



Teradata On Microsoft Azure Innovating Together

Analyze Anything, Anywhere

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Teradata is a Microsoft Gold Partner

- Ongoing joint engineering, collaboration, and alignment
- 20 Engineer-Engineer Reviews
- Best practices for Azure features
 - Security, data movement, hybrid, VNet interconnects
- Heavy investment in training
 - >105 Azure certifications / accred.
 - >1,000 Azure additional by Q2 2019

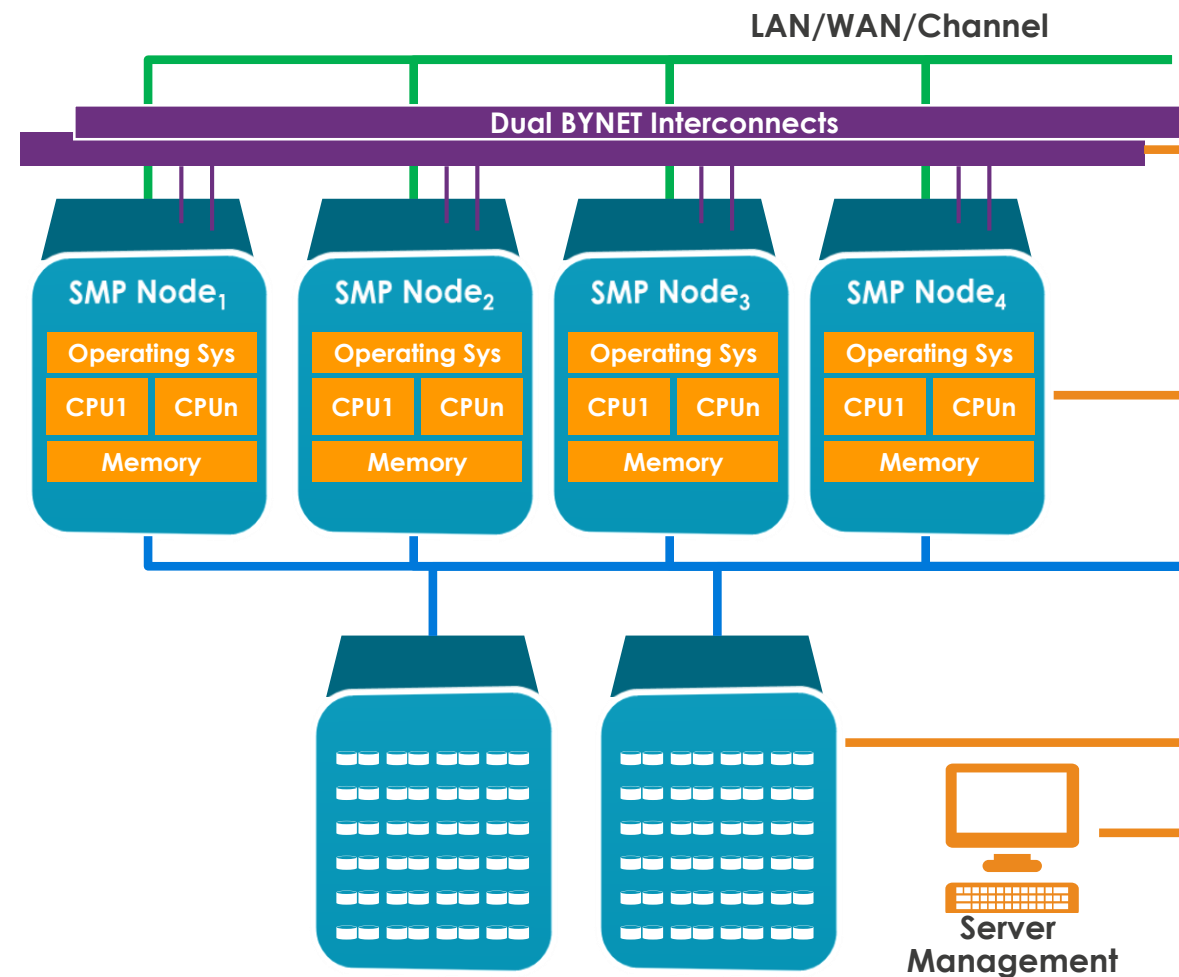
Teradata associates are committed!



Teradata Refresher

Teradata MPP Server Architecture

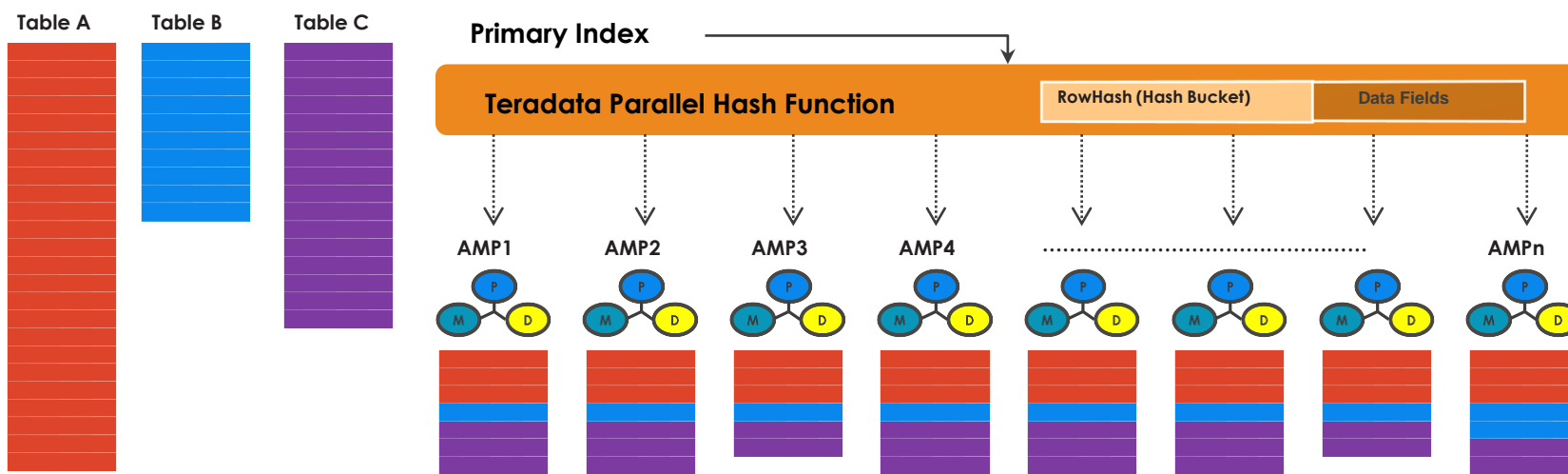
- **Nodes**
 - Incrementally scalable to 2048 nodes
- **Operating System**
 - Linux (SUSE)
- **Storage**
 - Independent I/O
 - Scales per node
- **BYNET Interconnect**
 - Fully scalable bandwidth
- **Connectivity**
 - Fully scalable
 - Traffic spread across all nodes
 - Channel – ESCON/FICON
 - LAN, WAN
- **Server Management**
 - One console to view the entire system



Teradata Data Management

Rows automatically distributed evenly by **hash partitioning**

- Even distribution results in scalable performance
- Done in real-time as data are loaded, appended, or changed.
- Hash map defined and maintained by the system
 - 2^{32} hash codes, 1,048,576 buckets distributed to AMPs
- Primary Index (PI) column(s) are hashed
- Hash is always the same - for the same values
- No reorgs, repartitioning, space management

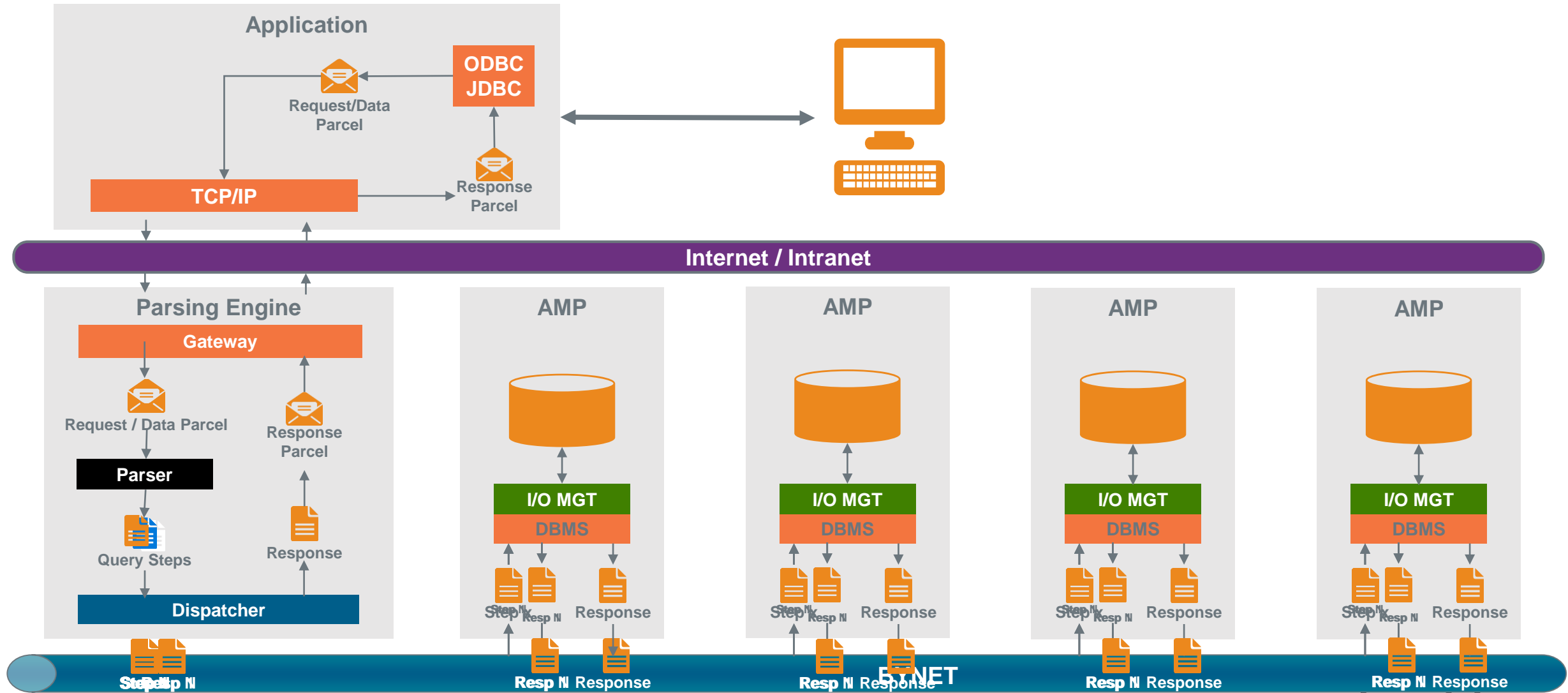


Property of Teradata

Query Execution

The Life of a Teradata Query

Query Execution



We're Ranked #1... (and #1... and #1...)

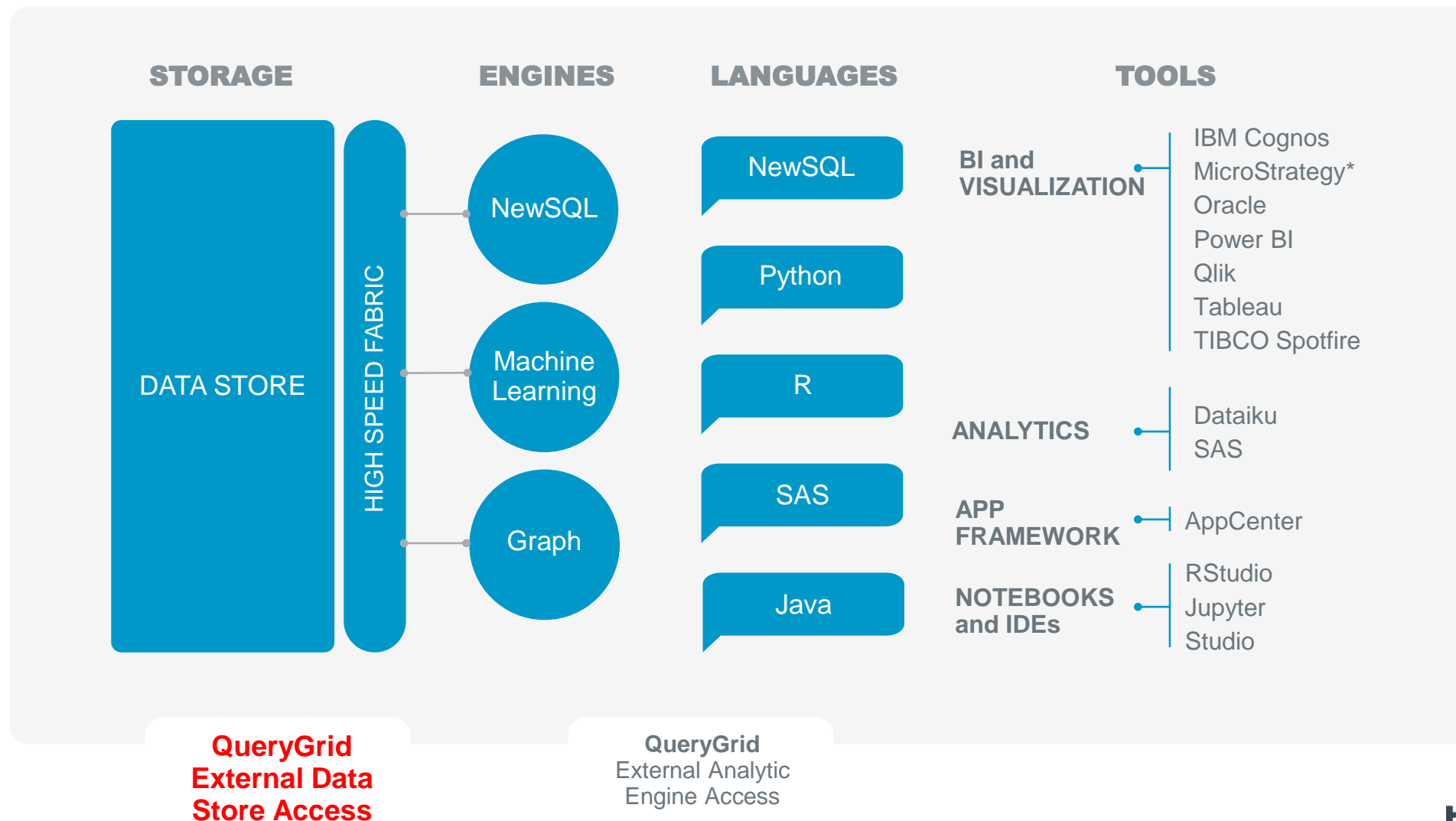


2018 Gartner Critical Capabilities



View source

Teradata Vantage – Any Language, Any Tool, All Your Data



Machine Learning Engine Functions

Statistics

AdaBoost
Approximate Distinct Count
Approximate Percentile
CMAVG
ConfusionMatrix
ConfusionMatrixPlot
Correlation
CoxPH
CoxPredict
CoxSurvFit
Cross Validation
Distribution Matching
EMAVG
Enhanced Histogram
Fmeasure
GLM
GLMPredict
Hidden Markov Model
Histogram
KNN
LARS Functions
LinReg
LRTEST
Non-linear Kernel SVM
Percentile
Principal Component Analysis
Random Sample
ROC Curve
Sample
Shapley Value
SMAVG
Sparsesvm_predict
Sparsesvm_trainer
Sparse_model_printer

Statistics (cont.)

Support Vector Machines
VectorDistance
VWAP
WMAVG

Data Transformation

Antiselect
Apache Log Parser
Fast Fourier Transform
FellegiSunterTrainer
FellegiSunterPredict
IdentityMatch
IpGeo
Inverse Fast Fourier Transform
JSONParser
Multicase
MurmurHash
Number as Categories
OutlierFilter
Pack
Pivot
PSTParserAFS
Scale Functions
StringSimilarity
Unpack
Unpivot
URIPack
URIUnpack
XMLParser
XMLRelation

Path, Pattern and Time Series

Arima
ArimaPredictor
Attribution
Burst
ChangePointDetection
Causality Detection
DTW
DWT
DWT2D
FrequentPaths
IDWT
IDWT2D
Interpolator
nPath
Path_Analyzer
Path_Generator
Path_Start
Path_Summarizer
SAX
SAX2
SeriesSplitter
Sessionization
Shapelets
TimeSeriesOrders
Unsupervised Shapelets
VARMAX

Visualization

CfilterViz
NpathViz

Association

Basket_Generator
Cfilter
FPGrowth
KNN Recommender
WSRecommender

Cluster

Canopy
Categorical Clustering
Gaussian Mixture Model
KMeans
KMeansPlot
Minhash

Decision Tree

XGBoost
Forest
Forest_Evaluate
Forest_Drive
Forest_Predict
Forest_Analyze
Single_Tree_Drive
Single_Tree_Predict

Naïve Bayes

naiveBayesMap
naiveBayesReduce
naiveBayes_text
naiveBayes_text_predict
naiveBayes_train
naiveBayes_predict

Deep Learning

Neural Networks

Text

Chinese Text Segmentation
LDA Functions
Levenshtein Distance
Named Entity Recognition
(CRF Model)
Named Entity Recognition (Max
Entropy Model)
nGram
PoStagger
Sententizer
Sentiment Extraction Functions
Text Classifier
Text_Parser
TextChunker
TextMorph
TextTagging
TextTokenizer
TF_IDF

System Functions

nc_skew
nc_relationstats

Location Analysis

LoadGeometry
PointinPolygon
GeometryOverlay

Graph Engine Functions

Graph

AllPairsShortestPath
Betweenness
Closeness
EigenvectorCentrality
gTree
LocalClusteringCoefficient
LoopyBeliefPropagation
Modularity
nTree
PageRank
PersonalizedSALSA
RandomWalkSample

Teradata & Azure

The Demands Keep Rising

- Move faster ?? Stay on the latest release •
- Reduce CapEx **what** Reduce technical debt •
- Be more responsive **to** Focus on answers •
- Add capabilities more easily **do** Sleep at night •
- ?? •

Cloud Deployment Can Help

- **Accelerate time-to-value**
 - Avoid lengthy procurement process
- **Shift to OpEx**
 - Often preferred over CapEx
- **Reduce financial risk**
 - Start small, only grow when needed
- ~~Save money ??~~
 - Belief that cloud = cost savings



They've Done It – and You Can, Too



SIEMENS

AMGEN®

GameStop®



ticketmaster®



Arcos Dorados

QUALCOMM®

JAM CITY



Cafe Rio
MEXICAN GRILL.

Office
DEPOT®

vizient®



P&G



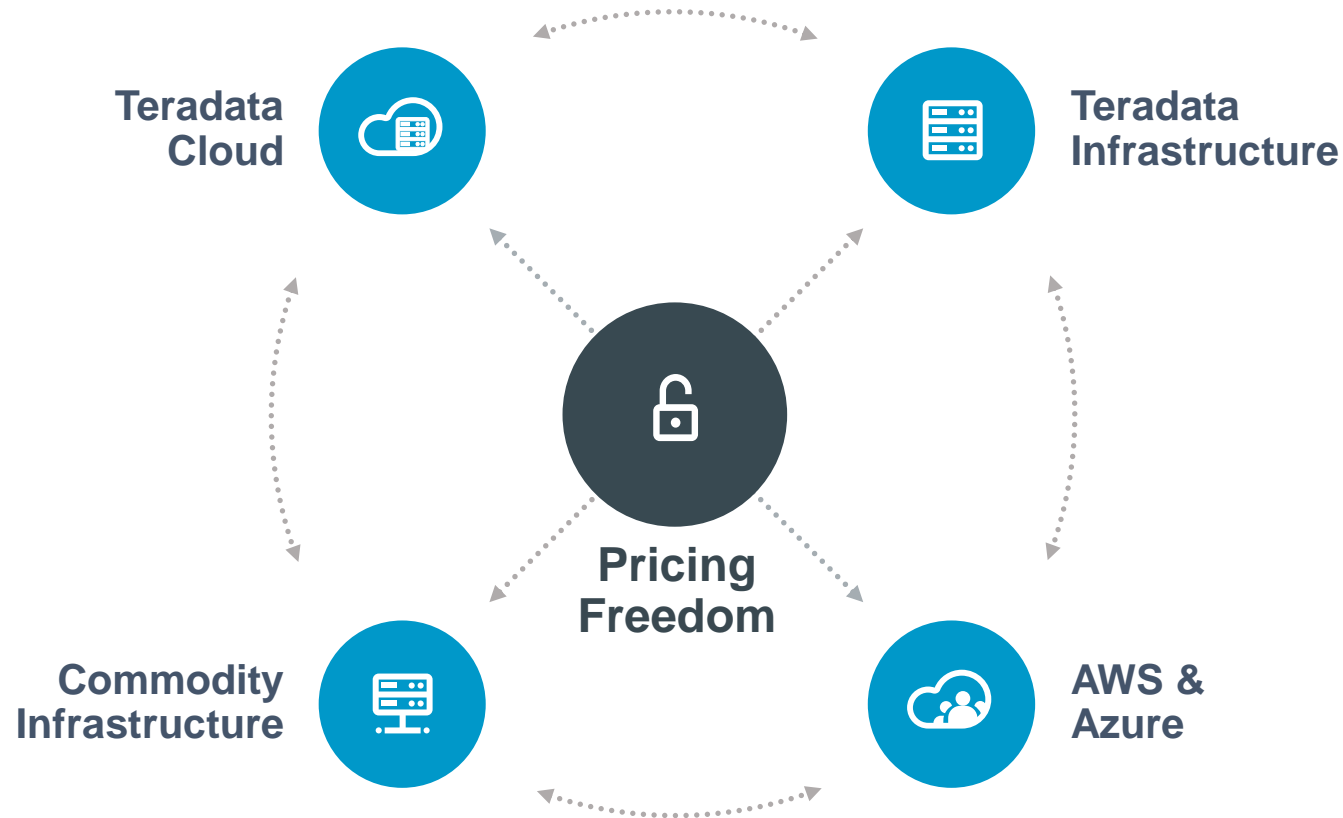
sasol



MONSANTO 

teradata.

Deploy Teradata Anywhere
Buy Any Way
Move Anytime



Vantage
subscription-based
licenses are
PORTABLE

Cloud Consumption Options

As-a-service

“Provision & manage the system for us.”

- **Benefit:** Focus on answers, not IT
- **Use cases** recommended:
 - Production Analytics
 - Disaster Recovery
 - Test / Dev / QA / Data Labs

Do-it-yourself

“We’ll deploy & manage on our own.”

- **Benefit:** Broad system customization
- **Use cases** recommended:
 - Proofs of Concept
 - Test & Development
 - Discovery Analytics / Data Labs

AS-A-SERVICE

Cloud Consumption Option #1

IntelliCloud as-a-service

“Provision & manage the system for us, please.”

- **Benefit:** Focus on answers, not IT
- **Use cases** recommended:
 - Production Analytics
 - Disaster Recovery
 - Test / Dev / QA / Data Labs



IntelliCloud for Azure

Americas	U.S., Canada
International	Australia, France, Ireland, Netherlands, U.K.



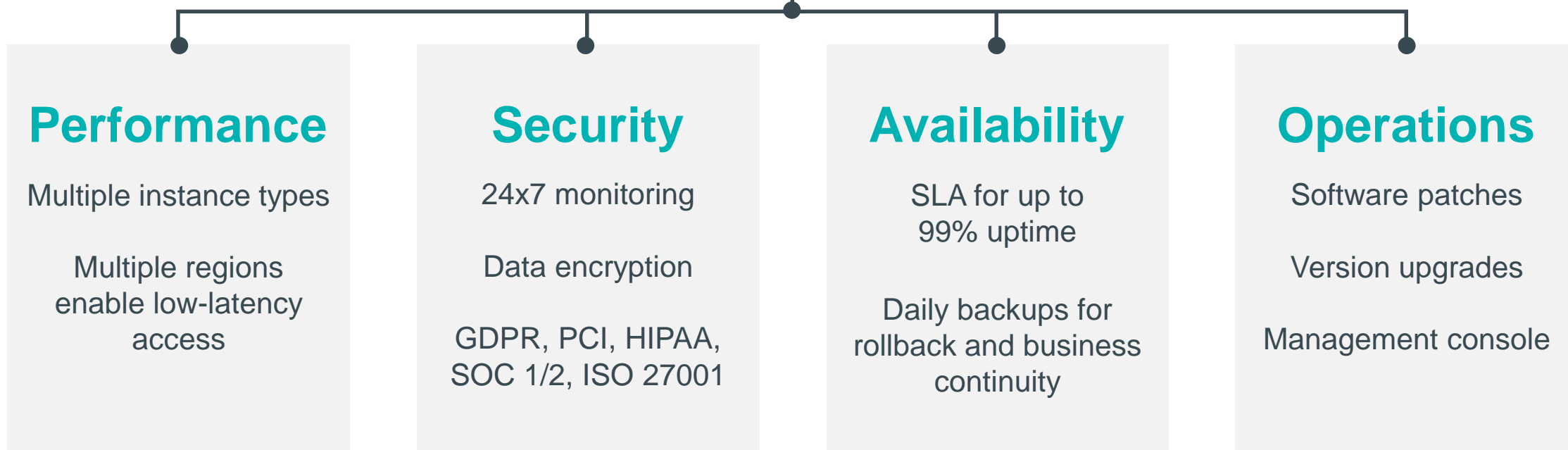
IntelliCloud Subscriptions Attributes

Service Feature	Included
Vantage Software	✓
Infrastructure	✓
Monitoring	✓
Encryption	✓
Compliance	✓
Web Console	✓
Onboarding	✓
Up to 99% SLA	✓
Backups	✓

- **Predictable cost**
 - Flexible pricing, no hidden fees
- **Convenient subscription options**
 - Start small, grow as needed
- **“Just bring your data and a DBA”**
 - We provision and manage system

*Uptime SLA = **99%** (2-7 instances) | **98%** (8+ instances)

IntelliCloud Service Features



IntelliCloud Security and Compliance

- **Audited for compliance**

- GDPR
- PCI
- HIPAA
- SOC 1 and 2
- ISO 27001

- **Designed to comply**

- EU Model Clauses
- EU-US Privacy Shield
- Additional regulations

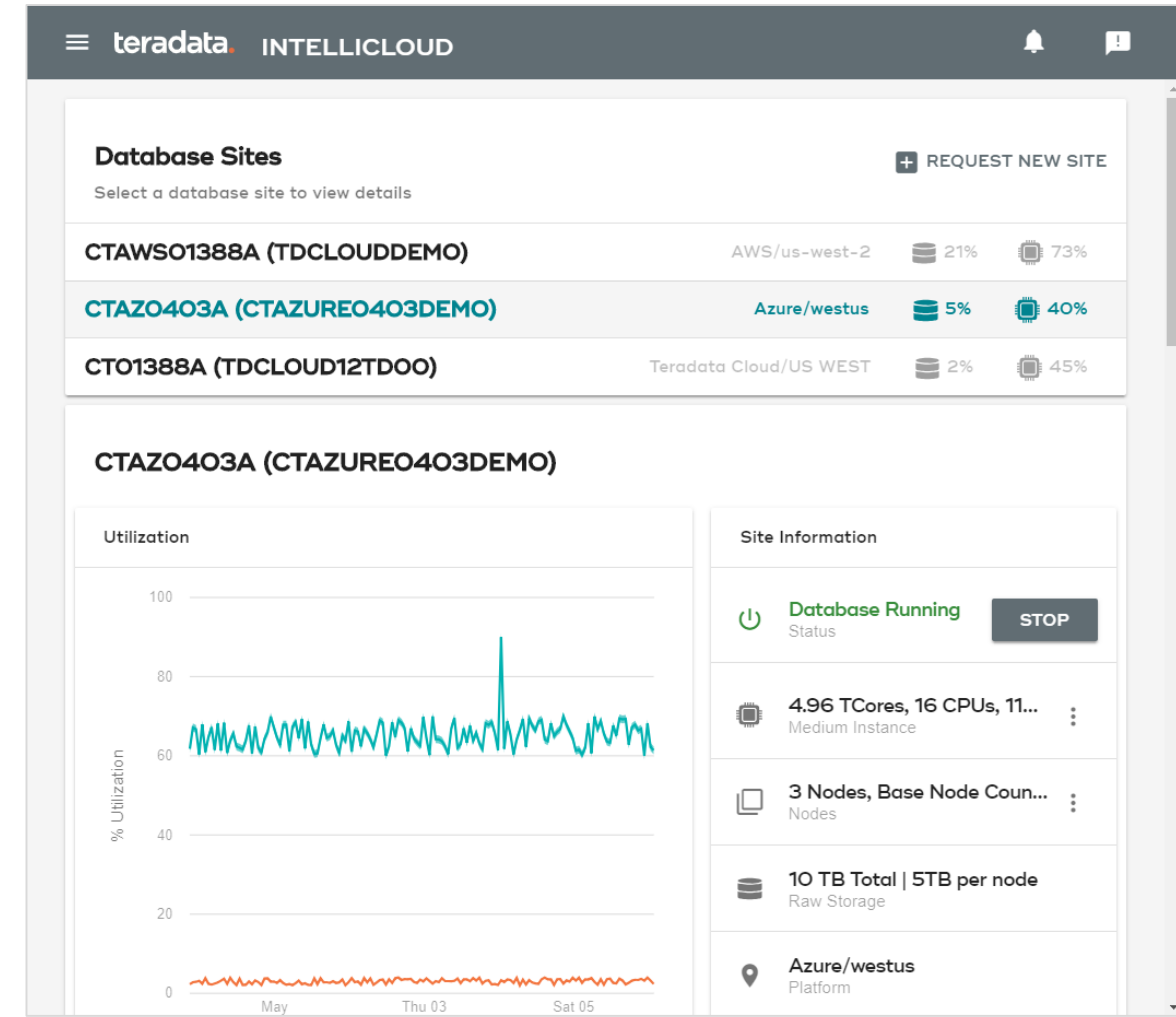


We invest ~\$1M each year in recurring third-party audits to ensure compliance

IntelliCloud Management Console

- Scale Up/Down (*size of instances*)
- Scale Out/In (*# of instances*)
- Stop/Start (*halt TCore consumption*)
- Storage Expansion (*1TB increments*)

 Watch demo



DO-IT-YOURSELF

Cloud Consumption Option #2

Do-it-yourself Deployment

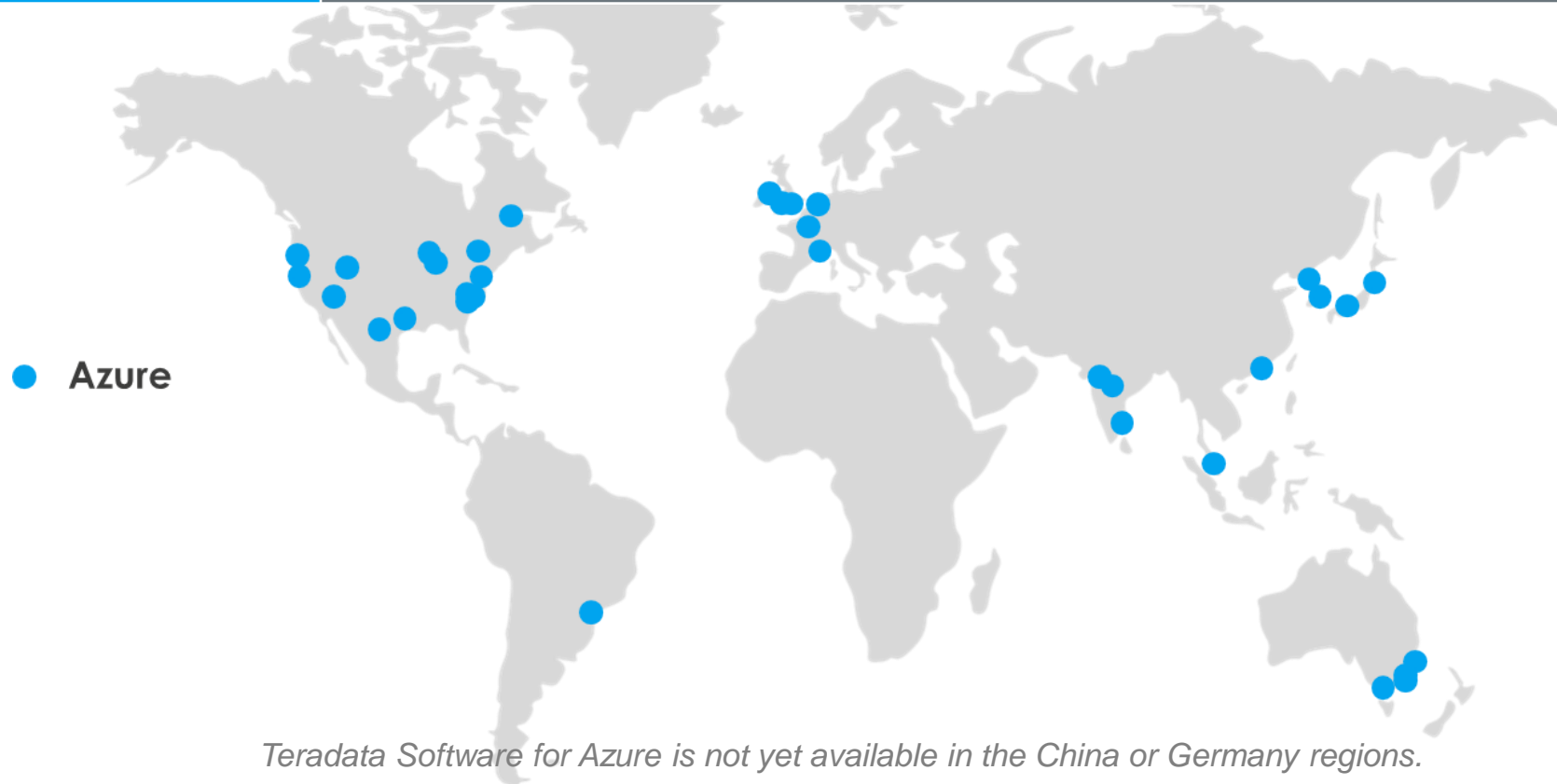
“We’ll deploy & manage the system on our own.”

- **Benefit:** System customization
- **Use cases** recommended:
 - Proofs of Concept
 - Test & Development
 - Discovery Analytics / Data Labs



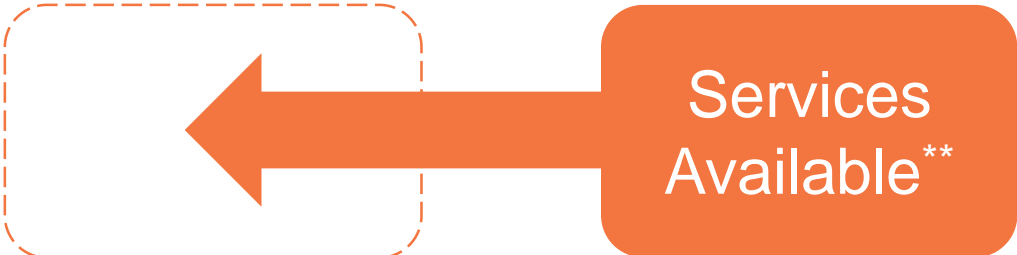
Do-it-yourself Deployment: Azure



Americas	U.S., Brazil, Canada
International	Australia, France, Hong Kong, Ireland, Japan, Korea, Netherlands, Singapore, U.K.



Comparing Cloud Consumption Options

	As-a-service	Do-it-yourself
Capabilities Included		
SQL Engine	•	•
License Portability	•	•
1-Year & 3-Year Terms	•	•
Premier Cloud Support	•	•
Hourly (On-Demand)		•
Machine Learning & Graph Engines	May	
Availability SLA	Up to 99%*	
Compliance Audits	•	
Security Monitoring	•	
Backup & Restore	•	
Infrastructure Monitoring	•	
Upgrades & OS Patches	•	
Easy Elastic Provisioning	•	


Services Available**

 Best for short term / discovery
 ML/G not planned for DIY

*Uptime SLA = **99%** for 2-7 instances | **98%** for 8+ instances.

**Services to be scoped and priced based on customer requirements; requires separate SOW/contract.

Subscribe and Deploy via Azure Marketplace

Choose Teradata Vantage with or without Teradata IntelliSphere

The screenshot displays the Azure Marketplace interface. On the left, a sidebar titled 'Browse apps' lists various categories: Get Started, Compute, Networking, Storage, Web, Mobile, Containers, Databases, Analytics, AI + Machine Learning, Internet of Things, Integration, Security, Identity, Developer tools, Management Tools, Blockchain, and Azure Active Directory apps. The main content area shows search results for 'teradata' (15 results). Filters at the top include Trials (All), Operating System (All), Publisher (All), Pricing Model (All), and Product Type (All), with a 'Reset filters' link. The results are displayed in a grid of app cards. Two cards are highlighted with red boxes: 'Teradata Vantage' and 'Teradata Vantage with IntelliSphere'. Both cards show the Teradata logo, the app name, a brief description, a star rating (4.5 stars for Vantage, 4.5 stars for Vantage with IntelliSphere), and a 'Get it now' button. The pricing for both is listed as 'Price varies'.

App Name	Description	Rating	License	Price
Teradata Viewpoint (IntelliSphere)	Advanced web-based management portal for up to 10 Teradata systems – and includes	4.5 stars (1)	Bring your own license	Price varies
Teradata Viewpoint	Advanced web-based management portal for Teradata Vantage	4.5 stars (1)	Bring your own license	Price varies
Teradata Data Stream Controller	Provides administrative functions and metadata storage for the Teradata Data Stream Utility.		Bring your own license	Price varies
Teradata Server Management	Monitors Teradata systems and generates alerts related to errors and operational state changes.		Price varies	Price varies
Teradata Data Mover (IntelliSphere)	Powerful data movement tool that chooses the fastest way to copy data and objects between		Price varies	Price varies
Teradata Vantage	Flagship analytics platform providing fastest path to secure, scalable, high-performance	4.5 stars	Price varies	Price varies
Teradata QueryGrid Manager (IntelliSphere)	Provides a federated query capability allowing users to access and query data in remote		Bring your own license	Price varies
Teradata Vantage with IntelliSphere	Advanced analytics platform providing fastest path to secure, scalable, high-performance	4.5 stars	Price varies	Price varies
Teradata Data Mover	Powerful data movement tool that chooses the fastest way to copy data and objects between		Price varies	Price varies
Teradata QueryGrid Manager	Provides a federated query capability allowing users to access and query data in remote		Bring your own license	Price varies

Resource Manager Templates

Templates enable easy deployment of an entire Teradata ecosystem

Configure any mix of applications...

Example 1

- ☐ Teradata Vantage
- ☐ Teradata Viewpoint
- ☐ Teradata Server Management
- ☐ Teradata Data Stream Controller

Example 2

- ☐ Teradata Vantage
- ☐ Teradata Viewpoint (Multiple Systems)
- ☐ Teradata Server Management
- ☐ Teradata Data Stream Controller
- ☐ Teradata Query Service
- ☐ Teradata Ecosystem Manager
- ☐ Teradata Data Mover

Microsoft Azure

Home > New > Marketplace > Everything > Teradata Vantage > Create Teradata Vantage > Database Settings > Choose a size

Create Teradata Vantage

- 1 Basics Done
- 2 Teradata Database Configure Database
- 3 Viewpoint Configure Viewpoint
- 4 Server Management Configure Server Managem...
- 5 Teradata Query Service Configure Teradata Query S...
- 6 Data Stream Controller Configure Data Stream Con...
- 7 Ecosystem Manager Configure Ecosystem Mana...
- 8 Data Mover Configure Data Mover
- 9 QueryGrid Manager Configure QueryGrid Mana...
- 10 General Settings

Database Settings

- * System name prefix database
- * DBC password
- * Confirm DBC password
- Japanese language support No
- Database Version 16.20
- Database Tier Developer Base Advanced Enterprise
- * VM Size x Standard E16s v3
- Storage Size Per Node (in TB) 6
- Scale Out/In Scale Out-Ready
- * Number of nodes 2
- Temporal Yes No
- Teradata Intelligent Memory (TIM) Yes No

Choose a size

Browse the available sizes and their features

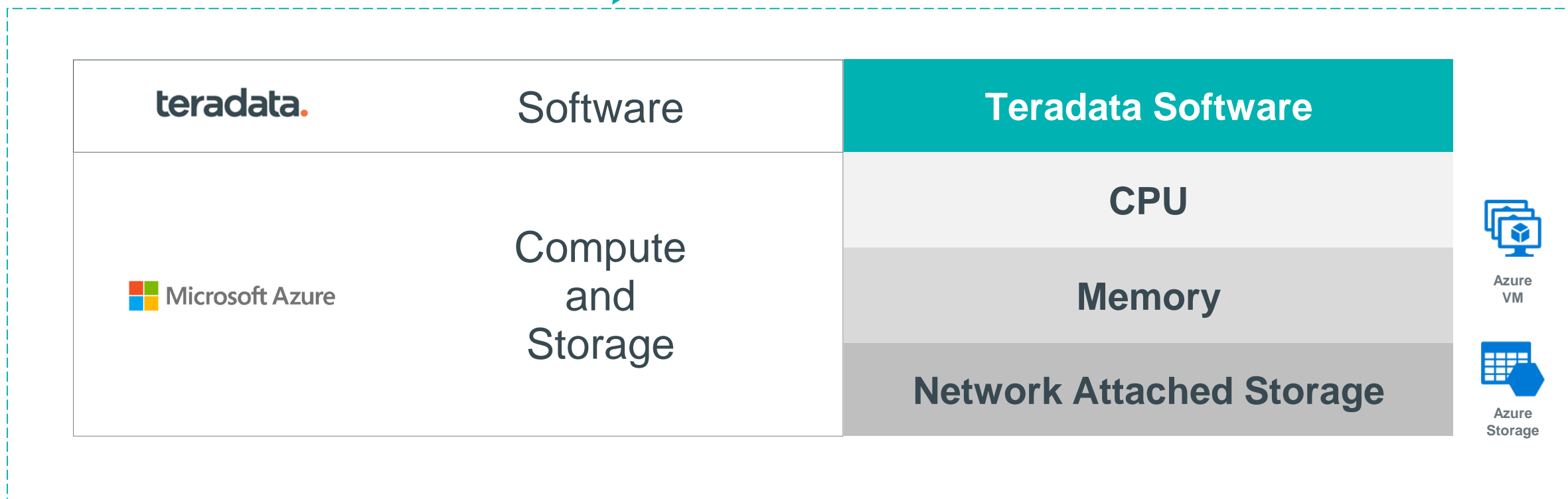
vCPUs 1

RECOM...	SKU	TYPE	DATA DL...	MAX IOPS	LOAD BA
★	E16s_v3	Standard	32	32000	Load bal
	D32s_v3	Standard	32	64000	Load bal
★	E32-16s_v3	Standard	32	64000	Load bal
★	E32s_v3	Standard	32	64000	Load bal
	D64s_v3	Standard	32	128000	Load bal
	E32-8s_v3	Standard	32	64000	Load bal
	E64-16s_v3	Standard	32	128000	Load bal
	E64-32s_v3	Standard	32	128000	Load bal
✓	E64s_v3	Standard	32	128000	Load bal
	D16s_v3	Standard	32	32000	Load bal

Teradata – Azure Features

Standard Azure Infrastructure

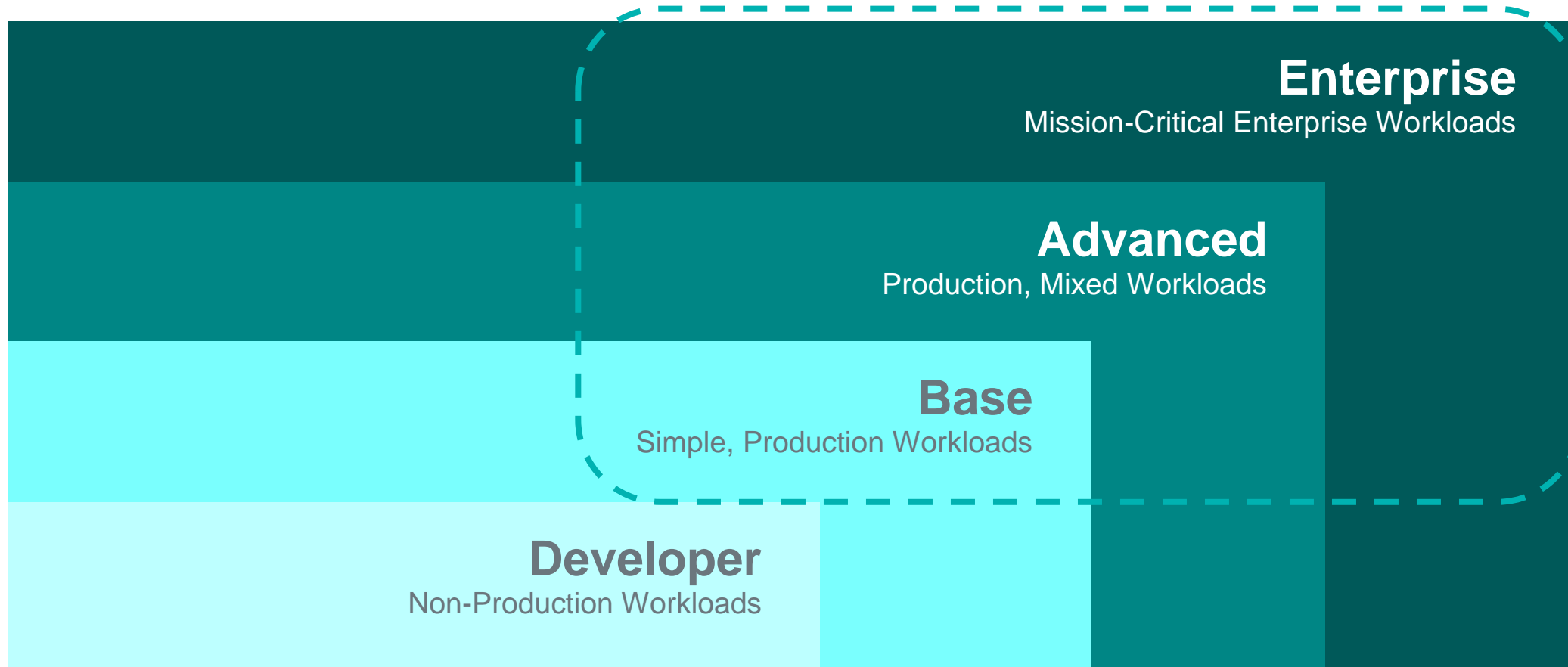
IntelliCloud services encompass entire Teradata software + Azure infrastructure stack



IntelliCloud Software Tiers

Geared for the type of workloads you want to run

IntelliCloud for Azure



IntelliCloud Feature Availability

	Base	Advanced	Enterprise
Azure VM Options			
Network Attached Storage	E16sv3, E32sv3, E32-16sv3, E32-8sv3, E64sv3, E64-32sv3, E64-16sv3	E16sv3, E32sv3, E32-16sv3, E32-8sv3, E64sv3, E64-32sv3, E64-16sv3	E16sv3, E32sv3, E32-16sv3, E32-8sv3, E64sv3, E64-32sv3, E64-16sv3
Scalability			
Concurrent Query Limit	15	None	None
Instance Limit	64	64	64
Customer Support			
Support Included	Premier	Premier	Premier
Server Management	✓	✓	✓
Vantage Features			
Row Level Security	✓	✓	✓
Secure Zones	✓	✓	✓
Teradata Columnar	✓	✓	✓
Teradata Temporal	✓	✓	✓
Teradata Intelligent Memory	-	✓	✓
Workload Management	-	<u>TIWM</u>	<u>TASM</u>
Ecosystem Applications			
Data Mover (Small)	✓	✓	✓
Data Stream Utility	✓	✓	✓
Query Service	✓	✓	✓
Viewpoint (Multiple Systems)	✓	✓	✓
Value-Add Options			
Data Lab	✓	✓	✓
Data Mover (Medium, Large)	✓	✓	✓
Ecosystem Manager	✓	✓	✓
QueryGrid	✓	✓	✓
Price Ratio	0.7x	1x	1.2x

Target Use Cases

- Enterprise: Mission-Critical
- Advanced: Production, Mixed
- Base: Simple, Production

Workload Management

- Enterprise: TASM
- Advanced: TIWM
- Base: None

Relative Pricing

- Base = 30% less than Advanced
- Enterprise = 20% over Advanced

Flexibility – Stop/Start and Metering via IMC

Leverage the flexibility of cloud to save on costs

Database Running
Status

Azure/eastus
Platform

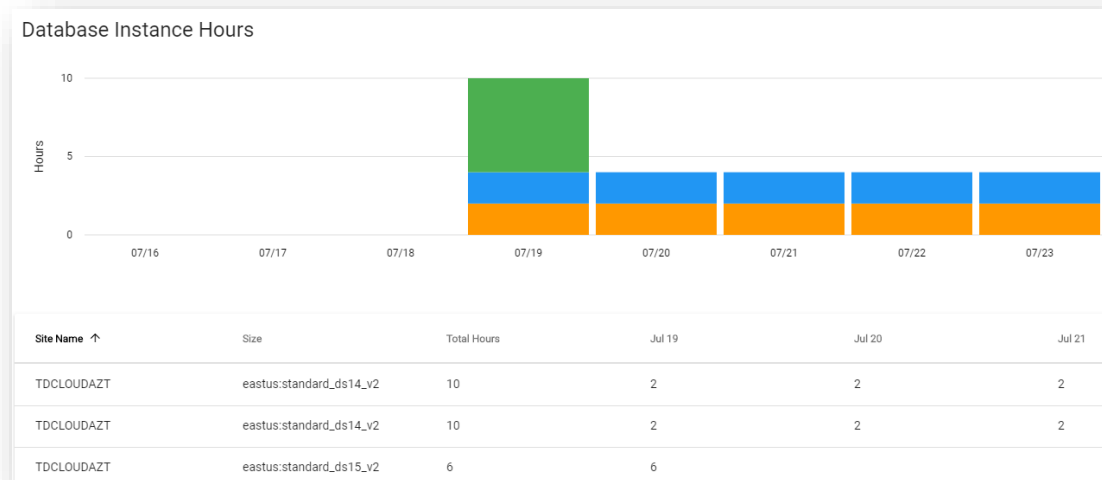
Production
Purpose

16.20.11.01
Database Version

4.96 TCores, 16 CPUs, 112GB Memory
Medium Instance

12TB Total
Raw Storage

2 Nodes | Base Node Count: 2
Nodes

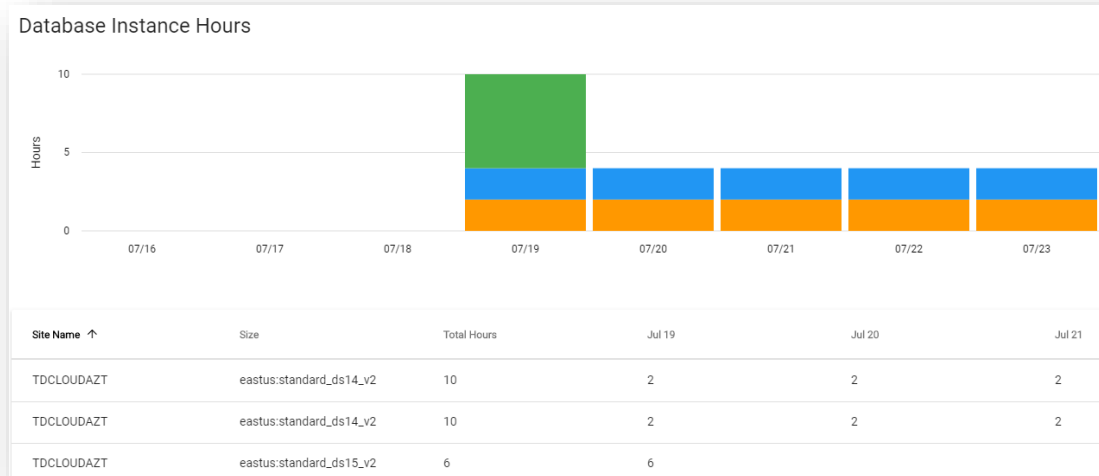


Track usage in the **Metering** section of the IntelliCloud Management Console

Save costs by “**Stopping**” the system when not needed (even on 1-year and 3-year subscriptions)

Elasticity – Scale Up/Down & Metering via IMC

Leverage the flexibility of cloud to meet your workload requirements



Track your usage in the **Metering** section of the IntelliCloud Management Console

Independently scale compute without adding storage by going up or down between various ESv3 instances to meet your workload requirements

Elasticity – Scale Out/In & Metering via IMC

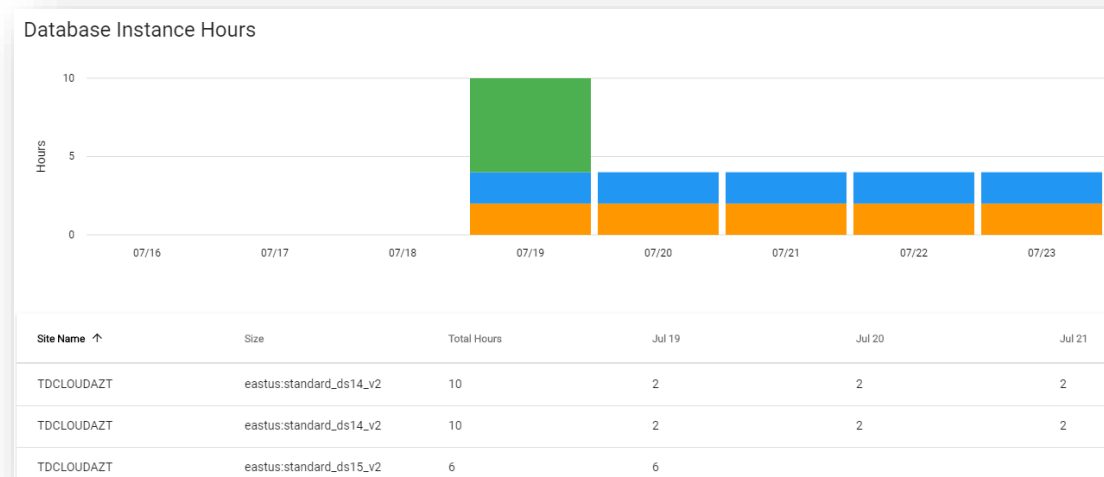
Leverage the flexibility of cloud to meet your workload requirements

Node Scaling

Scale-Out/In supports below scaling values for database node range of 2-64

2 Nodes 3 Nodes 4 Nodes **6 Nodes** 8 Nodes

CANCEL **APPLY CHANGES**

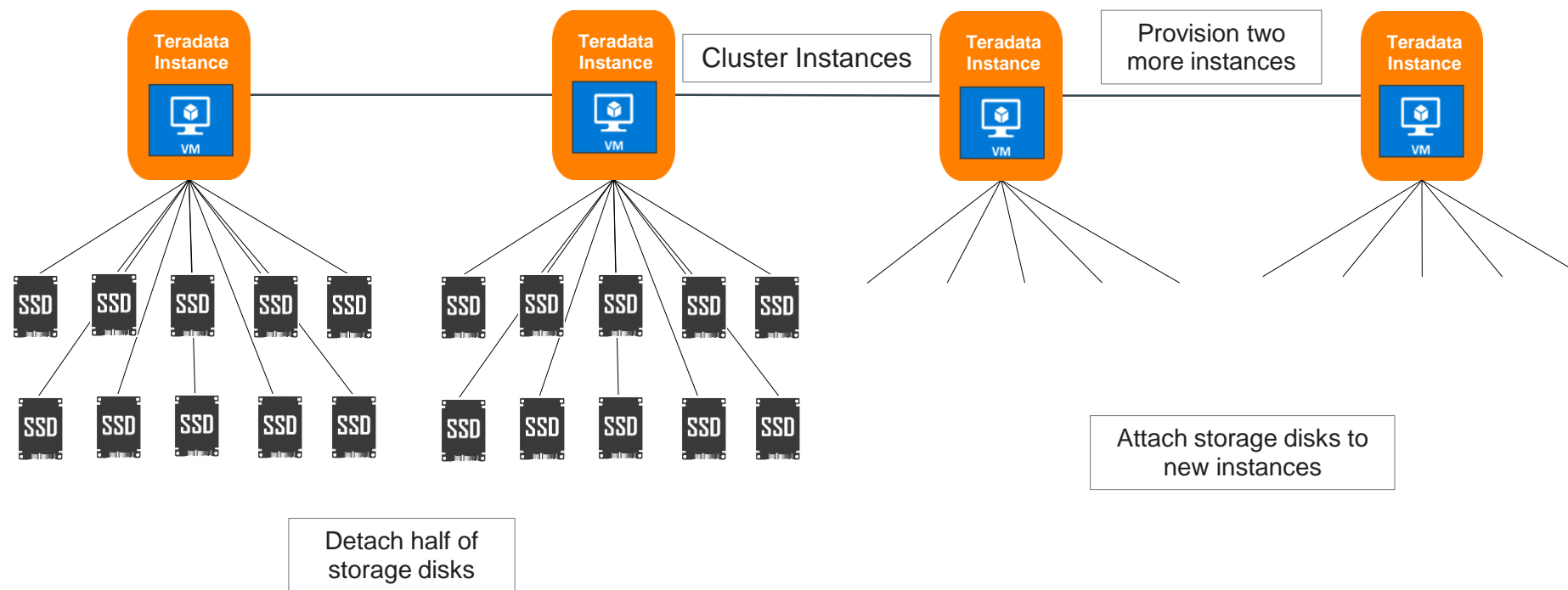


Independently scale compute without adding storage by adding more nodes to your Teradata system to meet your workload requirements

Track your usage in the **Metering** section of the IntelliCloud Management Console

Elasticity – How Scale Out/In Works

Example: A 2-instance system Scaled Out to a 4-instance system without adding storage



Amps are migrated to new instances along with the storage disks. Hence, **no data redistribution required!**

System Expansion – Storage Growth via IMC

Leverage the flexibility of cloud to add storage when running out of space

Storage Expansion		
	Instance	Total
Current size	10TB	20TB
Increase Storage by	<input type="text" value="2"/> TB	24TB

Independently add storage without changing compute by adding more Premium SSD storage to meet your storage growth requirements

How Pricing Works for Elasticity Features

All features are not billed in the same manner

Feature	Purchase In / Consume By	Pay-as-you-go	Pricing & Billing
Scale Up & Scale Out	Days/Hours	Yes	The price for Scale Up/Scale Out hours is the same regardless of whether purchased upfront or on a pay-as-you-go basis.
Scale Down & Scale In	Days/Hours	No	To get a discount, Scale Down/Scale In hours must be purchased upfront. In situations where: <ol style="list-style-type: none">1. Customer Scales Down/Scales In more than for the upfront committed hours, no further discounts are provided2. Customer Scales Down/Scales In less than for the upfront committed hours, customer will be billed at the end of the contract
Stop/Start	Days/Hours	No	To get a discount, Stop/Start hours must be purchased upfront. In situations where: <ol style="list-style-type: none">1. Customer Stops the system more than the committed hours, no further discounts are provided2. Customer Stops the system less than the committed hours, customer will be billed at the end of the contract

Evolution of Elasticity and Price Models

Coming 2H 2019

1

Fixed Capacity

- Perfect for steady-state workloads

2

Elastic Provisioning

- Ideal for varying yet substantial utilization

3

True Consumption

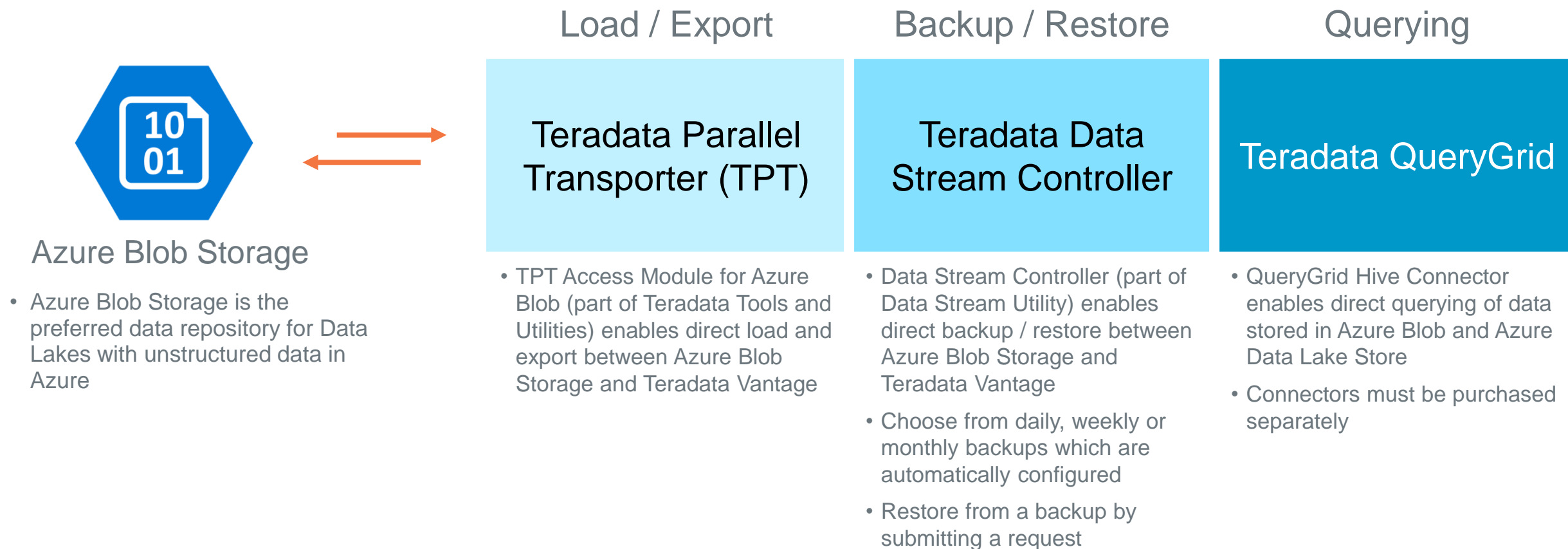
- Best for low, spiky, or uncertain usage

Pay for what's provisioned

Pay for what's used

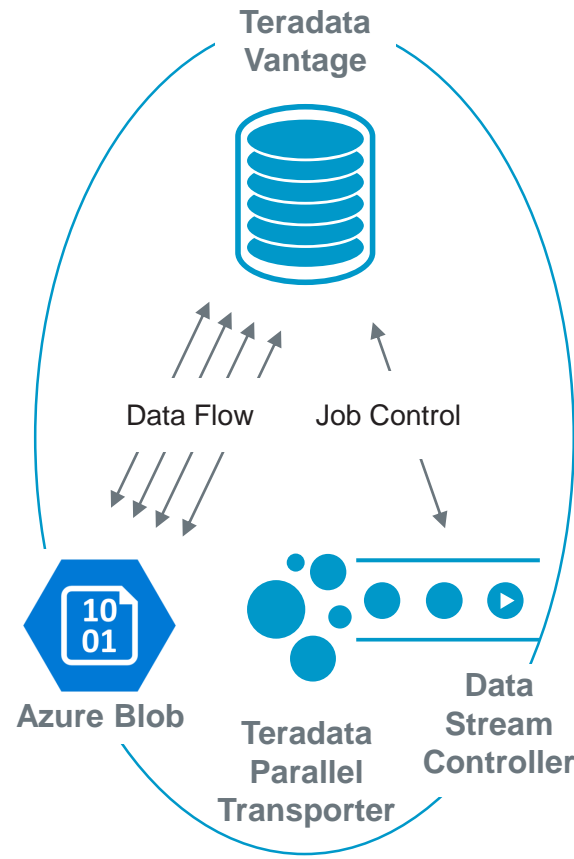
Integration with Azure Blob Storage

With low-cost Blob, pay only for what you use – storage scales automatically



Load Data with Teradata Parallel Transporter

- Teradata Parallel Transporter (TPT) Access Module for Azure Blob enables **parallel data load and export** between Azure Blob and Teradata Vantage
- TPT is FREE with Teradata Vantage and includes Load, Export, Update, and Stream operators



Backup Data with Data Stream Controller

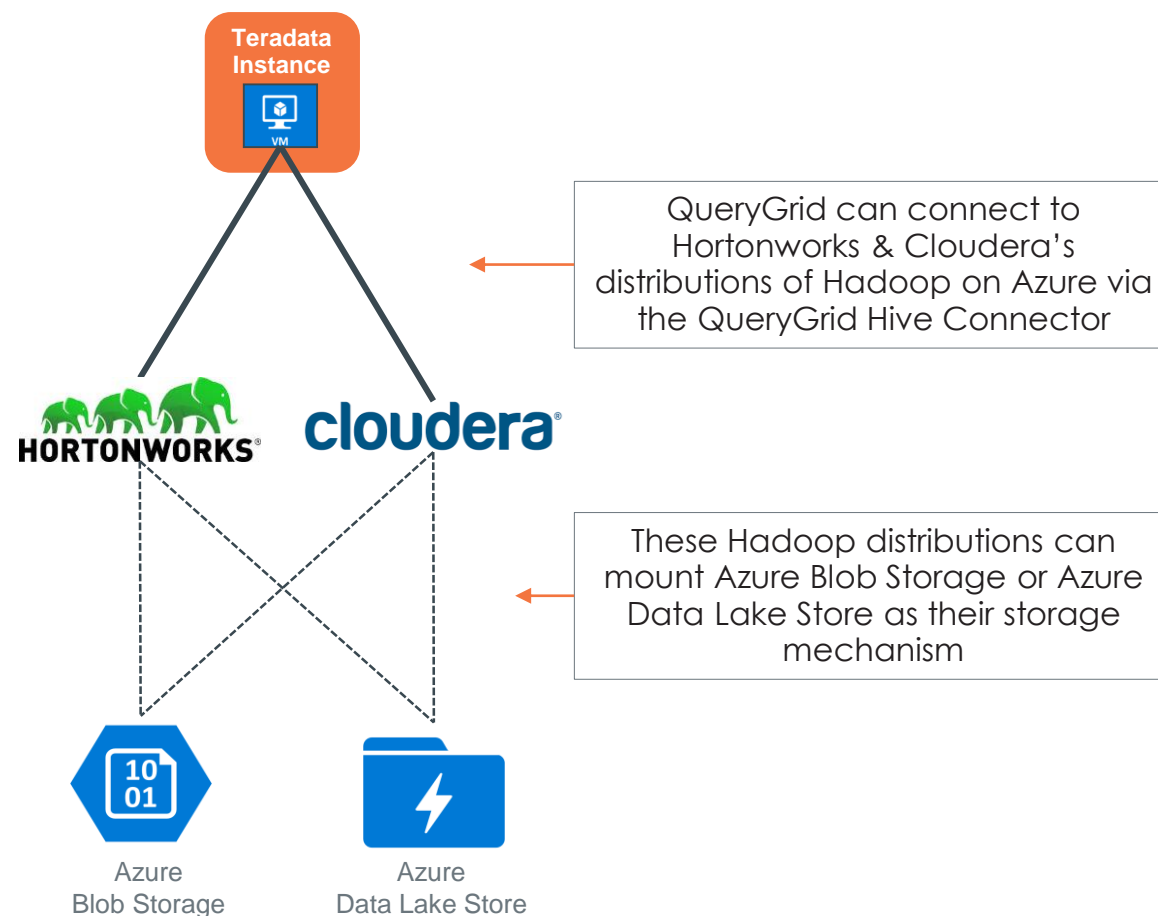
- **Easily create and manage jobs in Teradata Viewpoint** for backup and restore at the database or object level
- **Incremental backup** means only changed blocks are streamed from the database
- **Multiple parallel data streams** between each Teradata instance and Azure Blob minimize backup and restore windows

Direct access to DSC is not available with IntelliCloud

Directly Query Data in Azure Blob and ADLS

- QueryGrid enables customers to leverage their data stored in Azure Blob Storage or Azure Data Lake Store using the QueryGrid™ Hive connector as shown
- QueryGrid™ Hive connector supports Hortonworks and Cloudera's distributions of Hadoop

Good idea:
Use with QG to
combine current
with historical data

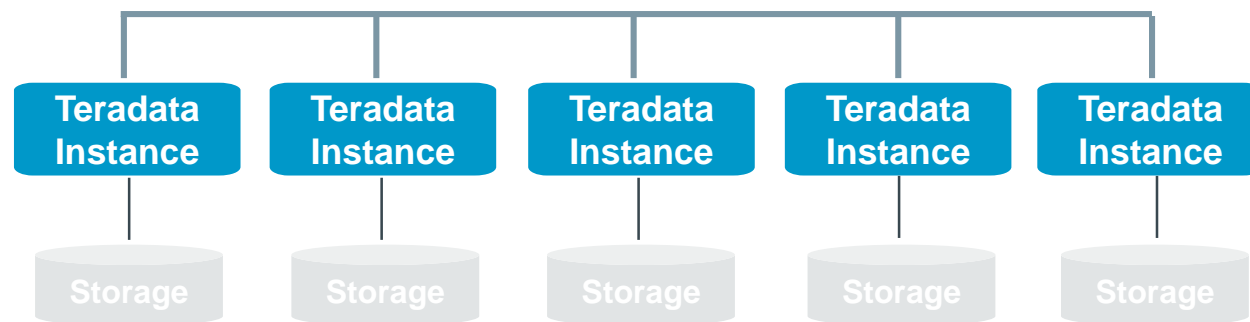


Resiliency – Automatic Node Failure Recovery

Building for failure is a key design point of Teradata Software for Azure

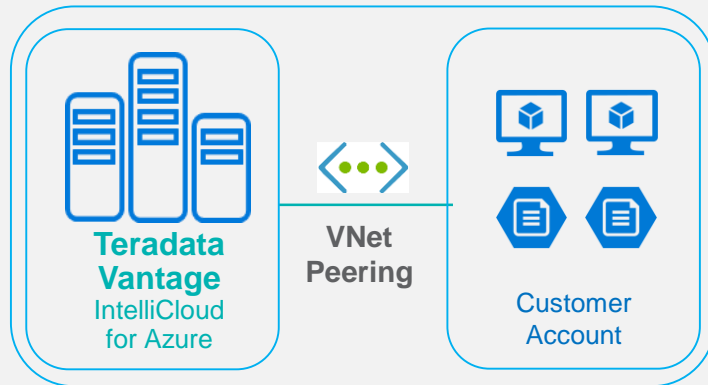
- Detects when an instance has dropped out of a system and spins up a new one (*in approx. 20 minutes*)
 - All system resources **are automatically restored**
 - Minimum 2 instances required in a cluster for node failure recovery to kick in

Also Available:
Hot Standby Nodes
option to further
reduce downtime



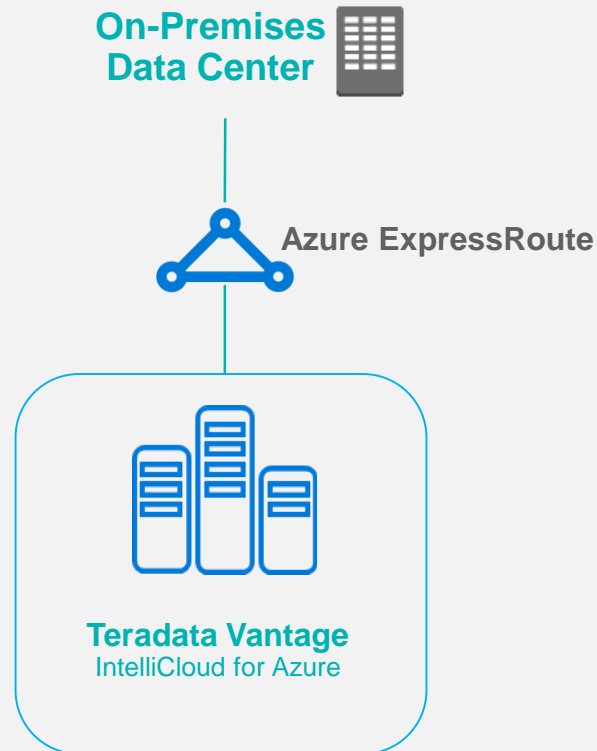
IntelliCloud Connectivity Options

Virtual Network Peering



Extend your Azure VNet to IntelliCloud securely

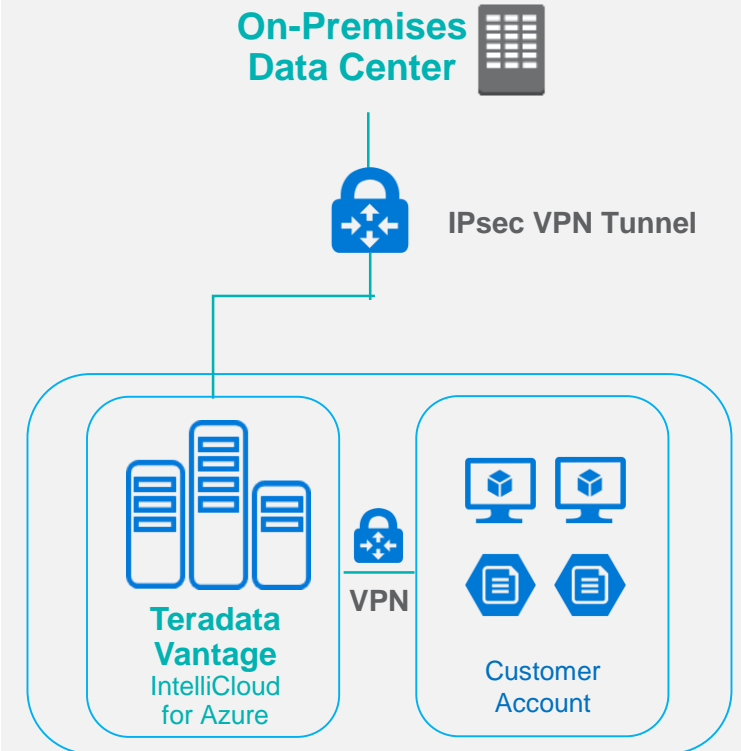
Azure ExpressRoute



Extend your On-Premises Data Center to IntelliCloud securely

Customer owns the Azure ExpressRoute

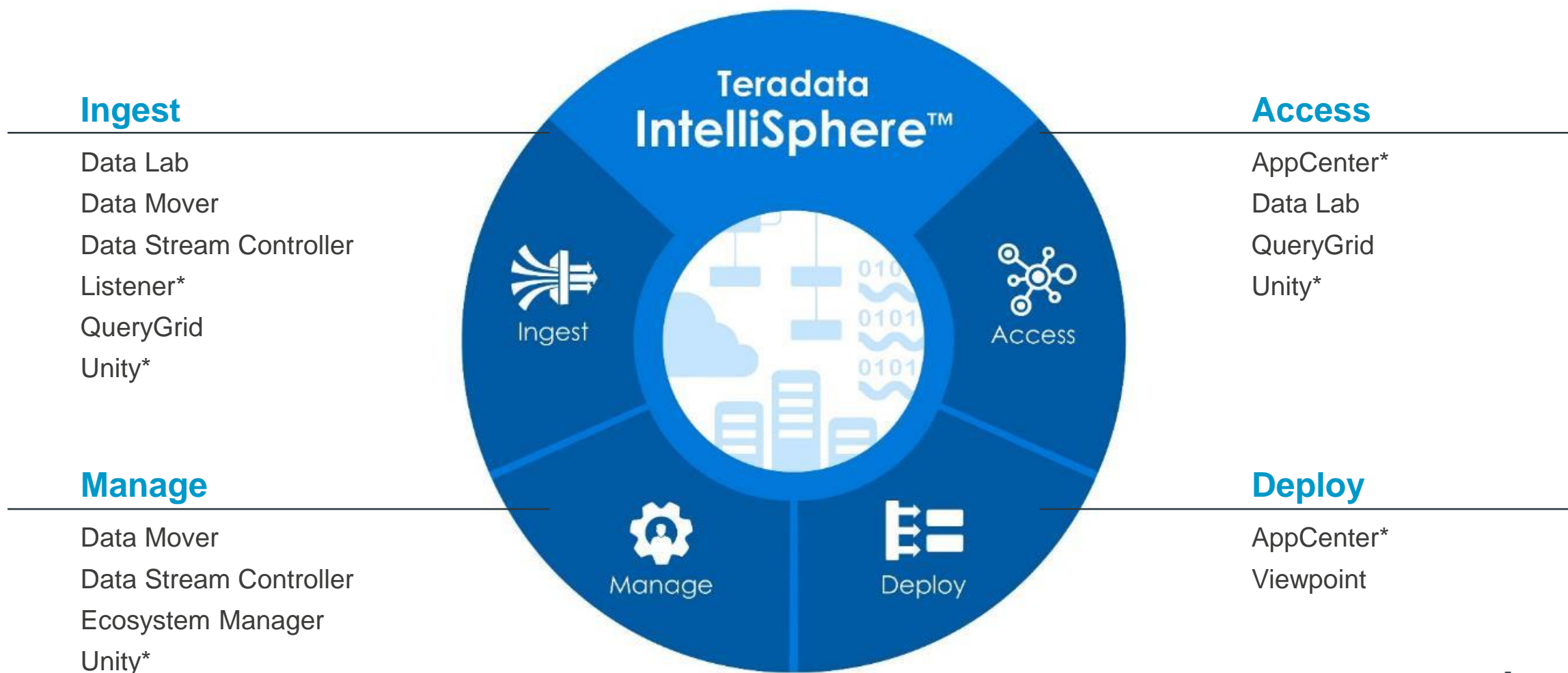
Virtual Private Network



Extend your On-Premises Data Center or Azure VNet to IntelliCloud securely

Analytical Ecosystem Orchestration

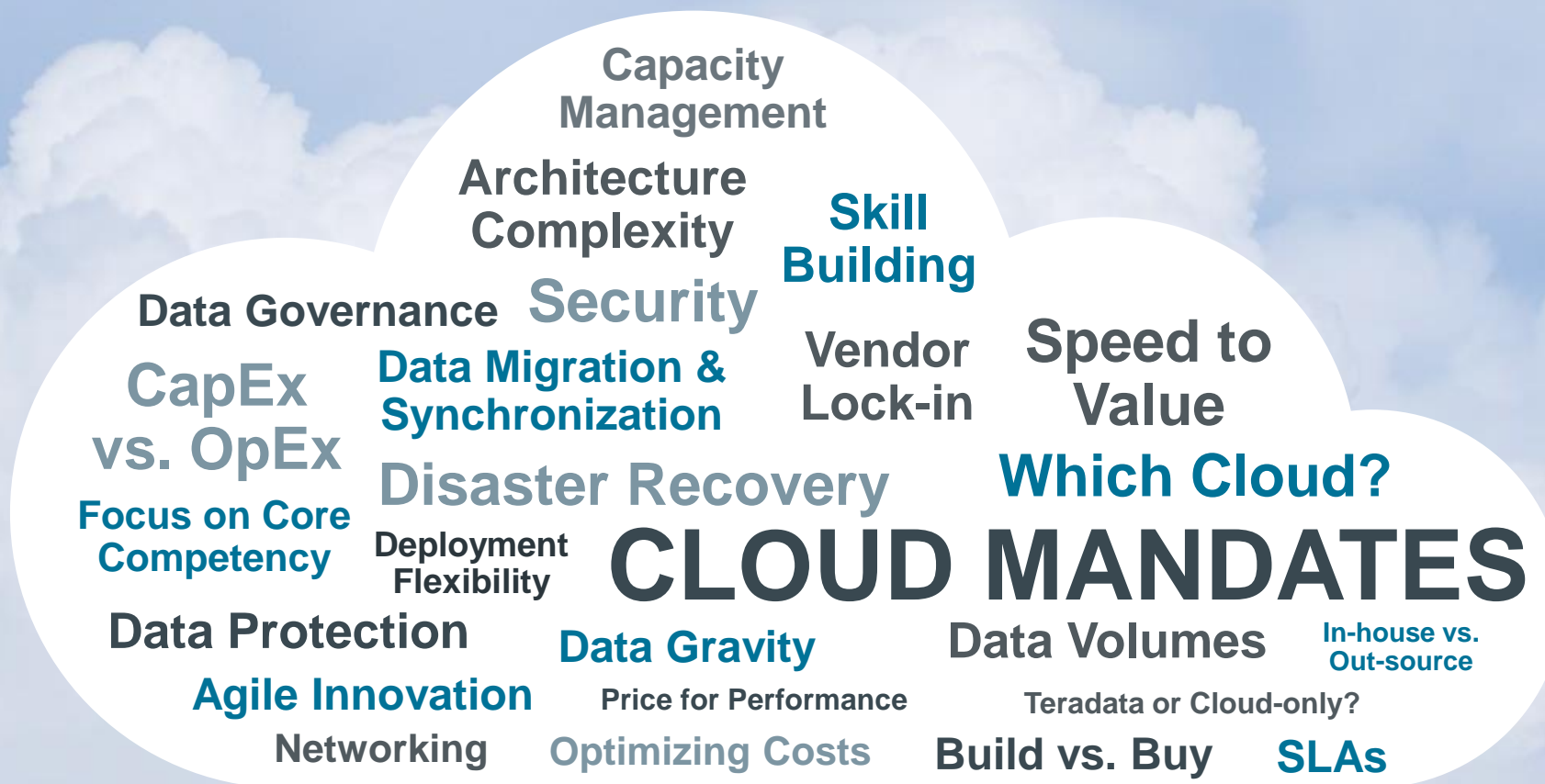
Several capabilities included in one simple subscription-based software license



**Not yet available in Azure Marketplace*

RECOMMENDATIONS

What Do YOU See in the Cloud?

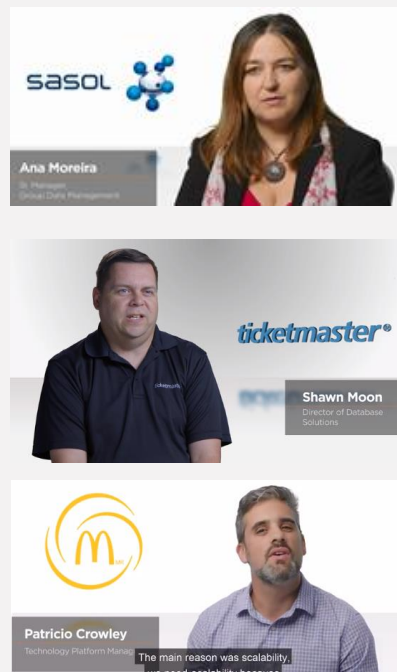


Start with Education – and Talk to Our Customers

Read our cloud white papers



View our customer videos and case studies



Schedule a Cloud Workshop with our team



Sign Up for a Cloud Workshop

- Key output is the **Cloud Workshop Summary Report**
- Expert advice on your cloud strategy and solution
- High-level scope of project
- **Highly recommended for any company considering cloud**

- 
- Business objectives
 - Potential benefits
 - Migration considerations
 - Public cloud capabilities
 - Cloud-suitable workloads
 - Common cloud use cases
 - Cloud readiness and gaps
 - Best fit deployment options
 - Teradata's hybrid cloud portfolio

Teradata Consulting and Systems Integrators

ADVISE & ARCHITECT

DESIGN & IMPLEMENT

OPTIMIZE AND MANAGE

Artificial Intelligence Strategy	Business & Analytics Capability Review	Advanced Analytics & Data Science	AnalyticOps Foundation	BI and Data Visualization	AnalyticOps & Optimization	Business Continuity Operations	Elastic Provisioning
Business & Analytics Roadmap	Business & Analytics Governance	Data, Acquisition & Integration	Data Design and Access	Data Security and Privacy	Managed Database & Application Operations	Managed Ecosystem Administration	Ecosystem Upgrades & Migrations
Ecosystem Architecture Definition	Rapid Analytic Consulting Engagement (RACE)	Data Lake	Data Platform Foundation	Data Management		Support Services	
			Teradata Applications				

IntelliCloud Customer Support

- IntelliCloud includes Teradata Premier Cloud Support
- Customers can log incidents/case via:
 - Cloud Service Portal (<https://support.teradatacloud.com/>) OR
 - Call us at 1-877-MY-TDATA -> Option 3 (S1 “system down” incidents only)
- Support Hours, customer status updates depend on incident severity:

	S1 – Critical	S2 – Significant	S3 – Medium/Minor	S4 – Low
Cloud Operations	On-call for S1 incidents	9 AM EST – 8 PM EST	9 AM EST – 8 PM EST	9 AM EST – 8 PM EST
Incident Acknowledgment	2 hours	2 hours during business day	Next business day	Next business day
Customer Status update	Every Hour	Every 6 hours during business day	Daily during business day	Weekly
Hardware/Software Incidents	24 x 7	9 AM EST – 8 PM EST	9 AM EST – 8 PM EST	9 AM EST – 8 PM EST

Thank you.

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

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