



Impact of Cloud Computing on Healthcare V2.0

<http://www.cloud-council.org/deliverables/impact-of-cloud-computing-on-healthcare.htm>

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Today's Speakers



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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

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

650+ Organizations participating



<http://cloud-council.org>

Current Market Dynamics

Market Dynamics

1. Escalation of consumerism
2. Impact of healthcare regulation and restructuring of financial risks
3. Influence of digitalization
4. Focus on preventive healthcare
5. Need for medical practice and healthcare delivery transformation

Impact

- Traditional healthcare mechanisms augmented with digital options
- Increased technology investment to accelerate healthcare digitization
- Shifting of roles played by incumbent healthcare actors
- Growing importance of data integration & comparative analysis
- Accrual of medical knowledge & practice improvement accelerated
- New business models for lower cost and better efficiency

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

Considerations for Leveraging Cloud Computing for Healthcare

Technical Area	Cloud Computing Considerations
Privacy & Security	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ 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	<ul style="list-style-type: none">▪ KPIs for reliability/performance must be defined & monitored▪ Disaster recovery & change management is critical
Integration, Interoperability, Portability	<ul style="list-style-type: none">▪ Standard healthcare interfaces and data models facilitates migration to different CSPs▪ Ensure compatible business and operational processes & smooth integration with existing enterprise systems
Standards	<ul style="list-style-type: none">▪ Understand available standards and CSP adherence▪ Critical standards that impact healthcare include Continua Health Alliance, ISO TC 215, ISO/IEE 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

Download the whitepaper: <http://www.cloud-council.org/deliverables/impact-of-cloud-computing-on-healthcare.htm>

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

*Most healthcare deployments are likely to be **hybrid** given the specific requirements and benefits of different types of workloads.*

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

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

NIST
SP 800-160



CSA cloud security alliance®



NIST
SP 800-131a



ISO 27002
Security Techniques: Code of Practice
for Information Security Controls

CSCC Security for Cloud Computing: 10 Steps to Ensure Success, Version 2.0

<http://www.cloud-council.org/deliverables/security-for-cloud-computing-10-steps-to-ensure-success.htm>

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

<http://www.cloud-council.org/deliverables/practical-guide-to-cloud-service-agreements.htm>

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*
<http://www.cloud-council.org/deliverables/practical-guide-to-hybrid-cloud-computing.htm>
- *Practical Guide to Cloud Service Agreements v2.0*
<http://www.cloud-council.org/deliverables/practical-guide-to-cloud-service-agreements.htm>
- *Security for Cloud Computing: 10 Steps to Ensure Success v2.0*
<http://www.cloud-council.org/deliverables/security-for-cloud-computing-10-steps-to-ensure-success.htm>

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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The background is a vibrant blue with a complex, abstract pattern. It features a grid of squares, some of which are filled with various geometric shapes like circles, semi-circles, and smaller squares. The colors range from a deep, dark blue to a bright, light blue, creating a sense of depth and movement. The overall effect is a modern, digital aesthetic.

Thank You