Impact of Cloud Computing on Healthcare V2.0

Today’s Speakers

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**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

### 2017 Projects
- **Impact of Cloud Computing on Healthcare v2**
- 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
- And more!

### 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

### 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

### 2017 Projects
- Web App Hosting Ref. Architecture
- Mobile Ref. Architecture
- Big Data & Analytics Ref. Architecture
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- Practical Guide to Cloud SLAs, V2
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50+ Organizations participating

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Healthcare provider systems leveraging cloud-based computing and cloud services offer an array of benefits in comparison to in-house client-server systems.
Benefits of Cloud Computing for Healthcare

Economic
- Cost flexibility
- OPEX vs. CAPEX
- Reduced IT resource expenses

Operational
- Increased scalability
- Improved security & privacy
- CSPs employ expert professional staff

Functional
- Enhanced interoperability & integration
- More easily share information
- Rapid development & innovation
- Support for mobile & IoT devices
- Sophisticated analytic capabilities
High Value Cloud Computing Services for Healthcare

- Population Health Management
- Care Management Support
- Diagnostic Support
- Image Handling Service
- Medical Practitioner Assistance

Whitepaper includes tooling for each service that exists in the marketplace today.

- Patient Connectivity
- Data Distribution Services
- Laboratory Services
- Clinical Research
- BPM & Case Management Services
<table>
<thead>
<tr>
<th>Technical Area</th>
<th>Cloud Computing Considerations</th>
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| Privacy & Security                   | ▪ Strong cloud service agreements (CSA) must be established  
▪ Awareness of where & how ePHI is moved, handled & stored  
▪ Ability to track creation, modification and deletion of ePHI  
▪ Use of third party authentication highly recommended  
▪ Background screenings for CSP personnel who “touch” ePHI  |
| Regulation & Compliance              | ▪ Healthcare entity responsible for compliance  
▪ Require CSP to contractually agree to maintain all ePHI in adherence with government standards and regulations  
▪ Request CSP certifications (HIPAA, ISO/IEC 27001, etc.)  |
| Service Reliability                  | ▪ KPIs for reliability/performance must be defined & monitored  
▪ Disaster recovery & change management is critical  |
| Integration, Interoperability,       | ▪ Standard healthcare interfaces and data models facilitates migration to different CSPs  
▪ Ensure compatible business and operational processes & smooth integration with existing enterprise systems  |
| Portability                          |                                                                                                                                                                                                                                 |
| Standards                            | ▪ Understand available standards and CSP adherence  
▪ Critical standards that impact healthcare include Continua Health Alliance, ISO TC 215, ISO/IEC 11073, HL7, HIMSS, HITSP  |
Prescriptive series of steps customers should take to ensure successful deployment of cloud-based healthcare solutions

7 Steps to Ensure Successful Deployment

1. Build the business case for cloud computing
2. Prioritize specific cloud-based healthcare solutions
3. Determine cloud deployment & service models
4. Address security and privacy requirements
5. Integrate with existing enterprise systems
6. Negotiate CSAs and monitor KPIs
7. Manage the cloud environment

Step 1: Build the business case for cloud computing

**Considerations**
- Automate management
- Orchestrate virtual assets
- Provide ‘built in’ local/global disaster protection
- Deliver real-time business intelligence
- Enable IoT augmented patient care
- Leverage Big Data analytics & cognitive assistance for medical professionals
- Economies of scale
- Flexible payment models

**Recommendations**
- Complete an application / workload assessment study
- ID services that can be migrated to cloud
- Determine which applications can be replaced with available cloud services
- ID entirely new capabilities that can be provided by cloud services
- Barriers of entry to cloud-based healthcare services have disappeared
- Prevalence of SaaS offerings & improved CSAs now available
- Ensure best service category & deployment model selected to fit business objectives
- Network connectivity & security are critical dependencies
Step 2: Prioritize specific cloud-based healthcare solutions

### Develop a Strategy
1. Avoid platform bias
2. Understand your current state
3. Define your future state
4. Select cloud service provider(s)
5. Plan a phased approach
6. Establish a proof of concept
7. Scale to production

### Cloud Drivers / Use Cases
- IT cost reduction
- Connected healthcare
- Big Data Analytics
- Telemedicine
- IoT enabled healthcare
- Diagnostics support
- DevOps
- Disaster Recovery as a Service
- Backup as a Service
Step 3: Determine cloud deployment & service models

### Deployment Model Considerations
- Security
- Data classification
- Business model
- Target operating model
- Application architecture
- Cost
- Performance

### Service Model Considerations
- Depends mainly on existing in-house solutions and IT skills
- **SaaS** preferred when in-house healthcare service does not exist and IT skills limited
- **PaaS** is a good option when in-house IT skills available - acquire new healthcare services & enhance services to satisfy unique requirements
- **IaaS** most cost effective alternative when HCO looking for additional storage and compute capacity to support existing in-house healthcare solutions

*Most healthcare deployments are likely to be hybrid given the specific requirements and benefits of different types of workloads.*
Step 4: Address security & privacy requirements

Recommendations

- Security is shared responsibility between cloud customers and cloud service provider
  - NIST 800-160, CSA, ISO/IEC 27017, ISO/IEC 27018

- Understand regulations that govern the privacy and security of healthcare data
  - HIPAA and GDPR

- Physical, administrative, and technical safeguards must be addressed in cloud environment
  - Mobile / IoT devices pose challenges
  - Encryption and two-factor authentication are key technical safeguards

- Do not collect ePHI unnecessarily

- Do not allow ePHI to spread to systems where it’s not required

- Securely dispose of ePHI when it is no longer needed

CSCC Security for Cloud Computing: 10 Steps to Ensure Success, Version 2.0
Step 5: Integrate with existing enterprise systems

Integration Requirements

- Hybrid cloud computing
- Identity & Access Management
- IT administration & management
- Medical device IoT
- Advanced analytics
- Telemedicine
- Standards conformance
- Audit, compliance & operational intelligence
- Middleware
Step 6: Negotiate cloud service agreements & monitor KPIs

**Considerations**

- Understand business level performance objectives
- Identify metrics critical to achieving objectives
- Ensure metrics are defined at the right level of granularity that can be monitored on continuous basis
- Identify standards that provide consistency in metric definitions and methods of collection
- Analyze and leverage the metrics on an ongoing basis as a tool for influencing business decisions
- Understand service responsibility line (SRL)

**Potential KPIs**

- **Patient satisfaction KPIs**: patient wait times, examining room usage, bed and room turnover, claim processing time
- **Operational effectiveness KPIs**: new streams of info provide better visibility into inpatient flow, revenue cycles and patient feedback loops
- **Wearable device KPIs**: time taken to react to out-of-normal measurements
- **Social media KPIs**: track positive & negative media mentions and consumer sentiment as they relate to public health issues
- Measure how quick to respond to sentiment through communication channels

*CSCC Practical Guide to Cloud Service Agreements*
Step 7: Manage the environment

Focus Areas

- Management of electronic health records (including sharing)
  - Retrieve & transmit health data for patients to/from external sources which have security, privacy and provenance issues
  - Manage privacy and security of patient health data generally
  - Ensure availability & timely synchronization of patient health data

- Automation of internet connected devices with real time data (IoT)
  - Fall detection for elderly patients
  - Health monitoring for patients with chronic disorders
  - Detection of escalating symptoms for patients with mental disorders

- Field devices including physician / nurse tablets for capturing & displaying data
  - Protect device and network resources against interruption and attack
  - Regularly update medical devices and network software
  - Provide security protection for Android devices and apps that use weak passwords
  - Set up secure communications through a variety of networking mechanisms

- Management of intelligent cognitive assistants (physician assistant)

- Systems maintenance
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

Whitepapers

• *Practical Guide to Hybrid Cloud Computing*

• *Practical Guide to Cloud Service Agreements v2.0*

• *Security for Cloud Computing: 10 Steps to Ensure Success v2.0*

Cloud Customer Reference Architectures

• Web Application Hosting
  http://www.cloud-council.org/deliverables/cloud-customer-architecture-for-web-application-hosting.htm

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

• IoT
  http://www.cloud-council.org/deliverables/cloud-customer-architecture-for-iot.htm

• Mobile
  http://www.cloud-council.org/deliverables/cloud-customer-architecture-for-mobile.htm

• And more!

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Thank You