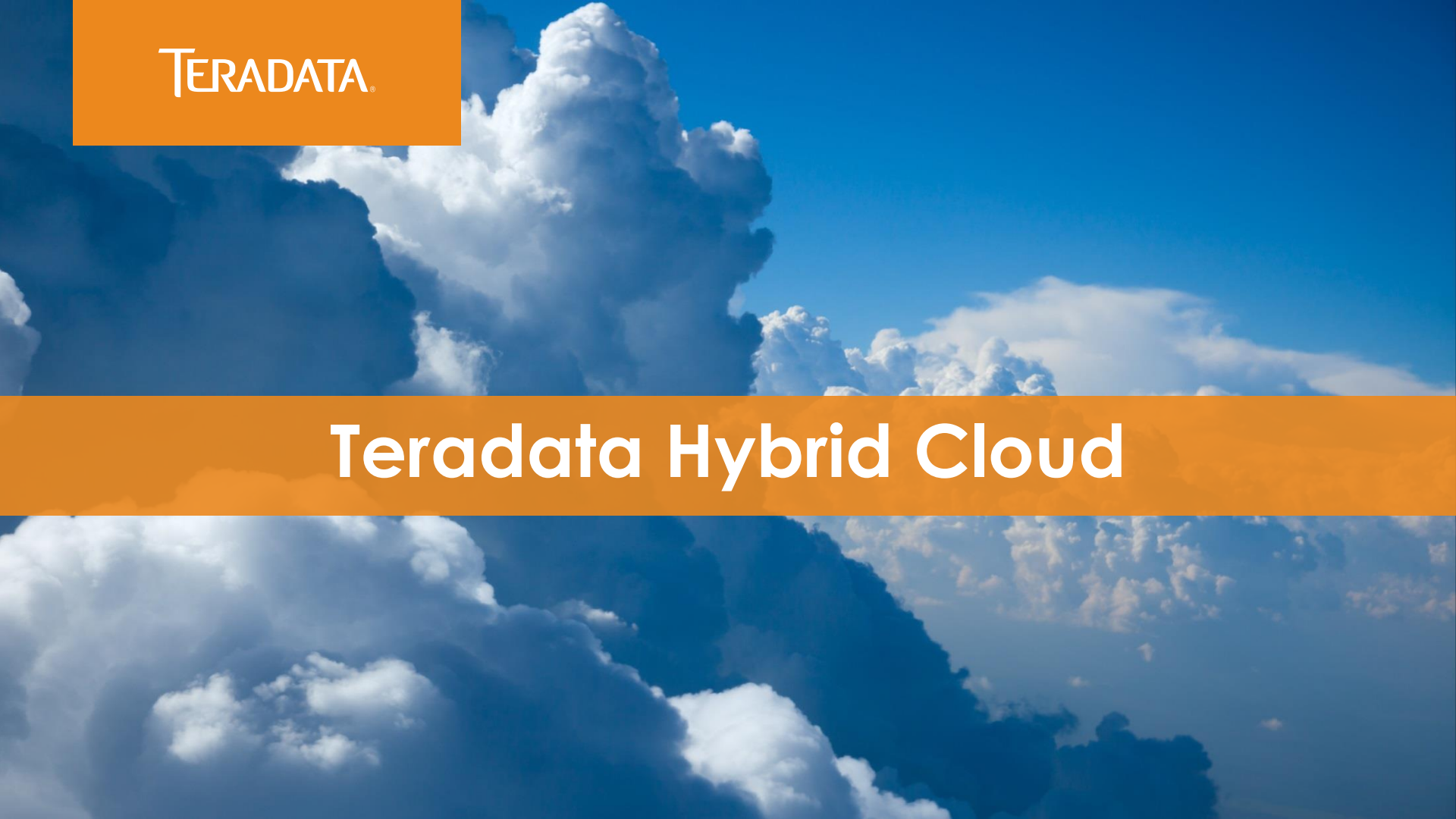
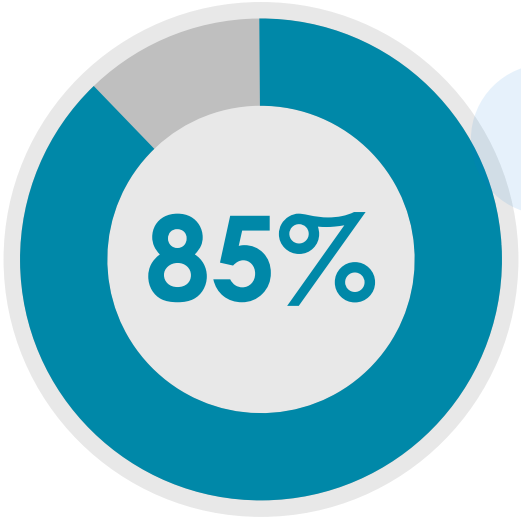

TERADATA
Teradata Hybrid Cloud

Hybrid Cloud
Definition

Customer environment using a mix of ***managed, public, private*** and ***on-premises*** resources orchestrated to work together

Survey: Customers Want “Hybrid Cloud” and “As a Service”

Companies will deploy both **on-premises** and **in the cloud** by 2020



Companies want to **consume** data warehousing **“as a service”**

2016 Sources: JPMorgan CIO Survey and Teradata Cloud Customer Survey (N=316, US companies with >$500M in revenue, targeted decision makers and influencers of data warehouse purchases)

TERADATA.

Why Do Customers Want Cloud?

- **Accelerate time-to-value**
  - Avoid lengthy procurement process
- **Increase experimentation**
  - Easier/faster testing of new ideas
- **Shift to OpEx** (subscription model)
  - Often preferred over CapEx (upfront purchase)
- **Reduce financial risk**
  - Pay only for resources consumed
- **Focus in-house talent on data insight**
  - No need to worry about infrastructure management

Teradata Everywhere™

Same software available on every deployment option

FLEXIBILITY

IntelliCloud™
(IntelliFlex™ / Appliance / AWS)

Public Cloud
(AWS / Azure Marketplace)

Private Cloud
(VMware)

On-Premises
(IntelliFlex™ / Appliance)

Analytical Ecosystem

Unified Data Architecture

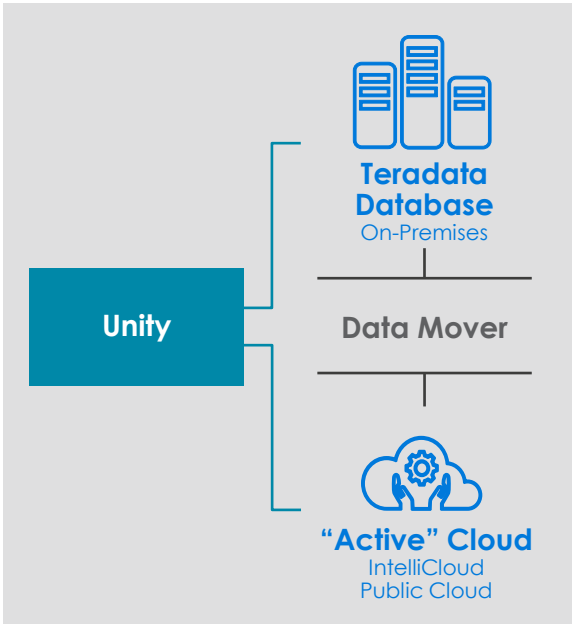
PERFORMANCE

TERADATA.

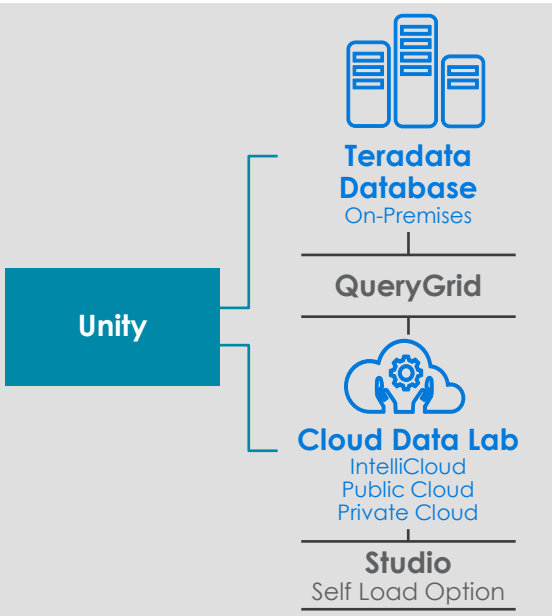
Use Cases

“Borderless Analytics” Use Cases

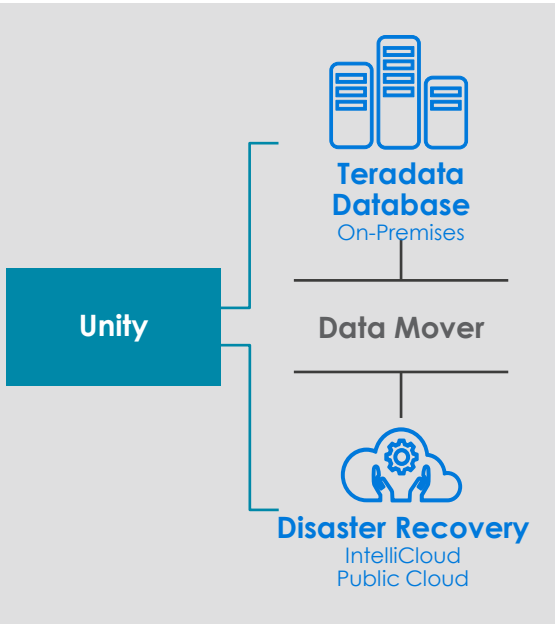
Cloud Bursting



Cloud Data Lab



Cloud Disaster Recovery

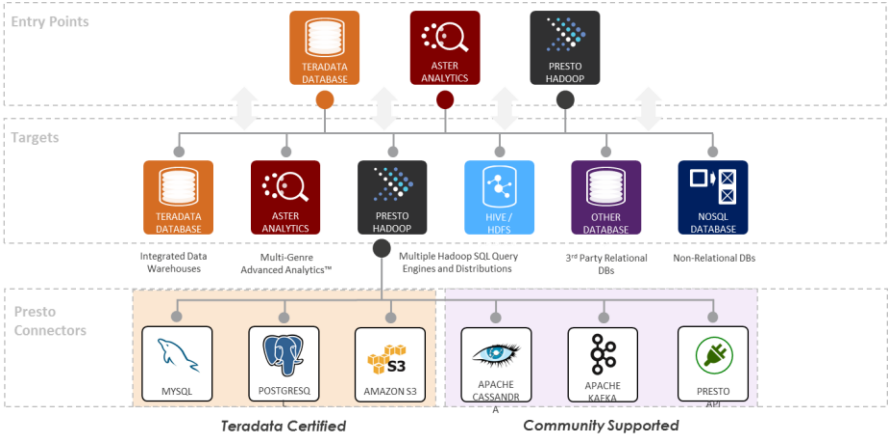


“Borderless Analytics” Enabled by Teradata Ecosystem

Teradata Unity

- IntelliCloud, public & private, on-prem
- Intelligent copy of changed data
- Push-button system initialization

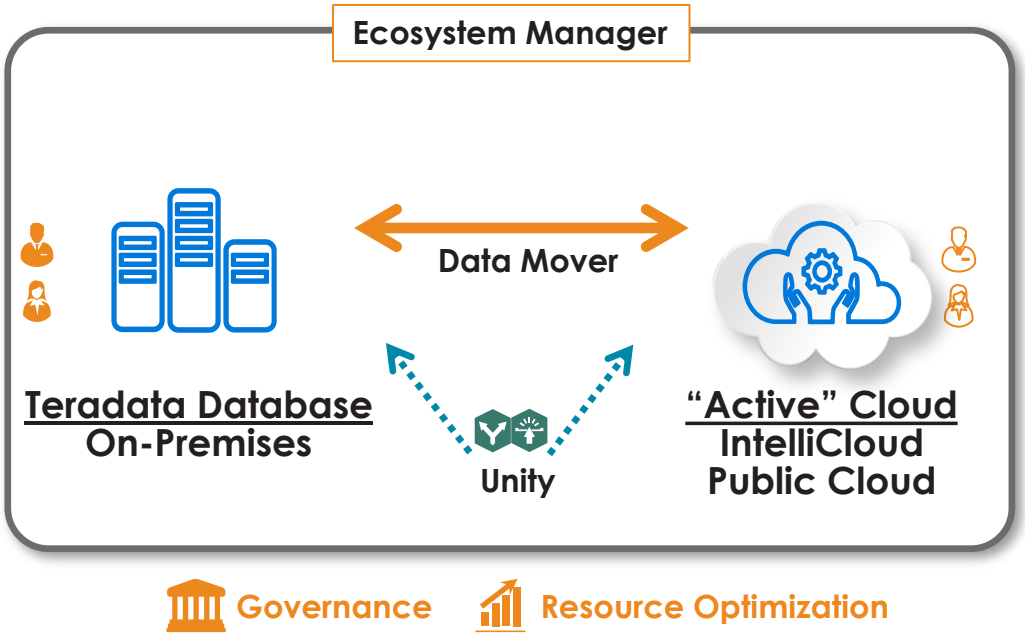
Teradata QueryGrid™



- New architecture delivers improved performance, consistency
- Framework for new services such as security, encryption, performance monitoring

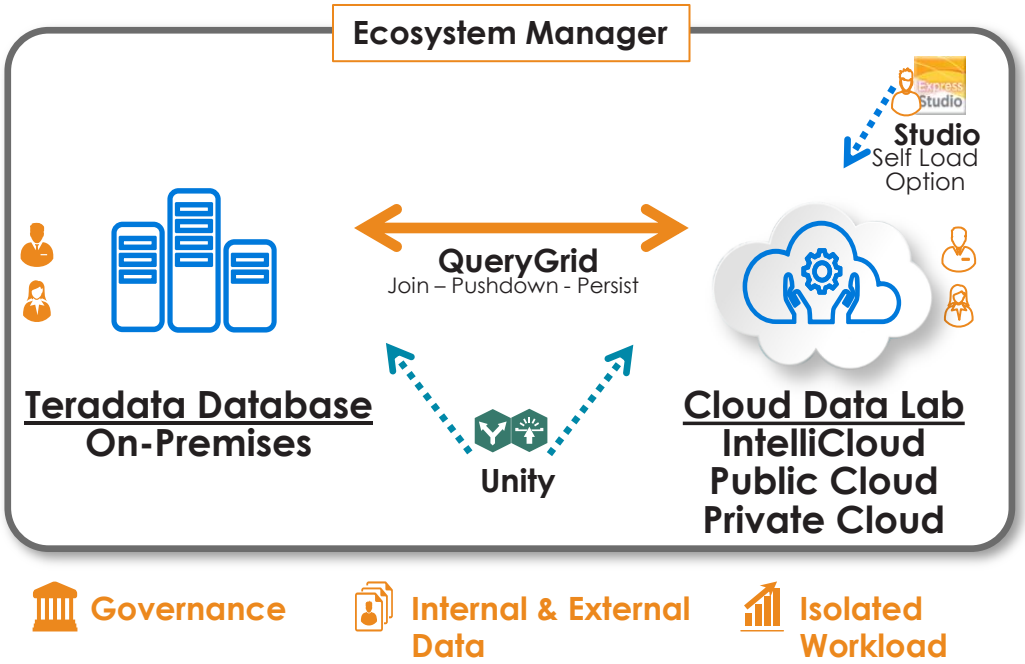
Cloud Bursting

- Secondary system is already in existence and kept current
- Leverages the Active / Active environment
- Balance workload and optimize resources between environments



Cloud Data Lab

- Data Labs / Sandboxes are becoming the norm
- May not require "up to the minute" production data
- Speeds Dev with lower impact on primary system
- May include governance of the Data Lab Portal



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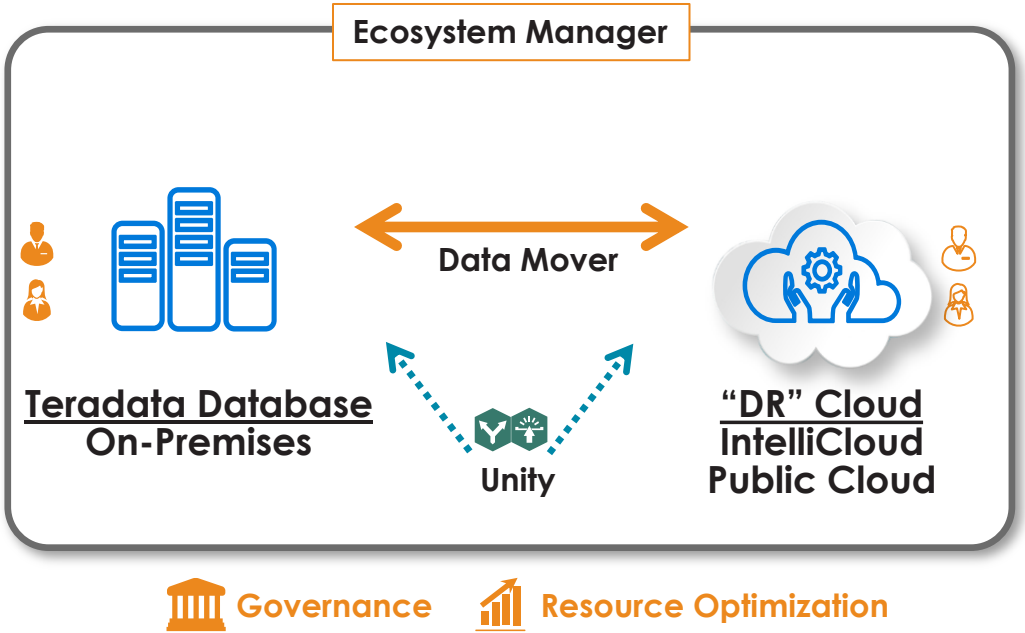
Cloud Disaster Recovery

- Customer may not have (or want) a 2nd data center
- Disaster Recovery system may be warm and passive
- Could also be an "archival system" with little access
- References:
  - Meredith
  - Core Digital Media



Introducing…

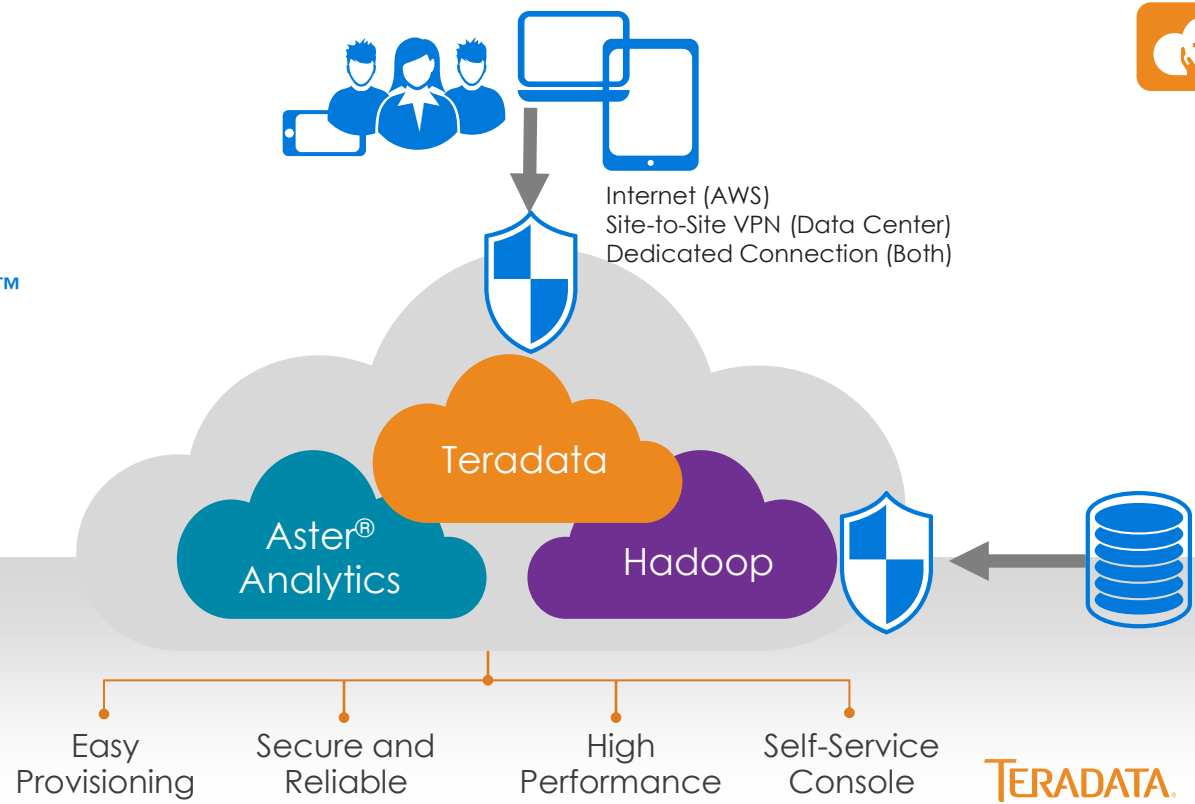
Teradata IntelliCloud™

Teradata IntelliCloud™ provides Best-in-Class Data & Analytic "**Software as a Service**"

TERADATA.

IntelliCloud™ "Software as a Service"

- *Software available:*
  - **Teradata**
  - **Aster® Analytics**
  - **Hadoop (CDH & HDP)**
  - **AppCenter & QueryGrid™**
- *Deployment options:*
  - **IntelliFlex™**
  - **Appliance**
  - **AWS**
  - **Azure** ***(Q4)***



IntelliCloud™ Subscription Attributes

Service Feature	Included
Software	✓
Infrastructure	✓
Monitoring	✓
Encryption	✓
Compliance	✓
Web Console	✓
Onboarding*	✓
99.9% SLA**	✓
Backups***	✓

- **Predictable cost**
  - Flat rate subscription pricing
- **Comprehensive infrastructure services**
  - Expanded choice, no hidden fees
- **Audited security and compliance**
  - ISO 27001, SOC 1&2, PCI, HIPAA
- **"Just bring your data and a DBA"**
  - We manage the environment for you

** Does not include consulting services such as architecture, migration, BI/DI*

*** For platforms deployed in Teradata data centers*

**** For Teradata Database*

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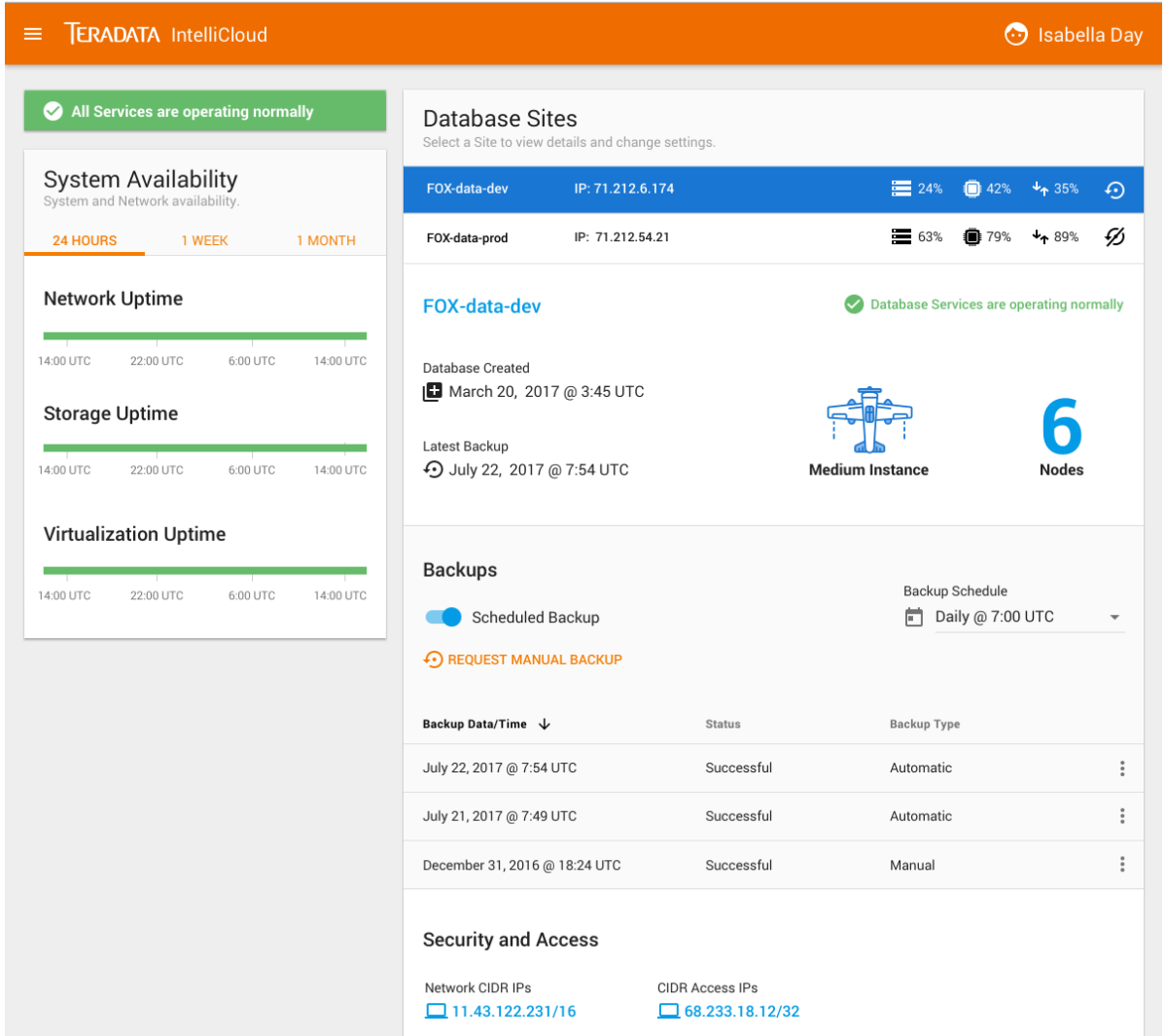
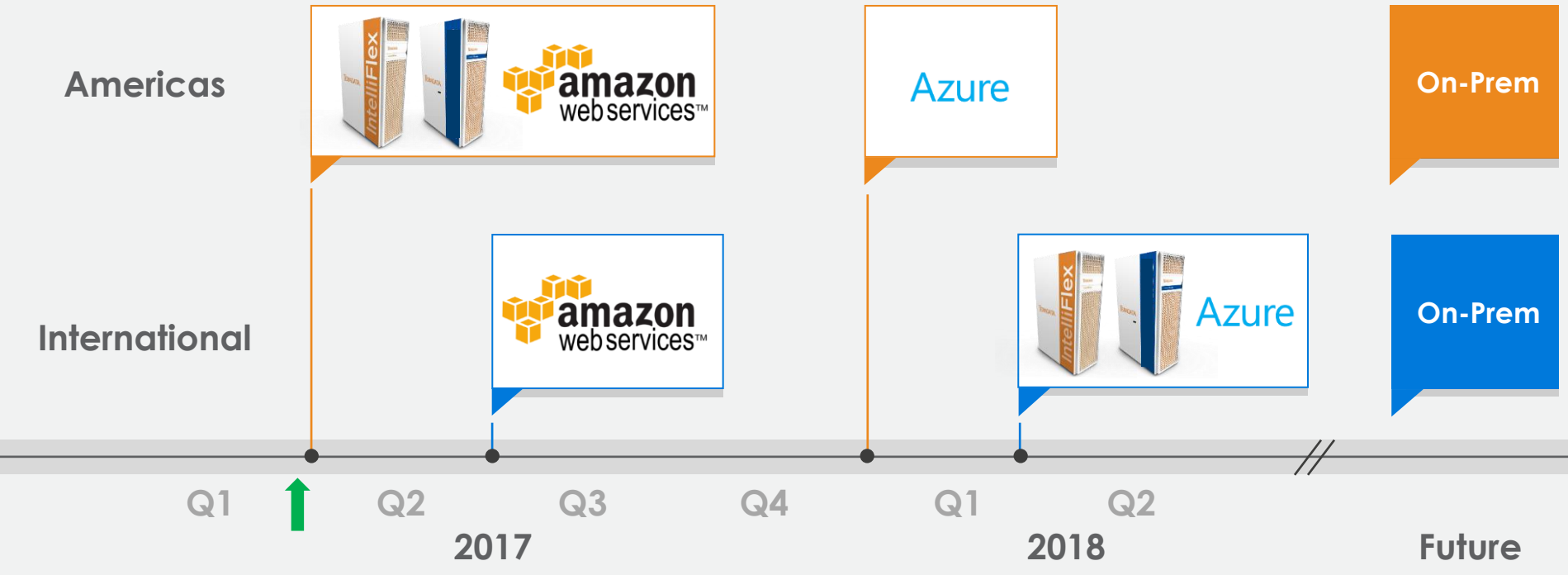
IntelliCloud™ Self-Service Management Console

- *Availability*
- *Utilization*
- *Backups*
- *Security*
- *Users*
- *More*



IntelliCloud™ Rollout Timeline



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Public Cloud Marketplaces

Teradata Software on AWS/Azure* Marketplaces

Best-in-Class Data Warehousing and Multi-genre Advanced Analytics*

- Same software as in on-premises systems
- Hourly pay-as-you-go or Annual subscription**
- Includes Teradata Premier Cloud Support
- Uniform global availability

* *Teradata Database on Azure coming Q1; Aster Analytics on Azure coming Q2*

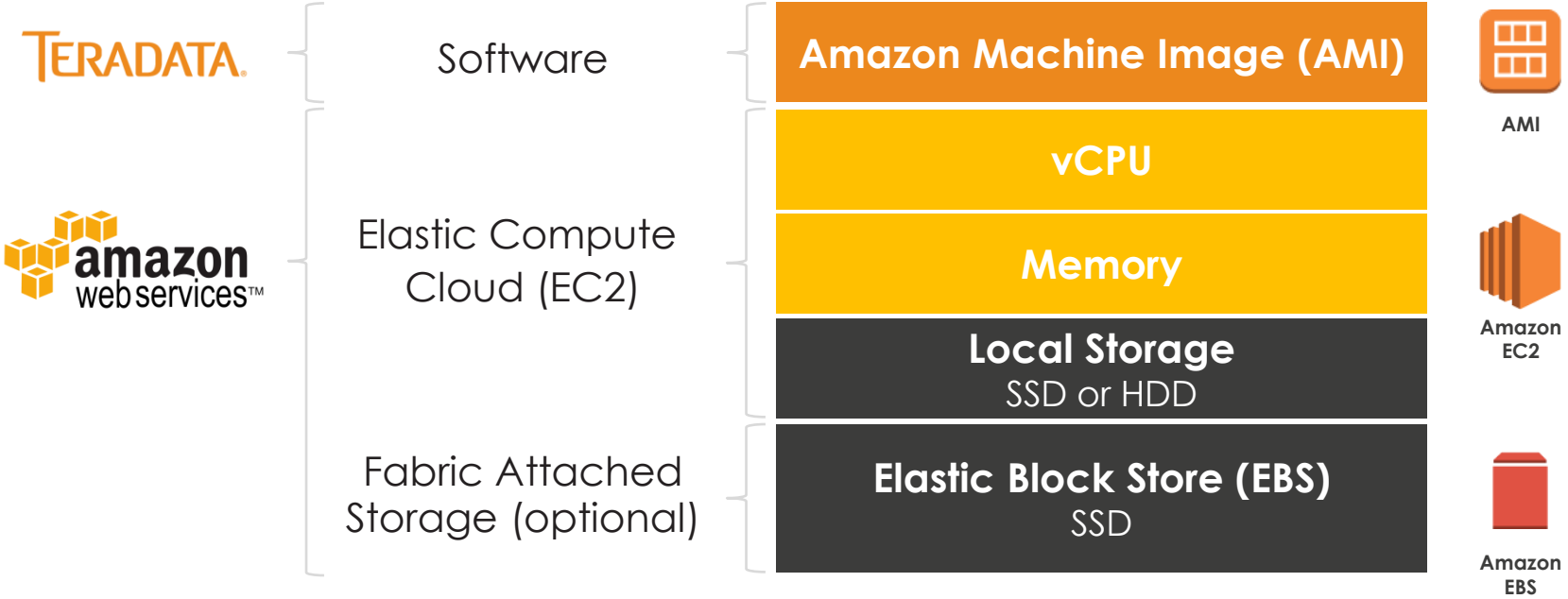
** *Annual subscription requires BYOL in Azure Marketplace, coming Q3*

TERADATA.

Global Availability with AWS and Azure

TERADATA

Teradata Software + AWS Infrastructure Stack



Teradata Database on Azure Solution Building Blocks

	Software	Function
TD	**Teradata Database 15.10**	Azure Premium and Local Storage options
VP	**Teradata Viewpoint**	Single system (w/ Data Lab optional) or multi-system
SM	**Teradata Server Management**	System monitoring
DSC	**Teradata Data Stream Controller**	Teradata Database backup to Azure Premium or Blob storage
REST	**Teradata REST Services**	RESTful interface to Teradata Database
TTU	**Teradata Tools and Utilities**	Loading and moving data
TPT	**Teradata Parallel Transporter**	Load, Update, Export, and Stream Operators
QG	**Teradata QueryGrid™**	Connects queries to other data repositories
TASM	**Teradata Active System Management**	Teradata Active System Management
DM	**Teradata Data Mover**	Data movement: Azure to Azure, On-Premises to Azure
EM	**Teradata Ecosystem Manager**	Multi Teradata system monitoring
Presto	**Teradata Presto**	Teradata distribution of Presto certified for HDI or HDP/CDH

CDH = Cloudera HDP = Hortonworks HDI = HDInsight

Which Teradata Cloud Option Is Right for You?

Teradata IntelliCloud™

- *"Just bring your data and a DBA"*
- Teradata Database, Aster, Hadoop
- Teradata provides infrastructure
  - Managed platform or AWS resources
- **Comprehensive service offering**
  - Teradata provides onboarding, monitoring, patches, upgrades, etc.
- Web-based management console
- Flat Rate subscription
  - 1-month, 1-year, 3-year terms

AWS / Azure Marketplaces

- *"Do it yourself – or hire us to help you"*
- Teradata Database, Aster, EMR / HDI
- AWS, Azure provide infrastructure
  - Standard public cloud resources
- **A La Carte software**
  - Customer owns responsibility for selection, configuration, integration, backups, etc.
- Standard public cloud services & tools
- Pay-as-You-Go or Flat Rate
  - Hourly On-Demand or 1-year* terms

* *Annual subscription requires BYOL in Azure Marketplace, coming Q3*

Private Cloud

Teradata Database on VMware – MPP Scalability

	NEW **Developer**	NEW **Enterprise**
Typical Use Case	Run multiple test or development environments simultaneously or evaluate Teradata Database	Teradata Database for Production, Development, Test use cases in private cloud/virtual environment
Platform Scalability	SMP only* Single virtual node	SMP or MPP Up to 8 physical servers/32 virtual nodes
Support	Community-based support	Fully Supported
Pricing/ Licensing	**Free download** Advanced Database features bundled	Per TCore term license Advanced Database features bundled

**MPP (with up to 2 nodes) release planned in near future*

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Customer Success

BevMo! Uses Teradata IntelliCloud™

- **No Hardware or Software to Buy**
  - "The beauty of the cloud is that **we get to have our cake and eat it too**."
  - "We didn't have to make these multi-million dollar (investments) to be competitive in the retail space."
- **Industry Expertise**
  - "Built on Teradata, the **gold standard for analytics**."
  - "**Data warehousing for the masses**, with access to industry expertise and best practices."

Bob Graham,
Vice President of IT, BevMo!

Meredith Uses Teradata Hybrid Cloud

- **Company**
  - $1.6B revenue, >3.7K employees
  - Media & marketing services: knowledge of home, family, food, and lifestyle markets
- **Challenge**
  - **Needed an off-site Test system that could also serve as a Disaster Recovery (DR) system** without adding any data center floor space
- **Solution**
  - On-premises: 6650 EDW, 2650 for Test, and 560 for Development
  - **Added Teradata IntelliCloud™** for Test / Dev and DR applications
- **Outcome**
  - "Having **the same Teradata database, with the same capabilities and SQL as our on-premises systems** provided that solution."

Core Digital Media Uses Teradata Hybrid Cloud

- **Company**
  - $500M revenue, 1K employees
  - Online marketing and customer acquisition business
- **Environment**
  - Teradata Appliance for Production & Test/Dev
  - Without Disaster Recovery (DR) instance to support business-critical workload
- **Motivation**
  - **Needed DR Solution** to support production system
  - Flexible options in future for data warehousing (Cloud, On-Prem)
- **Outcome**
  - **Added Teradata IntelliCloud™** to support critical data & workload in a disaster scenario
  - **Eliminated need for 2nd footprint in a 2nd data center**

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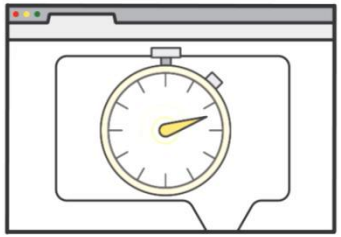
“How Seven West Media Captured Gold at the Rio Olympics”

- Australian broadcast and media company
- **First production use of Teradata Database on AWS**
- Streamed coverage of the 2016 Rio Olympics on TV, Internet
- **Signed up 1 million new people in just 2 weeks**
- Captured tons of demographic data used for email marketing
- **29% uplift in average minutes of use** compared to control group

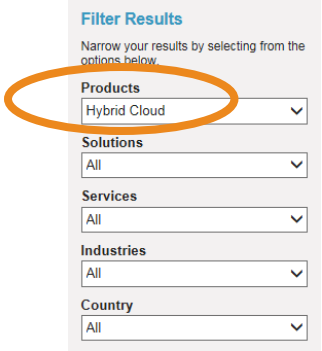


TERADATA | amazon web services

SEVEN WEST MEDIA

View webinar

For More Information… Read the Cloud Case Studies



www.teradata.com/Resources/

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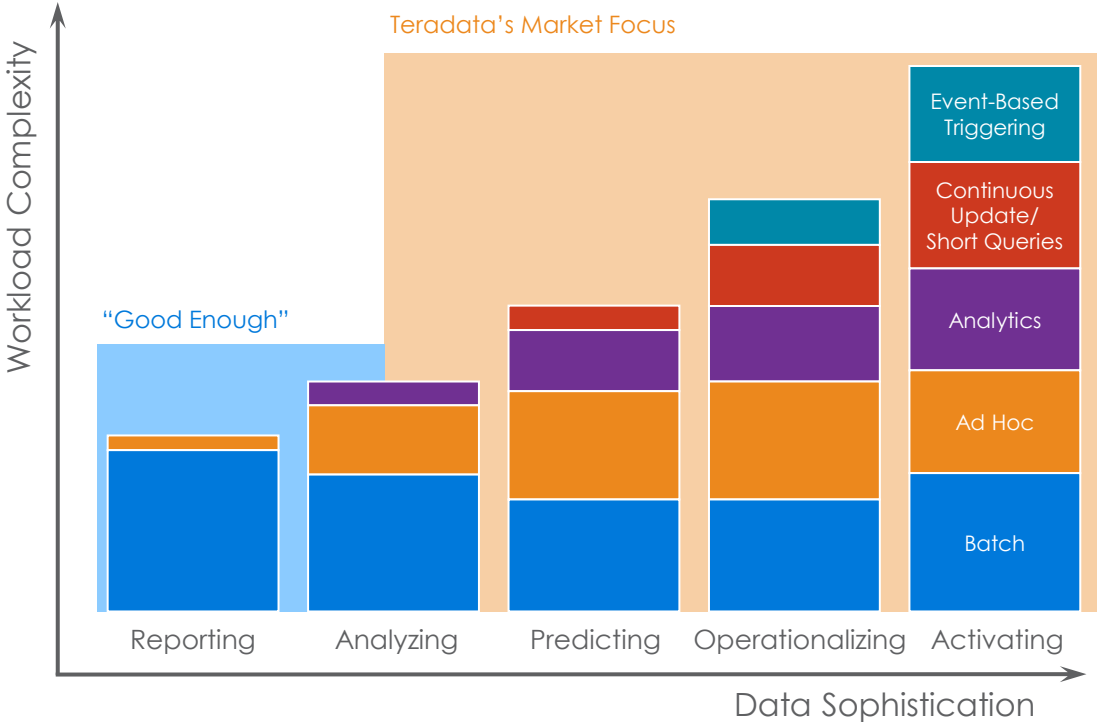
Teradata Differentiation

Our Focus = Upper Stages of Data Warehouse Maturity Model



ADVANCED DATA SYSTEMS BRING NEW CHALLENGES

- Query complexity grows
- Workload mixture grows
- Data volume grows
- Schema complexity grows
- Depth of history grows
- Number of users grows
- Expectations grow

And this is why experience matters!

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Teradata is a Leader in the 2017 Gartner Magic Quadrant for Data Management Solutions for Analytics

Figure 1. Magic Quadrant for Data Management Solutions for Analytics

Source: Gartner (February 2017)

Magic Quadrant for Data Warehouse and Data Management Solutions for Analytics by Roxane Edjlali, Adam M. Ronthal, Rick Greenwald, Mark A. Beyer, Donald Feinberg, February 20, 2017

TERADATA.

TERADATA Benchmark

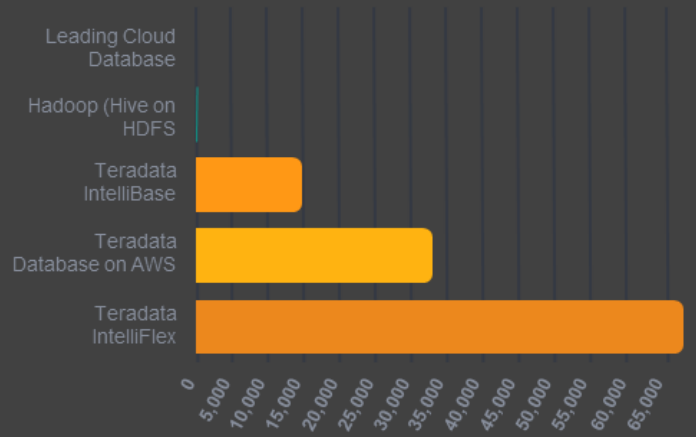
10:41:10

8 Nodes of IntelliFlex, AWS, & IntelliBase / 32 Nodes of Hadoop & Leading Cloud Database

50 Streams of Analytic, 300 Streams Tactical

67,556,736	32,956,106	14,723,649	29,956	1,903
Teradata IntelliFlex™	Teradata Database on AWS	Teradata IntelliBase™	Hadoop (Hive on HDFS)	Leading Cloud Database
			Failures: 37	

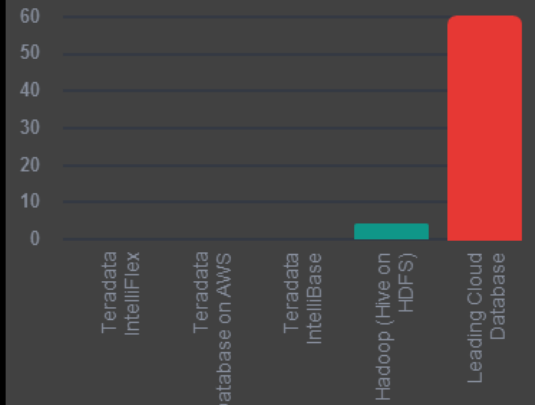
Total Queries Run (K)



Queries Per Hour

6.3 M	3.1 M	1.4 M	2.8 K	179
Teradata IntelliFlex	Teradata Database on AWS	Teradata IntelliBase	Hadoop (Hive on HDFS)	Leading Cloud Database

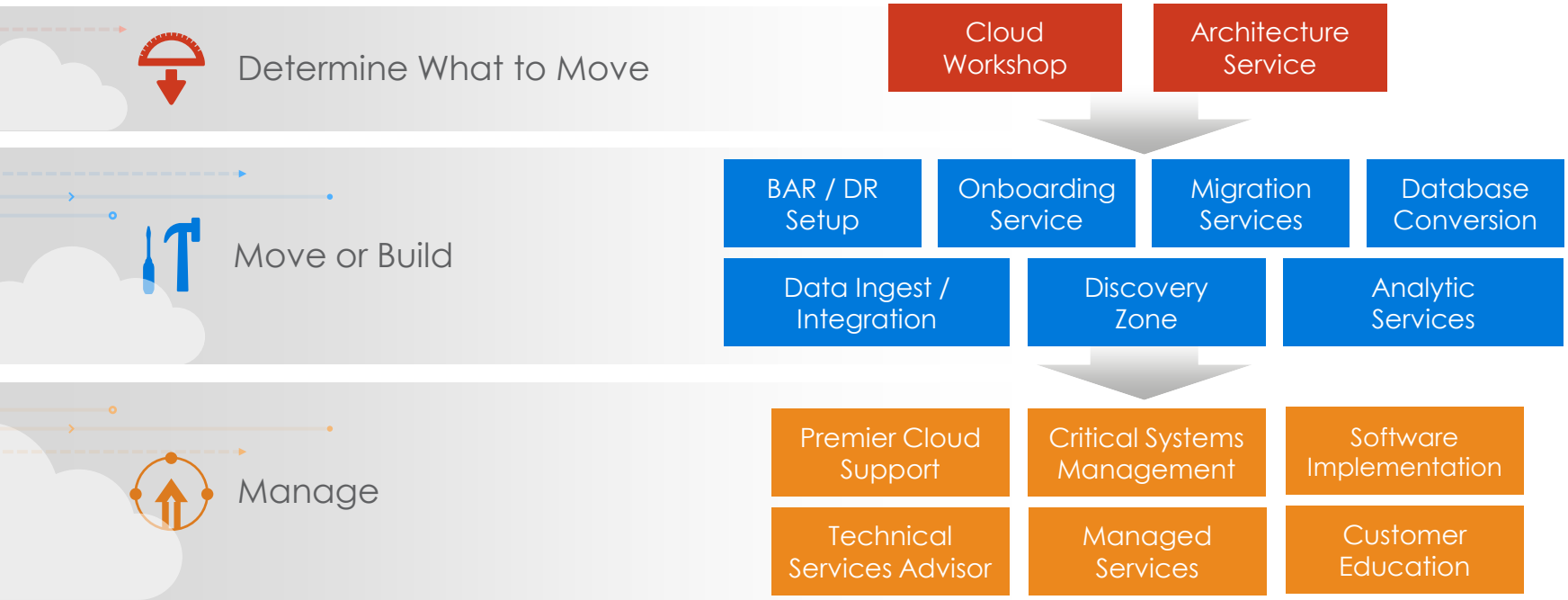
Cost Per Query (¢)



0.00383¢	0.00541¢	0.00592¢	4.26931¢	60.73618¢
Teradata IntelliFlex	Teradata Database on AWS	Teradata IntelliBase	Hadoop (Hive on HDFS)	Leading Cloud Database

(Teradata AWS & IntelliFlex Enterprise Tier)

Optional Services for Teradata in the Cloud



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Teradata Everywhere™

Same software available on every deployment option

FLEXIBILITY

IntelliCloud™
(IntelliFlex™ / Appliance / AWS)

Public Cloud
(AWS / Azure Marketplace)

Private Cloud
(VMware)

On-Premises
(IntelliFlex™ / Appliance)

Analytical Ecosystem

Unified Data Architecture

PERFORMANCE

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For more information, please visit
www.teradata.com/cloud

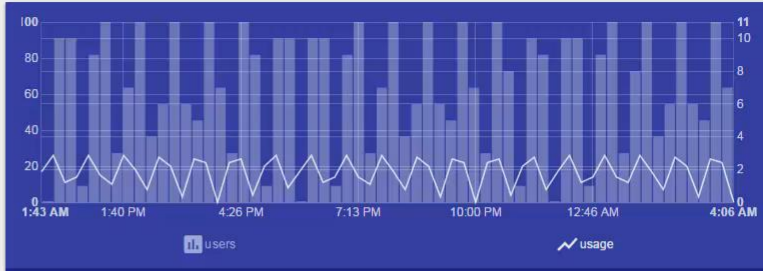
Hybrid Cloud UI

94
User Sessions
updated 1 minute ago

Teradata IntelliFlex
Users & Workloads

Sales 32 active user sessions	22%
Inventory 16 active user sessions	8%
Finance 18 active user sessions	16%
Forecasting 4 active user sessions	24%
MarketBasket 6 active user sessions	6%
Reporting 8 active user sessions	8%

DEACTIVATE SYSTEM



24
User Sessions
updated 1 minute ago

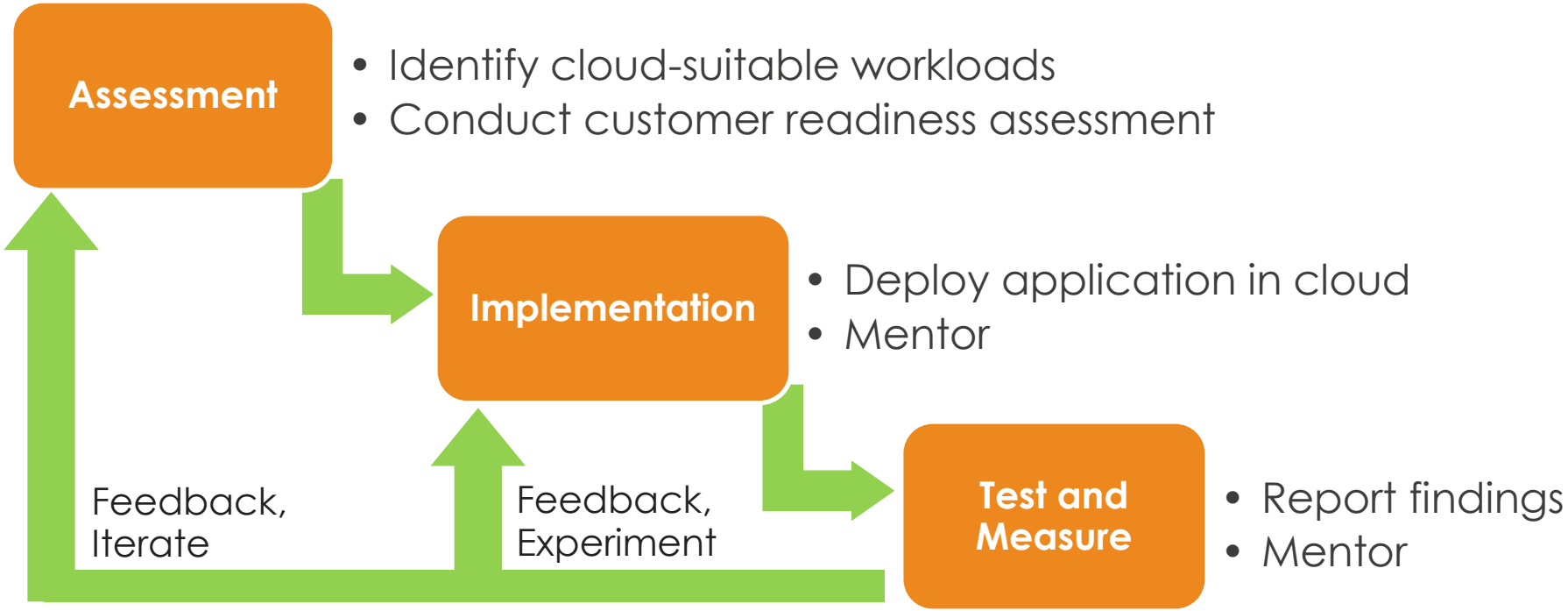
Teradata Managed Cloud
Users & Workloads

Inventory 24 active user sessions	12%

DEACTIVATE SYSTEM

TERADATA Hybrid Cloud

Hybrid Cloud UI Service Offering



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Hybrid Cloud UI Assessment Phase

Services designed to enable customers to accelerate their migration of applications from Teradata on-premises into the cloud

Potential Customer Profile	• Customers considering cloud bursting • Customers considering data lab in cloud • New / Existing customers with specific workloads to reside in cloud • Customers considering migrating dev / test environments to cloud
Available for	• Teradata on AWS • Teradata on Azure (TBA)
Scope	• Application with well-defined workload and small number of database objects and user dependencies • Cloud configuration • Data transfer and cloud pricing estimates
What's Included	• Customer interviews on current business requirements and identification of an application solution and/or workload suited for hybrid cloud • Review of customer's current infrastructure • Physical network connectivity considerations • Define cloud security and access controls • Design a detailed logical, physical architecture for hybrid cloud solution • Identify application workload, database objects, user dependencies • Define connectivity and data copy requirements from on-prem to cloud

Typical Duration and Roles

Duration	4 to 6 weeks, depending on scope
Roles	• Cloud Architect • Teradata Application Architect • Teradata Solution Architect

Use Case Implementation

Cloud Bursting Implementations

- **Isolated Workload**
  - Orchestrated data copy, foreign views, user routing
  - Real-time object synchronization not necessary
  - Examples: Isolated weekly batch reporting; ETL

- **Production Workload**
  - Orchestrated data copy, foreign views, user routing
  - Real-time object synchronization necessary
  - Example: Defined production workload; TASM workload (futures)

- **System**
  - Full object synchronization, user routing, governance
  - May be partial or full system active / active
  - Examples: Black Friday; temporary relief of system saturation

Cloud Data Lab Implementations

- **Ad-Hoc**
  - Orchestrated data copy and foreign views
  - Single instance
  - Object synchronization, user routing, governance less important
- **Repetitive or Repeatable**
  - Orchestrated data copy, foreign views, user routing
  - Scheduled, event triggered, or manual execution
  - Object synchronization and governance may also be needed
- **HA (Active-Active)**
  - Object synchronization, user routing, governance
  - May be partial or full system active / active
  - Production type environment

Cloud Disaster Recovery Implementations

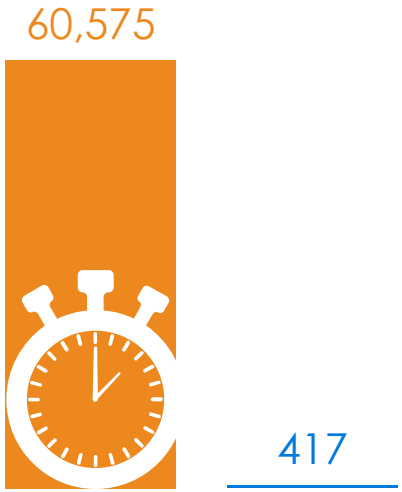
- **Archive**
  - Full system copy to storage
  - Minimal access
- **Active-Passive**
  - Full system copy
  - Scheduled synchronization or system copy
  - Only accessed in case of true disaster
- **Active-Active**
  - Full system copy
  - Full system synchronization and user routing

Teradata on AWS Performance

What Customers Can Do in 1 Hour on AWS (1)

Tactical Query performance during mixed workloads

- Teradata
- Competing Cloud Database



Teradata Database on AWS is 2.9X the price of the Competing Cloud Database

Performance/Price ratio = 145/2.9

145/2.9 = 50X

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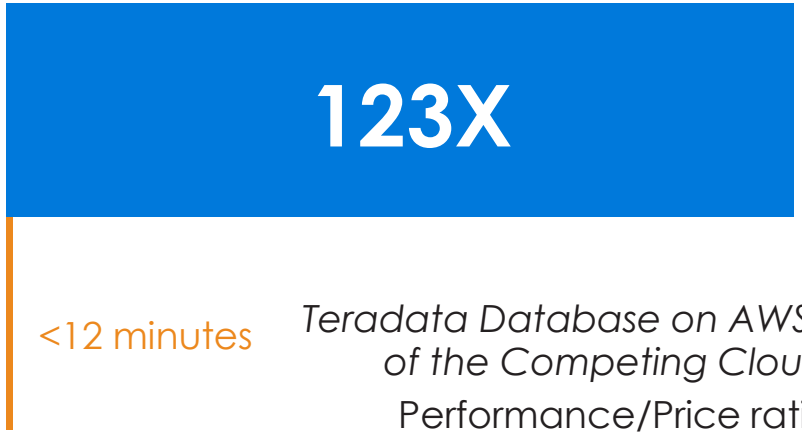
Performance of Real Customer Queries on AWS (2)

Which items do customers most often purchase together in the span of one week?

- Ex: Purchase Blu-Ray player, followed by an HDMI cable, within 7 days

Teradata

Competing Cloud Database



Teradata Database on AWS is 2.9X the price of the Competing Cloud Database

Performance/Price ratio = 123/2.9

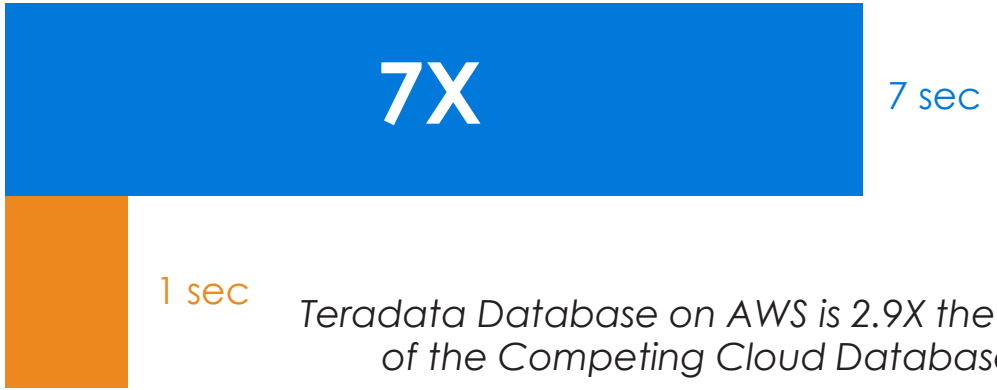
123/2.9 = 43X

Performance of Real Customer Queries on AWS (3)

Analyze store purchase returns

- By item, customer, date, time, store location, demographics

Teradata
Competing Cloud Database



Teradata Database on AWS is 2.9X the price of the Competing Cloud Database

Performance/Price ratio = 7/2.9

7/2.9 = 2.4X

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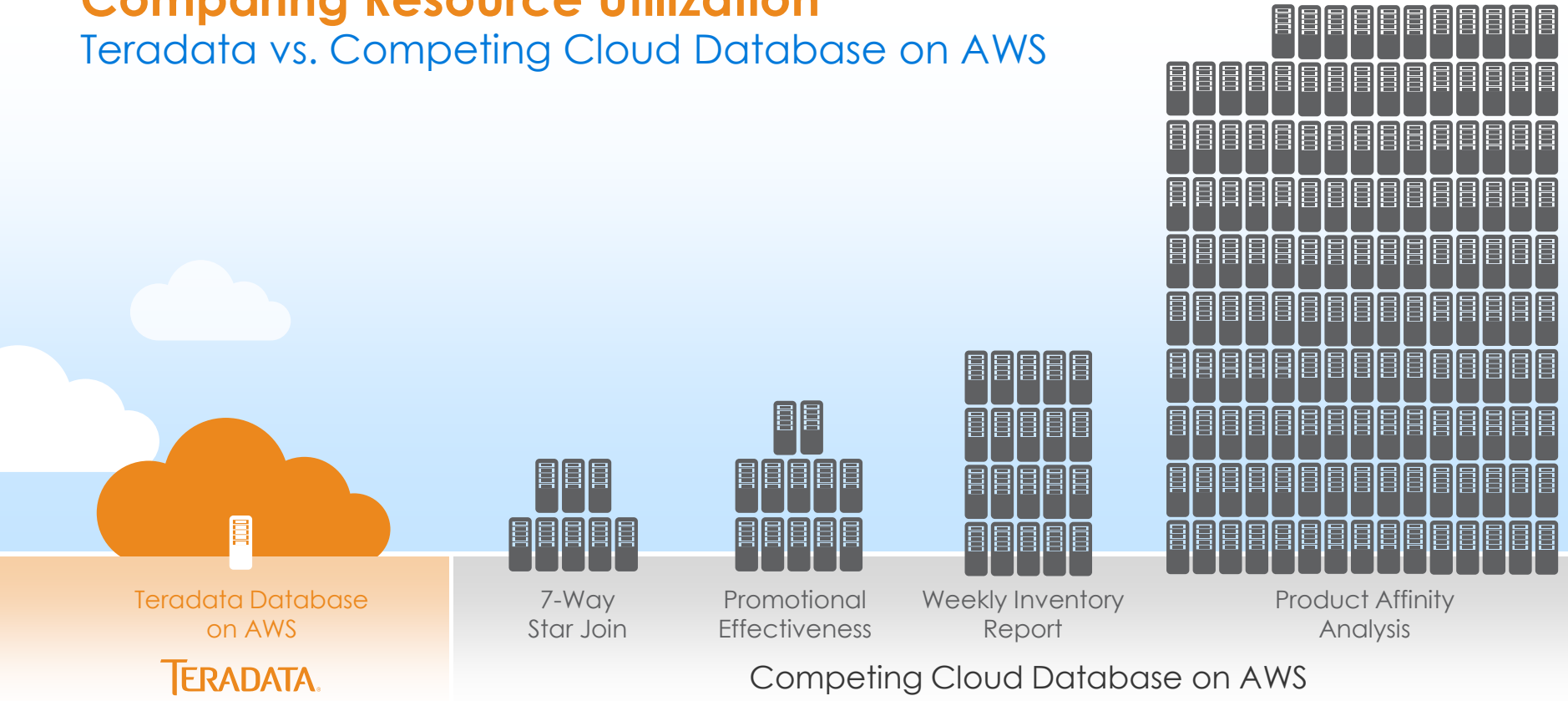
Comparing Resource Utilization

Teradata vs. Competing Cloud Database on AWS



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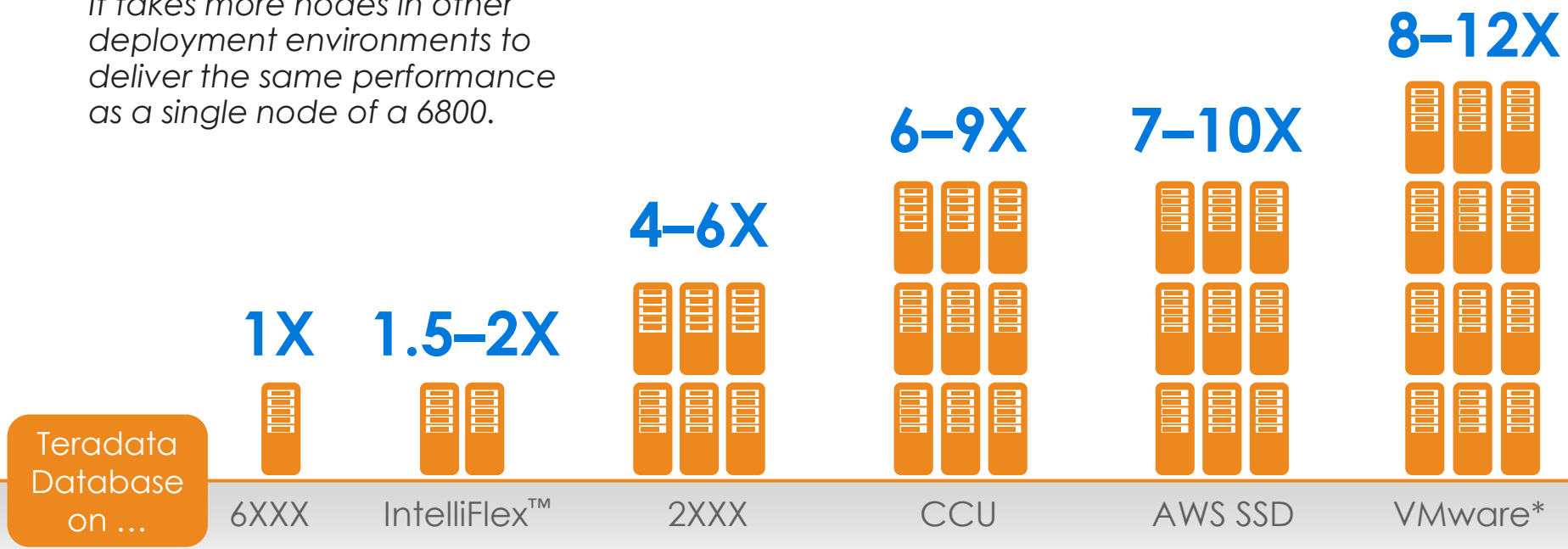
Teradata "Node Conversion" Rules of Thumb

It takes more nodes in other deployment environments to deliver the same performance as a single node of a 6800.



*Representative performance comparison for a mixed workload scenario involving 5 streams of DSS with 30 streams of Tactical. Results for individual deployments may vary.

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For more information, please visit
www.teradata.com/cloud