

Bienvenue dans le monde de Microsoft SQL Server 2014

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BASEL BERN BRUGG LAUSANNE ZUERICH DUESSELDORF FRANKFURT A.M. FREIBURG I.BR. HAMBURG MUNICH STUTTGART VIENNA

■ The company

Trivadis is a **market leader in IT consulting, system integration, solution engineering** and the provision of IT services focusing on  **Microsoft** and **ORACLE** technologies in Switzerland, Germany and Austria.

We offer our services in the following strategic business fields:



Trivadis Services takes over the interacting operation of your IT systems.

■ More than 600 Experts



12 Trivadis branches and more than 600 employees

200 Service Level Agreements

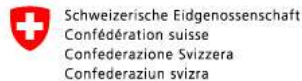
Over 4,000 training participants

Research and development budget:
CHF 5.0 / EUR 4 million

Financially self-supporting and sustainably profitable

Experience from more than 1,900 projects per year at over 800 customers

■ Some of over 800 customers

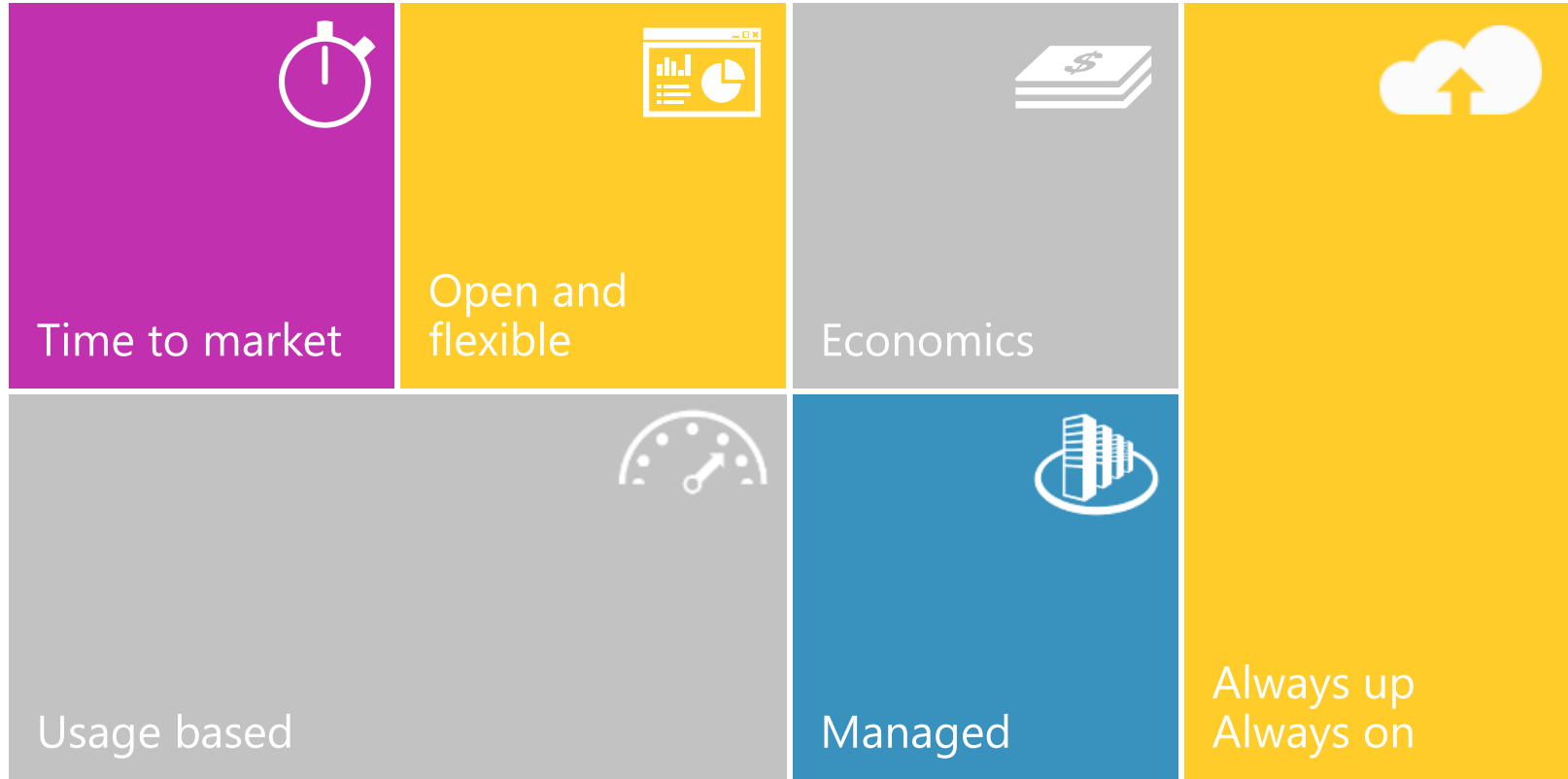


■ AGENDA

1. Database and the Cloud
2. In-Memory a Mega Trend

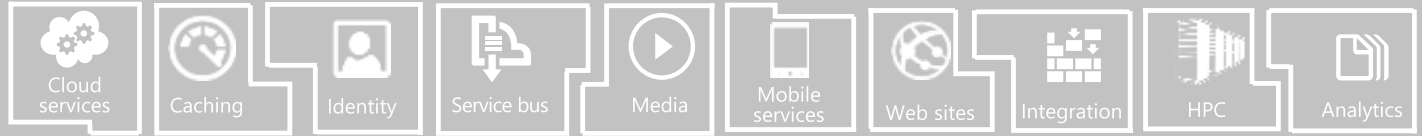
Database and the Cloud

Reasons for the cloud



■ What is Windows Azure: Services

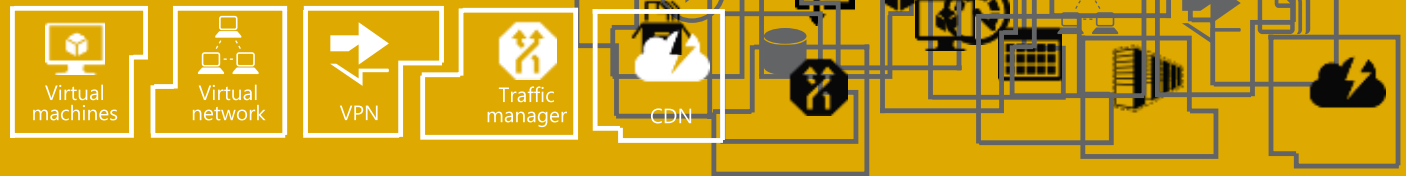
App services



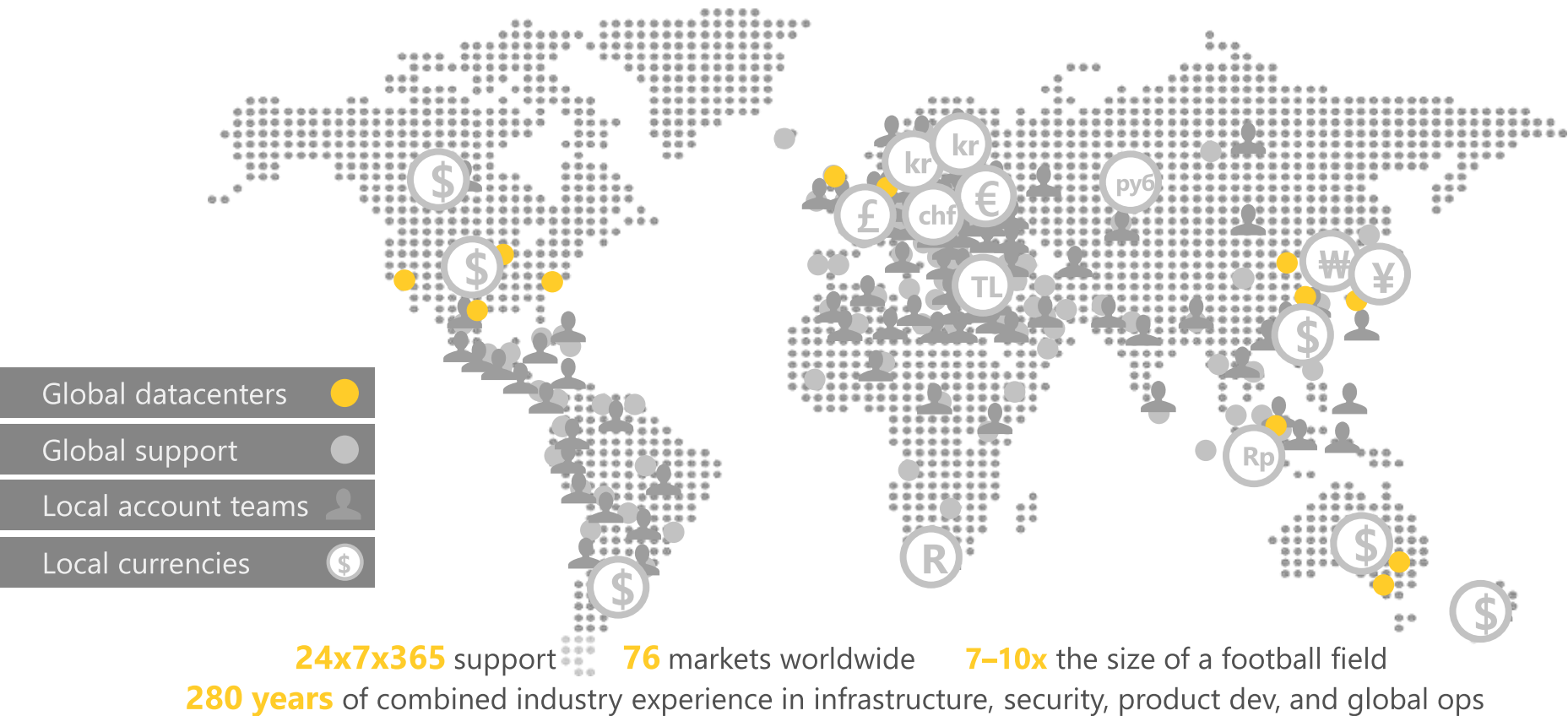
Data services



Infrastructure services



■ What is Windows Azure: global footprint





■ Windows Azure Data Management — Overview

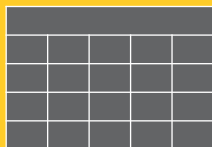
NON-RELATIONAL

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Blob Storage

A cloud storage service offering the simplest way to store large amounts of unstructured text or binary data, such as video, audio and images, and for creating virtual hard drives in the cloud.

Best for
inexpensive,
scalable storage of
data



Tables

A NoSQL key/value store that provides simple access to semi-structured data at a lower cost for applications that do not need robust querying capabilities

Best for
inexpensive,
scalable storage of
semi-structured
data



HDInsight

A Big Data implementation 100% compatible with Hadoop.

Best for Big Data
Analytics across
semi-structured and
unstructured data

RELATIONAL



SQL Server in a VM

A full-featured instance of SQL Server running in a Windows Azure Virtual Machine for quickly and easily running-or testing SQL Server applications in the cloud

Best for existing
and new
applications
needing full SQL
Server feature set



SQL Database

A feature-rich, fully managed relational database service that offers a highly productive experience with business-ready capabilities built on SQL Server technology

Best for new cloud
applications
needing relational
capabilities and
high availability

■ Options for Relational Data Services in the Cloud

INFRASTRUCTURE AS A SERVICE (IaaS)



SQL Server in a
Windows Azure Virtual Machine

Full Control & Flexibility

Highly Customized Environment

Eliminate Hardware Costs

Decrease Time to Market

PLATFORM AS A SERVICE (PaaS)



Windows Azure SQL Database

Simplified Administration

Fully Managed Service

Eliminate Hardware & Administrative Costs

Build Modern Apps

■ Options for Relational Data Services in the Cloud

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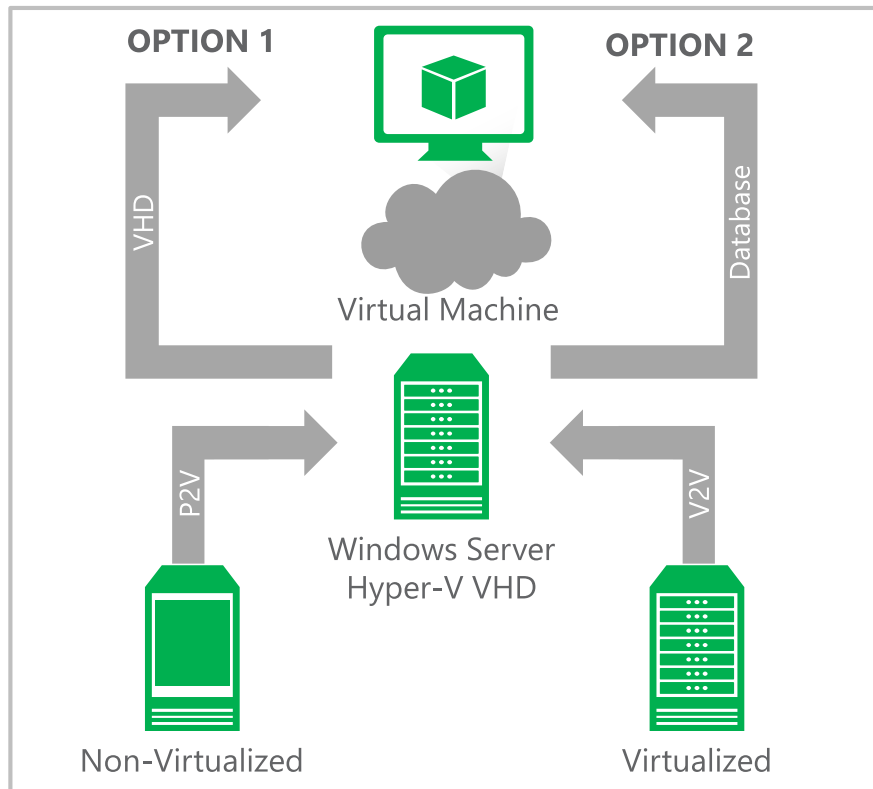
Eliminate Hardware & Administrative Costs

Build Modern Apps



SQL Server in a
Windows Azure VM

Move Existing Tier 2 & 3 Apps



Reduce/remove hardware costs and maintenance

Virtualization compatibility on-premises and cloud for portability

No application changes, simply virtualize and move

■ Options for Relational Data Services in the Cloud

INFRASTRUCTURE AS A SERVICE (IaaS)



SQL Server in a
Windows Azure Virtual Machine

Full Control & Flexibility

Highly Customized Environment

Eliminate Hardware Costs

Decrease Time to Market

PLATFORM AS A SERVICE (PaaS)



Windows Azure SQL Database

Simplified Administration

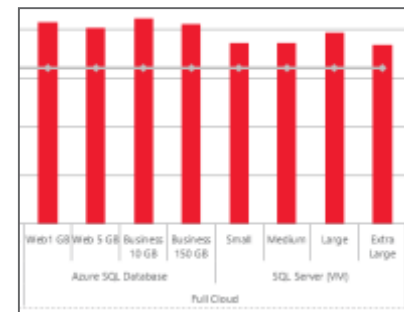
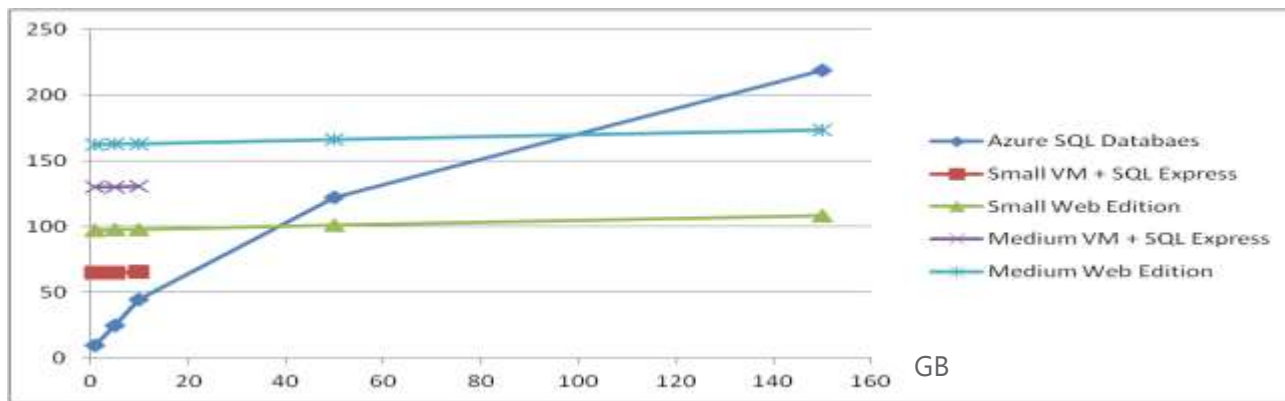
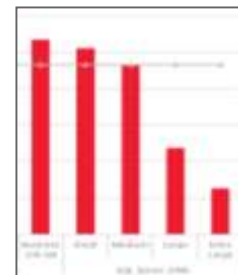
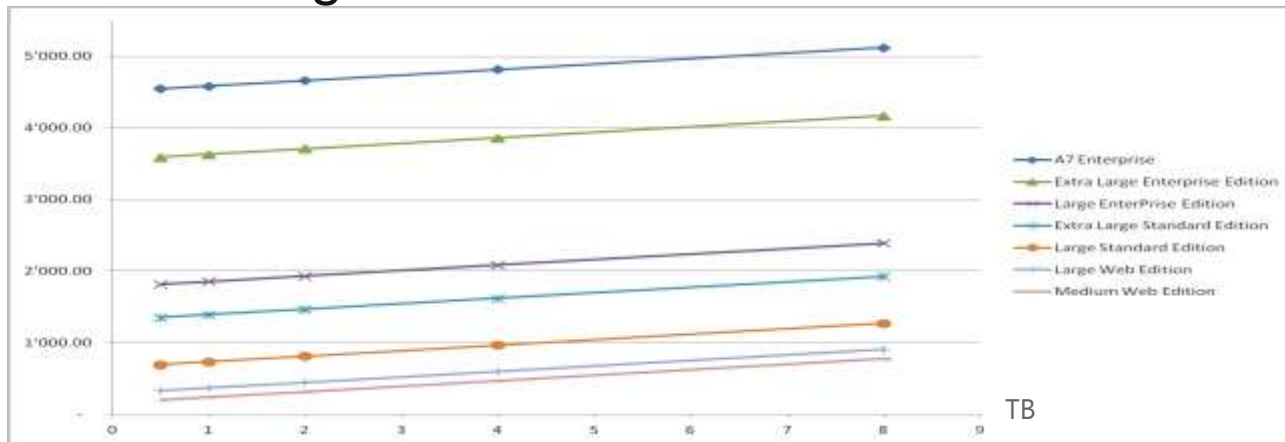
Fully Managed Service

Eliminate Hardware & Administrative Costs

Build Modern Apps

Price Ranges for Azure SQL DB and SQL Server in Azure VM

CHF per Month



■ SQL Server Backup to Windows Azure

SQL Server Backup to Windows Azure benefits:

- Easy integration with Windows Azure Storage
- Saves on storage and administration
- Extra data protection from Windows Azure, inherently off-site and geo-redundant

SQL Server Managed Backup to Windows Azure

SQL Server 2014

No need to manage backup policy

Measures database usage patterns to set frequency of backup to Windows Azure

SQL Server Backup to Windows Azure

SQL Server 2014

Backup to and restore from Windows Azure via SSMS

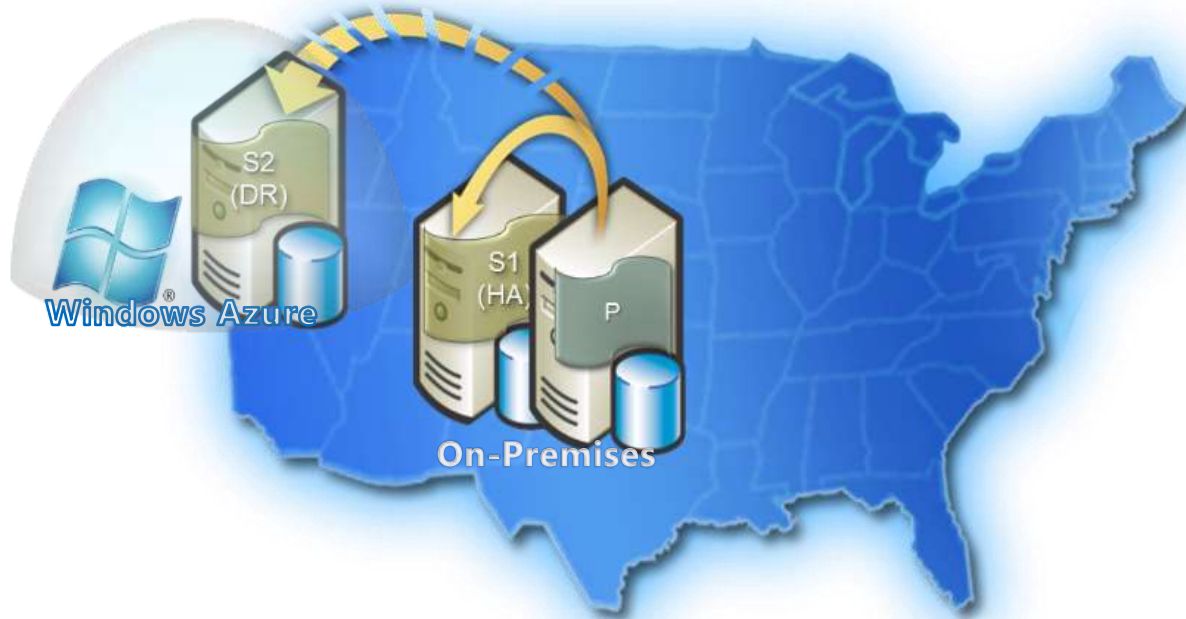
Manual or automated scheduling

SQL Server Backup to Windows Azure Tool

Stand-alone application for prior version of SQL Server

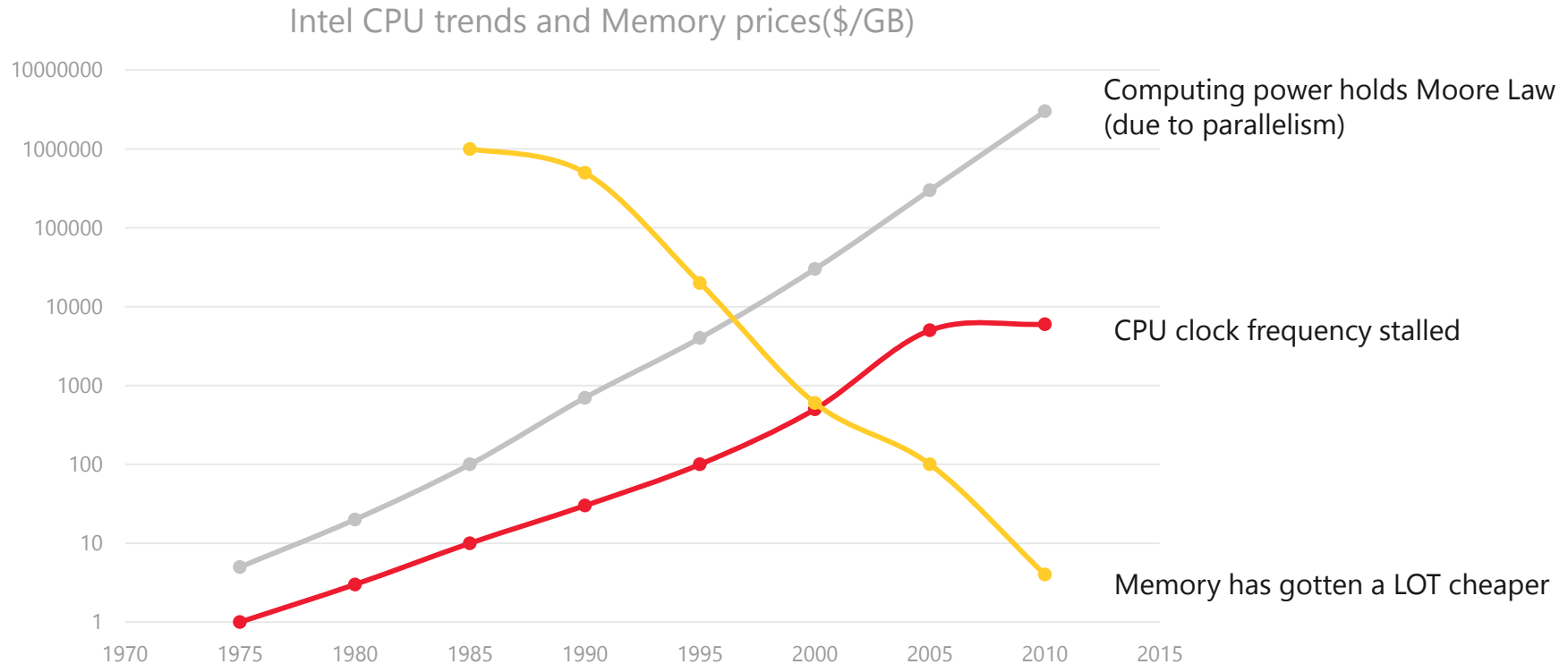
Can encrypt backups stored locally or in Windows Azure

■ Always-On and Azure



In-Memory a Mega Trend (OLTP)

■ Driver for In Memory OLTP (HEKATON)



■ Hekaton Architecture Pillars

Customer Benefits

High performance data operations

Efficient, business-logic processing

Frictionless scale-up

Hybrid engine and integrated experience

Hekaton Tech Pillars

Main-Memory Optimized

- Optimized for in-memory data
- Indexes (hash and range) exist only in memory
- No buffer pool, B-trees
- Stream-based storage

T-SQL Compiled to Machine Code

- T-SQL compiled to machine code via C code generator and VC
- Invoking a procedure is just a DLL entry-point
- Aggressive optimizations @ compile-time

High Concurrency

- Multi-version optimistic concurrency control with full ACID support
- Core engine uses lock-free algorithms
- No lock manager, latches or spinlocks

SQL Server Integration

- Same manageability, administration & development experience
- Integrated queries & transactions
- Integrated HA and backup/restore

Drivers

Hardware trends

Steadily declining memory price, NVRAM

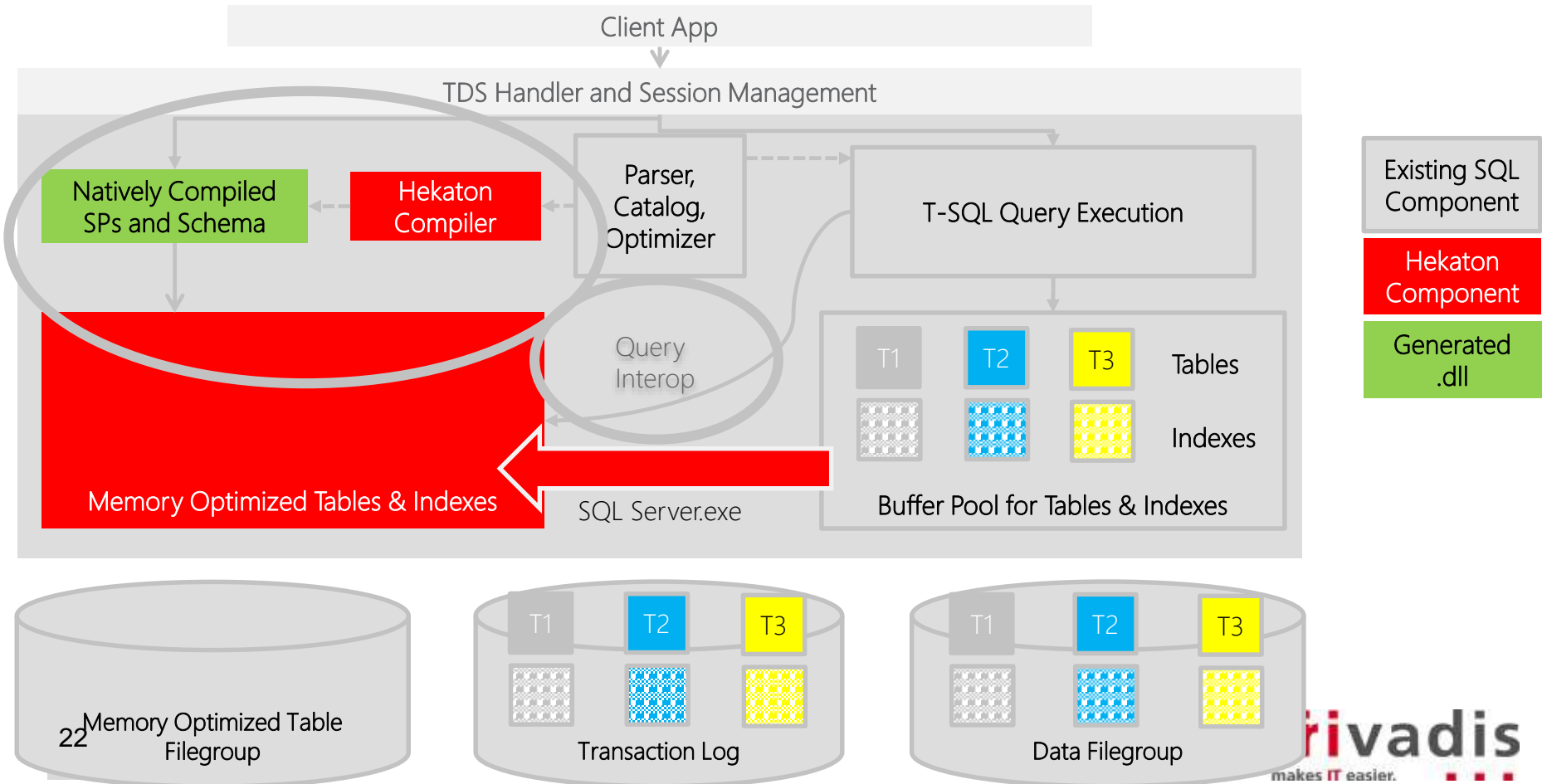
Stalling CPU clock rate

Many-core processors

Business

TCO

Hekaton Integration and Application Migration



SQL Server 2014

In Memory Data Warehouse

■ Column vs. Row Store

Row Store (Heap / B-Tree)

data page "1000"

ProductID	OrderDate	Cost
310	20010701	2'171.29
311	20010701	1'912.15
312	20010702	2'171.29

data page "1001"

ProductID	OrderDate	Cost
313	20010701	4'171.20
314	20010704	1'812.25
315	20010702	1'171.30

Column Store (values compressed)

data page
"2000"

ProductID
310
311
312
313
314
315

data page
"2001"

OrderDate
20010701
20010702
20010704


data page
"2003"

Cost
2'171.29
1'912.15
2'171.29
4'171.20
1'812.25
1'171.30

Fetch Only Needed Columns

Segment Elimination

```
SELECT ProductKey, SUM (SalesAmount)
FROM SalesTable
WHERE OrderDateKey < 20101108
```



OrderDateKey	RegionKey	Quantity
01	1	6
04	2	1
04	2	2
03	2	1
05	3	4
02	3	5

StoreKey	RegionKey	Quantity
02	2	1
03	1	5
01	2	1
04	2	4
04	1	5
01	1	1

OrderDateKey	ProductKey	SalesAmount
20101107	106	30.00
20101107	103	17.00
20101107	109	20.00
20101107	103	17.00
20101108	106	20.00
20101108	106	25.00

OrderDateKey	ProductKey	SalesAmount
20101108	102	14.00
20101108	106	25.00
20101109	109	10.00
20101109	106	20.00
20101109	106	25.00
20101109	103	17.00

Fetch Only Needed Segments

Segment Elimination

```
SELECT ProductKey, SUM (SalesAmount)
FROM SalesTable
WHERE OrderDateKey < 20101108
```

The diagram illustrates segment elimination in a data warehouse. It shows two tables, SalesFact and DimSales, with a large red 'X' over them, indicating they are not needed for the query. The query only requires segments from DimProduct and DimDate.

OrderDateKey	ProductKey	SalesAmount
20101107	106	30.00
20101107	103	17.00
20101107	109	20.00
20101107	103	17.00
20101108	106	20.00
20101108	106	25.00

OrderDateKey	ProductKey	SalesAmount
20101108	102	14.00
20101109	105	25.00
20101109	106	10.00
20101109	106	20.00
20101109	103	25.00
20101109	103	17.00

■ Clustered & Updatable Column Store Index in SQL 2014

- Updateable
- Includes all columns in the table
- Only index on the table
- Uses column store compression
- Stores data to improve compression and performance (not sorted)
- Available in Enterprise, Developer, and Evaluation editions

■ Details Clustered Column Store Index

Partition

INSERT

- Rows are placed in the Row Store (heap)
- When Row Store is big enough, a new ColumnStore Row Group is created

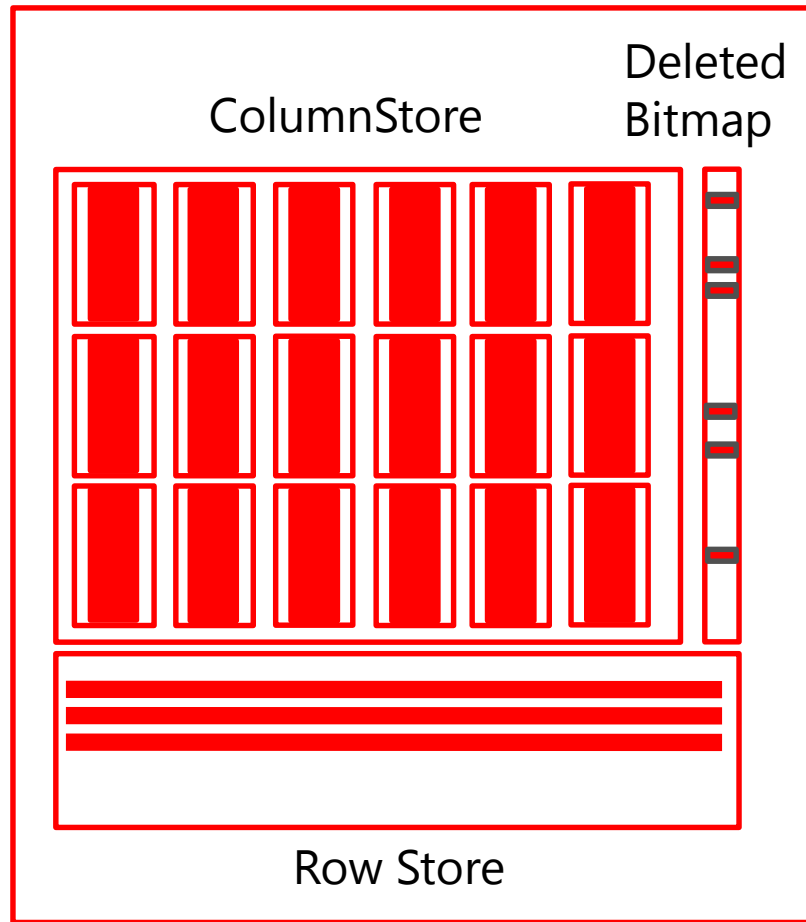
DELETE

- Rows are marked in the Deleted Bitmap

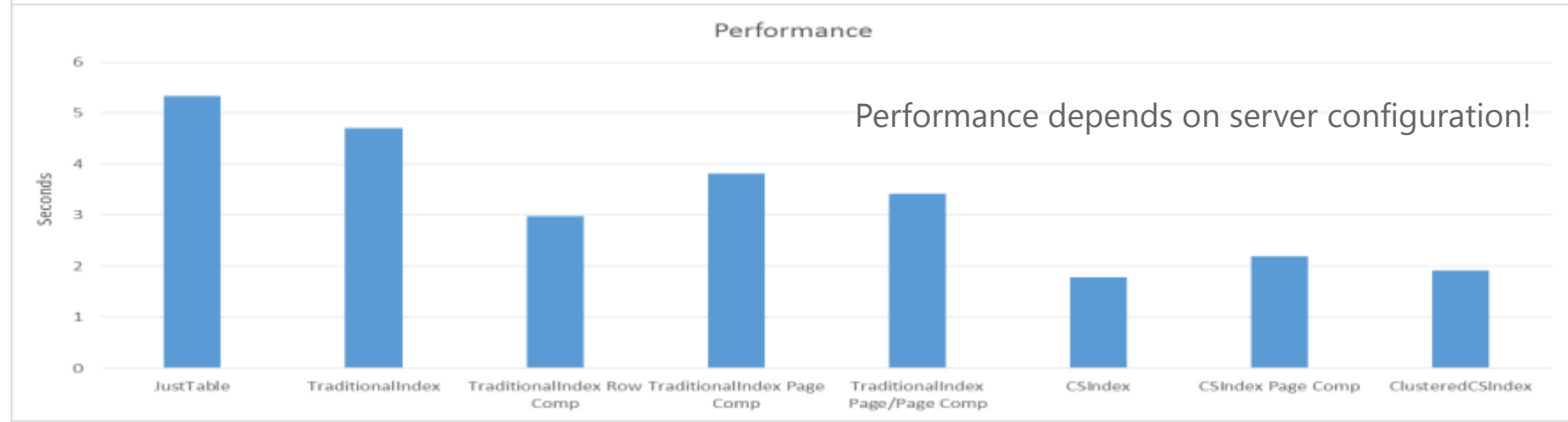
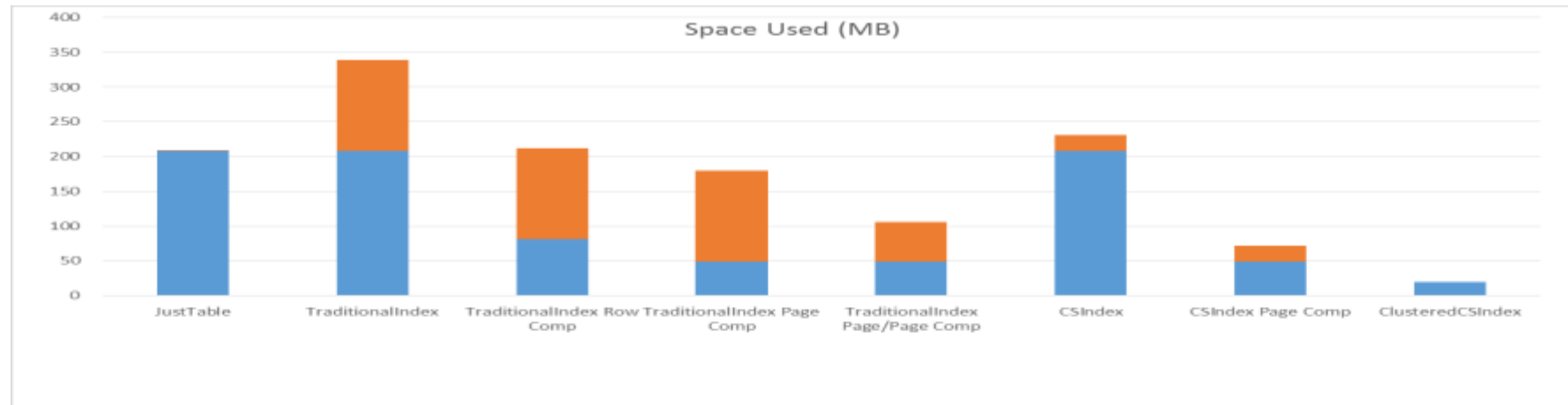
UPDATE

- Delete plus insert

Most data is in ColumnStore format



■ Some numbers



Merci