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Technology

Is Cloud Computing for you?

Assessing the value of cloud computing for your organization

Dr. Matthias Ziegler and Thomas M. Michelbach

April, 2011

Agenda

- Introduction
- Cloud Computing Decisions Overview
- Cloud Computing Assessment
 - Infrastructure as a Service
 - Platform as a Service
- Summary

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- **Introduction**

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Who are we?



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Dr. Matthias Ziegler is a senior manager and master technology architect at Accenture. He leads the Architecture Innovation group in Austria, Switzerland and Germany, which pioneers emerging technologies at our clients.



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Thomas Michelbach is a manager and senior technology architect at Accenture. He is part of the Accenture Architecture Innovation group with a focus on innovative solutions around cloud computing, business process management and other emerging technologies.

Who are you?

- Hands up:
 - Who is already **using** Cloud Computing in their organization?
 - Who is **planning to use** Cloud Computing in their organization within the next 12 months?
 - Who is **gathering information** about Cloud Computing but without concrete plans on where / how to use it?



Who is our target audience?

- **Enterprise Architects** preparing their IT strategy with cloud computing
- **Solution Architects** interested in defining which applications are suitable for the cloud
- **Solution Designers** interested in identifying application patterns for the cloud
- **Decision Makers** interested in understanding if their organization can benefit from the cloud and how



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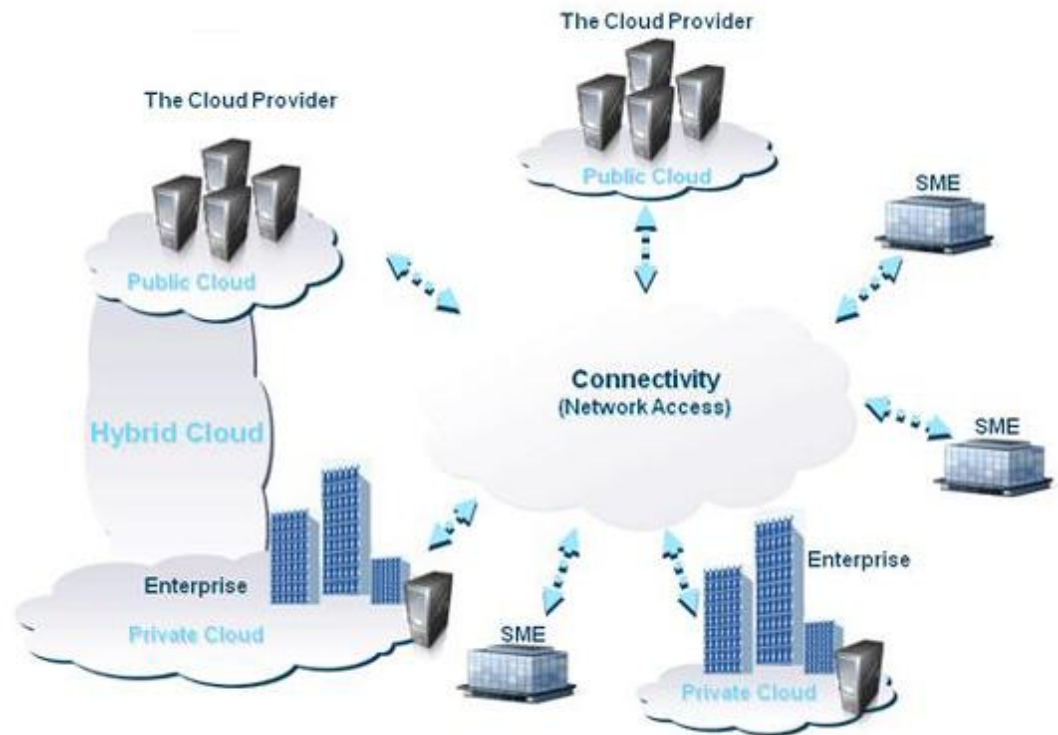
What are the decisions to take?

- What **deployment** model?
 - public, private, hybrid, community
- What **service** model?
 - IaaS, PaaS, SaaS
- What cloud **vendor** and **products**?
- Which of my applications?



What cloud deployment model is right for me?

- Are you a **large enterprise** and own a data center?
- Do you have **sensitive data**?
- Do you require **high bandwidth or data volumes** integrating with your on premise systems?



What cloud service model shall I take?

Traditional solutions



Cloud solutions

SAP ERP
Oracle Apps
MS Office/Exchange

SaaS

Do you need business applications provided on a subscription basis that are not part for your differentiation in the market (commodity)?

Salesforce.com
Workday
Oracle on Demand
Google Apps
Microsoft Dynamic CRM

Windows/.NET
Linux/Solaris
J2EE

PaaS

Do you need prepared /baselined environments to run applications?

Force.com
Windows Azure
Google Apps Engine

Buying hardware
IBM Blade Center
Sun Fire X4100

IaaS

“Do you need to better manage your IT infrastructure as a service with measurable objectives and fast provisioning?”

Buying computing time
Amazon EC2
vCloud
IBM Blue Cloud

What vendors and products shall I choose?

- A plethora of vendors covering various service models with different products exist.
- Which one is applicable for you?

salesforce.com.
Success. Not Software.®

ORACLE®

Microsoft®

workday®

vmware®

avanade®
Results Realized

veeva

DELL™

amazon
web services™

NETSUITE

verizon

CISCO™
PARTNER
Gold
Certified

ELOQUA Google™

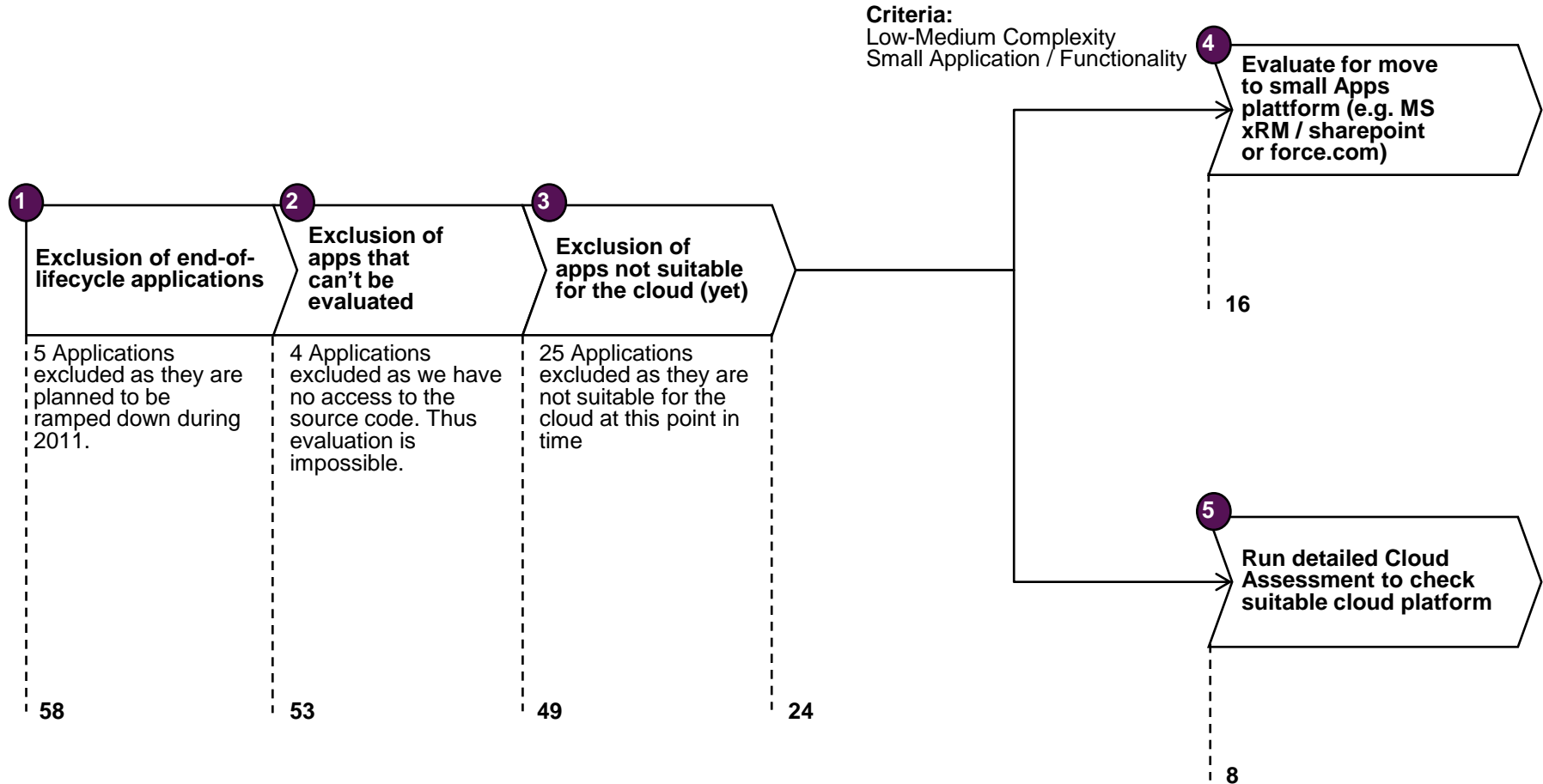
BT

NTT Communications

SAP

EMC²
where information lives®

Which of my applications are applicable for cloud computing?



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How do I find out what works for me?



- Bring order into chaos ...
 - Overview of the cloud service models and respective vendors
 - Structure and simple approach how to analyze the IT landscape
 - High level analysis of requirements based on questionnaire
 - Recommendation of one or many possible solutions
 - Shows fit with main cloud vendors offerings

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What are the areas of concern for IaaS?

Infrastructure

- Expected growth in the next years
- Type of application growth (constant/variable)
- Applications usage (predictable, peak times etc.)

5

Performance

- Expected bandwidth issues
- Performance issues for batch applications
- SLAs for transactions
- Required application uptime
- Storage related SLAs

5

Complexity

- Application development ongoing?
- Special hardware requirements
- Environment specific hard coding
- System criticality
- Level of customizing & integration
- Operating system
- Acceptable downtime for cloudification
- Etc.

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Security

- Security protocols in place
- Compliance requirements
- Type of data used by applications
- Interface security (encrypted communication)
- Single Sign On requirements

6

Backup/Recovery

- Backup of entire system/ application/ data
- Backup frequency
- Backups retained for how long
- Number of copies per backup
- Data repository model
- Offsite data protection solution in place

6

Configuration Management

- Configuration management policies in place
- Repository management systems in use
- Version control defined

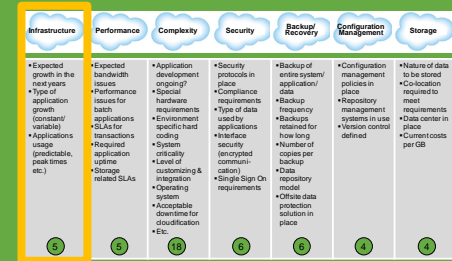
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Storage

- Nature of data to be stored
- Co-location required to meet requirements
- Data center in place
- Current costs per GB

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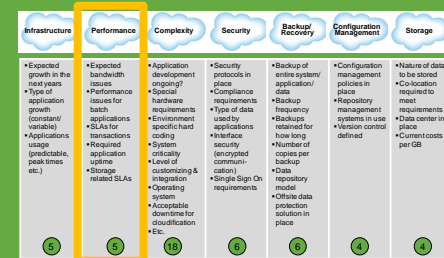
IaaS Assessment – Infrastructure



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
What is the expected infrastructure growth to support the application over the next 5 years?	Infrastructure <input type="checkbox"/> shrinks <input type="checkbox"/> remains stable <input type="checkbox"/> grows	If there is large growth expected to happen quickly, cloud-based solutions may help to add capacity in a short amount of time.
What best describes usage patterns for the application?	Usage is <input type="checkbox"/> stable <input type="checkbox"/> well known <input type="checkbox"/> with expected peaks <input type="checkbox"/> with unpredictable bursts of traffic	Applications with unpredictable and spiky traffic can be a good fit for the cloud since capacity can be increased or decreased quickly, depending on demand.

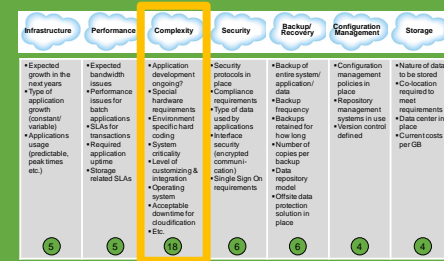
IaaS Assessment – Performance



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
If this is a batch application are there any perceived performance issues?	<input type="checkbox"/> No <input type="checkbox"/> Sometimes <input type="checkbox"/> Significant performance issues	If there are perceived performance issues, cloud computing, with readily available extra capacity, may be a good choice.
Is there expected to be a bandwidth issue with the application if ran internally?	<input type="checkbox"/> No <input type="checkbox"/> Sometimes <input type="checkbox"/> Significant bandwidth required	Internal bandwidth constraints can make an application a good fit for the cloud.

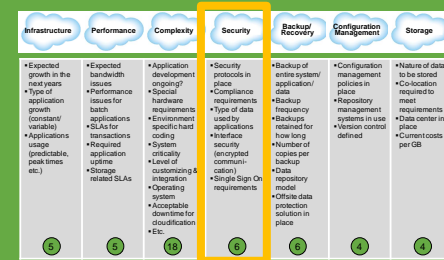
IaaS Assessment – Implementation Complexity



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
How integrated is the application with other systems? (either on premises or in the cloud)?	<input type="checkbox"/> Highly - (10) <input type="checkbox"/> Moderately - (5) <input type="checkbox"/> Lightly - (2) <input type="checkbox"/> None - (0)	Applications that are tightly integrated with other systems can be more difficult to migrate to the cloud, and may require some effort to facilitate those connections.
Is there any problem in parallelizing processes from a code or data perspective?	<input type="checkbox"/> Yes <input type="checkbox"/> No	If an application is easily parallelizable, it may be a good fit for the cloud. This characteristic allows you to run parallel processes on different cloud instances.

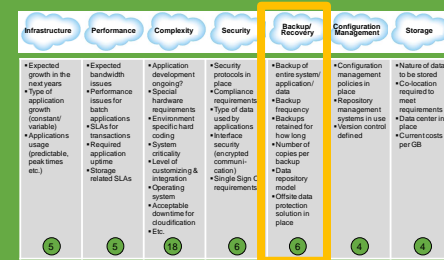
IaaS Assessment – Security



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
Which of the following best describes the type of data used by the applications?	<input type="checkbox"/> Public <input type="checkbox"/> Internal Only <input type="checkbox"/> Confidential <input type="checkbox"/> Highly Confidential	Consideration should be taken to evaluate what data can be made anonymous, and what steps can be taken in order to mitigate potential data security risks.
How are communications between the application and other systems secured?	<input type="checkbox"/> Passwords <input type="checkbox"/> Keys <input type="checkbox"/> IPSEC <input type="checkbox"/> SSL/HTTPS	The strength of communications security can be an important consideration when moving to the cloud, as data is traveling outside of corporate firewalls.

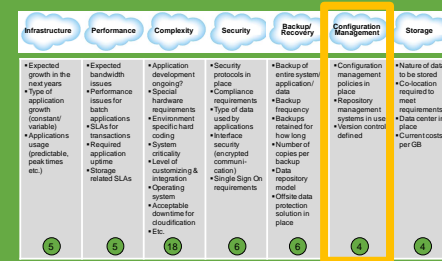
IaaS Assessment – Backup / Recovery



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
How often are backups made and how long are they retained?	<input type="checkbox"/> daily to annually <input type="checkbox"/> days to years or even infinitely	The size, frequency and lifetime of backups to systems greatly impact storage costs. Cost savings can be found using cloud storage options.
Is an offsite data protection solution (vault, disaster recovery center) in place?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Many cloud storage options provide quick and easy ways to replicate data into different locations, providing disaster recovery protection.

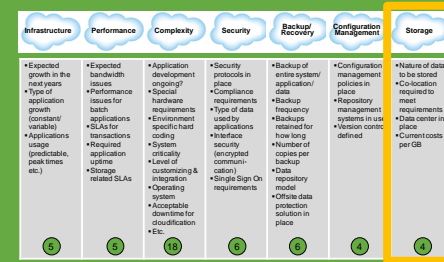
IaaS Assessment – Configuration Management



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
Are there existing robust configuration management policies?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Policies should be crafted to deal with extra layer of complexity introduced by cloud e.g. handling of cloud images.
Are proprietary repository management systems used by the client?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Some management systems provide capabilities for direct deployments of code from the repository to servers. It is important to examine these systems to see what, if any, changes will need to be made to the process for a cloud implementation, or if such a management system can even be used at all.

IaaS Assessment – Storage



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
If the application is hosted internally and not the cloud, will the system require colocation to meet its needs?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Colocation will incur additional cost and complexity, as well as being hosted off-premises. Therefore, applications that would require colocation may be a good fit for the cloud.
How much do you currently pay for storage per GB per month?	<input type="checkbox"/> Less than \$0.10 <input type="checkbox"/> \$0.10 to \$0.50 <input type="checkbox"/> Greater than \$0.50	If your current storage costs are high, you may be able to gain some cost savings by moving to cloud storage.

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What PaaS vendor fits for me?

The PaaS fit analysis questions are broken down into 5 categories

- Analyze overall application portfolio
- Analyze usage patterns
- Analyze business logic & middleware
- Analyze integration requirements
- Analyze data storage requirements

Overall Application Usage Patterns Business Logic Integration Data Storage

Summary Select your Answer Importance

My app is computationally intensive. I need guaranteed published transaction processing speed. Transaction time includes both CPU Compute + DB query times combined. I need 0.5 sec or less/tran: Medium

My app has high availability and high SLA expectations (published) 99.999% - Three 9 SLAs put: Very Important

My app is a new initiative and I need development, debugging, testing, source control, configuration management and cloud deployment tools Dev., SC, DB and automate: Medium

Matching scores with PaaS providers

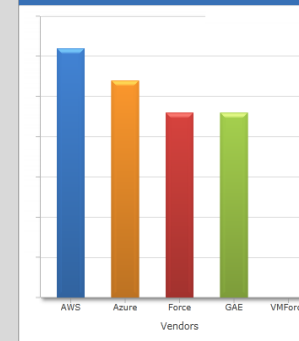
	1st Best Fit	2nd Best Fit	3rd Best Fit
Overall Application	AWS	Azure	Force
Usage Patterns	Force	GAE	AWS
Business Logic	AWS	Azure	Force
Integration	Azure	AWS	Force
Data Storage	AWS	Force	GAE

PaaS vendor repository



1. Overall Application

Best Fit : AWS



- **My app is computationally intensive. I need guaranteed published transaction processing speed. Transaction time includes both CPU Compute + DB query times combined.** EC2 offers various sizes of instances. EC2 provides auto scaling and Cluster Compute Instances for HPC applications
- **My app has high availability and high SLA expectations (published).** EC2 has 99.95% SLA; S3 has 99.9% SLA.
- **My app is a new initiative and I need development, debugging, testing, source control, configuration management and cloud deployment tools.** Amazon provides AWS toolkit for Eclipse for developing Java based applications. In addition, the toolkit provides features such as remote debugging and deploying to Amazon EC2 instances

What are the areas of concern for PaaS?

Application Characteristics

- How does the application development lifecycle and environment look like?
- Which programming language is being used?

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Usage Patterns

- What is the typical usage patterns for the application?
- Is it a lightweight web 2.0 application?
- Or rather a JEE Portal?
- Does it need integration with new social media and collaboration tools?
- Do you need batch processing and management?

7

Business Logic

- How is the business logic implemented?
- Is it coded directly programming language?
- Service orchestrations?
- BPM with business rules?

5

Integration

- Is the integration going dealing with messaging?
- Asynchronous and synchronous patterns are needed?
- Does the application interface with external systems? Legacy Systems? ERPs?

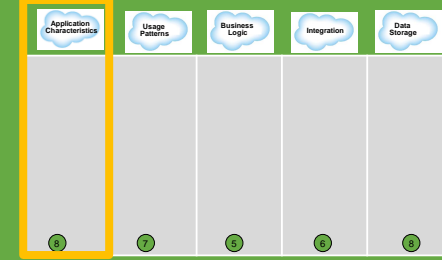
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Data Storage

- Topics like SQL and NoSQL are relevant.
- Application requires a relational/SQL database structure

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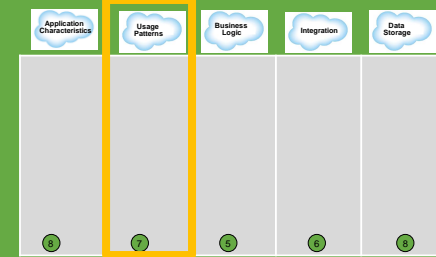
PaaS Assessment – Application Characteristics



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
Is your application heavily based on Java or on .NET technologies?	<input type="checkbox"/> Java <input type="checkbox"/> .NET <input type="checkbox"/> both	Azure for .NET, readily available AMIs for Java/JMI on AWS
Does your application have high SLA requirements?	Range from 99.99 to 99.999999	Azure published SLAs with 99.9999 while AWS EC2 has 99.95 and S3 99.9
Does your application require SAS70 security?	<input type="checkbox"/> SAS70 <input type="checkbox"/> PCI Level 1 and 2 <input type="checkbox"/> Other	Ensure the chosen vendor offers the certifications you require

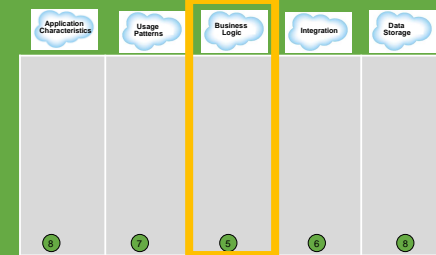
PaaS Assessment – Usage Patterns



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
Does your application have strong content management usage requirements? E.g.: portal, web 2.0 tagging, social media integration.	<input type="checkbox"/> Yes <input type="checkbox"/> No	Azure provides strong capabilities AWS has Beanstalk third-party AMIs GAE has some built-in support
Is your application a batch system? Do you need a batch-job controller, monitor and scheduler with ability for batch job, restart and recovery?	<input type="checkbox"/> Yes <input type="checkbox"/> No	AWS has MapReduce GAE must be coded with partial existing APIs (Cron/Task Services).

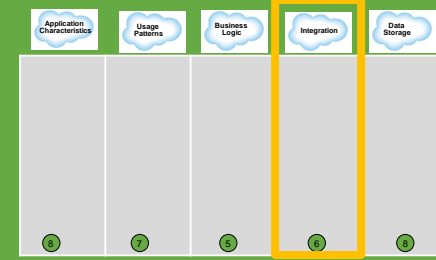
PaaS Assessment – Business Logic



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
Does your application need business logic in form of business processes/workflows or business rules?	<input type="checkbox"/> Yes <input type="checkbox"/> No	AWS has third-party AMIs with BPM solutions. Platforms are still evolving for different application styles.
Is your app's business logic heavily transactional,? Do you need native/advanced trans. server messaging & queuing?	<input type="checkbox"/> Yes <input type="checkbox"/> No	AWS and Azure provide transactional services, e.g. messaging. Others still stick to the non-transactional characteristics of distributed computing.

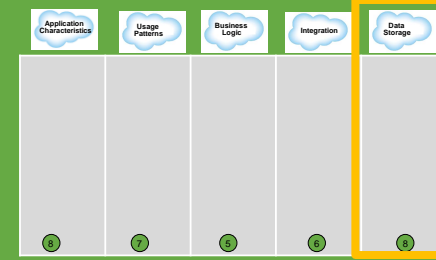
PaaS Assessment – Integration



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
Do you need synchronous and asynchronous message integration queuing for my application?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>Azure and AWS have messaging services</p> <p>GAE provides Task and XMPP Services</p>
Do you require various integration interfaces with external clients and/or providers? Such as ERP, CRM and supply chain system?. Need a large 3rd party integration marketplace?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>Force.com has a list of 3rd party adapters.</p> <p>AWS lets you create a solution based on IaaS.</p> <p>GAE tells you to build it in Java for example.</p>

PaaS Assessment – Data Storage



Examples for critical questions and the impact of possible answers

Critical Question	Possible Answers	Potential Impact
Does the application require a relational/SQL database structure?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<p>Azure has SQL Service.</p> <p>AWS has Relational Database Services</p> <p>GAE has only BigTable (NoSQL), but SQL Service is in the roadmap.</p>
How big is the data storage right now? How big in 3 years?	In TB or PB	Increasing data can use Big Data offerings from AWS or GAE

PaaS case study

- Client requested the development of a highly scalable web application, following key requirements
 - Performance
 - Scalability
 - Usage of social media, integration with Twitter, Picasa and other tools
 - Platform for development and execution should be available
 - It has to be up and running as soon as possible
- Solution used was Google App Engine, which delivered the non-functional requirements and the fast time to market.

Taking a mission-critical application to the cloud for Origin Digital



Origin Digital is a global IP broadcasting company. It is headquartered in the New York City area and has offices in Canada and the United Kingdom. The company's enterprise- and consumer-facing solutions include live IP broadcasts, on-demand publishing, and portal production that make it easy for organizations to manage delivery of video content to any device, in any format.

Business challenge

Origin Digital wanted to create a more scalable transcoding workflow environment that delivered the same high performance its customers enjoyed but with lower operating expense, easier management, and without requiring additional capital expenditures for underutilized resources.

“We’re seeing significant reductions (in some cases ½) in computing resource cost for comparable workflows by using the Cloudcoder running on Windows Azure.”

Curt Kendall, Vice President of Products, Origin Digital

Accenture's role

Working with Accenture and Avanade, Origin Digital built its Cloudcoder application, using the Microsoft Visual Studio® 2008 development system, in about two months. The Cloudcoder integrates into the Origin Digital central management platform while offloading much of the processing to the cloud. Customers upload digital files to the Origin Digital network, and the Odaptor calls the Cloudcoder service, which transcodes the file.

Technologies used:

- Microsoft Azure
 - Compute
 - Blob Storage
 - Message Queue
- SQL Azure Database
- WCF integration with Origin Digital “on-premise” backend

Results

By building the Cloudcoder on the Windows Azure platform, Origin Digital gained real-time scalability, and reduced administration, time-to-market, and costs.

- Real-time scalability
- Reduced administration
- Faster time-to-market
- Reduced costs

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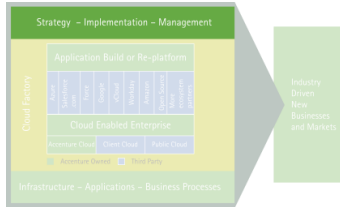
We are currently extending the tools in following areas...

- Vendor Lock-In
 - Can solutions be migrated easily?
- Licensing
 - Is the license model already set?
 - Does it need to be extended?
- Legal Compliance
 - EU Directives
 - Export Compliance
- Aligning and updating our point of view (PoV) for the current PaaS market

Cloud Computing is for you, if ...

- ... you need to cover unpredictable load peaks.
- ... you want to benefit from the scaling effects of large data centers.
- ... you want to start small but scale quickly based on demand.
- ... you want a more agile and standardized infrastructure.
- ... you want to benefit of control and measurable effects of a clear infrastructure and platform landscape.

Strategy | Implementation | Management ... this is part of a higher level framework...



Expertise

Strategy

Adapt your IT strategy and plan for cloud services integration

Accenture identifies and prioritizes significant opportunities across infrastructure, applications, business processes and for developing new businesses.

Industrialization Differentiators

- Industry-specific cloud points of view to focus quickly on areas that matter
- Cloud strategy methodology
- Accenture Cloud Computing Suite and unique assets, tools and cost models

Implementation

Migrate smoothly from legacy IT to new, lower cost solutions

Management

Manage a hybrid environment of cloud services & legacy IT

We recommend you to ...

**... check your application
portfolio today ...**

**... in order to benefit from
cloud computing tomorrow!**

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A bright blue sky with scattered white clouds. The clouds are fluffy and vary in size, with some larger ones on the left and right sides, and smaller ones scattered throughout. The overall scene is bright and clear.

Act now!