

Windows Server RIP

Rainer Stropek

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@rstropek

Abstract

Sie fragen sich, was an Cloud Computing so revolutionär sein soll? Besuchen Sie Rainer Stropek in dieser Session und sehen Sie, warum Windows Azure so grundlegend anders ist, als alles, was wir bisher von Rechenzentren gekannt haben. Netzwerk, Server, Load Balancer, Fabric, CDN - was ist dran an dem "Betriebssystem für die Cloud"?

Ever asked yourself why Cloud Computing is considered a „disruptive technology“? Come and join Rainer Stropek in this session and see, why Windows Azure is so fundamentally different than everything you used to know from your on-premise data center. Network, servers, load balancers, fabric, CDN – after the session you will have a clear understanding about Microsoft's „operating system for the cloud“.

Parts of this slide deck has originally been developed by Rainer Stropek together with Max Knor, Technical Global Alliance Manager, Global Partner Team, Developer & Platform Evangelism, Microsoft Corp.

Introduction

- [software architects gmbh](#)
- Rainer Stropek

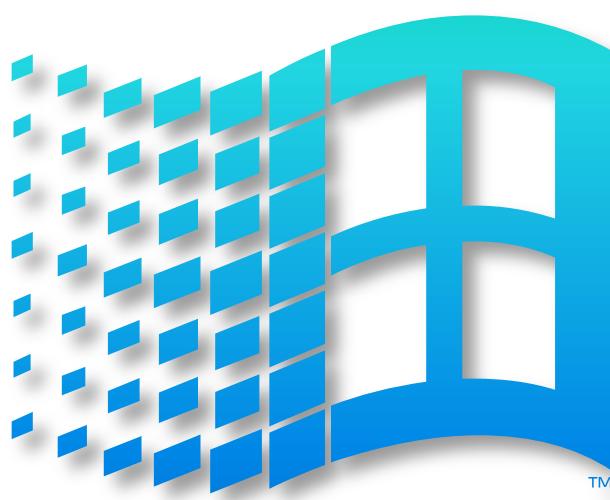
Developer, Speaker, Trainer

MVP for Windows Azure

rainer@timecockpit.com



<http://www.timecockpit.com>
<http://www.software-architects.com>



I



U



**To start using Windows Azure and Cloud Computing,
I have to learn a lot – sorry, no time for that!**

Just another
Windows Server

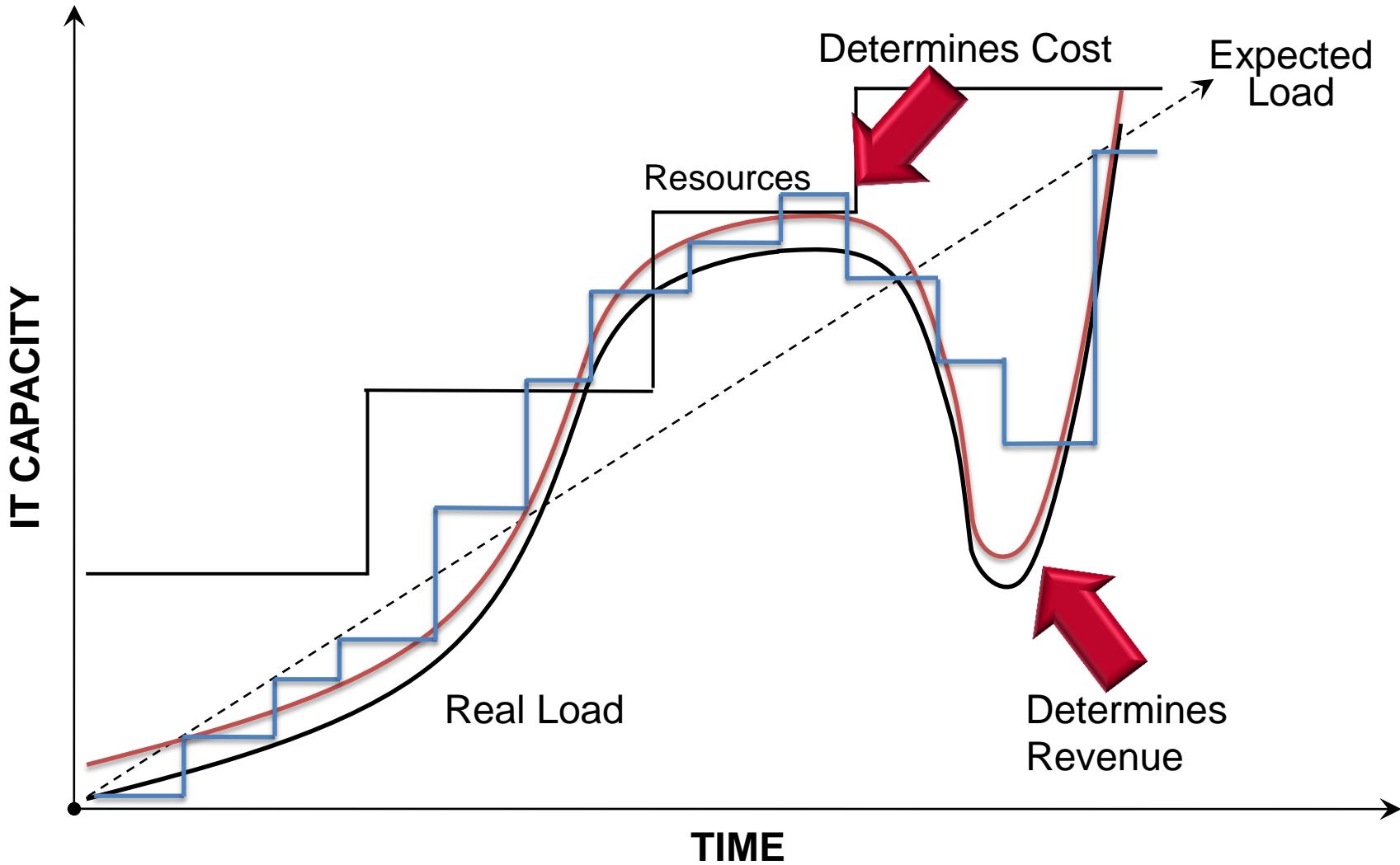
Just another
IIS

Just another
SQL Server

Just another
Server Cluster

Just another
Web Farm

Just another
SQL Server Cluster





Intelligent Network Load Balancer



Network Activation



Stateless Web and/or Application Servers



Stateless “Worker” Machines



Async Activation



State Tier

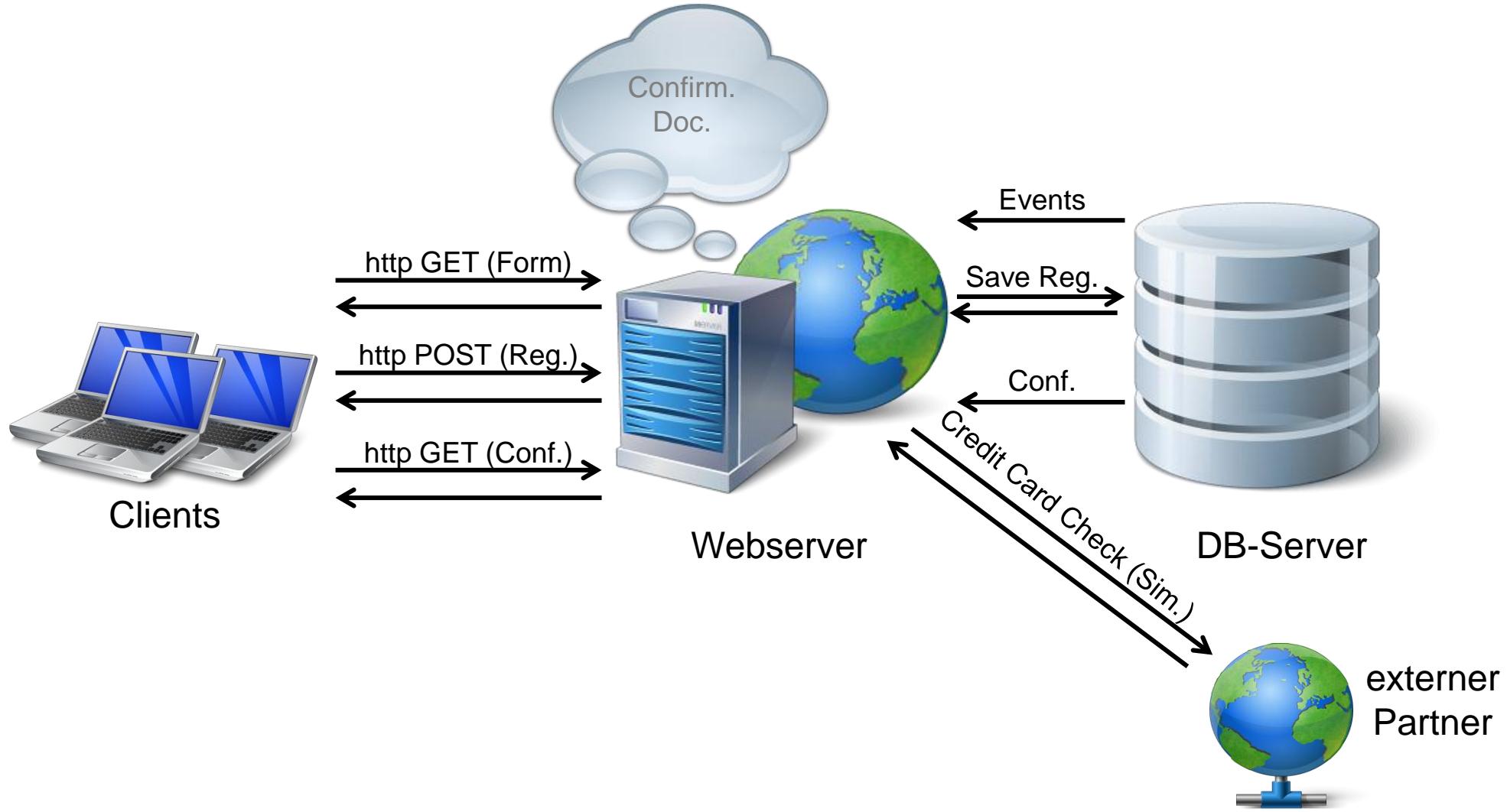
Queues

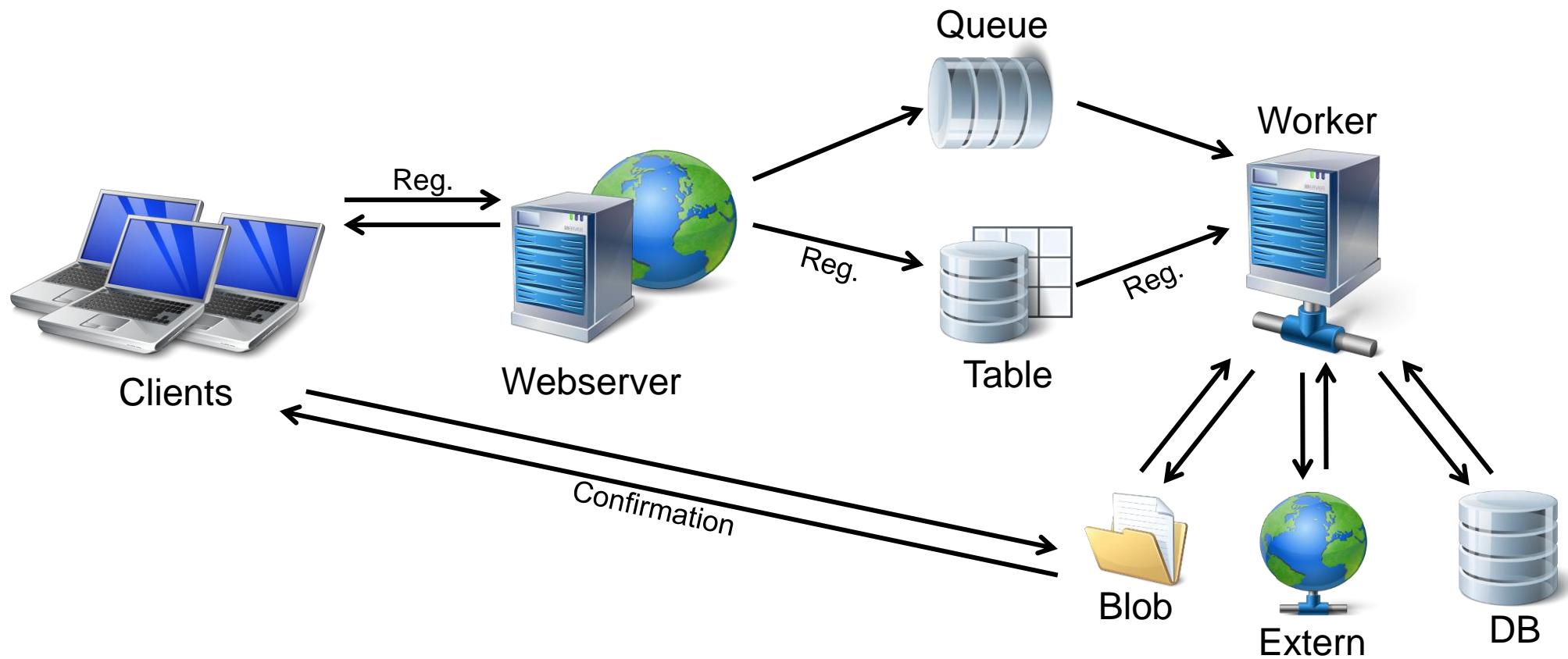
Key/Value Datastores

Partitioned RDBMS

Shared Filesystem



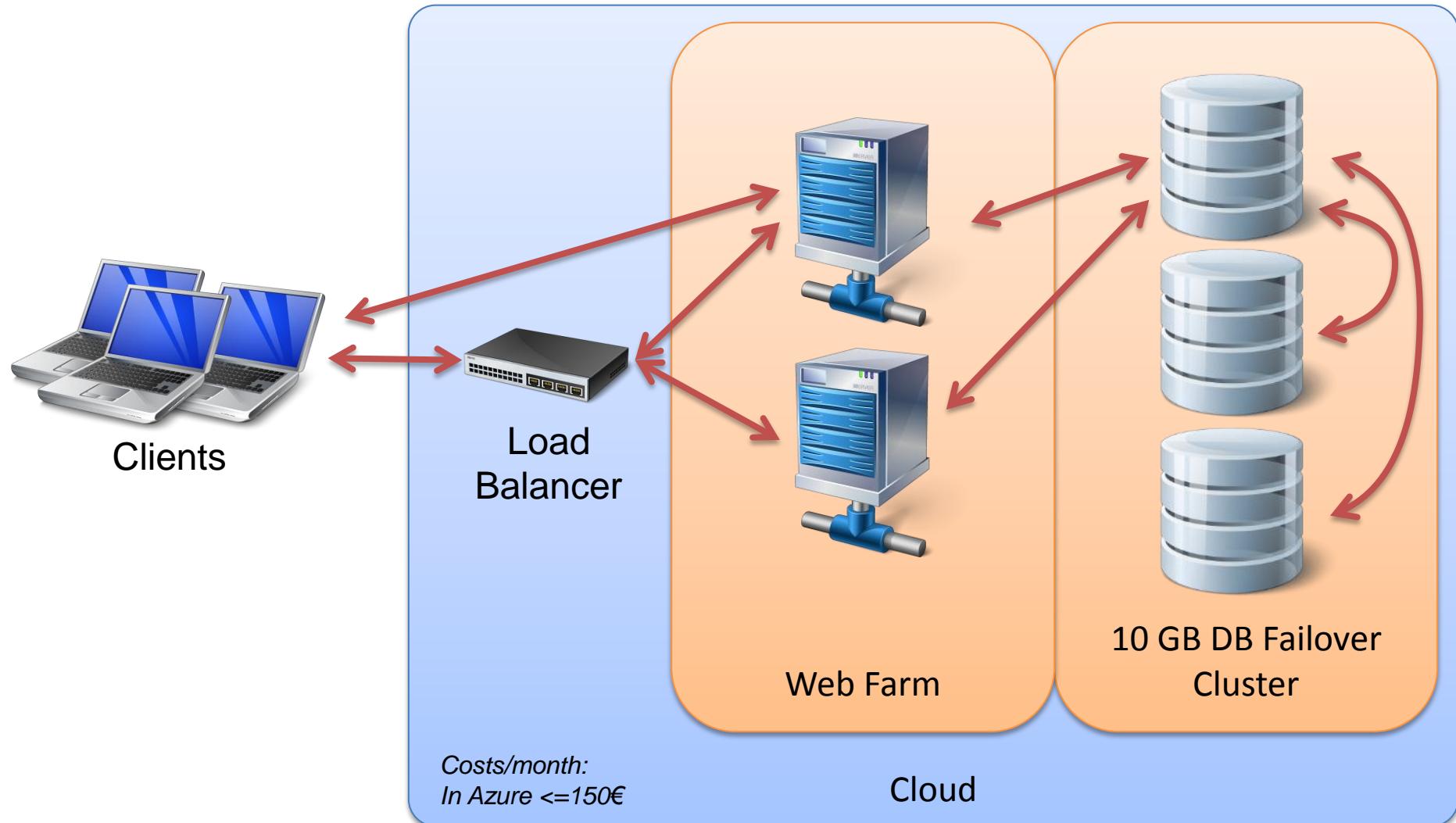






Sorry, can't use Azure in my projects,
it's too expensive!

Check out next issue of dot.net magazine:
Top tips to get more for your money in Windows Azure



Windows Compute Emulator

- *Windows Azure Compute Emulator* aka **DevFabric**
 - Part of [Windows Azure SDK](#) → free
- Simulates Windows Azure during development process
 - For debugging
 - To reduce cost
 - To develop offline
- Emulator ≠ Windows Azure
 - Emulator can access resources on local machine
 - Local resources will not be available in the cloud
 - → Tests in emulator do not replace tests in the real cloud

Windows Compute Emulator

- Prerequisites
 - [Windows Azure SDK](#) and Azure-Tools für VS
 - Visual Studio 2010
 - IIS and SQL Server 2008 R2 (see also [MSDN](#))
- Installation
 - Installation of SDK and Tools
 - Configure emulator (see also [MSDN](#))
- You can only access apps in emulator locally
 - Tip: Various blog article in the web describe who to make apps in emulator available over the network (e.g. [Emmanuel's Blog](#))

demo

Windows Compute Emulator

Local development environment for the cloud

Occupy Roles Wisely

Web Role

- IIS (since 1.4)

Worker Role

```
• While (true)  
{ }
```

VM-Role

- Custom

- Web Role for...
 - ...anything that should be hosted in IIS
 - ...multiple web sites in a single role
- Worker Roles for...
 - ...any kind of background work
 - Remember: Can be combined with web role
- VM-Role only if...
 - ...you are unable to automate role setup (startup tasks)
 - ...software necessary for role setup is unstable
 - ...software necessary for role setup needs UI

Care About Storage Types, you must!



Storage

Per GB stored and
transactions

\$0.15 GB/month

\$0.01/10k transactions

Web Edition

Per database/month

\$9.99/month

(1-5 GB DB/month)

Business Edition

Per database/month

Starting at \$99.99/month

(10-50 GB DB/month)

- Think about...
 - ...storage volume needed
 - ...number of transactions
 - ...programming effort
- [Background information](#) for Azure Storage Pricing

- ...client capabilities
- ...necessary performance
- ...necessary throughput
- ...static/dynamic nature

When To Use What??

SQL Azure

- Strong programming model needed
- Need for complex [ACID](#) transactions

KO:

- Restricted storage amount acceptable (currently max. 50GB/DB)
- TDS is possible (soon no-code OData will be an option)

Windows Azure Storage

- [Price](#) sensitive (~1/65th compared to SQL Azure)
- Auto-scale out → Fast
- Large storage volumes (many, many TBs)
- REST/HTTP needed
- CDN needed
 - Possible with SQL Azure + web role, too – not without code
- NTFS needed (Drives)
- Queues needed

The background of the image is a dense, overlapping pile of ripe peaches. The fruit is primarily orange with some yellow and green at the stems. They are arranged in several rows, filling the frame.

Cloud Computing is nothing else than hosting – **nothing new!**

demo

Webfarm

Windows Azure Compute Emulator

Service Deployment

Service Model

Webportal
(API)

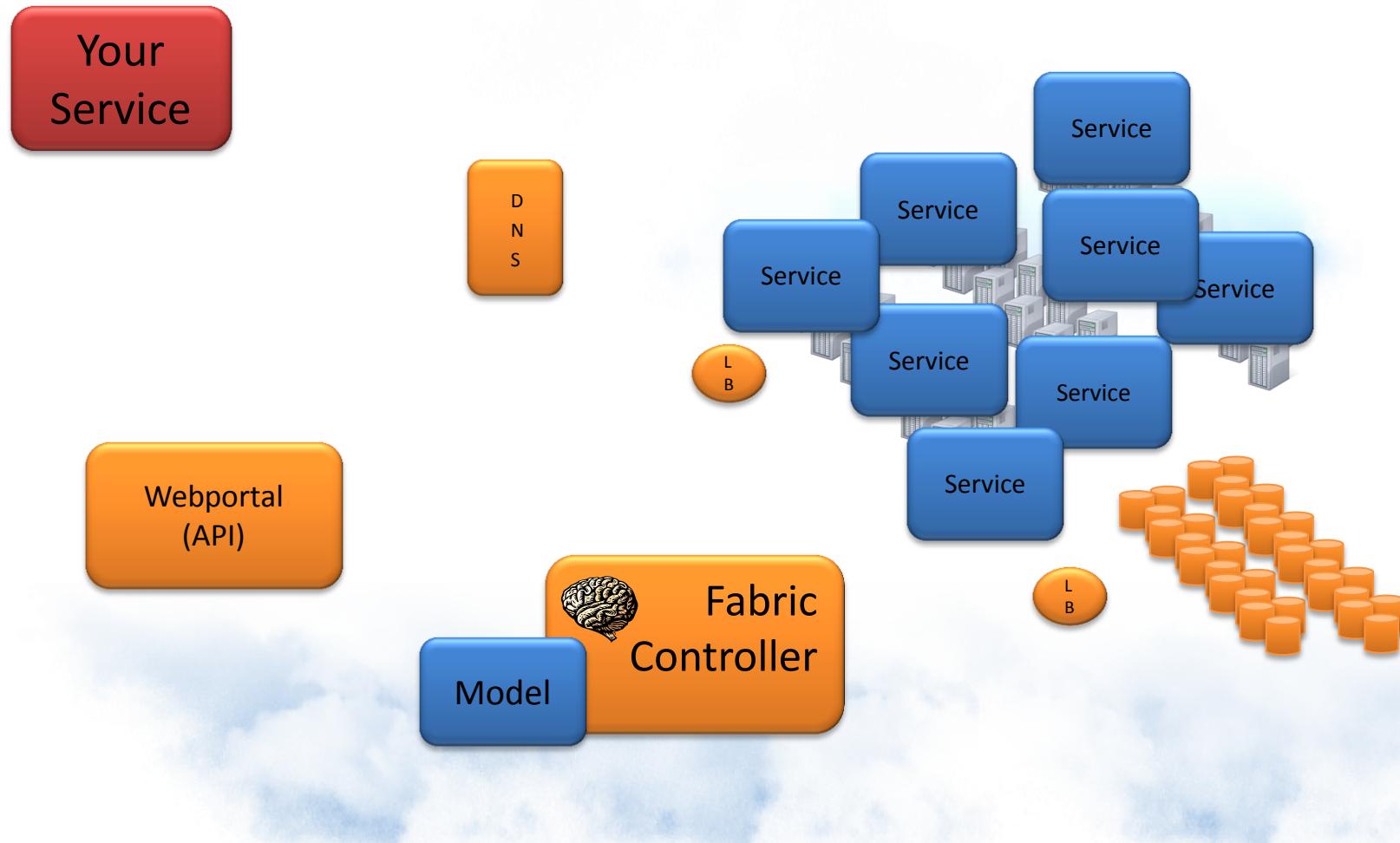
config
Fabric Controller

D
N
S

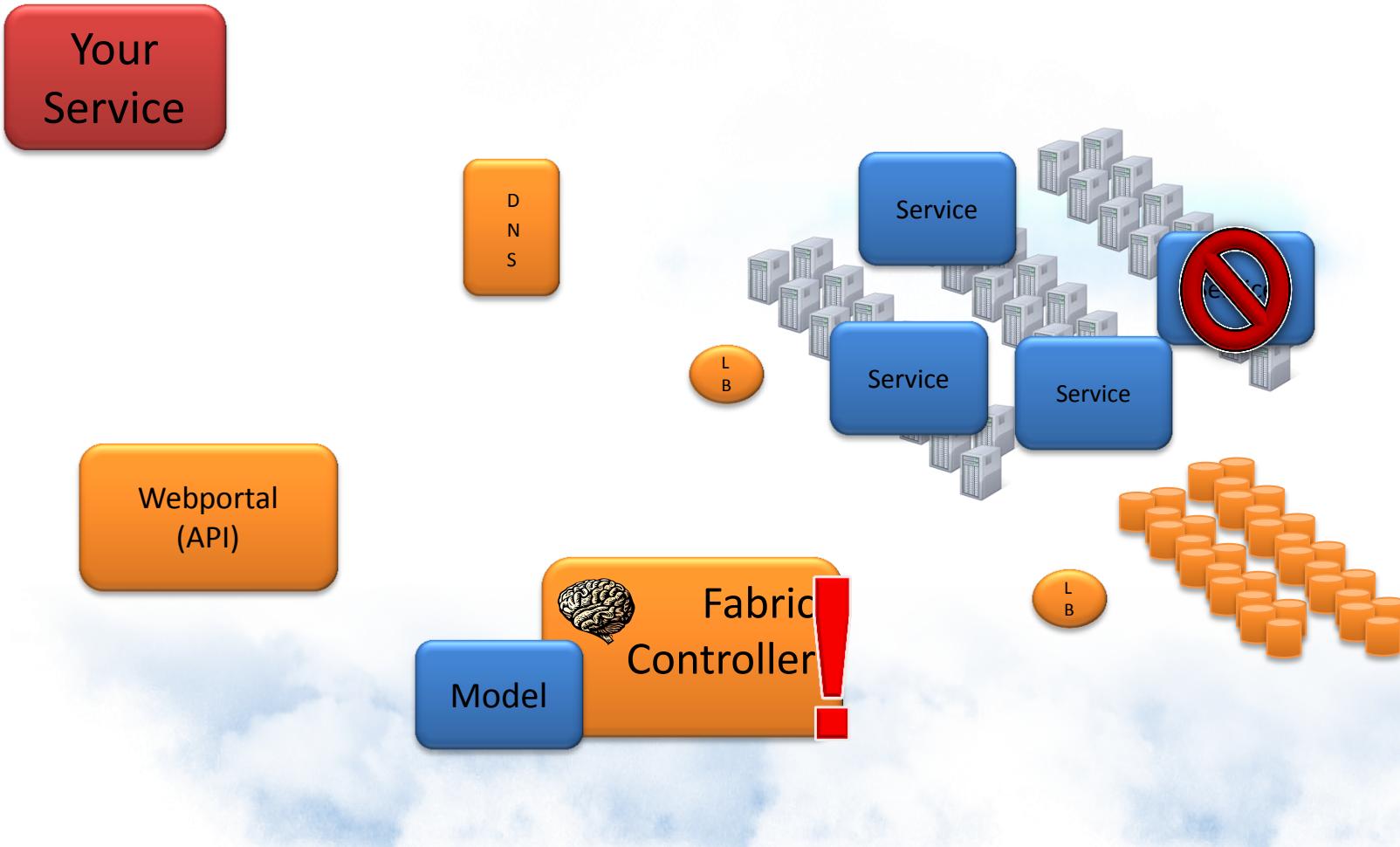
L
B



Service Scaling



Service Monitoring & Recovery



Microsoft's SLAs → No Silver Bullet

You get credits, not compensation for damage

$$\frac{\text{Maximum Connectivity Minutes} - \text{Connectivity Downtime}}{\text{Maximum Connectivity Minutes}} = \text{Monthly Connectivity Uptime Percentage}$$

ii. Monthly Connectivity Uptime Service Levels

Monthly Uptime Percentage	Service Credit*
<99.95%	10%
<99%	25%

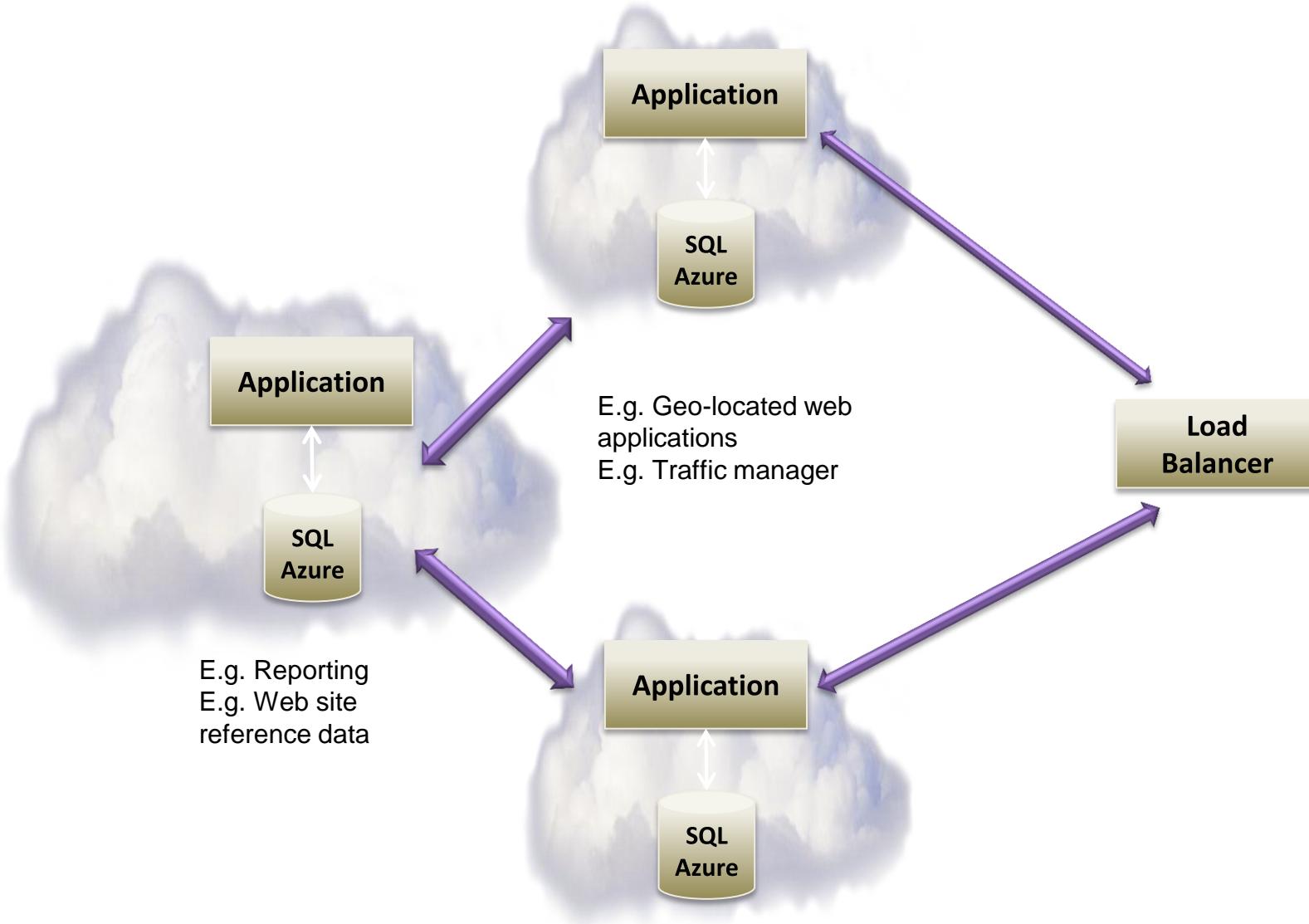
*Service credit applies only to Windows Azure Compute Services (i.e., not Windows Azure Storage or other Windows Azure platform services)

iii. Monthly Role Instance Uptime Service Levels

Monthly Uptime Percentage	Service Credit*
<99.9%	10%
<99%	25%

*Service credit applies only to Windows Azure Compute charges (i.e., not Windows Azure Storage or other Windows Azure platform services)

Backup still important!



Windows Azure Traffic Manager

Getting Started
Common Tasks
Help and Support
Beta Programs

Beta Programs

Thank you for your interest in Windows Azure Beta Programs. Access to Windows Azure beta programs is by invite only, and is being allocated on a first-come-first-serve basis.

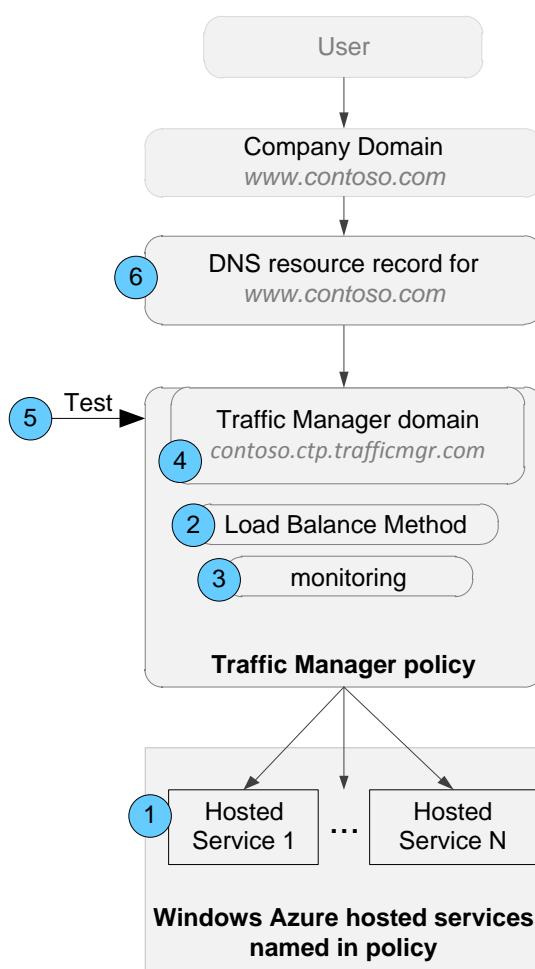
To apply for a beta program, select the program's checkbox and click "Apply for Access".

We appreciate your patience.

Name	Description	Status
▶ Windows Azure Connect	The Windows Azure Connect CTP provides secure IP-level connectivity between Windows Azure and on-premises IT resources. Please see Virtual Network for more details.	Active
◀ Traffic Manager	The Windows Azure Traffic Manager CTP is a new feature that allows you to load balance traffic to multiple hosted services. You can choose from three load balancing methods: Performance, Failover, or Round Robin. Traffic Manager will monitor your hosted service on any http or https port you choose. If it detects your service is offline it will send traffic to the next best available service. Please see Virtual Network for more details.	Active
MVP MSDN Abo		Active
Special: a-alejim		Active
▶ VM Role	The VM Role Beta Program includes a new Windows Azure role that allows you to upload a custom virtual hard disk image of a Windows Server 2008 R2 virtual machine and run it in Windows Azure. By checking the box to opt-in to the VM Role Beta program, you accept the license terms for your use of the Windows Server 2008 R2 software in the VM Role Beta Program.	Active

Home

Windows Azure Traffic Manager



Create Traffic Manager policy

Choose a subscription: Special: a-alejim

Choose a load balancing method:

- Performance: Detects the location of the user traffic to route it to the best online hosted service based on network performance.
- Failover: Create an ordered list of hosted services. All traffic is routed to the online service highest on the list.
- Round Robin: Equally distributes traffic to all hosted services.

Select hosted services to include in policy

Type to filter DNS names:

Available DNS names:

customodataprovider.cloudapp.net	West Europe
devconnections2011.cloudapp.net	West Europe
importosmlarge.cloudapp.net	West Europe
loadtestingdemo.cloudapp.net	West Europe

Selected DNS names:

Specify a monitoring endpoint

Protocol: HTTP Port: 80 Relative path and filename: /

Specify DNS settings

Traffic Manager DNS prefix: .ctp.trafficmgr.com

DNS time to live (TTL): 300 seconds

Create Cancel

BigMat

MATERIALS BANYOLES

MAGATZEMS PROFESSIONALS
PER A LA CONSTRUCCIÓ

C/ Sant Andreu, 103-111 - 17834 BANYOLES

Tel. 972 571 817 - Fax 972 580 940

E-mail: sumiampu@bigmat.es



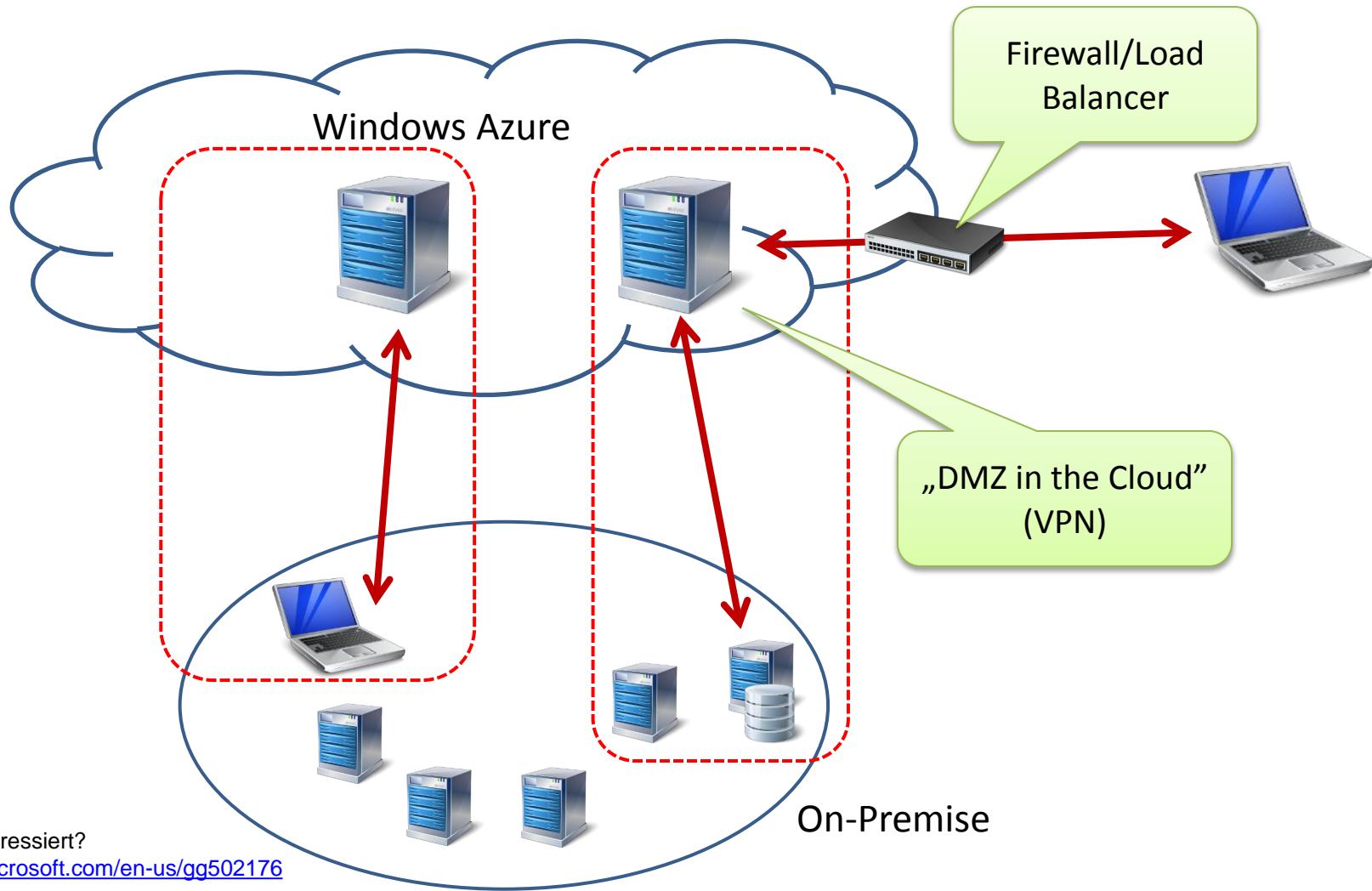
**PROHIBIT EL PAS A TOTA
PERSONA ALIENA A L'OBRA**

Cloud Computing is a **security risk!**

Security

- Data protection
 - Consider relevant data protection laws
 - Possible solution: Windows Azure Connect
- Security
 - Cloud maybe better than on-premise
 - Privacy – certificates, encryption, etc.
 - Availability – clusters, fail-over scenarios, etc.
 - Physical security of data centers

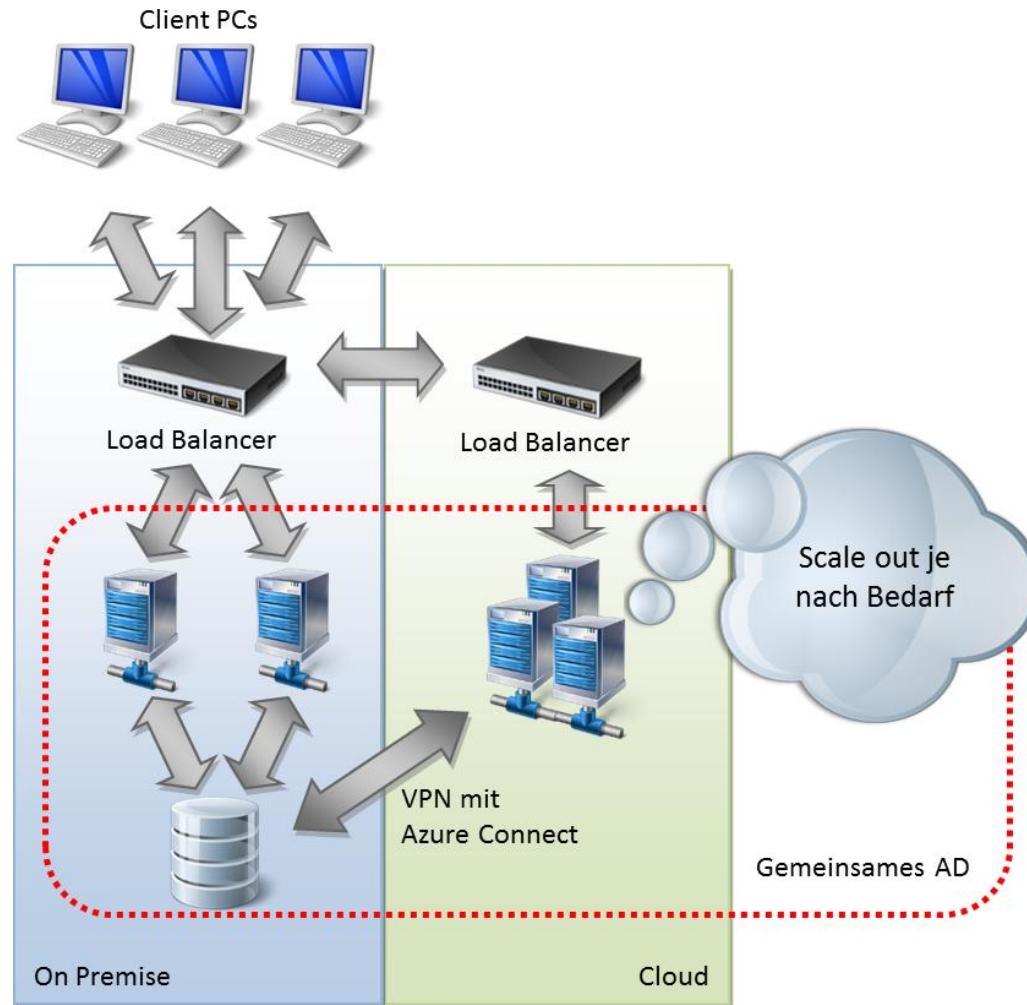
Windows Azure Connect (in CTP)



An Details interessiert?

<http://msdn.microsoft.com/en-us/gg502176>

Scale Into The Cloud



demo

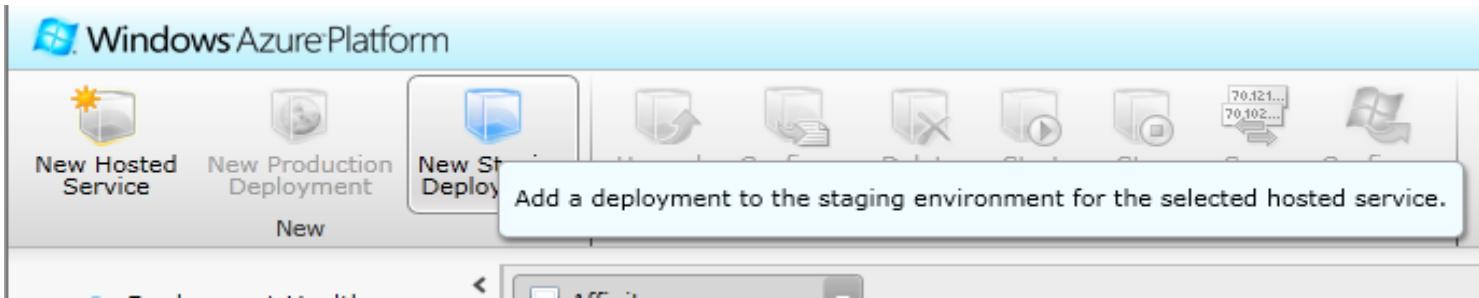
Windows Azure Connect

Access on-premise resources from the cloud



**Deployment in Azure is so complex –
unusable!**

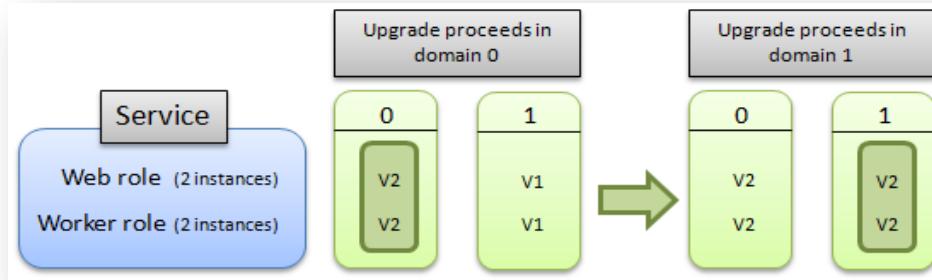
„Production“ and „Staging“



- Production
 - `http://<myapp>.cloudapp.net`
- **Staging**
 - `http://<guid>.cloudapp.net`
 - For testing purposes, to prepare a new version

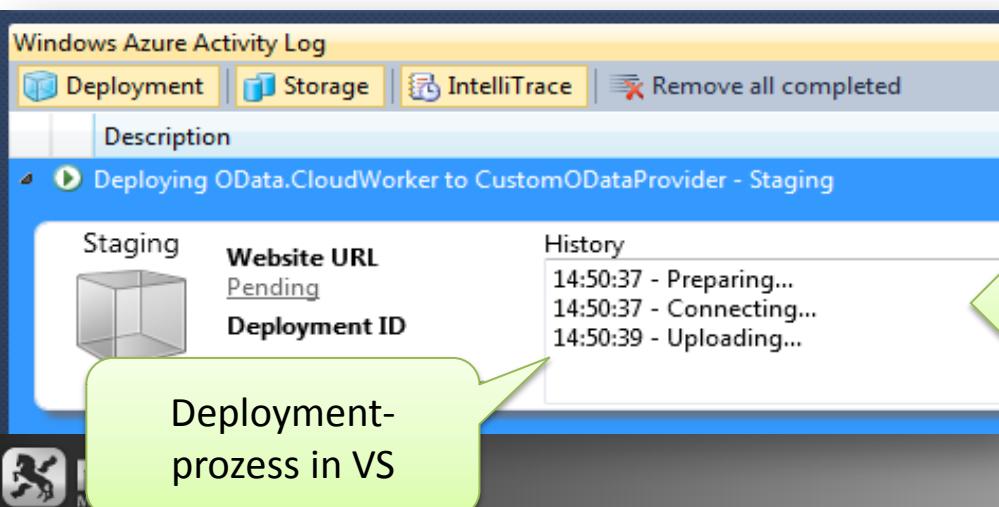
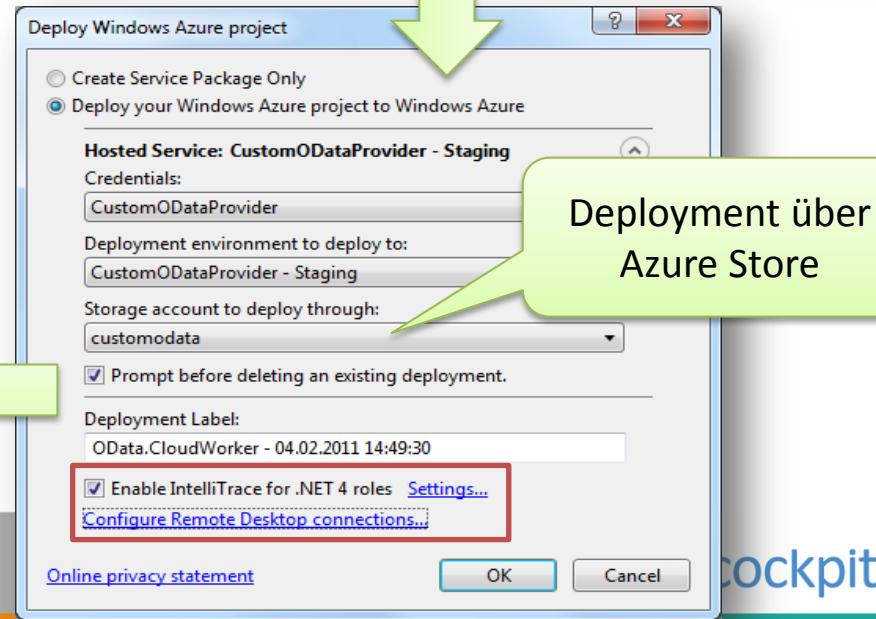
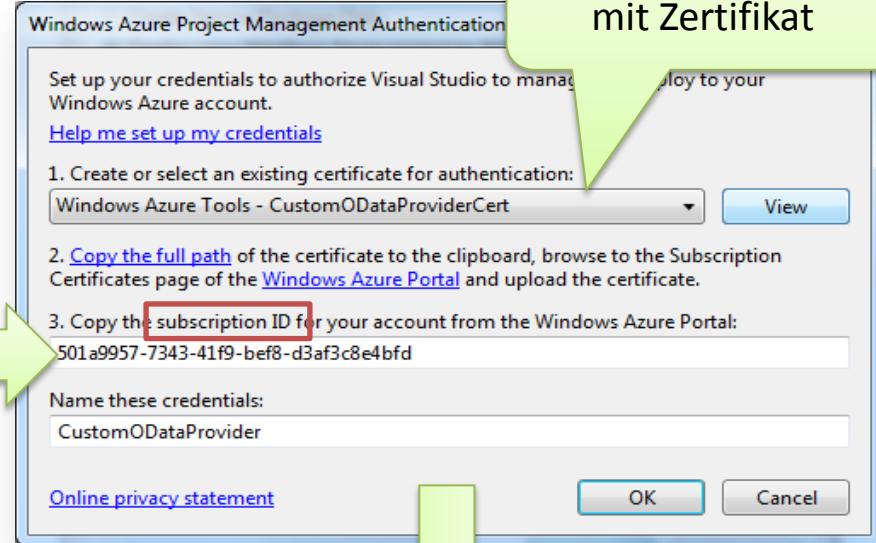
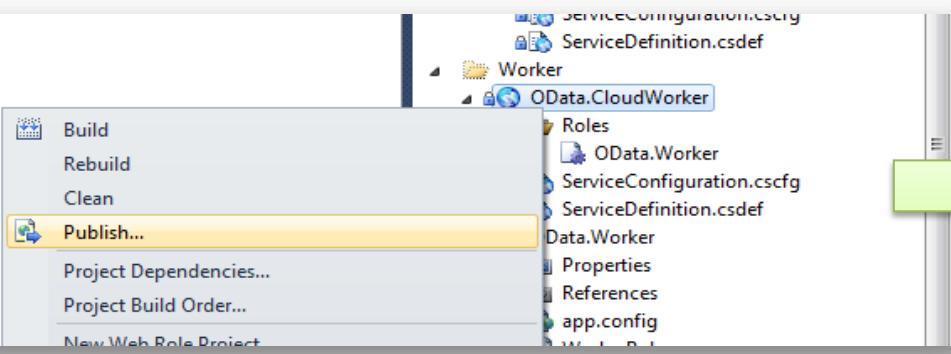
Deployment Types

- In-Place Update
 - Can be done for prod and staging
 - Service model must not change (e.g. same number of roles)



- **VIP Swap (Virtual IP Swap)**
 - Switches between Prod \leftrightarrow Staging
 - Service model may change, endpoints must not change

Deployment mit VS



Deployment über das Portal

<http://windows.azure.com>

The screenshot shows the Windows Azure Platform management interface. The top navigation bar includes links for New Hosted Service, New Production Deployment, New Staging Deployment, Upgrade (which is highlighted with a red box), Configure, Delete, Start, Stop, Swap VIP, Configure OS, Reboot, Reimage, Enable, Configure, and Connect. Below the navigation bar is a sidebar with links for Deployment Health, Affinity Groups, Management Certificates, Hosted Services (3), Storage Accounts (5), User Management, and VM Images. The main content area displays a list of resources under 'Hosted Services (3)'. One service, 'CustomODataService.Cloud - 02.02.2011 16:07:24', is selected. A detailed 'Upgrade Deployment' dialog box is open over the list, also highlighted with a red box. The dialog box contains the following fields:

Subscription:	Special: a-alejim		
Service name:	CustomODataProvider		
Target environment:	Production		
Role to upgrade:	All		
Upgrade mode:	<input checked="" type="radio"/> Automatic <input type="radio"/> Manual		
Package location:	<input type="text"/>	Browse Locally...	Browse Storage...
Configuration file:	<input type="text"/>	Browse Locally...	Browse Storage...
Deployment name:	CustomODataService.Cloud - 02.02.2011 16:07:24		

At the bottom right of the dialog box are 'OK' and 'Cancel' buttons.

VIP Swap



- Prod contains V_x
- Deploy V_{next} to Staging
 - Connect Staging with Staging-DB
 - Final QA
 - Connect Staging with Prod-DB
 - Final QA, Warm-up
- Perform VIP Swap, now V_{next} is online
- Stop Staging **and delete it**

demo

VIP Swap

Prod ↔ Staging

Generic Roles

- Load **Assemblies at runtime** e.g. from Blob-Store
- Possible for Web- and Worker-Roles
 - Web Role: [Windows Azure Accelerator for Web Roles](#)
 - Worker Role: You can easily build that yourself
- More information
 - [Blogartikel von Rainer Stropek](#)
 - [AppDomain-Klasse](#)
 - [Assembly-Klasse](#)



NO ALCOHOLIC
BEVERAGES



NO
SMOKING



NO GLASS
CONTAINERS



NO DOGS
OR PETS



NO MOTOR
VEHICLES



NO
LITTERING



NO OPEN
FIRES



NO
CAMPING



NO
DIVING



NO
BASEBALL



NO BOAT
LAUNCHING



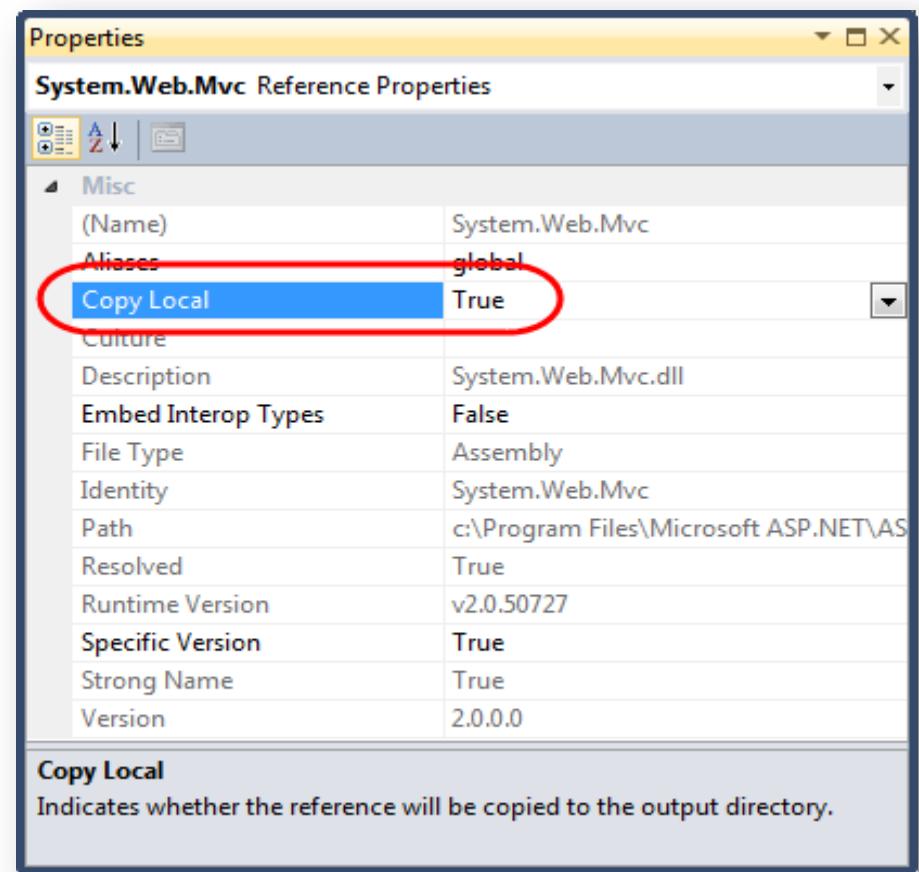
NO
VENDORS

My application needs

non-Microsoft components – they are not installed in Azure!

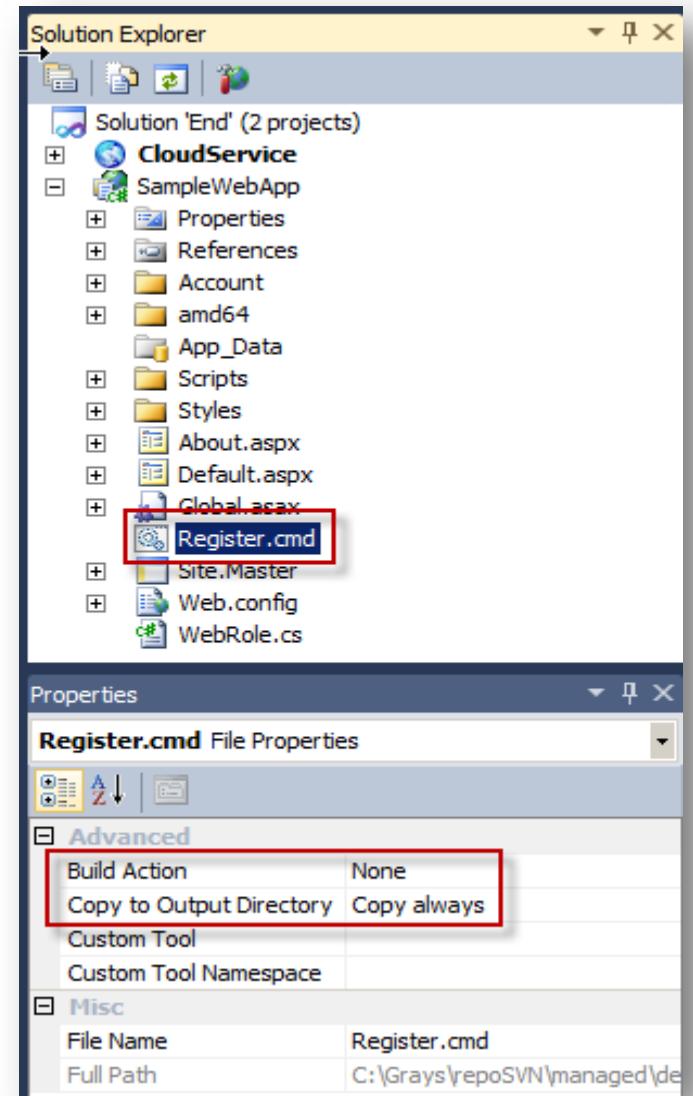
Assemblies

- Copy Local = true for additional referenced Assemblies
- How to deploy other files: see [Adding Files to your Windows Azure Service Package](#)



Startup Scripts

```
<ServiceDefinition [...]>
  <WebRole name="SampleWebApp">
    <Startup>
      <Task commandLine="Register.cmd"
            executionContext="elevated"
            taskType="simple" />
    </Startup>
  </WebRole>
</ServiceDefinition>
```



ServiceDefinition.csdef

```
<Startup>
  <Task commandLine="DACFramework\install_dac.cmd" executionContext="elevated" taskType="simple" />
</Startup>
```

Install_dac.cmd

```
REM Cleanup old log files (just in case)
erase DACFramework\install*.txt
erase DACFramework\install_SQLSysClrTypes.txt > DACFramework\install_log.txt

REM Install DAC components using MSIEEXEC
msiexec /i DACFramework\SQLSysClrTypes.msi /qn /l* DACFramework\install_SQLSysClrTypes.txt
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\SharedManagementObjects.msi /qn /l* DACFramework\install_sharedManagementObjects.txt
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\DACFramework.msi /qn /l* DACFramework\install_DACFramework.txt
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\SqlDom.msi /qn /l* DACFramework\install_SqlDom.txt
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\TSqlLanguageService.msi /qn /l* DACFramework\install_TSqlLanguageService.txt
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\SqlCmdLnUtils.msi /qn /l* DACFramework\install_SqlCmdLnUtils.txt
if ERRORLEVEL 1 goto InstallError

REM Success
echo INSTALLATION SUCCESSFULLY COMPLETED >> DACFramework\install_log.txt
goto EndOfScript

:InstallError
REM Handle installation error
echo INSTALLATION ERROR (ERRORLEVEL=%ERRORLEVEL%) >> DACFramework\install_log.txt
goto :EndOfScript

:Endofscript
```

ServiceDefinition.csdef

```
<Startup>
  <Task commandLine="DACFramework\install_dac.cmd" executionContext="elevated" taskType="simple" />
</Startup>
```

Install_dac.cmd

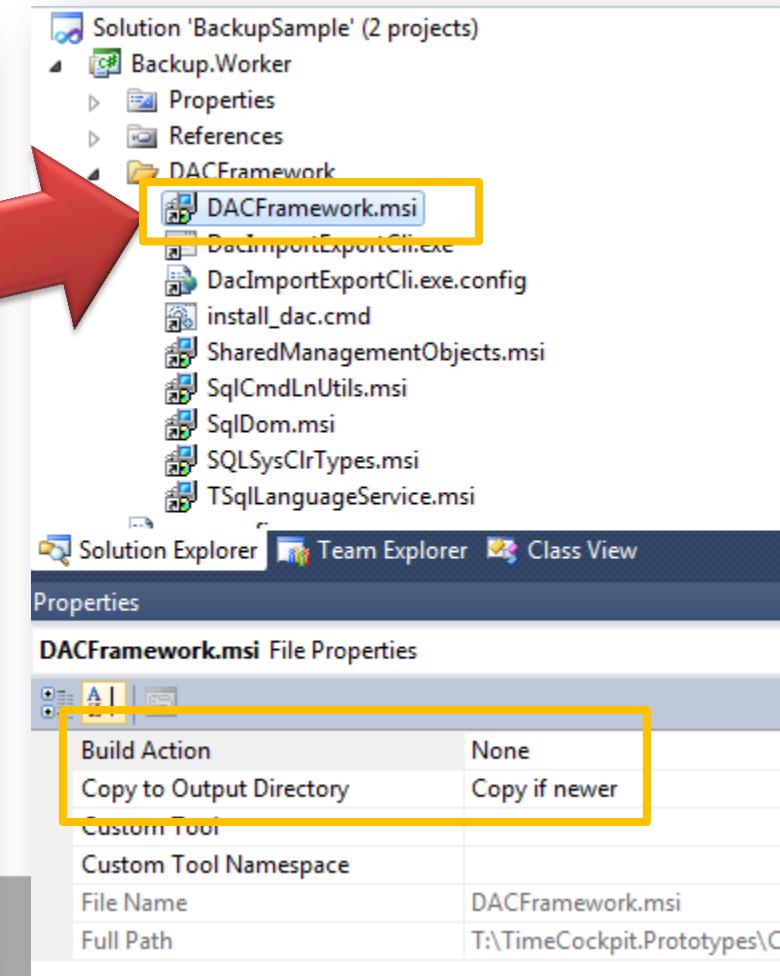
```
REM Cleanup old log files (just in case)
erase DACFramework\install*.txt
erase DACFramework\install_SQLSysClrTypes.txt > DACFramework\install_dac.log

REM Install DAC components using MSIEXEC
msiexec /i DACFramework\SQLSysClrTypes.msi /qn /l* DACFramework\install_dac.log
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\SharedManagementObjects.msi /qn /l* DACFramework\install_dac.log
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\dacframework.msi /qn /l* DACFramework\install_dac.log
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\SqlDom.msi /qn /l* DACFramework\install_dac.log
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\TSqlLanguageService.msi /qn /l* DACFramework\install_dac.log
if ERRORLEVEL 1 goto InstallError
msiexec /i DACFramework\SqlCmdLnUtils.msi /qn /l* DACFramework\install_dac.log
if ERRORLEVEL 1 goto InstallError

REM Success
echo INSTALLATION SUCCESSFULLY COMPLETED >> DACFramework\install_dac.log
goto EndOfScript

:InstallError
REM Handle installation error
echo INSTALLATION ERROR (ERRORLEVEL=%ERRORLEVEL%) >> DACFramework\install_dac.log
goto :EndOfScript

:Endofscript
```





Common Creative License
<http://www.flickr.com/photos/matthileo/3552898254/>

Automation

Startup tasks, deployment, build, etc.

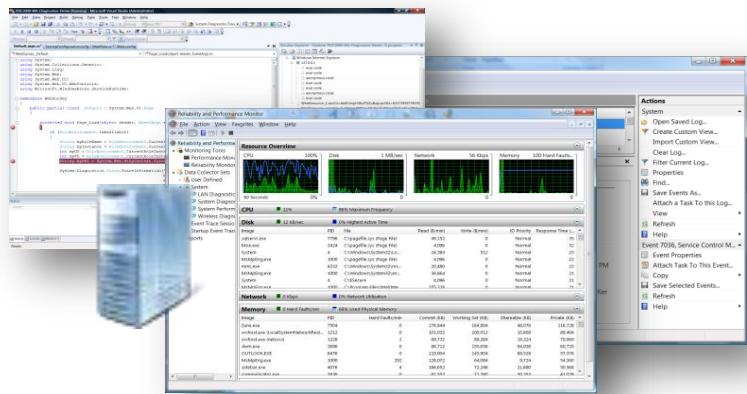


Azure is a **black hole** –
you cannot check what's going on inside!

Monitoring On-Premise vs. Cloud

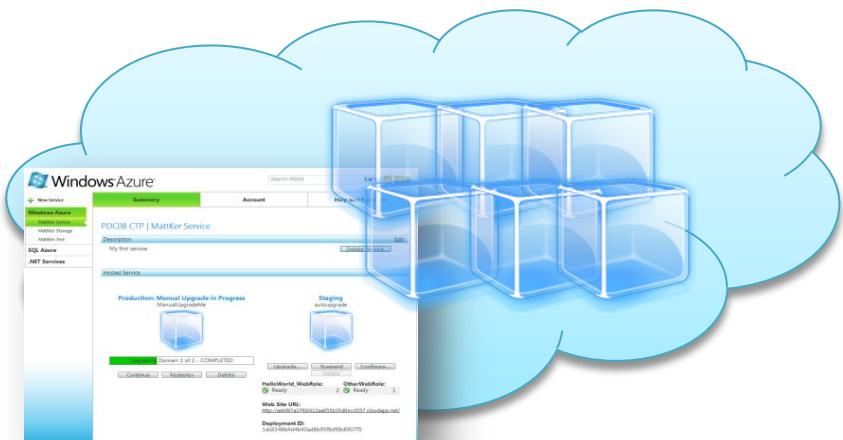
On-Premise

- Static environment
- Well known
- Small number of servers



Cloud

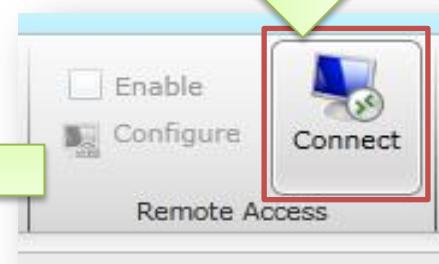
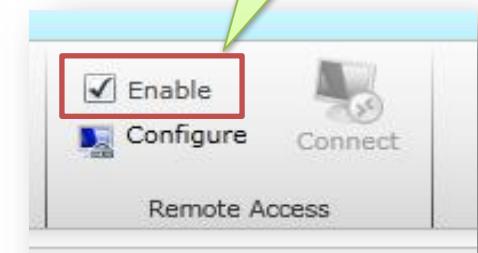
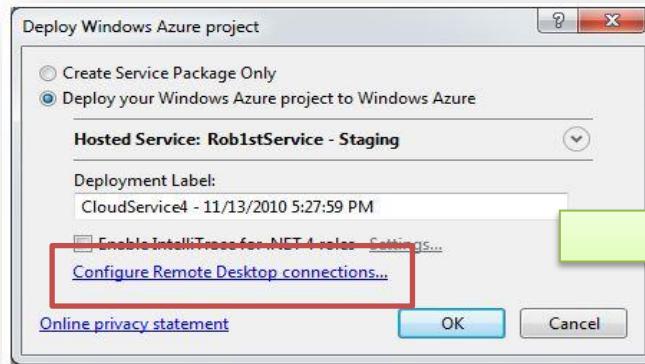
- Dynamic environment
- Many instances, elastic
- Many nodes



RDP vs. Diagnostics

- Remote Access with RDP
 - During development
 - Troubleshooting in specific situations
- Diagnostics
 - Continuous monitoring
 - Long term statistics („Telemetry“)
 - Monitoring of the whole system instead of a single instance

Remote Connection (RDP)



Azure Diagnostics

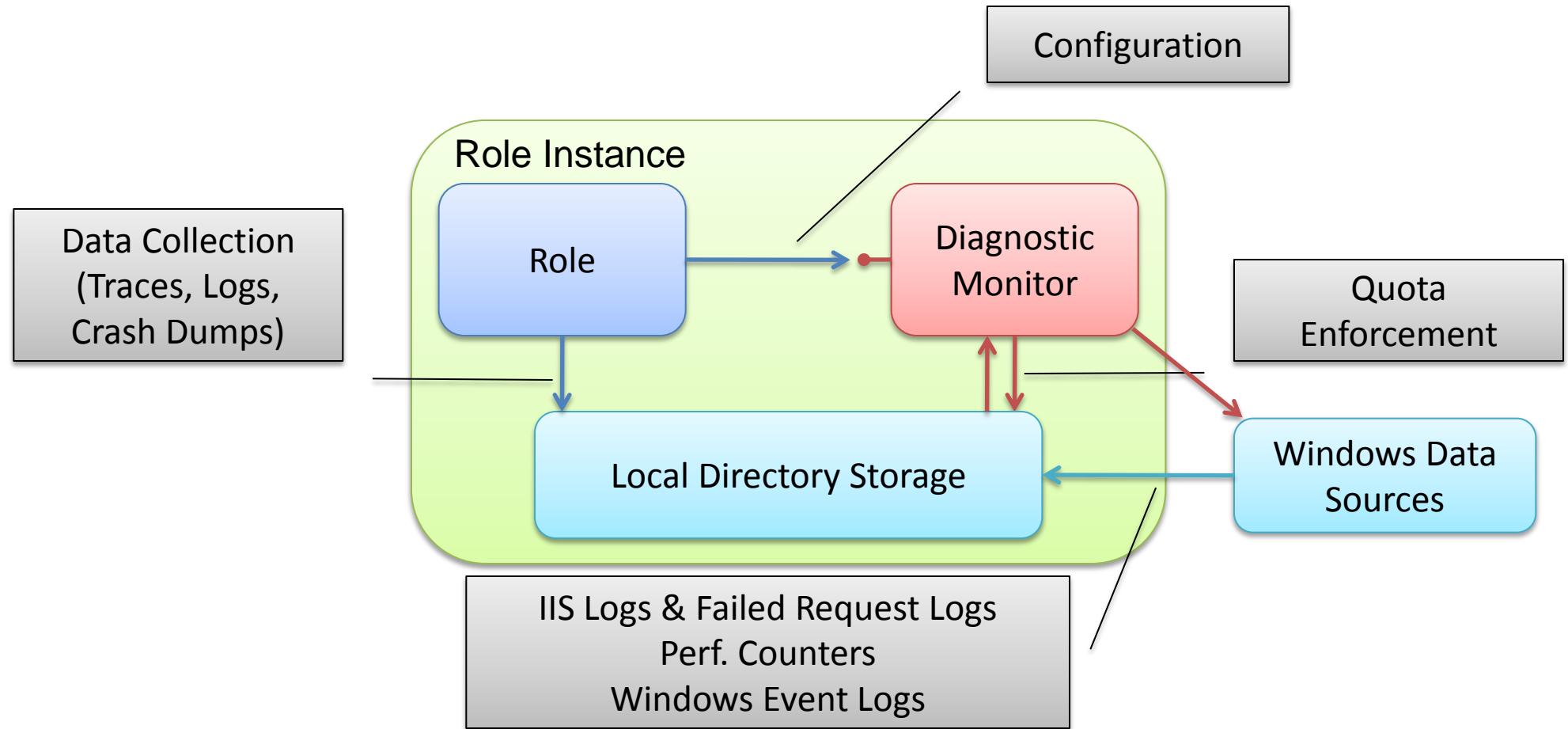


Image Source: Microsoft PDC 09, Session SVC15, Matthew Kerner

Azure Diagnostics

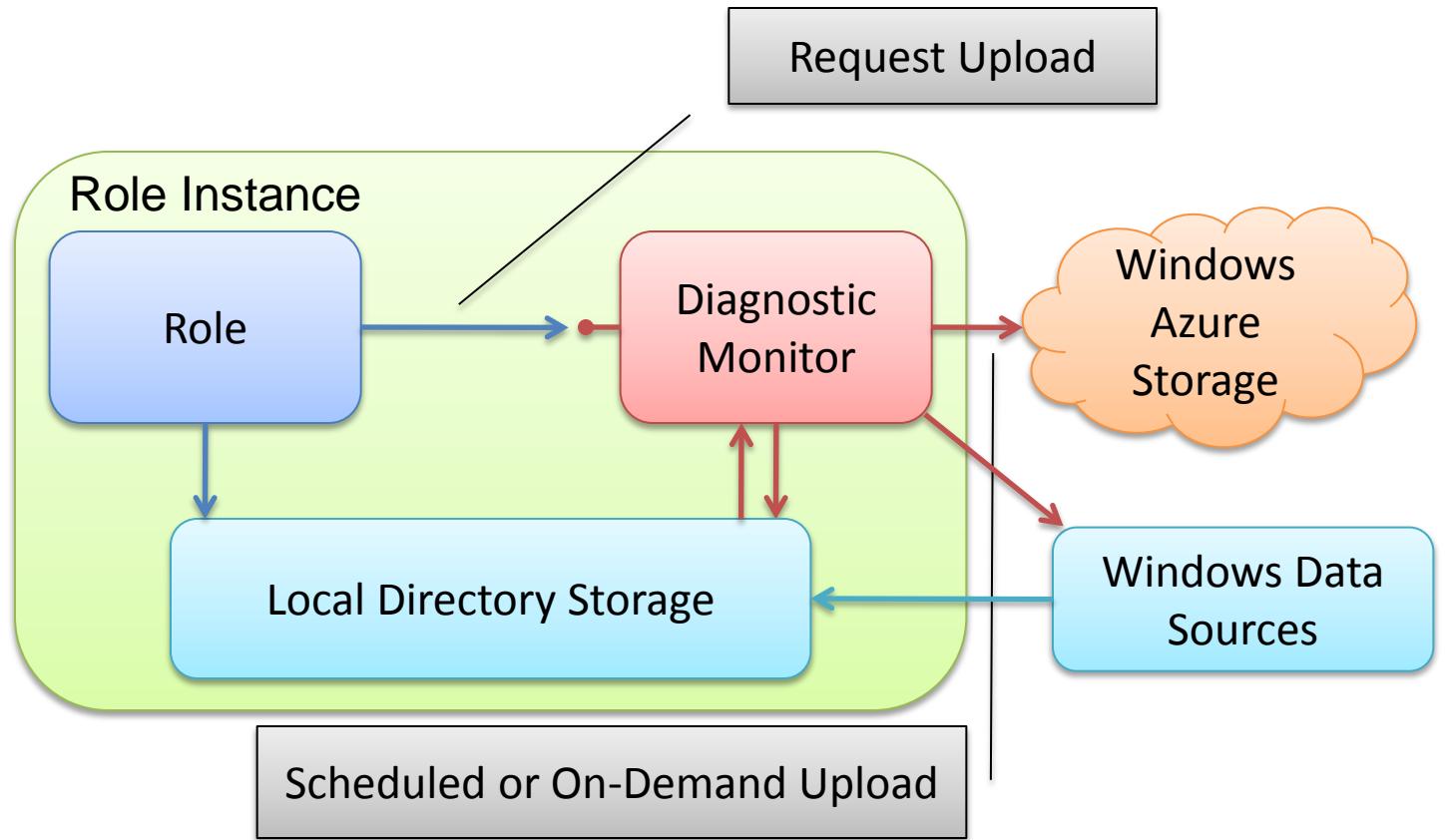
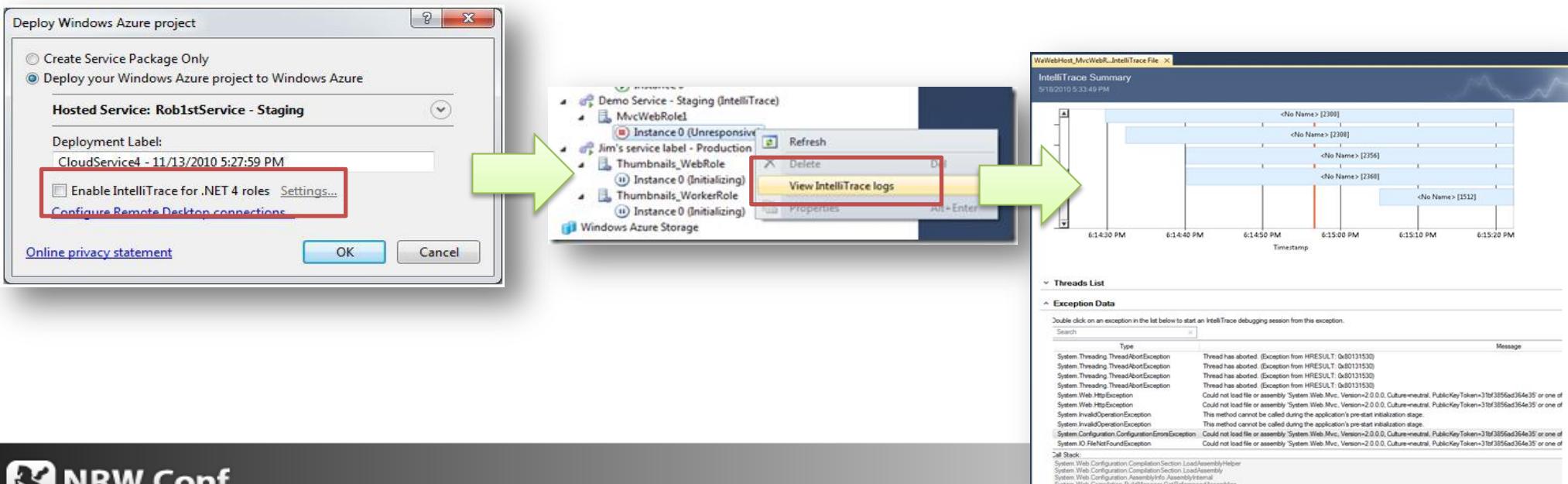


Image Source: Microsoft PDC 09, Session SVC15, Matthew Kerner

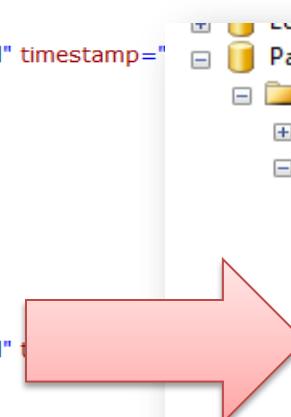
IntelliTrace in Azure

- Logging for specific events (e.g. exceptions) that happened in Azure
- You can open logs in VS (ex-post analysis)
- IntelliTrace-data is stored in Windows Azure Storage



Mission Impossible?

```
<?xml version="1.0" encoding="UTF-8" ?>
- <osm version="0.6" generator="pbf2osm">
  <node id="172539" lat="52.5651847" lon="13.3354546" version="9" changeset="5702878" user="Woschl" uid="121042" timestamp="2010-09-06T21:00:00Z">
    <node id="172540" lat="52.5647252" lon="13.3364064" version="7" changeset="5702878" user="Woschl" uid="121042" timestamp="2010-09-06T21:00:00Z">
      <node id="172541" lat="52.5655270" lon="13.3362226" version="2" changeset="728814" user="bahnpirat" uid="13203" timestamp="2009-03-03T14:11:00Z">
        <node id="172542" lat="52.5660003" lon="13.3375554" version="3" changeset="728814" user="bahnpirat" uid="13203" timestamp="2009-03-03T14:11:00Z">
          <node id="172543" lat="52.5663124" lon="13.3394369" version="4" changeset="3410834" user="toaster" uid="10549" timestamp="2009-12-20T01:32:00Z">
            <node id="172544" lat="52.5666165" lon="13.3432402" version="5" changeset="3410834" user="toaster" uid="10549" timestamp="2009-12-20T01:32:00Z">
- <node id="172545" lat="52.5670070" lon="13.3466339" version="5" changeset="5701736" user="Woschl" uid="121042" timestamp="2010-09-06T19:32:00Z">
  <tag k="highway" v="traffic_signals" />
</node>
- <way id="30770007" version="2" changeset="2121805" uid="6669" user="Elwood" timestamp="2010-09-06T21:00:00Z">
  <nd ref="172539" />
  <nd ref="172540" />
  <nd ref="172541" />
  <nd ref="172542" />
  <tag k="access" v="permissive" />
  <tag k="highway" v="residential" />
  <tag k="maxspeed" v="5" />
  <tag k="name" v="Wolkenburgweg" />
  <tag k="postal_code" v="14169" />
</way>
- <way id="30770008" version="3" changeset="2121805" uid="6669" user="Elwood" timestamp="2010-09-06T21:00:00Z">
  <nd ref="172542" />
  <nd ref="172543" />
  <tag k="access" v="permissive" />
  <tag k="highway" v="residential" />
  <tag k="maxspeed" v="5" />
  <tag k="name" v="Lohrbergweg" />
  <tag k="postal_code" v="14169" />
</way>
- <way id="30770010" version="1" changeset="99086" uid="72235" user="Basstoelpel" timestamp="2010-09-06T21:00:00Z">
  <nd ref="172544" />
  <nd ref="172545" />
  <tag k="highway" v="footway" />
</way>
</osm>
```



The diagram illustrates the process of importing OpenStreetMap (OSM) data into a Microsoft SQL Server database. On the left, a snippet of OSM XML data is shown, detailing nodes and ways with specific coordinates, tags like highway and maxspeed, and users like Woschl and Elwood. On the right, a screenshot of the SQL Server Object Explorer shows the 'ParallelProgrammingDemo' database structure. A large red arrow points from the XML code to the 'dbo.Highway' table definition, which includes columns for HighwayID (PK), HighwayGeo (geography), HighwayType (nvarchar(100)), StartingNodeID, and EndNodeID. The 'Tables' node also lists System Tables, Columns, Keys, Constraints, Triggers, Indexes, Statistics, Views, Synonyms, Programmability, and Security.

demo

RDP into Worker-Role

Import OpenStreetMap in SQL Azure

Summary

On-prem server is dead!

- Elastic
- Can do (nearly) everything that your on-prem server can
- High availability
- No or at least less maintenance cost

Long live on-prem server!

- You need something that the platform cannot provide
- Laws
- Existing investments



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