

Agenda

17:00u Inloop & ontvangst

17:30u–17:35u Welkomstwoord

17:35u–18:30u Large global scale events & campaigns on Microsoft Azure (Dennis Mulder)

18:30u–19:15u Dinner

19:15u–20:00u Media Streaming in de Cloud (Erik Jansen, Microsoft)

20:00u–20:45u Onder de motorkap van Azure Web Sites (Eelco Koster, Ordina)

20:45u–21:30u Borrel

www.wazug.nl

Volgende sessie:

19 juni Tam Tam in Delft

Large global scale events & campaigns on Azure

Dennis Mulder

Solution Architect Manager EMEA

Azure Modern Apps CoE

Microsoft Corp

Session objectives

- Understand how your app can scale on Microsoft Azure
- Understand how we used Microsoft Azure on the biggest projects this year
- Explain the key architectural patterns to reach global scale and multiple millions of users

Two Customers

International Broadcasters (NBC sports and others)

Organizing Committee

Session Agenda

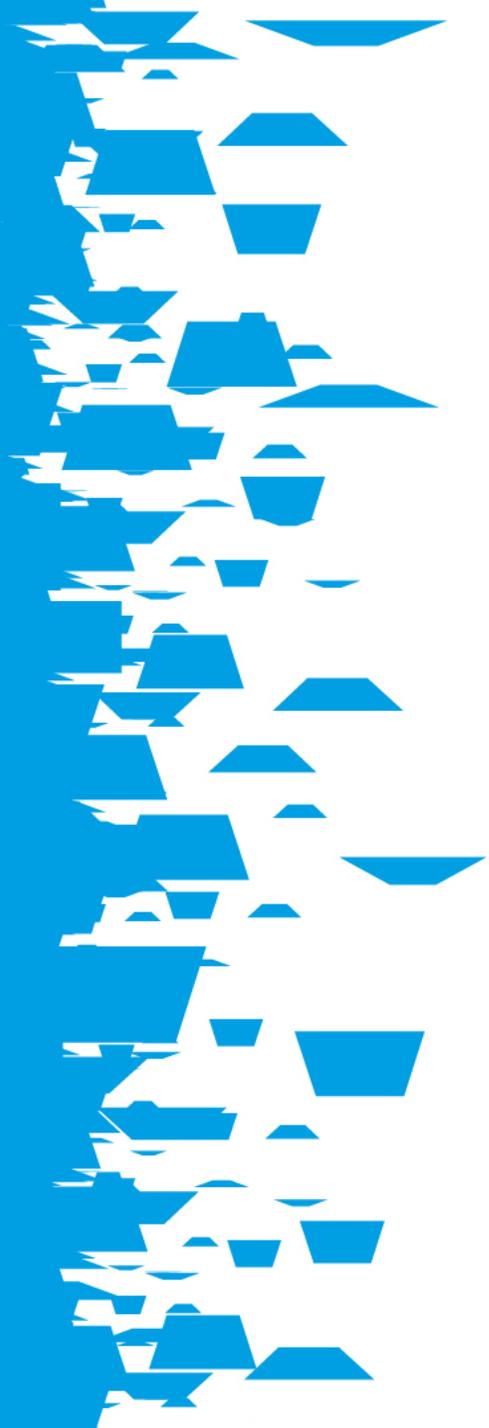
The need for scale and what is it anyway?

High Scale Architectural patterns for a sports website

High Scale Monitoring

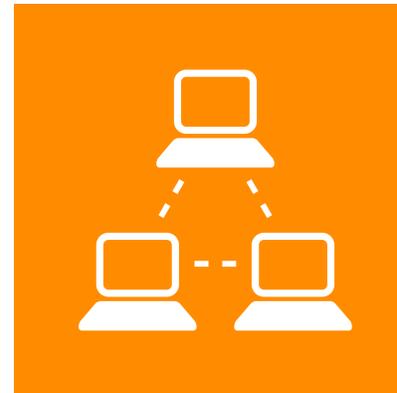


Scalability



Scalability

Scalability is the ability of a system, network, or process, to handle growing amount of work in a capable manner or its ability to be enlarged to accommodate that growth.



Scalable = Highly Available

Highly Available = Scalable

Why do applications fail?

Increased demand

Technical Failure

Hardware

Network

Platform Service

Transient conditions

Human

Upgrades

```
A problem has been detected and windows has been shut down to prevent damage to your computer.
```

```
DRIVER_IRQL_NOT_LESS_OR_EQUAL
```

```
If this is the first time you've seen this Stop error screen, restart your computer. If this screen appears again, follow these steps:
```

```
Check to make sure any new hardware or software is properly installed. If this is a new installation, ask your hardware or software manufacturer for any windows updates you might need.
```

```
If problems continue, disable or remove any newly installed hardware or software. Disable BIOS memory options such as caching or shadowing. If you need to use Safe Mode to remove or disable components, restart your computer, press F8 to select Advanced Startup Options, and then select Safe Mode.
```

```
Technical information:
```

```
*** STOP: 0x000000D1 (0x0000000C,0x00000002,0x00000000,0xF86B5A89)
```

```
***          gv3.sys - Address F86B5A89 base at F86B5000, DateStamp 3dd991eb
```

```
Beginning dump of physical memory
```

```
Physical memory dump complete.
```

```
Contact your system administrator or technical support group for further assistance.
```

What do we mean by available?

Same functionality

Degraded functionality

Splash Screen with warning message



As the load increases, are you still available?

Scalability Model for the Cloud

Cloud Apps Require Scale Beyond Scale-Up

Massive aggregate capacity: 100s of nodes available for use

Cloud Apps Demand the Best Economics

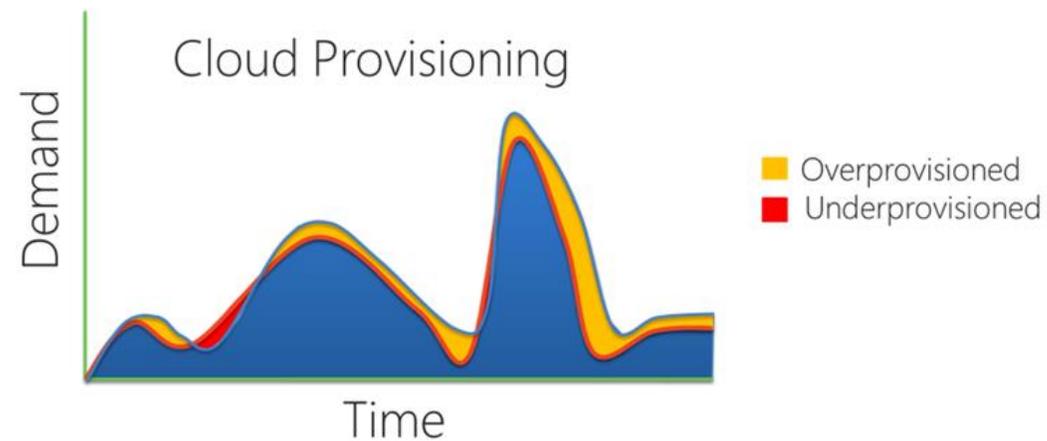
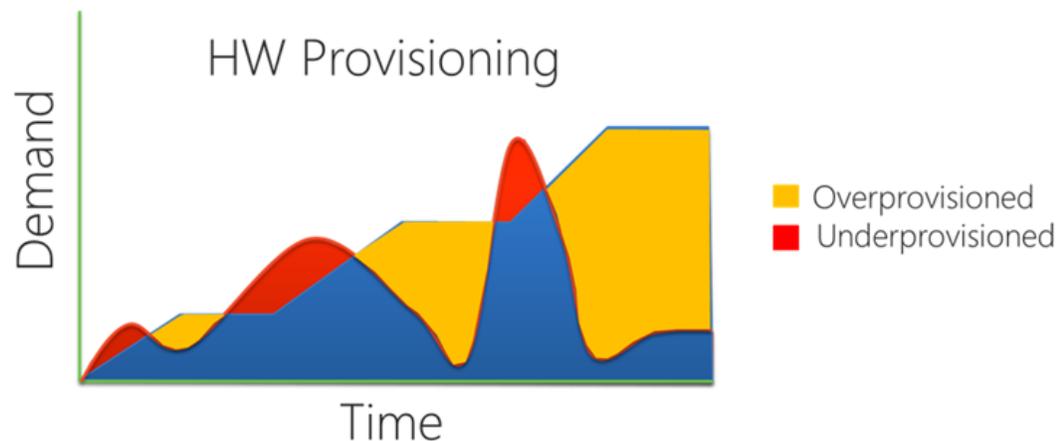
Best Price/Performance

Many commodity nodes for the economics

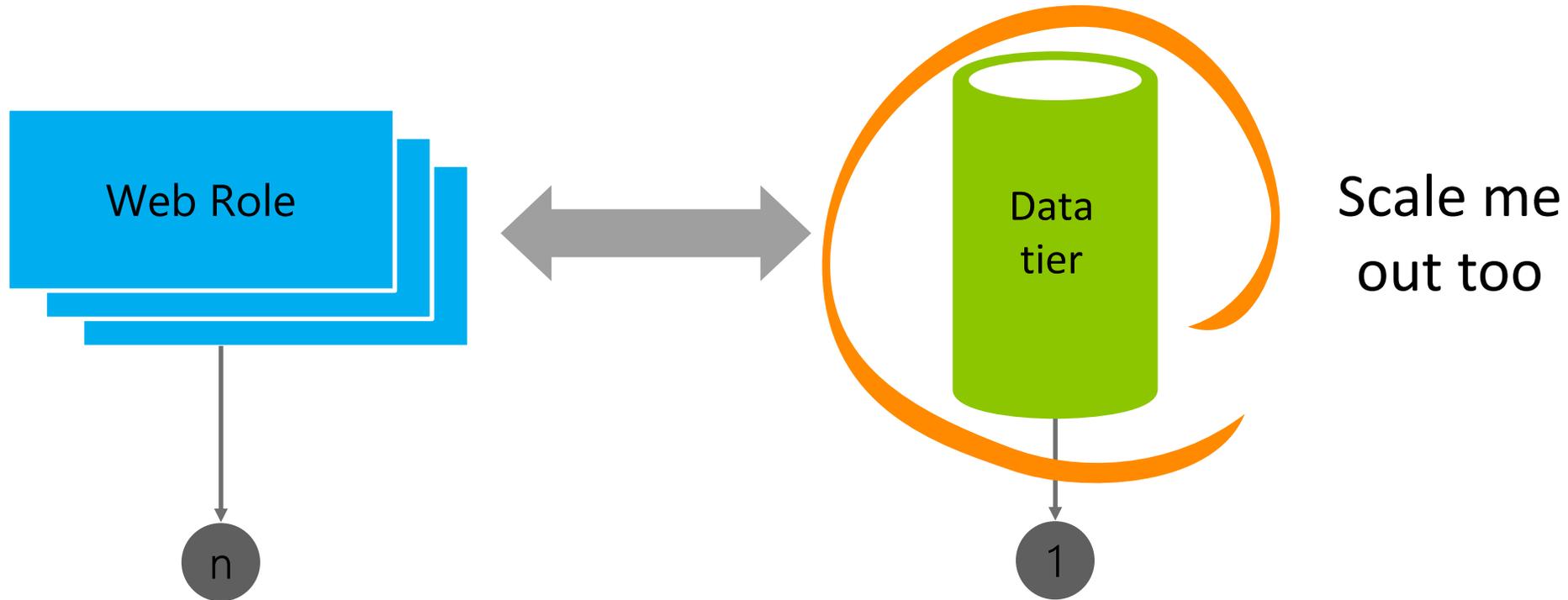
Elasticity + Pay-as-you-go

Provision just in time and without downtime!

Reduce overcapacity

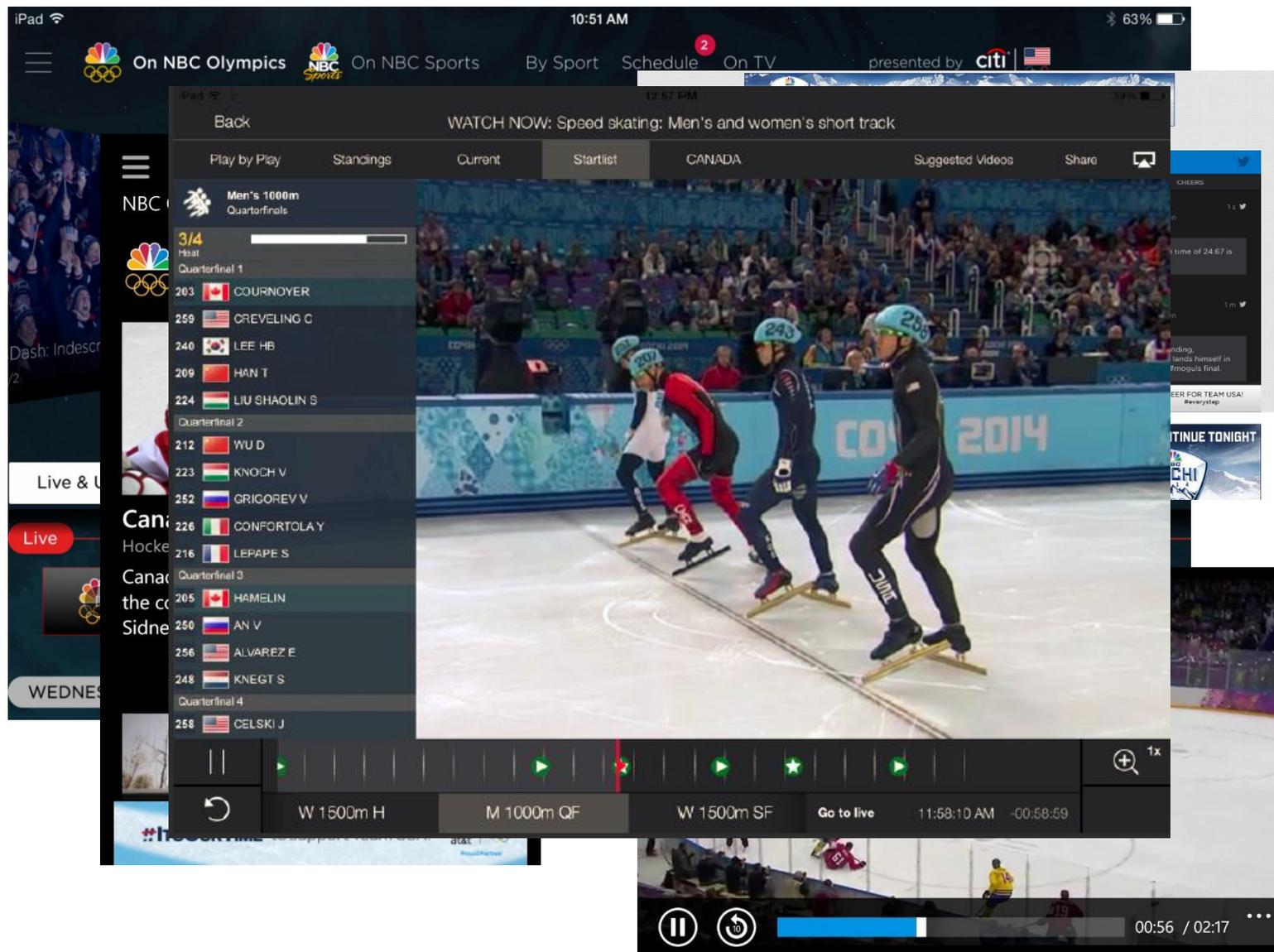


What is wrong with this?



Live Streaming

Sochi by the numbers



- 18 days of events
- 10,000 hours of HD streaming, Triple the Vancouver games
- 99.999% uptime
- 204 live streaming channels
- 100 TB of storage, 35 PB streamed
- 500 billion storage transactions
- 5 broadcasters in 22 countries
- NBC, CBC, América Móvil, ViaSat, and others
- Partners: iStreamPlanet, Deltatre, Adobe, Akamai
- Achieved a Streaming event record 2.1 million viewers of the US vs. Canada semifinal hockey game

Sochi Olympics Live Video Workflow

1. Olympics Broadcast Facilities

26 live feeds originate from the International Broadcast Center (IBC) in Sochi.

2. NBC Sports Facility

15 more feeds added from NBC productions for a total of 41 live feeds. Workflow management, ad operations, highlights creation completed.

3. Content Aggregation

All 41 feeds are received at iStreamPlanet's downlink facility in Las Vegas, replicated, some are locally encoded. All feeds are pushed into the Microsoft Azure cloud.

4. Cloud Ingest and Live Encoding

Feeds are received and encoded with video quality up to 1080p + closed captions + dynamic mid-roll ad marker insertions.

5. Cloud Storage and Live Streaming

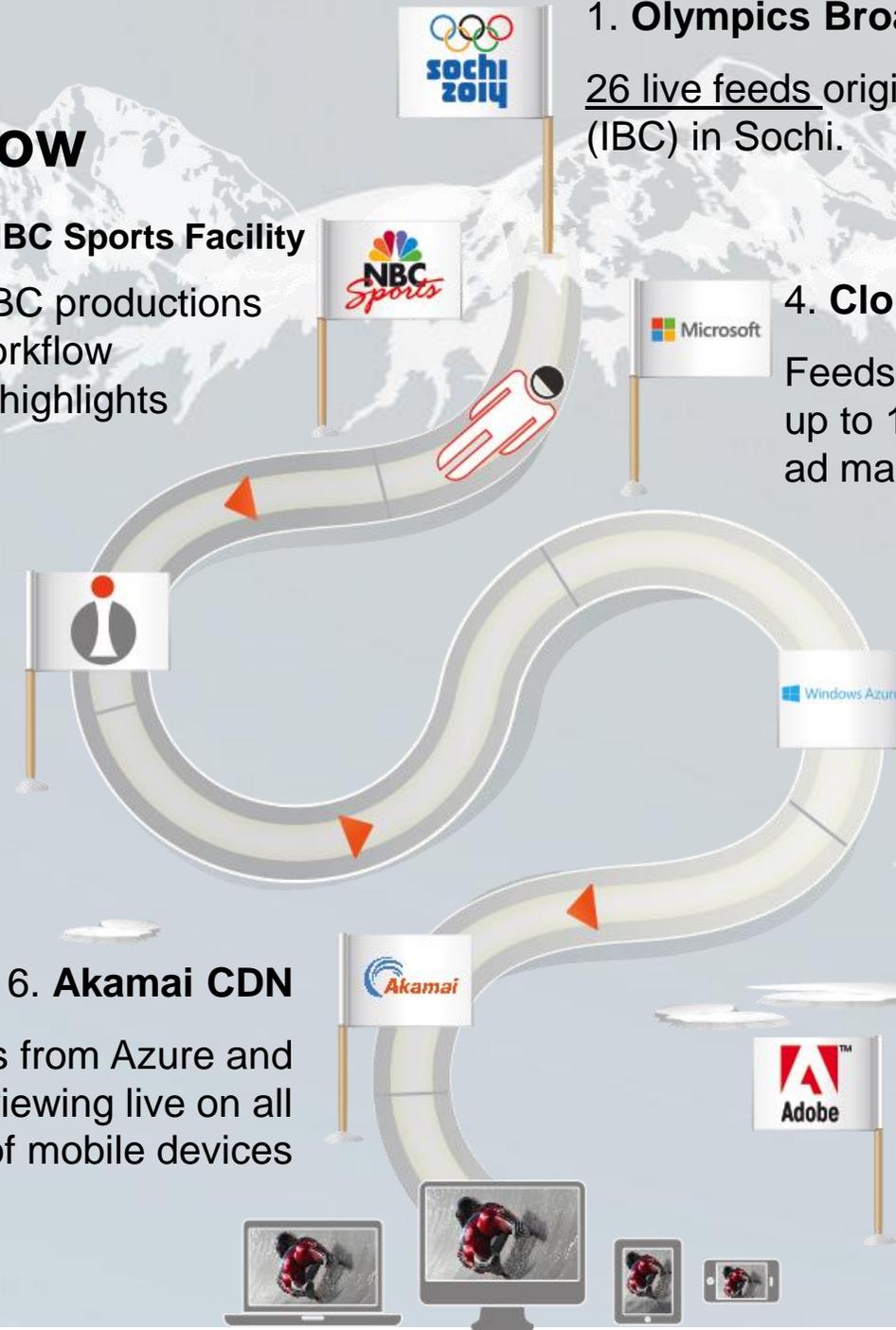
Encoded feeds are sent to cloud storage for immediate Live-to-VOD & Cloud DVR capabilities while simultaneously dynamically transmuxed to Smooth, HLS, HDS, and MPEG-DASH formats.

6. Akamai CDN

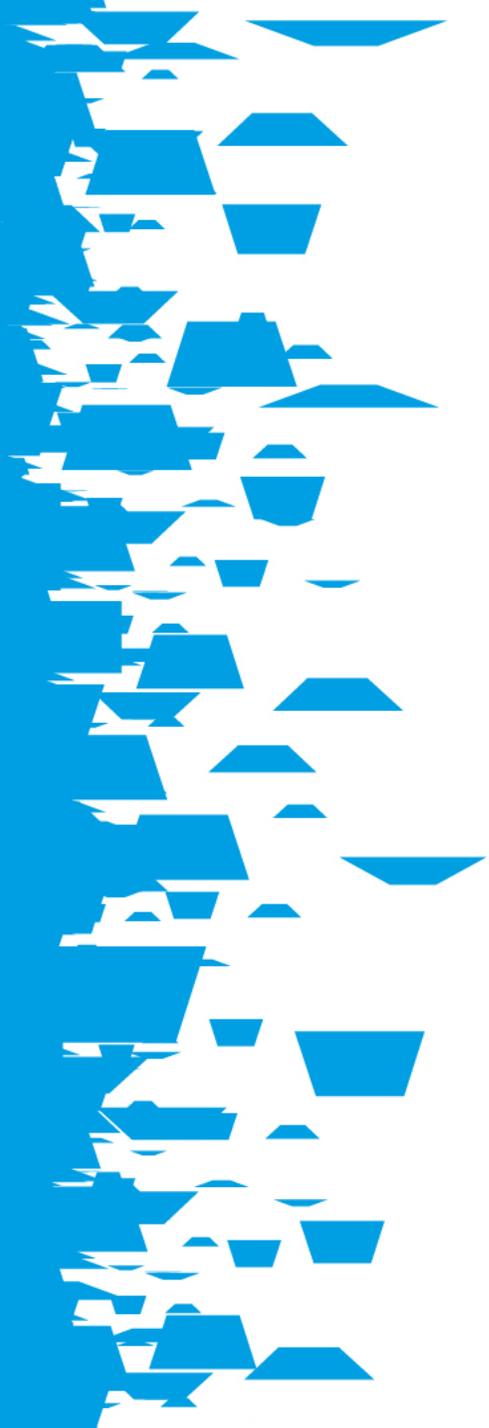
Akamai pulls streams from Azure and distributes to audiences viewing live on all types of mobile devices

7. Adobe Player Client

Adobe provides mobile and desktop players, as well as ad insertion, analytics, and TV Everywhere authentication.



Global scale website



Non-functional requirements



Real time delivery of live results



100% Uptime

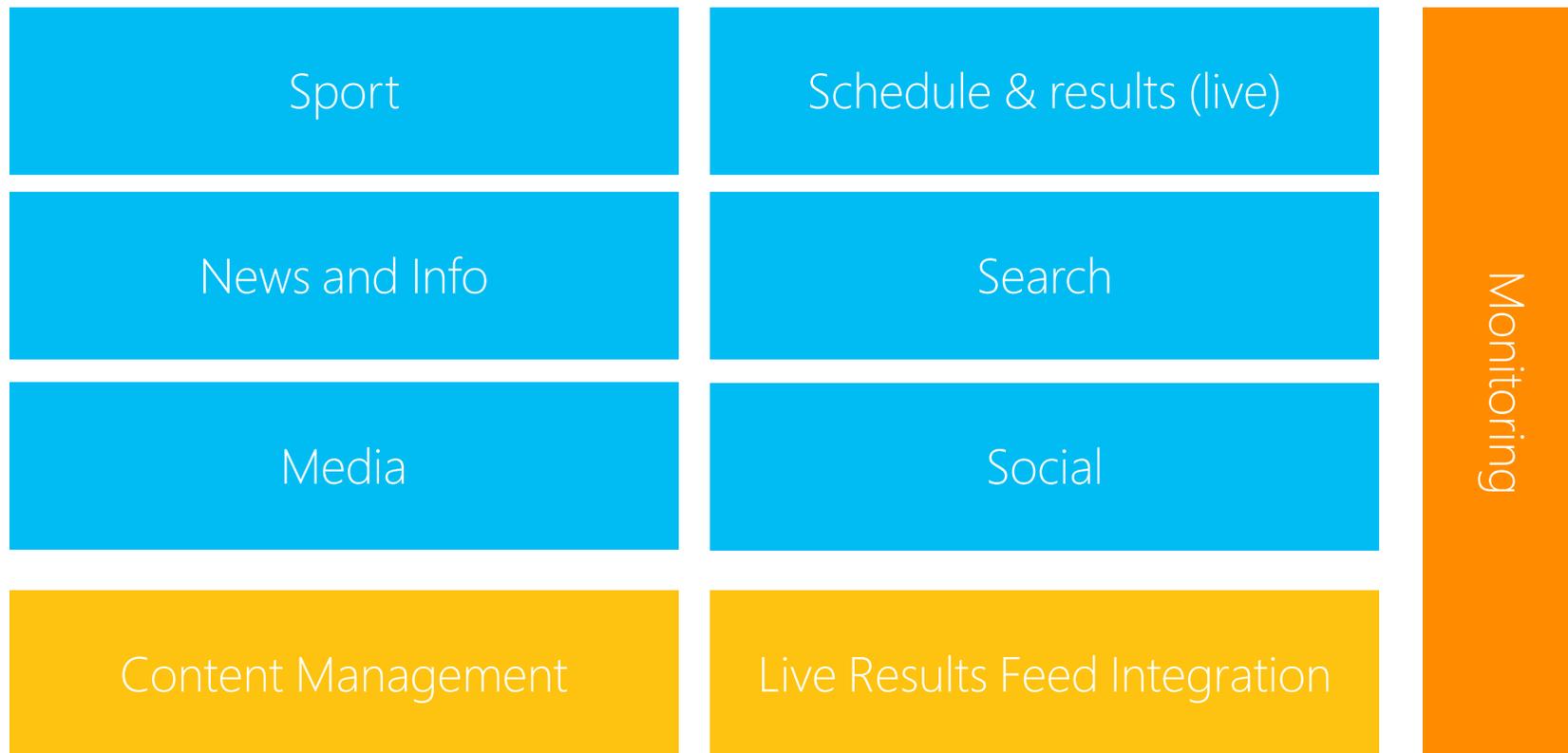


Delivery at global scale

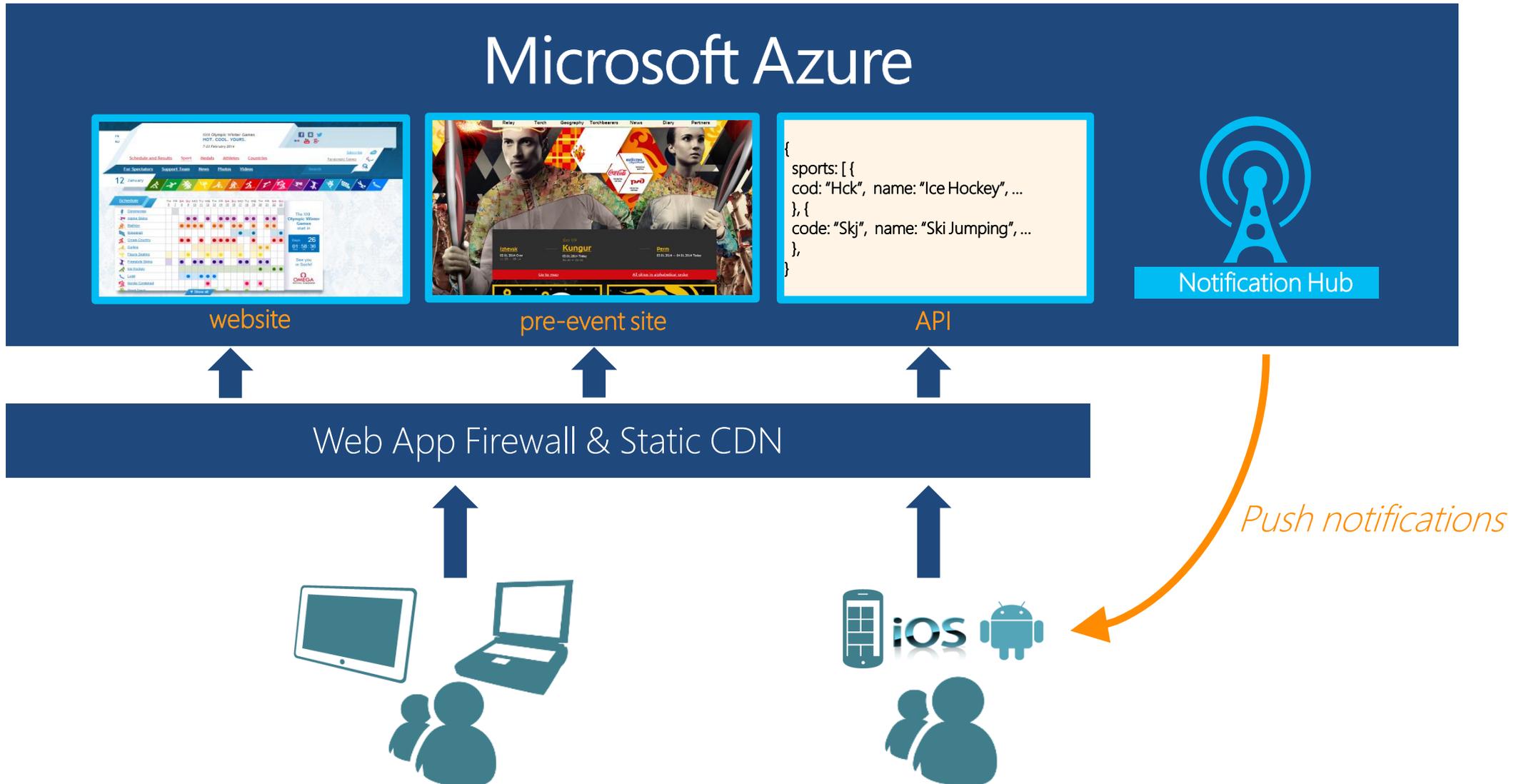
100M visitors

100K page views per sec at peaks

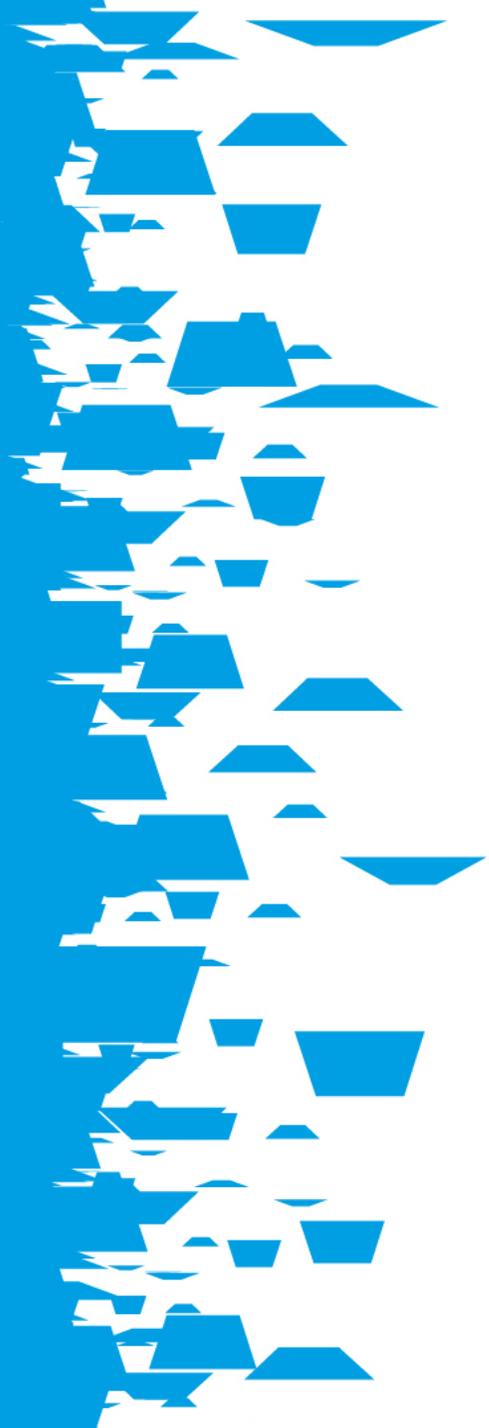
Main functional requirements



The Solution



Architecture



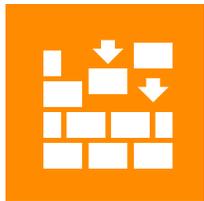
Architectural principles



Geo distribution to multiple Azure datacenters



Separation between Front-end and Back-end



Eventual consistency and soft logic

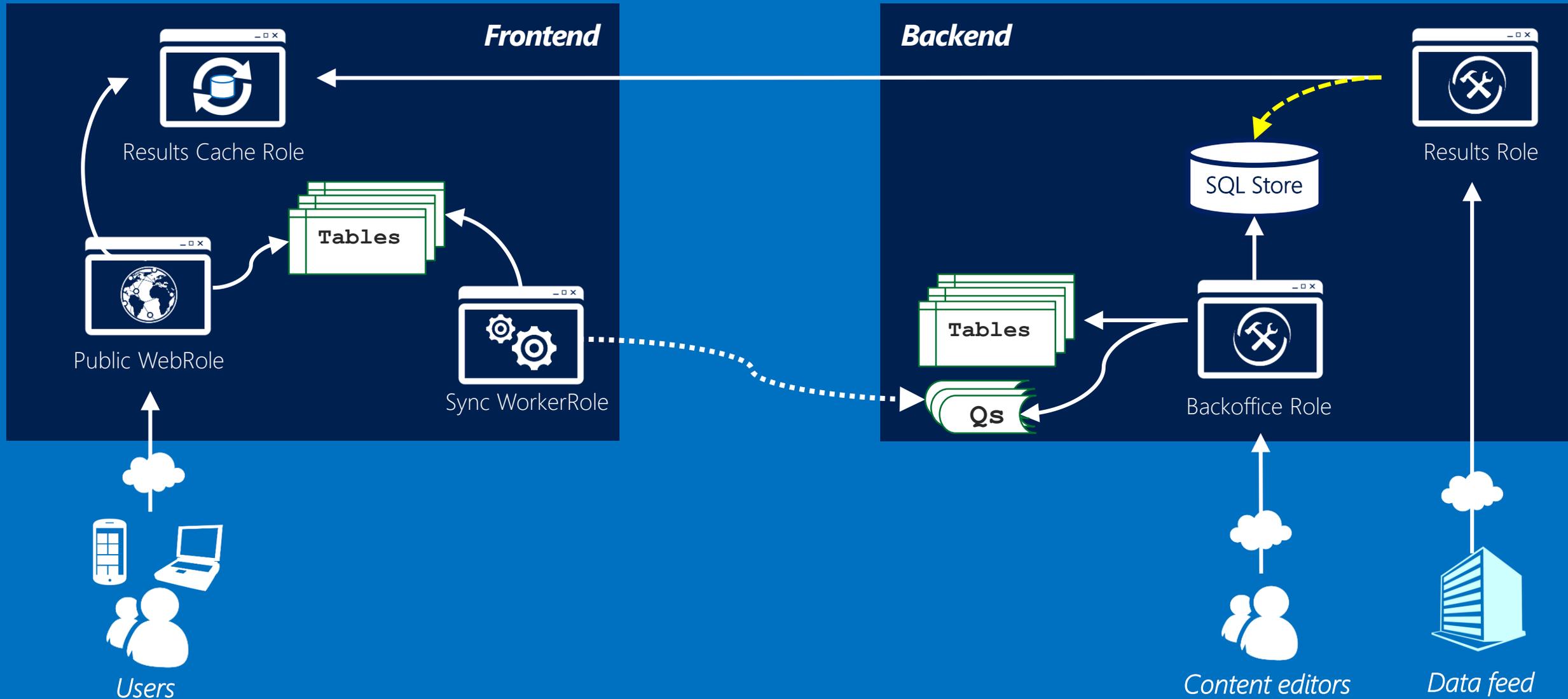


NoSQL storage

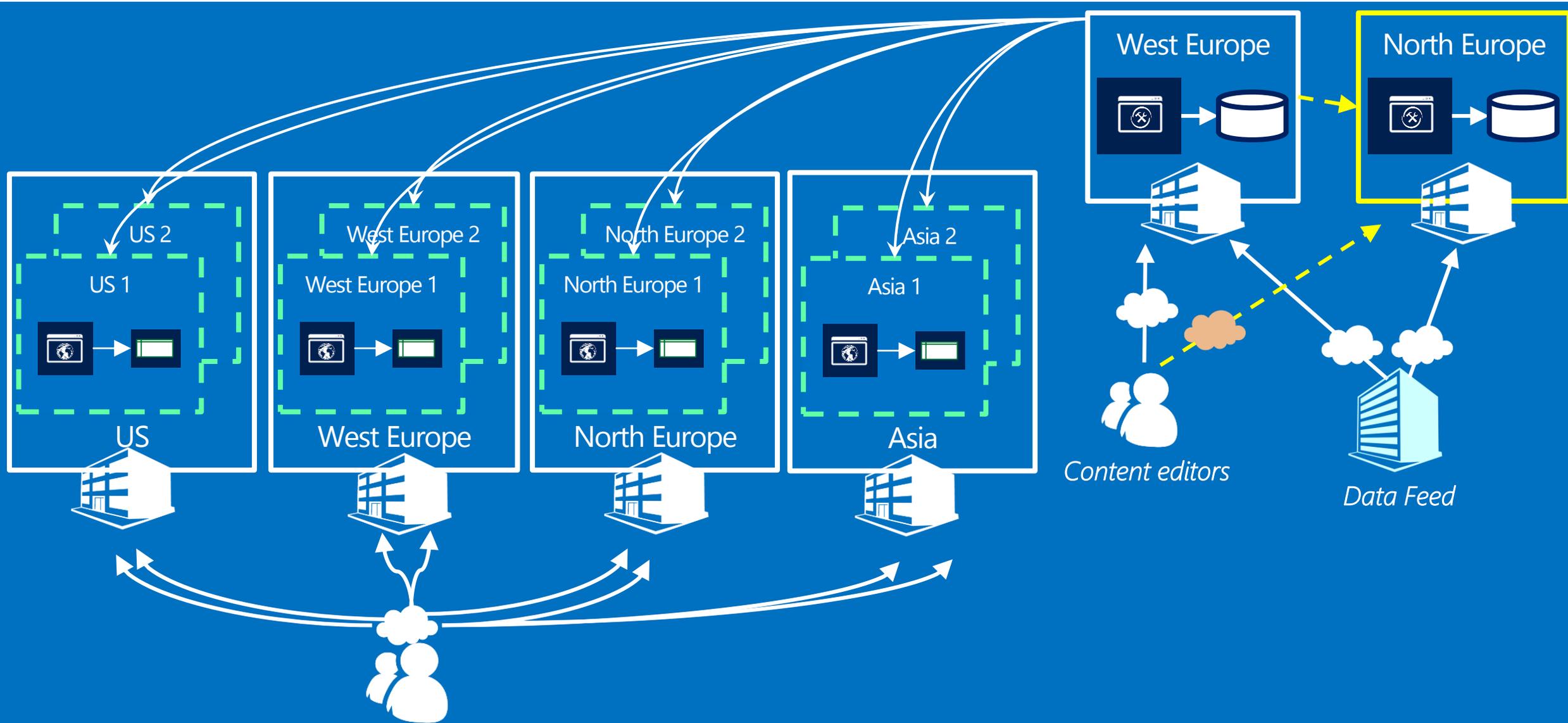


Caching of everything everywhere

High Level View

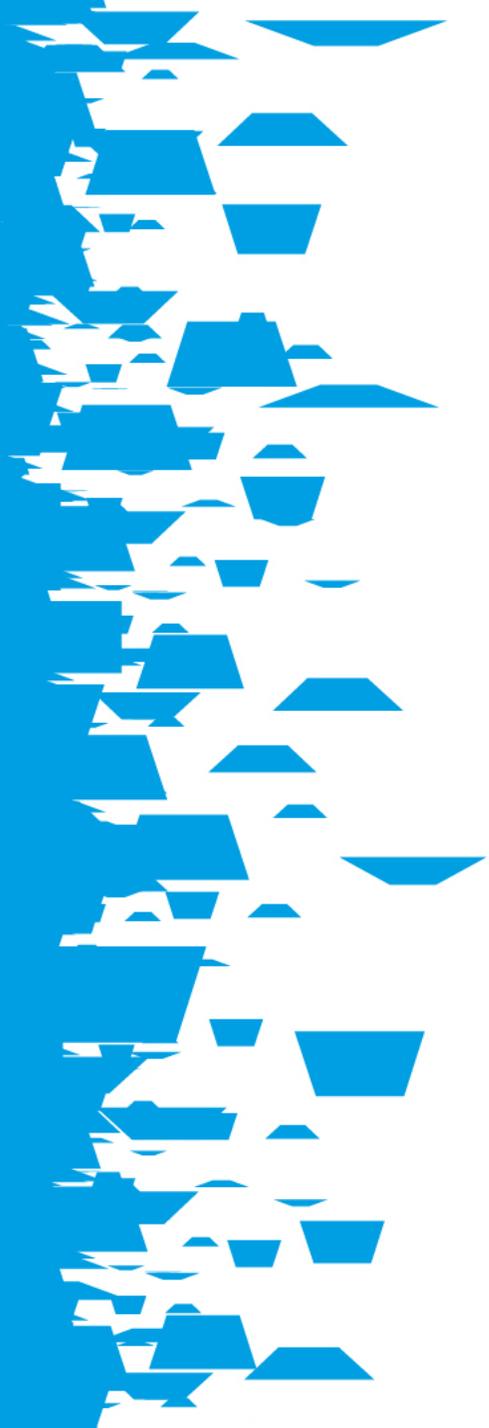


Multi *Virtual* DC architecture

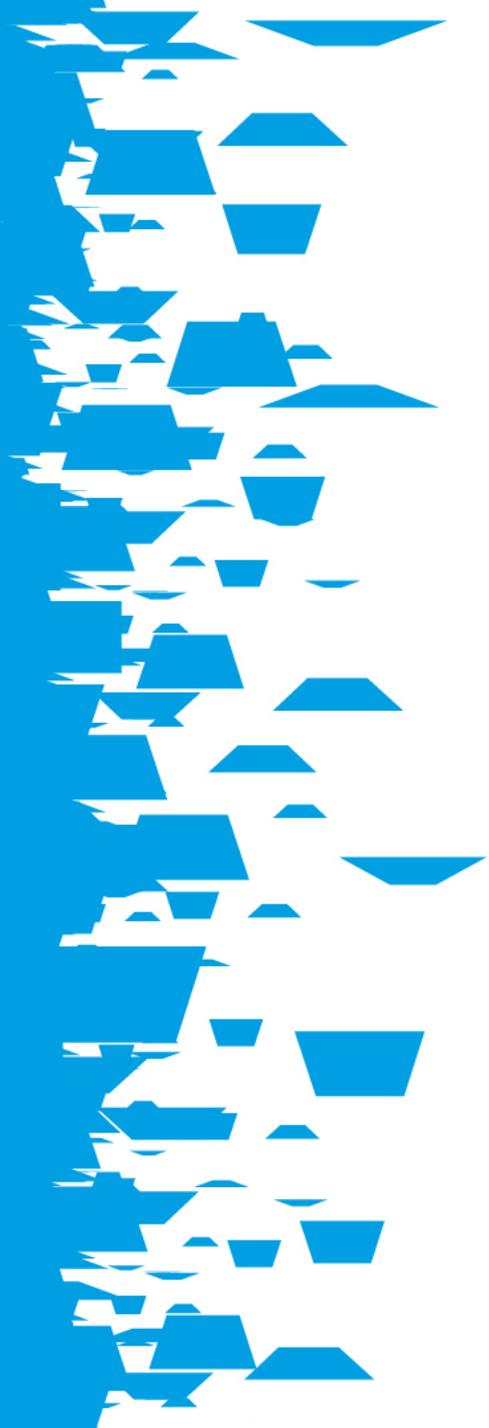


Edge Node

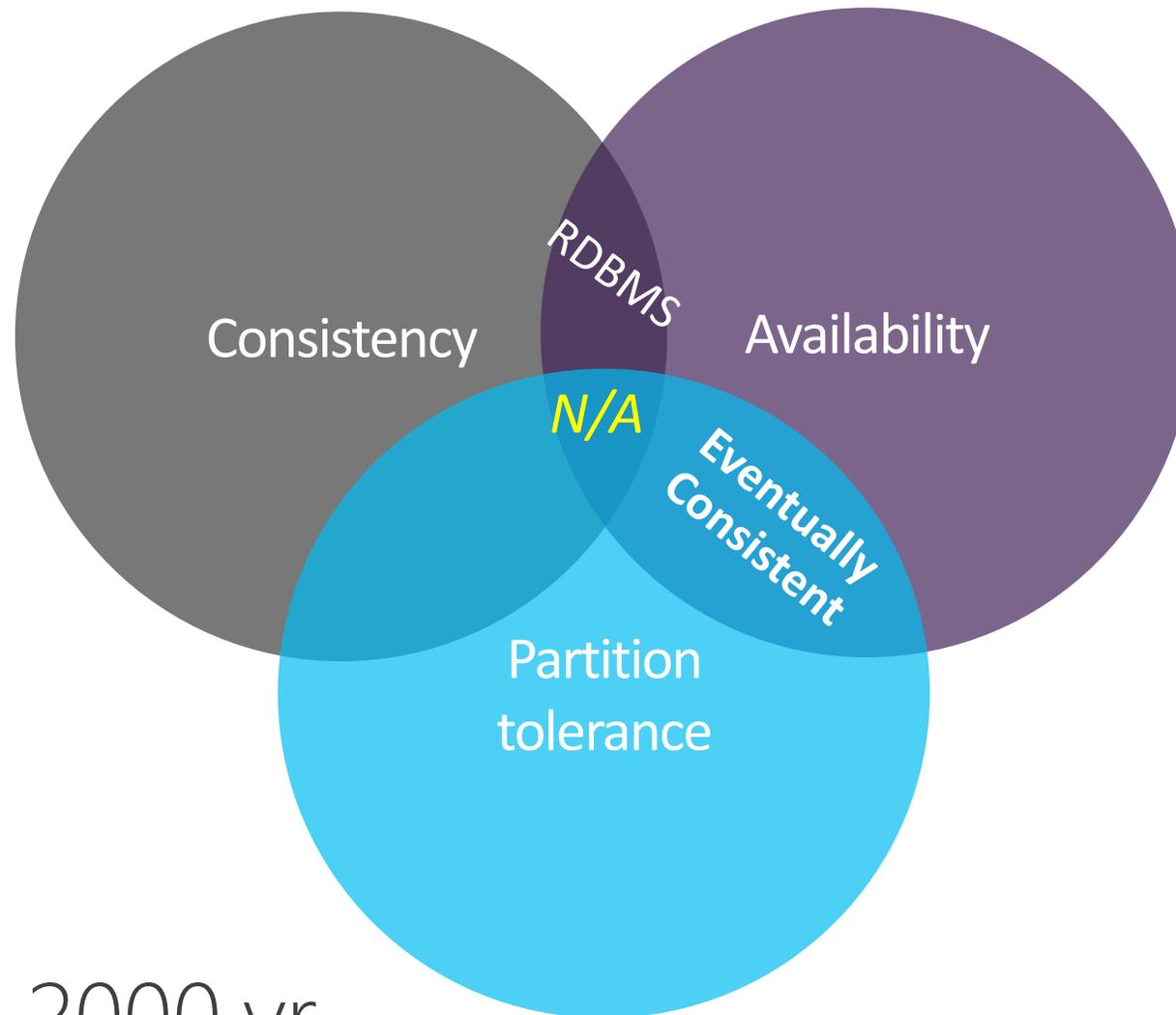
Aka Frontend



Data



Cap Theorem



Eric Brewer, 2000 yr

ACID vs BASE

Atomicity

Consistency

Isolation

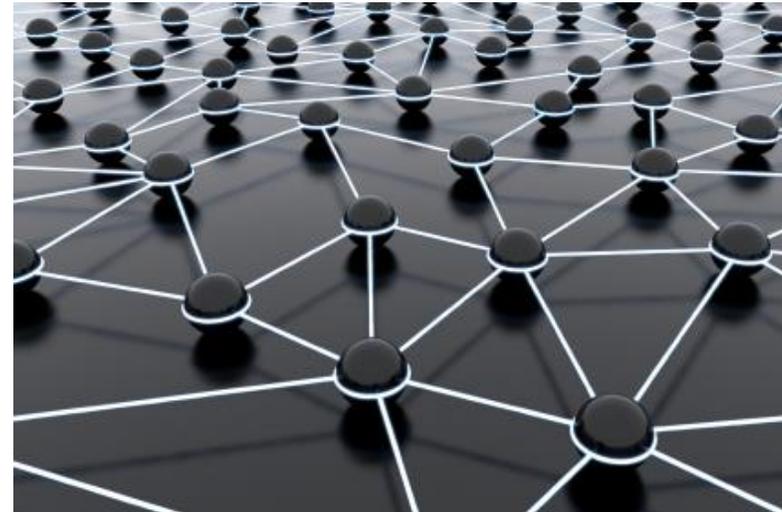
Durability



Basically Available

Soft-state

Eventual consistency



Data entities

Sport

Athlete

Country

Event

Place

Medal

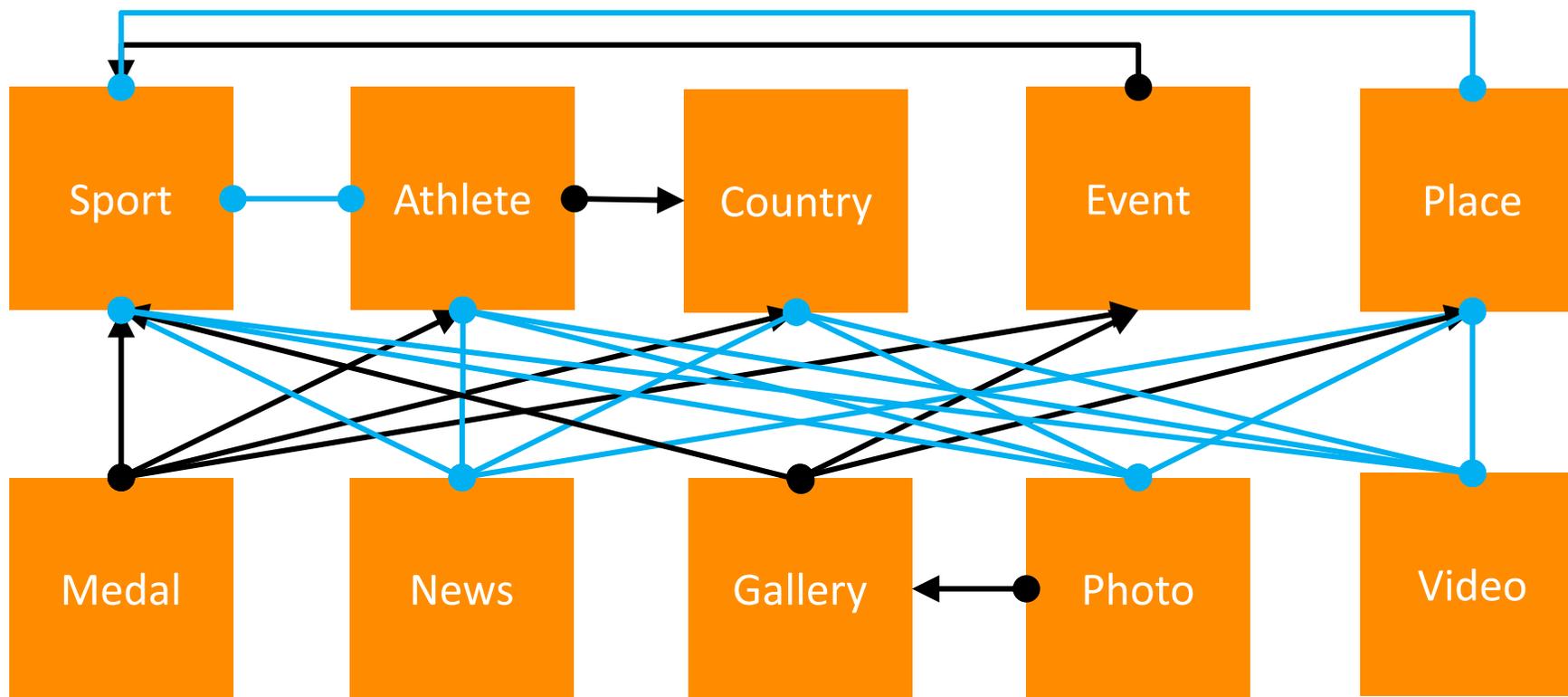
News

Gallery

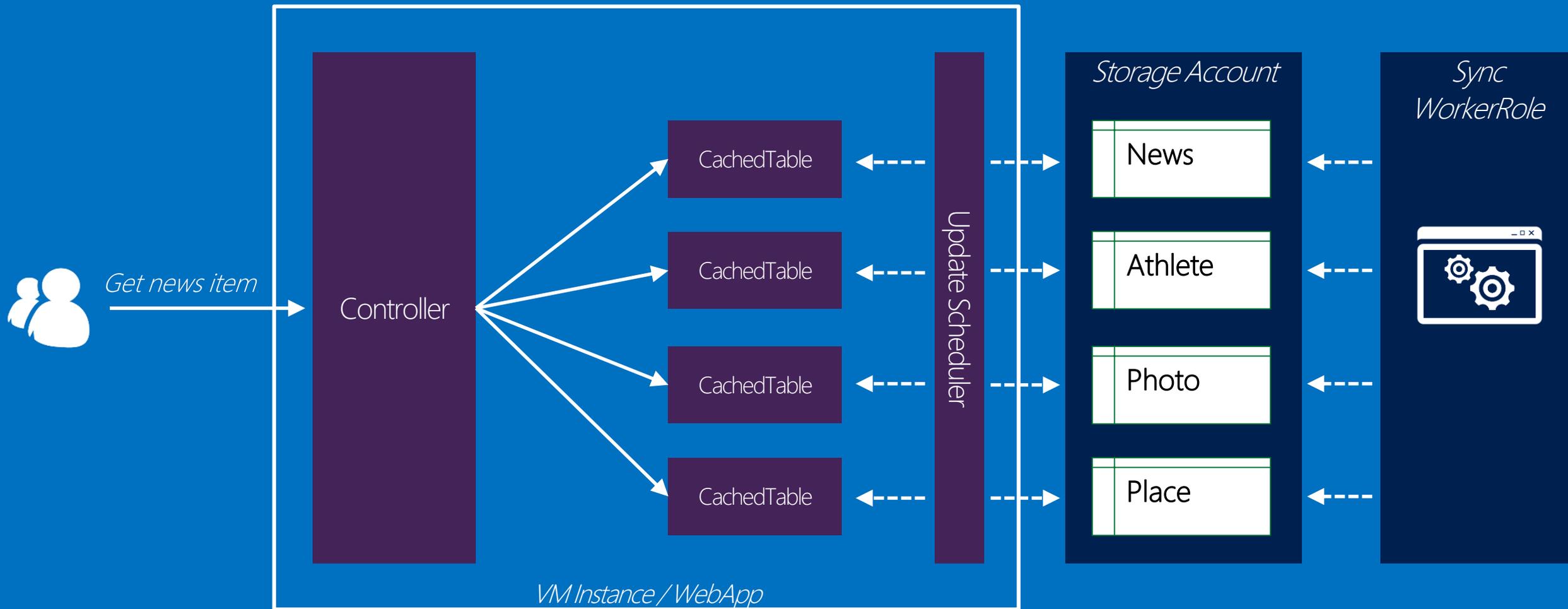
Photo

Video

Data entities



Data flow



Retrieving news item

```
//...
```

```
var news = News.Get(alias);
```

```
if (news != null) {
```

```
    viewModel.NewsTitle = news.Title;
```

```
    if (news.AthleteId != null) {
```

```
        var athlete =
```

```
Athletes.Get(news.AthleteId);
```

```
        viewModel.AthleteName =
```

```
athlete.Name;
```

```
    }
```

```
}
```

Here's your news item

404 Error



The page you were looking for doesn't exist

We suggest you to return to the [Home Page](#) or visit the [Site Map](#)



Here's your news item

Ivan Skobrev Becomes the Ambassador for the "Thank You, Mom." Program

25 December 2013 / [Partners News](#)



Monday
13 January

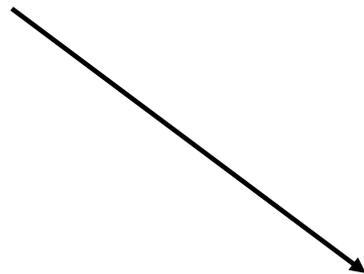
Ivan Skobrev becomes the Ambassador for the "Thank You, Mom." Program

Sports
 [Speed Skating](#)

Countries
 [Russian Fed.](#)

Speed skater Ivan Skobrev has become the ambassador for the P&G program "Thank you, Mom." for the Olympic Winter Games of 2014 in Sochi. As part of the collaboration, Ivan will present a program of Olympic partnership that P&G is implementing over three years.

Lightning speed and certainty of victory helped Ivan win two medals at the Olympic Winter Games of 2010 in Vancouver and ten more at Russian and European championships. His motivation and determination to succeed is combined with a care for family and loved ones, which ideally conveys the mission of the "Thank you, Mom." program.



Here's your news item

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Sports

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Athletes



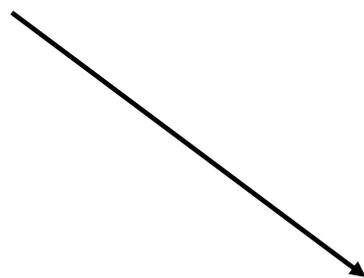
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"I am happy to present the "Thank you, Mom." program, which is especially important for me. After all, it is my Mother who took me skating for the first time. Having decided to pursue speedskating



Monitoring

What to monitor?

USER EXPERIENCE

- Scenario status
- Response times

DATA CONSISTENCY

- Storage consistency status
- Search index status
- Games results stats

APPLICATION HEALTH

- Alerts and events
- Logs and Traces (OS, IIS)
- Traces (App, Venus, Games results)
- Custom performance counters

INFRASTRUCTURE HEALTH

- Hosted service status
- Stats and metrics
(Storage, SQL, Service bus, ...)

Monitoring Challenges



Dozens of resources

300+
instances

20+
services

50+
roles

20+
storages

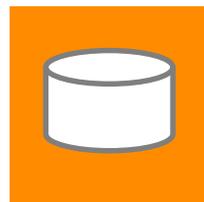
10+
databases

...



Large data flow

10GB
per hour



Data retention requirements



Many DCs => One Dashboard

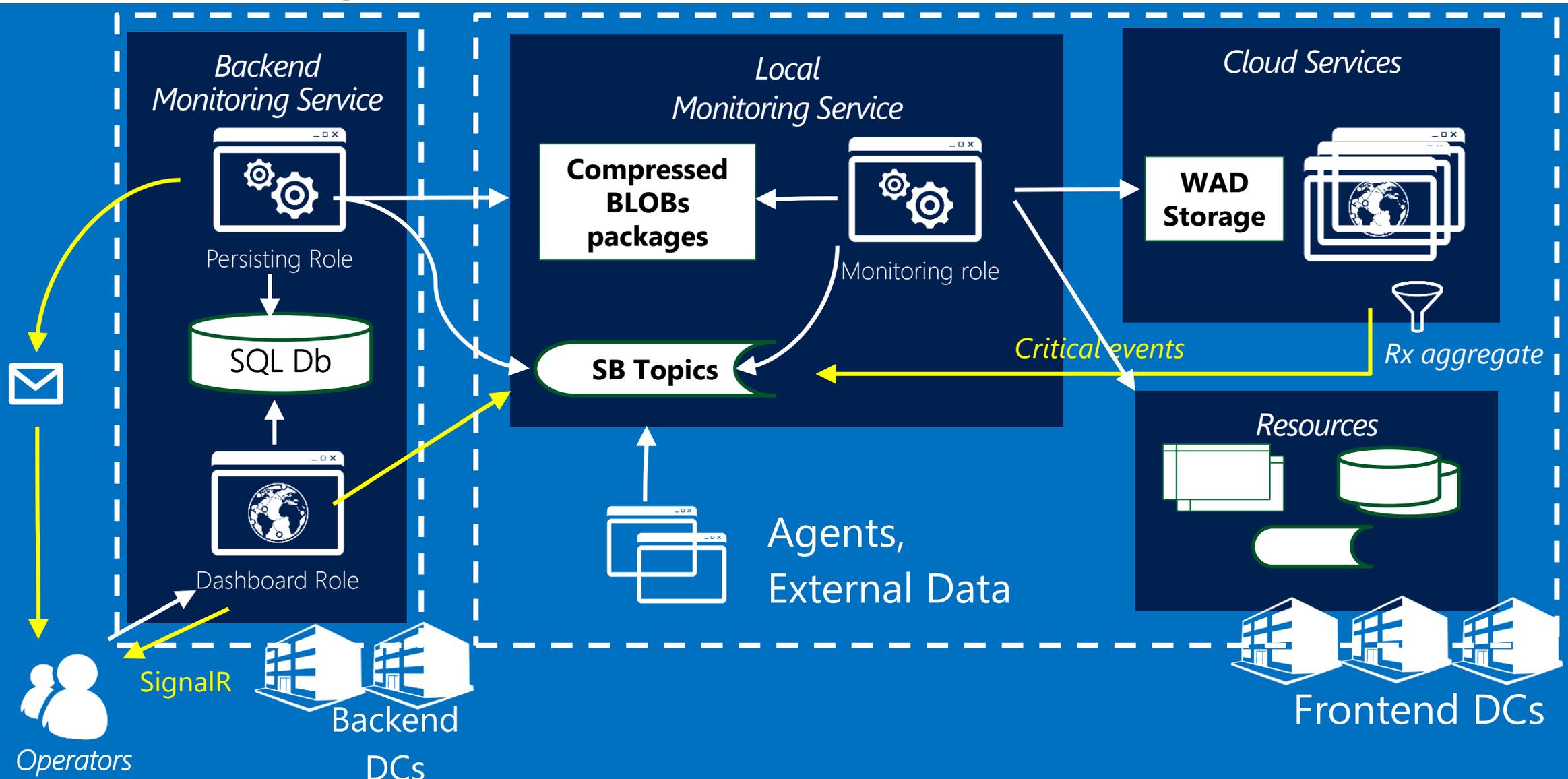
Monitoring tools (2012)

	Microsoft Azure Management portal		3rd Party
USER EXPERIENCE		x	✓
DATA CONSISTENCY			
APPLICATION HEALTH		✓	✓
INFRASTRUCTURE HEALTH	✓	✓	✓
CUSTOMIZABLE UI			
CLOUD BASED (SaaS, PaaS or IaaS)	✓	x	✓
PERFORMANCE	✓	?	?

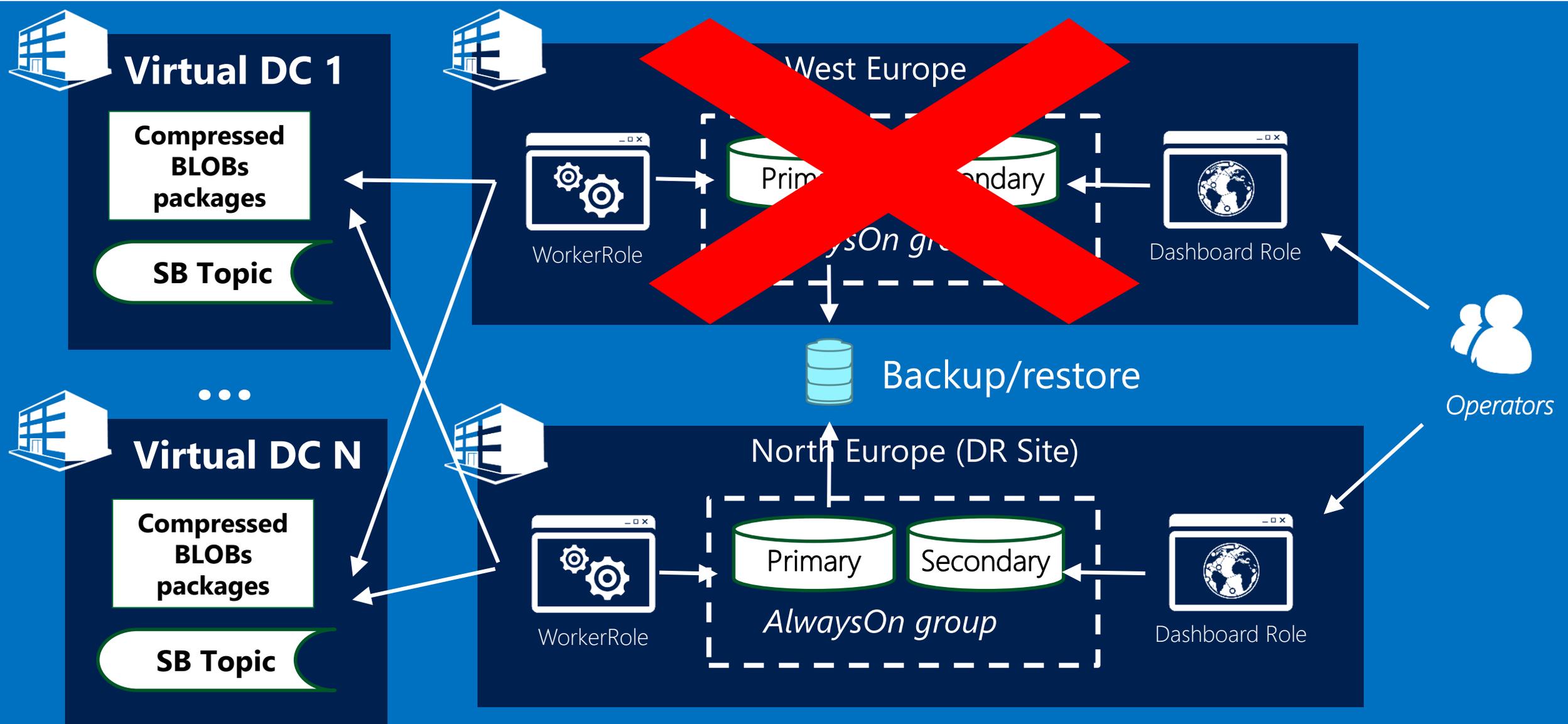
Monitoring tools (2014)

	Microsoft Azure Management portal	 Microsoft® System Center	3rd Party
USER EXPERIENCE	✓	✓	✓
DATA CONSISTENCY			
APPLICATION HEALTH		✓	✓
INFRASTRUCTURE HEALTH	✓	✓	✓
CUSTOMIZABLE UI			
CLOUD BASED (SaaS, PaaS or IaaS)	✓	✓	✓
PERFORMANCE	✓	?	?

Monitoring Architecture



Disaster Recovery



Key take aways

- Azure can run live media events at scale
- Azure can run very large scale websites
- The data tier is typically the area you need to worry about
- You have to think about scalability and high availability
- Loadtesting is key to proof your workload scales
- Monitoring at scale can be more challenging than your workload

Usergroups

Azure user group

19 juni TamTam Delft

Agenda:

TBD

www.wazug.nl

Iasa – Architecture usergroup

27 mei – Microsoft Schiphol

Agenda:

18:00 Welcome coffee

18:15 User Experience & Architecture - Milan Mulji

18:45 Networking, Drinks and Food.

19:15 Large global scale events & campaigns in the Cloud - Dennis Mulder

www.iasaglobal.org & www.meetup.com

Thanks!

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