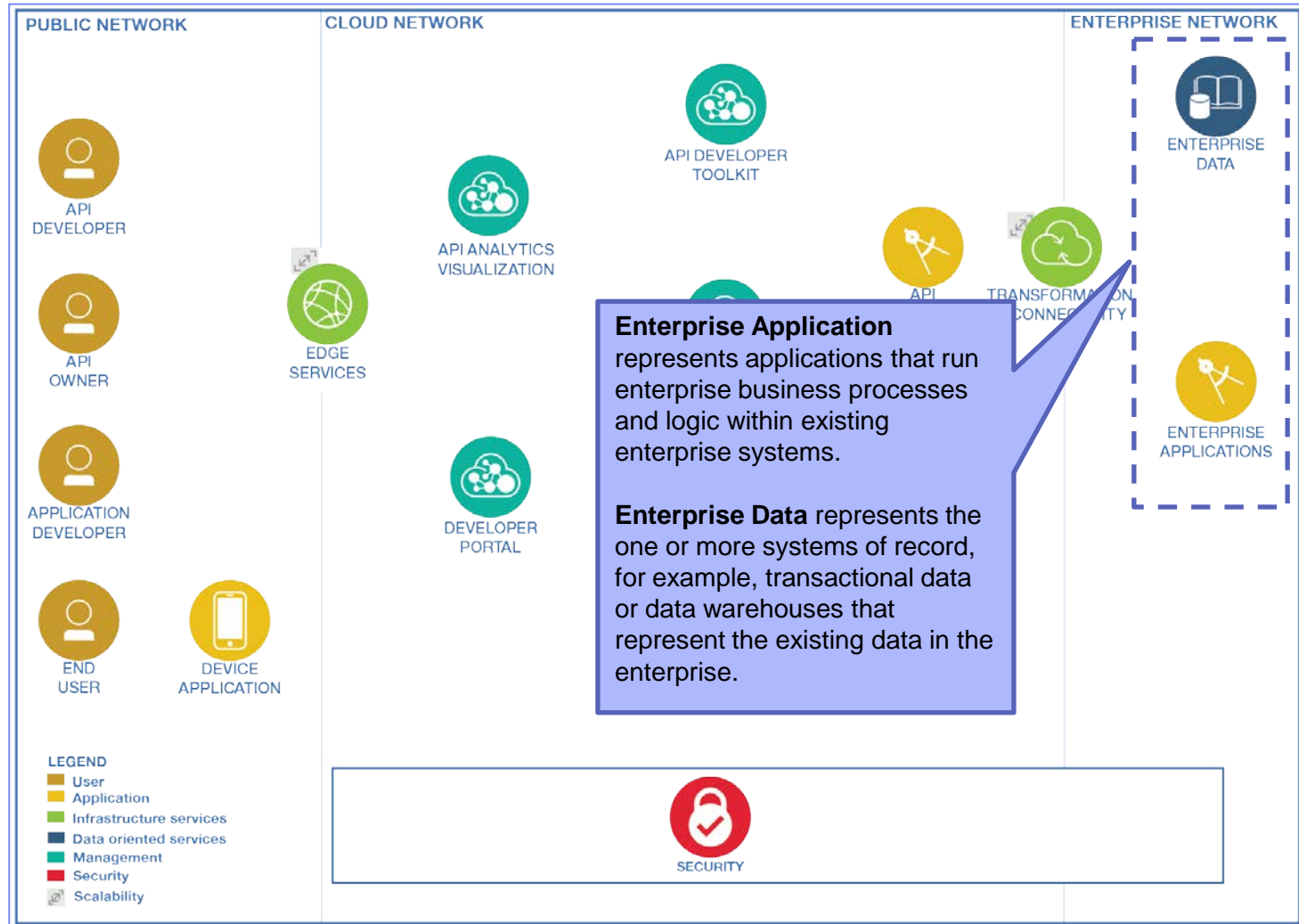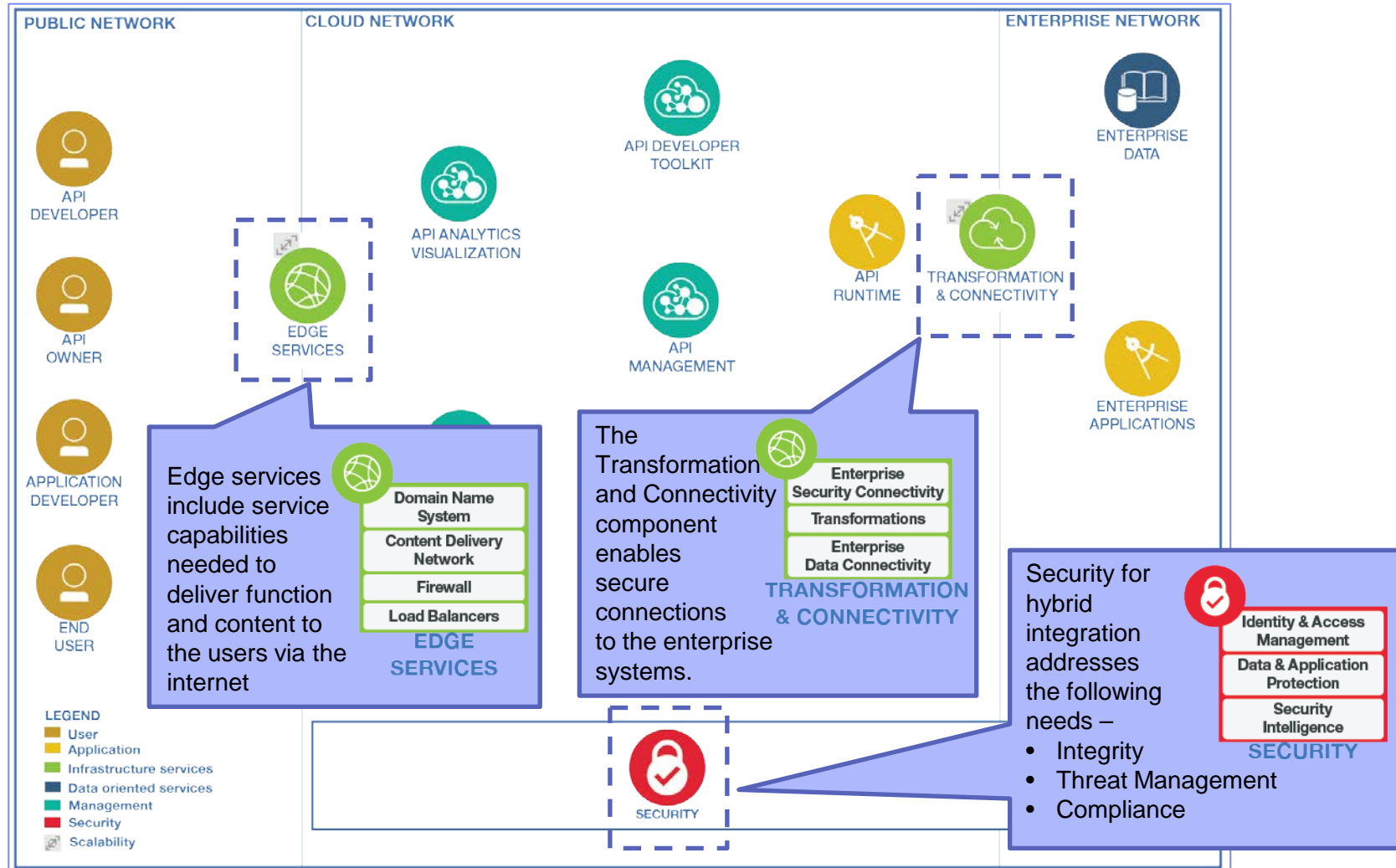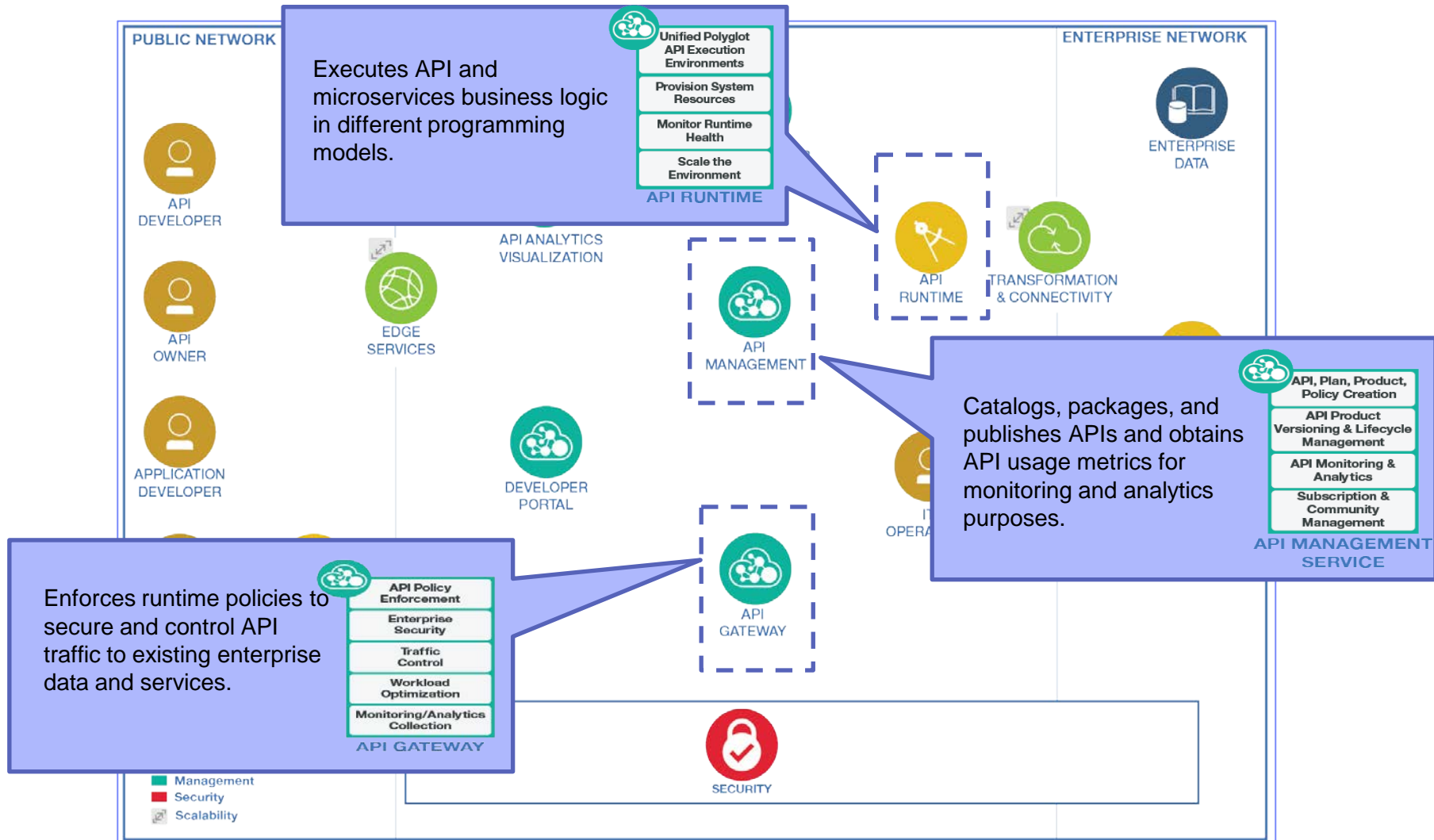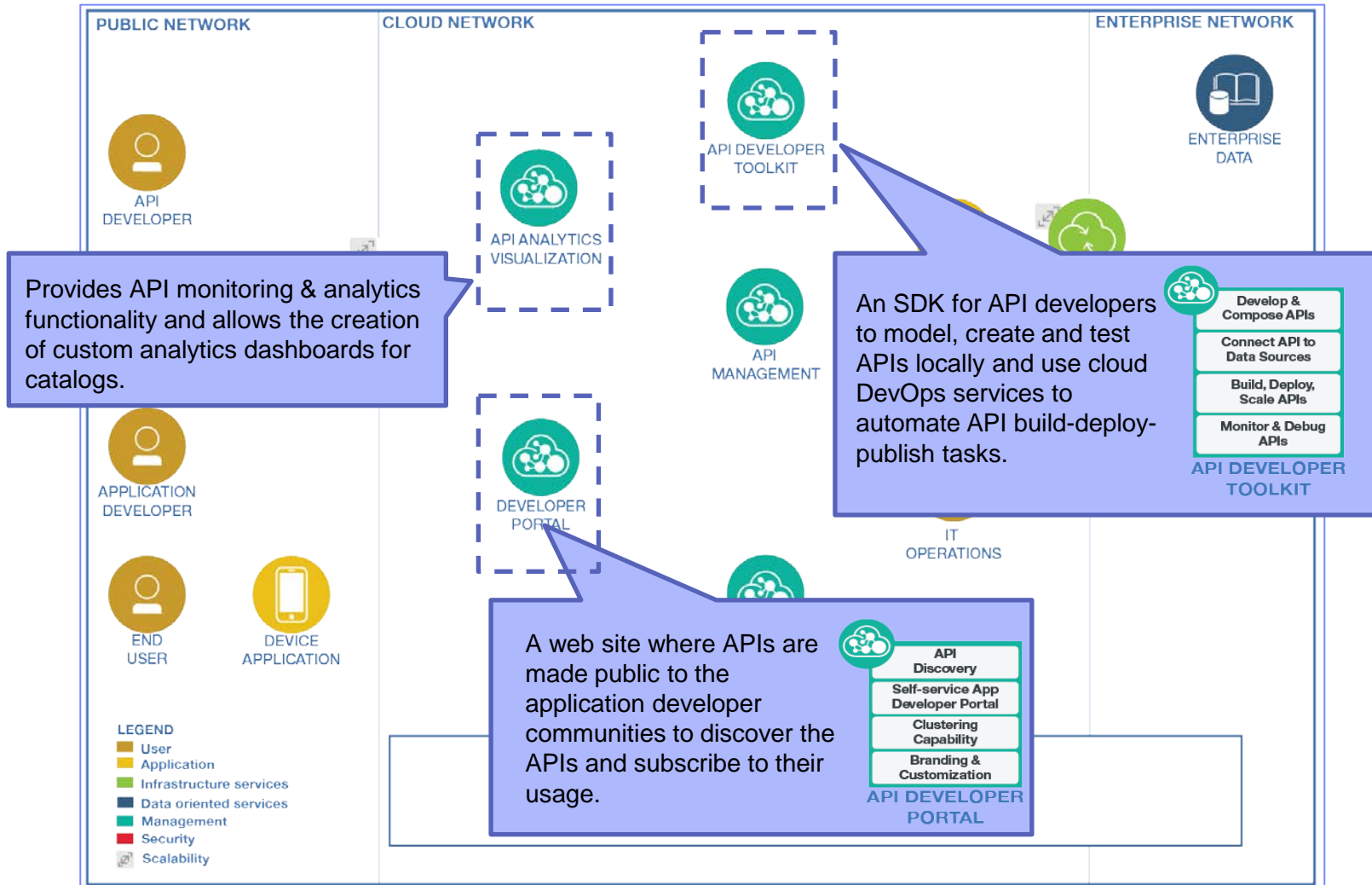
Cloud Customer Reference Architecture for API Management

Architecture Overview - *Supporting Capabilities*

Cloud Customer Reference Architecture for API Management

Architecture Overview – *Core Capabilities*

Executes API and microservices business logic in different programming models.

API RUNTIME
- Unified Polyglot API Execution Environments
- Provision System Resources
- Monitor Runtime Health
- Scale the Environment

Catalogs, packages, and publishes APIs and obtains API usage metrics for monitoring and analytics purposes.

API MANAGEMENT SERVICE
- API, Plan, Product, Policy Creation
- API Product Versioning & Lifecycle Management
- API Monitoring & Analytics
- Subscription & Community Management

Enforces runtime policies to secure and control API traffic to existing enterprise data and services.

API GATEWAY
- API Policy Enforcement
- Enterprise Security
- Traffic Control
- Workload Optimization
- Monitoring/Analytics Collection

PUBLIC NETWORK

ENTERPRISE NETWORK

- API DEVELOPER
- API OWNER
- APPLICATION DEVELOPER
- EDGE SERVICES
- API ANALYTICS VISUALIZATION
- API MANAGEMENT
- DEVELOPER PORTAL
- API GATEWAY
- API RUNTIME
- TRANSFORMATION & CONNECTIVITY
- ENTERPRISE DATA
- IT OPERA...
- SECURITY

Legend:
- ■ Management
- ■ Security
- ⤢ Scalability

Cloud Customer Reference Architecture for API Management

Architecture Overview – *Core Capabilities*

PUBLIC NETWORK

API DEVELOPER

APPLICATION DEVELOPER

END USER

DEVICE APPLICATION

LEGEND
- User
- Application
- Infrastructure services
- Data oriented services
- Management
- Security
- Scalability

CLOUD NETWORK

API ANALYTICS VISUALIZATION

API MANAGEMENT

DEVELOPER PORTAL

API DEVELOPER TOOLKIT

IT OPERATIONS

ENTERPRISE NETWORK

ENTERPRISE DATA

Provides API monitoring & analytics functionality and allows the creation of custom analytics dashboards for catalogs.

An SDK for API developers to model, create and test APIs locally and use cloud DevOps services to automate API build-deploy-publish tasks.

API DEVELOPER TOOLKIT
- Develop & Compose APIs
- Connect API to Data Sources
- Build, Deploy, Scale APIs
- Monitor & Debug APIs

A web site where APIs are made public to the application developer communities to discover the APIs and subscribe to their usage.

API DEVELOPER PORTAL
- API Discovery
- Self-service App Developer Portal
- Clustering Capability
- Branding & Customization

Cloud Customer Reference Architecture for API Management

Runtime Flow – Use Case

1. API developer signs on to the API Management cloud services account. He/she accesses or downloads the API Developer Toolkit to develop and test an API.
2. API owner signs on to the API Management cloud services account. He/she accesses the API Management component to include the created API in a product, specify access control and publish it.
3. Application developer accesses the Developer Portal. He/she searches and discovers the API.
4. Application developer uses the API in his/her app and deploys the app to an end-user device.
5. The device end user opens the app which issues the API request to be handled by the API Gateway, then the API Polyglot Runtime. The runtime may invoke APIs exposed by enterprise applications.
6. The API Gateway reports usage metrics and analytics to the API Management component.
7. Cloud provider IT operators log on to the polyglot Runtime to monitor and manage the API runtime environments.
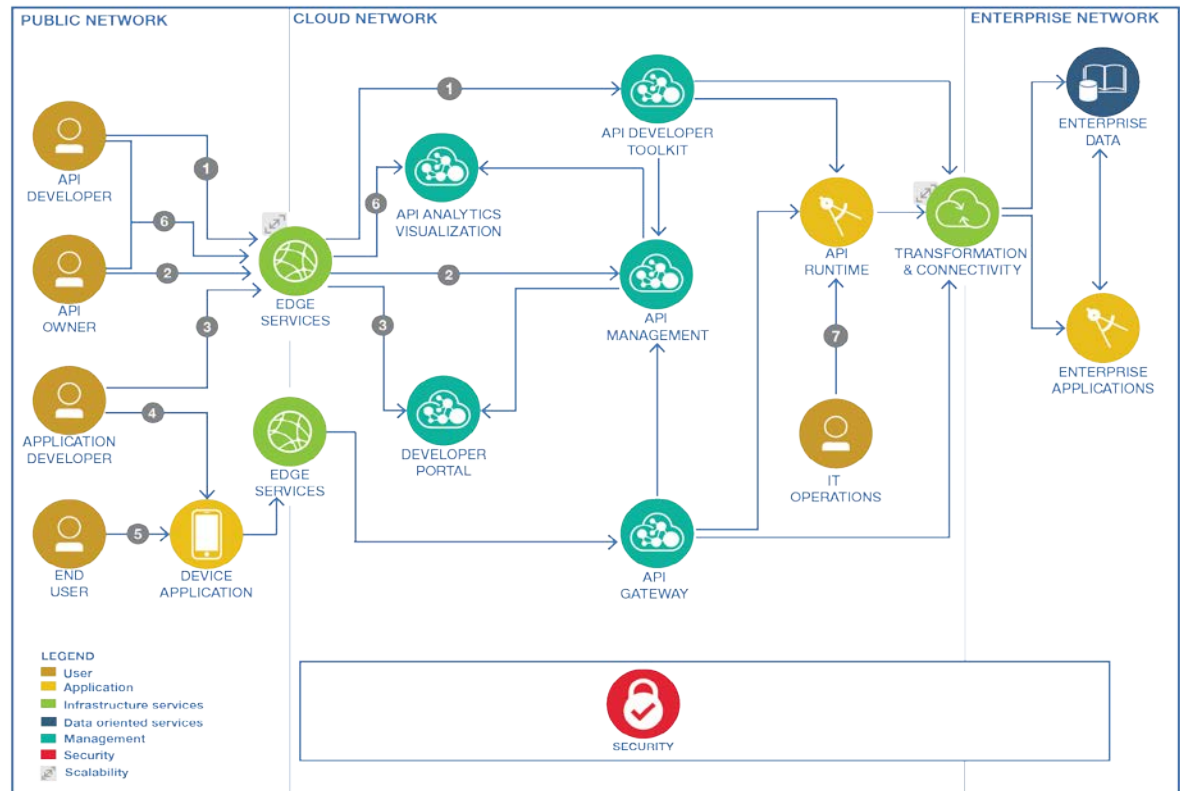
Cloud Customer Reference Architecture for API Management

Hybrid Cloud and APIs

Businesses implementing hybrid cloud solutions are looking for flexibility and agility in delivering new capabilities. Examples:

Mobile workforce

Using mobile applications deployed on the public or private cloud and invoking APIs that access data and transactions located in on-premises data centers.

Market channel expansion

The enterprise digital platform is hosted on a cloud environment and exposes core business capabilities from backend systems residing on-premises via a set of APIs.

Enterprise B2B integration

Inter-enterprise collaboration is enabled through a set of APIs hosted on a cloud platform and brokers B2B capabilities from on-premises back-ends, enterprise private clouds or external cloud services such as commercial SaaS applications.

Cloud Customer Architecture for Hybrid Integration: http://bit.ly/2lHlLs0

Cloud Customer Reference Architecture for API Management

Deployment Considerations

Security	**Isolation**	**Scalability & Load Balancing**
• Encryption Support	• Platform level.	• Adding more instances.
• Policy Authoring	• Organization level.	• Service clustering.
• Open Standards	• Catalog level.	• Prioritizing services within a time period.
• OAuth authorization standard		• Using internal vs. external load balancers.

Cloud deployment considerations also apply.

Call to Action

- ***Join the CSCC Now!***
  - To have an impact on customer use case based standards requirements
  - To learn about all Cloud Standards within one organization
  - To help define the CSCC's future roadmap
  - Membership is free & easy: http://www.cloud-council.org/become-a-member

- ***Get Involved!***
  - Join one or more of the CSCC Working Groups

    http://www.cloud-council.org/workinggroups

- ***Leverage CSCC Collateral***
  - Visit http://www.cloud-council.org/resource-hub

Additional Resources from the CSCC

- Practical Guide to Hybrid Cloud Computing
  http://www.cloud-council.org/deliverables/practical-guide-to-hybrid-cloud-computing.htm

- Cloud Customer Architecture for Hybrid Integration
  http://www.cloud-council.org/deliverables/cloud-customer-architecture-for-hybrid-integration.htm

- Security for Cloud Computing: 10 Steps to Ensure Success v2
  http://www.cloud-council.org/deliverables/security-for-cloud-computing-10-steps-to-ensure-success.htm

- Cloud Security Standards: What to Expect and What to Negotiate v1
  http://www.cloud-council.org/deliverables/cloud-security-standards-what-to-expect-and-what-to-negotiate.htm

- Practical Guide to Cloud Service Agreements v2
  http://www.cloud-council.org/deliverables/practical-guide-to-cloud-service-agreements.htm

- Migrating Applications to Public Cloud Services: Roadmap for Success
  http://www.cloud-council.org/deliverables/migrating-applications-to-public-cloud-services-roadmap-for-success.htm

- Cloud Customer Architecture for Big Data & Analytics
  http://www.cloud-council.org/deliverables/cloud-customer-architecture-for-big-data-and-analytics.htm

View all papers www.cloud-council.org/resource-hub and companion webinars www.cloud-council.org/events

Thank You