Federated Analytics in the Dawn of the Digital Era



Federated Analytics in The Dawn of the Digital Era

Patricia Florissi, PH D VP and Global CTO for Sales



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS 2017, ppt | 2



NORTHROP GRUMMAN

BOEING

FLYSIUM

There times in life where... One must pause, think, and... Try to grasp the moment we are living...

2 ELYSIUM

2 © Copyright 2017 Dell Inc.









Many factors at play



3 © Copyright 2017 Dell Inc.

🔁 ELYSIUM 🚽 🔁



Ø BOEING





BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.pt | 4

Start in contract of the second of the second



Convergence of these Many factors at play



5 © Copyright 2017 Dell Inc.

₽ ELYSIUM









OBAL PRODUCT DATA

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 6

CONTRACTOR OF A DESCRIPTION OF A DESCRIP

Dawn of a new era

DELLEMC

6 © Copyright 2017 Dell Inc.

🛱 ELYSIUM 🚽 🖃







ELYSIUM



TEIND

Dawn of the digital era

DELLEMC

7 © Copyright 2017 Dell Inc.

🛱 ELYSIUM 🚽 🄁





ELYSIUM



TEIND

What does this digital tide bring?

DELLEMC

8 © Copyright 2017 Dell Inc.

🛱 ELYSIUM 🚽 🍣





BOEING





OBAL PRODUCT DATA

The things the tide brings

© Copyright 2017 Dell Inc.

2 ELYSIUM

-Par





₽ ELYSIUM



OBAL PRODUCT DATA

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 10

DELLEMC

DATA SIZE MATTERS

2

DATA ECOSYSTEM MATTERS

> 3 DATA LOCALITY

The things the tide brings

2 DATA ECOSYSTEM MATTERS

DATA SIZE MATTERS



DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 11

10 © Copyright 2017 Dell Inc.





 \bigcirc

BOEING

₽ ELYSIUM

GLOBAL PRODUCT DATA

Cognitive revolution 2.0

11 © Copyright 2017 Dell Inc.



NORTHROP GRUMMAN





BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 12

ELYSIUM

Artificial intelligence

The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, speech recognition, decisionmaking, and translation between languages.

D&LLEMC

12 © Copyright 2017 Dell Inc.

🛱 ELYSIUM

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 13



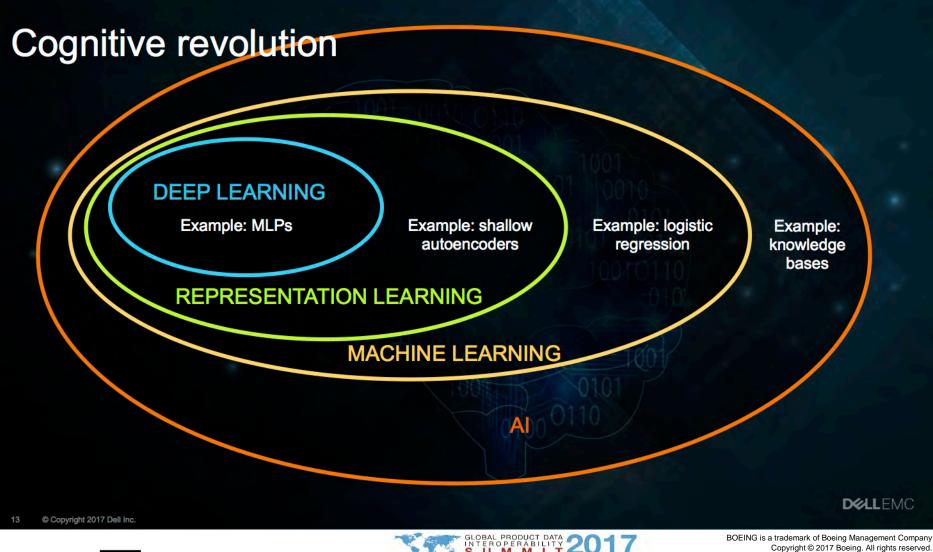


BOEING

22 ELYSIUN

OBAL PRODUCT DATA

NORTHROP GRUMMAN



Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 14

In the early days



Intellectually difficult for human being but relatively straight forward for computers

Deep Learning, Ian Goodfellow, Yoshua Bengio, and Aaron Courville

DELLEMC

14 © Copyright 2017 Dell Inc.





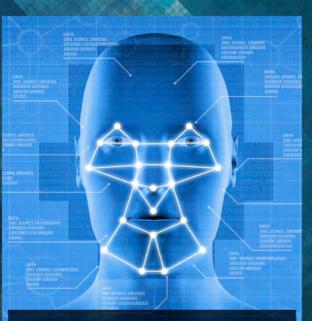
BOEING

2 ELYSIUM



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 15

In the now days



Intellectually easy and intuitive for humans but hard to be described formally for computers

Machine learning



Acquiring their own knowledge by extracting patterns from raw data

DELLEMC

15 © Copyright 2017 Dell Inc.







.....

ELYSIUM

-Ond Carl Astronom

Deep learning



Understand the world in terms of a hierarchy of concepts, with each concept defined through its relation to simpler concepts

DELLEMC

16 © Copyright 2017 Dell Inc.





BOEING

. Salar

Why is it called deep learning

Represents the world as a nested hierarchy of concepts The depth of the representational graphs high

Greater amount of composition of learned functions or learned concepts than traditional machine learning does

17 © Copyright 2017 Dell Inc.

01 4 60

′s1

 s_1







BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 18

0.10000

8,36268 0,00199

76,39700 Ye

60,63400 Ze

51 r2

m1, кг Ry_s1

Ys1

Zs1

alfa n_dv

n_sk

Yo

delta_t

delta_alfa

Learning algorithms

Liner regression

Logistic regression

Support vector machines

Clustering K-means Hierarchical cluster analysis (HCA) Expectation maximization

Deep belief network (DBNs)

Visualization and dimensionality reduction Principal component analysis (PCA) Kernel PCA Locally-linear embedding (LLE) T-distributed stochastic neighbor embedding (T-SNE)

Polynomial regression K-nearest neighbors 0 Anomaly detection Association rule learning **Decision trees** Random forests Ensemble methods Association rule learning Apriori Eclat DELLEMC

18 © Copyright 2017 Dell Inc.

🛱 ELYSIUM

NORTHROP GRUMMAN



ING

Common Denominator

They perform better

The more data

They analyze

DELLEMC

19 © Copyright 2017 Dell Inc.



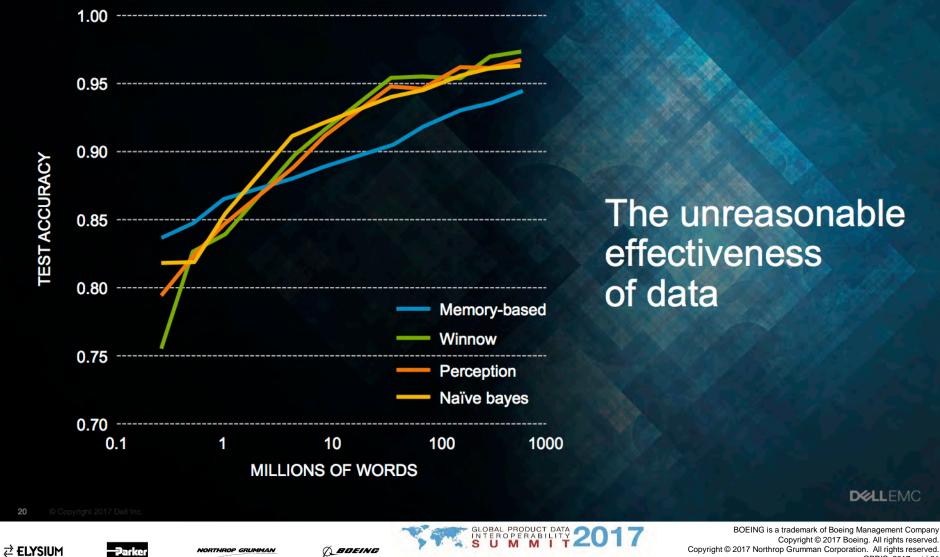




22 ELYSIU







ELYSIUM

GPDIS_2017.ppt | 21

Simple algorithms with lots of data

will out perform

Sophisticated algorithms with less data

21 © Copyright 2017 Dell Inc.

🛱 ELYSIUM

U M M I T2017

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 22





BOEING

DATA SIZE MATTERS 2 The things the tide brings DATA ECOSYSTEM MATTERS 3 DATA LOCALITY MATTERS \bigcirc DELLEMC © Copyright 2017 Dell Inc.

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 23





BOEING

ELYSIUM

OBAL PRODUCT DATA

The things the tide brings

2 DATA ECOSYSTEM MATTERS

DATA SIZE MATTERS

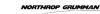


DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 24

23 © Copyright 2017 Dell Inc.





 \bigcirc

BOEING

ELYSIUM

OBAL PRODUCT DATA

Data monetization

The applicability of the data is large and broad

Source: Glenn Allmendinger

24 © Copyright 2017 Dell Inc.

🛱 ELYSIUM 🚽 Par





₽ ELYSIUN

Tran Aurosperso

PRODUCT

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 25

DELLEMC

Data fusion

Occurs when different sources are brought into contact and new facts emerge.



© Copyright 2017 Dell Inc.

2 ELYSIUM

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 26







ELYSIUN

Digital world value chain



Data: primary ingredient



Data: analytics: insights creation



Digital marketplace:

insights creation

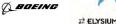
Applications: consumption vehicle

26 © Copyright 2017 Dell Inc.





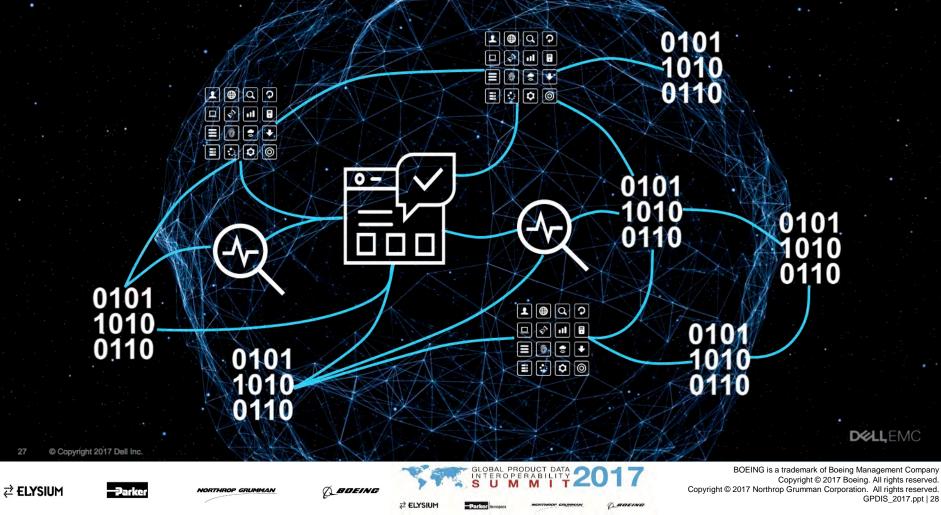




BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 27

D%LLEMC

Digital world value chain-graph



DATA SIZE MATTERS DATA The things the tide brings ECOSYSTEM MATTERS 3 DATA LOCALITY MATTERS \bigcirc DELLEMC 28 © Copyright 2017 Dell Inc.

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 29





BOEING

Dackar

ELYSIUM

OBAL PRODUCT DATA

Major data analytics trends emerging



29 © Copyright 2017 Dell Inc.



NORTHROP GRUMMAN



BOEING



OBAL PRODUCT

Centralization

And at the beginning there was one lake...

As the traditional approach to gain analytical insight from data in disparate sources

Batched data gathered in a single repository or cloud in preparation for analysis

DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 31



2 ELYSIUM



BOEING



Parker Aeresp

OBAL PRODUCT DATA

The perfect data in-mobility storm

IoT effect

Bandwidth constraints

Regulatory compliance

Traditioal Data Systems

Multi-Cloud

DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 32



Z ELYSIUM

NORTHROP GRUMMAN



Aerospana

Challenge imposed by traditional architecture thinking

Network

Understanding the data challenge

DATA HANDLING CHALLENGE

Massive numbers of endpoints for systems Storage requirement is unknown Managing massive, heterogeneous data an enormous challenge.



Diverse data sources -> diverse protocols, diverse transport requirements, diverse data

Must normalize and standardize for future data orchestration and integration

DATA USAGE CHALLENGE



Need to create an innovative business that uses this data

creates more value and fully uses current investment

^

DELLEMC

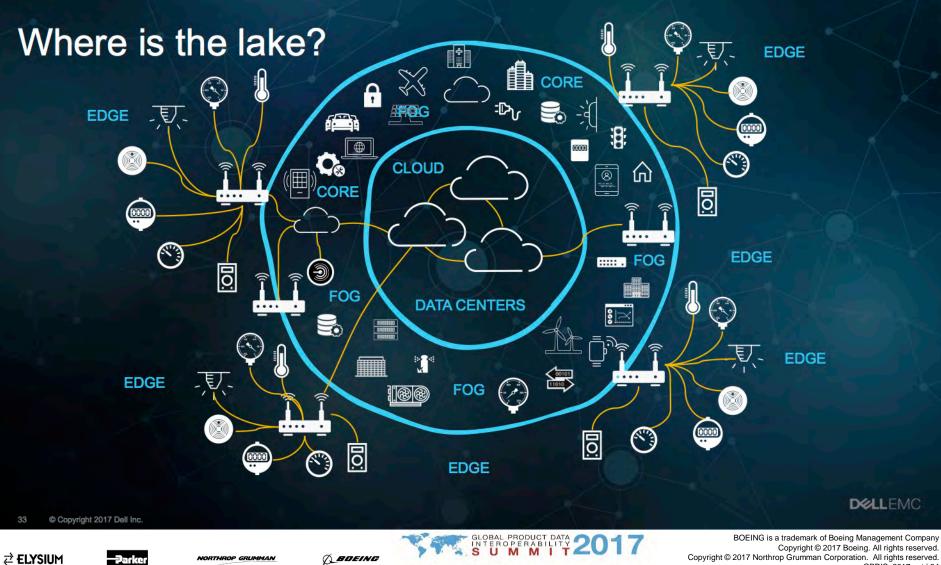
32 © Copyright 2017 Dell Inc.





BOEING





ELYSIUM

GPDIS_2017.ppt | 34

The things the tide brings

DATA ECOSYSTEM MATTERS

DATA SIZE MATTERS

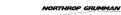


DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 35

34 © Copyright 2017 Dell Inc.







 \bigcirc

BOEING

값 ELYSIUM - Par

OBAL PRODUCT DATA



In the dawn of the digital era ...



36 © Copyright 2017 Dell Inc.

🛱 ELYSIUM 🚽 🖃









2 ELYSIUM

Backer

OBAL PRODUCT DATA

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 37

The dawn of federated analytics



37 © Copyright 2017 Dell Inc.

🛱 ELYSIUM 🚽 🚽









OBAL PRODUCT DATA

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 38

Federated analytics

Distributed analysis of data in place, as close as possible to the data source, while intermediate results can be shared and can be further analyzed along their path to other locations, enabling higher order learning at scale.

38 © Copyright 2017 Dell Inc.

🗱 ELYSIUM

--Par

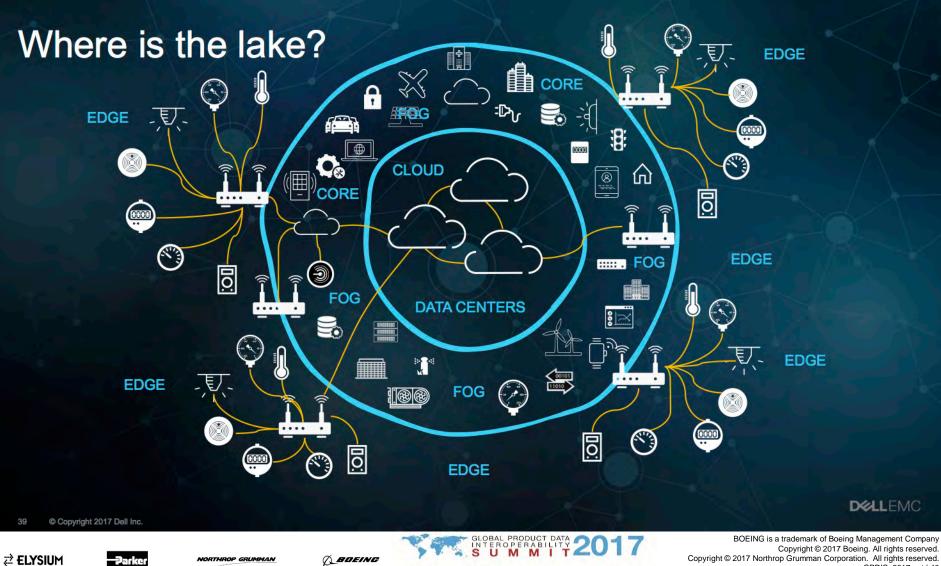






BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt [39]

DØLLEMC



GPDIS_2017.ppt | 40

NORTHROP GRUMMAN

ELYSIUM

Centralization

And at the beginning there was one lake...

As the traditional approach to gain analytical insight from data in disparate sources

Batched data gathered in a single repository or cloud in preparation for analysis

D&LLEMC





2 ELYSIUM

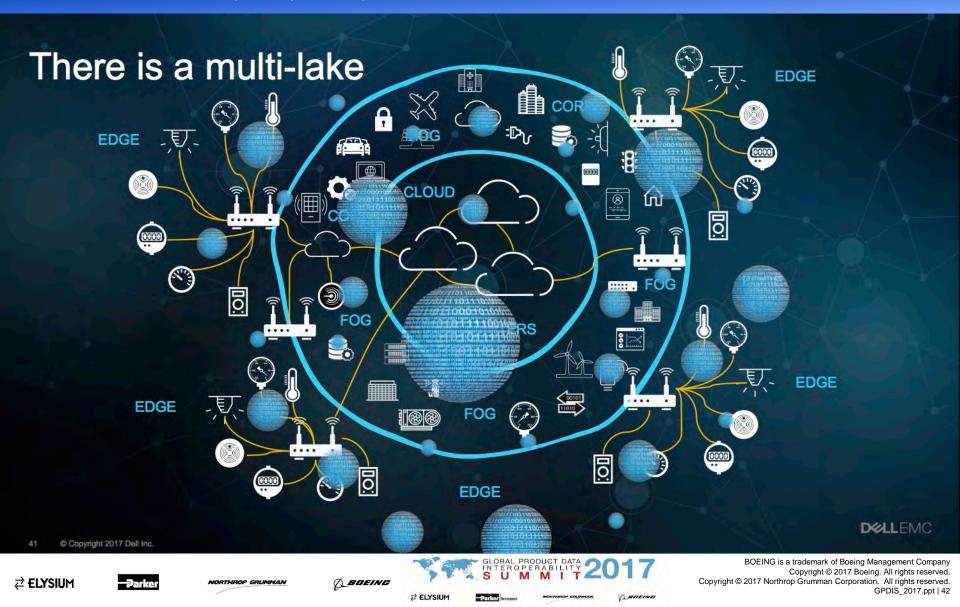
NORTHROP GRUMMAN

BOEING



-Parker Au

OBAL PRODUCT DATA



Anatomy of the world's data

42 © Copyright 2017 Dell Inc.

2 ELYSIUM

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 43

DELLEMC

-Parke

NORTHROP GRUMMAN

BOEING

ELYSIUM

Backer

OBAL PRODUCT DATA

Anatomy of a virtual data fabric

43 © Copyright 2017 Dell Inc.

2 ELYSIUM

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 44

DELLEMC



BOEING

ELYSIUM

-Darker Assesses

OBAL PRODUCT

Main challenges

how data science algorithms will be re-designed to reason and learn in a federated manner;

how analytics will be distributed close to where the data is collected; and

how the intermediate results will be aggregated and analyzed together to drive higher-order learning at scale. Those are much more challenging problems to solve

DELLEMC





ZZ ELYSIUM

BOEING

World Wide Herd (WWH)



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 46



NORTHROP GRUMMAN

BOEING



Parker Ares

OBAL PRODUCT DATA

Data sources generate data

Data-zone Fabric

© Copyright 2017 Dell Inc. 46

2 ELYSIUM

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 47



WORTHROP GRUMMAN

BOEING

0000

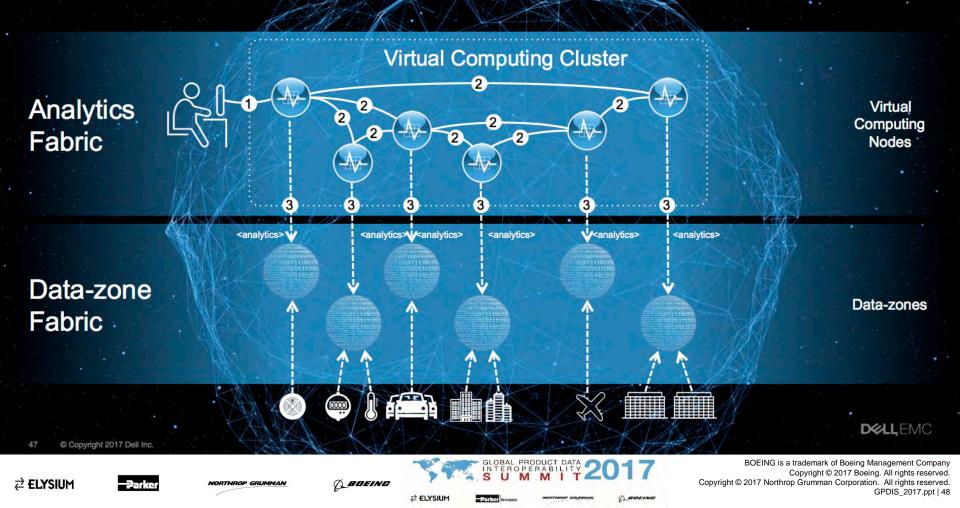
ELYSIUM

OBAL PRODUCT DATA

Data-zones

D&LLEMC

Along comes the analytics explorer



Parallel and distributed computation

4

(initial content) (initial con



Data-zones

DELLEMC



Analytics

Fabric

48 © Copyright 2017 Dell Inc.

🧱 ELYSIUM

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 49



IORTHROP GRUMMAN

4

BOEING

NONTHINO

OBAL PRODUCT DATA

4

Virtual Computing Cluster

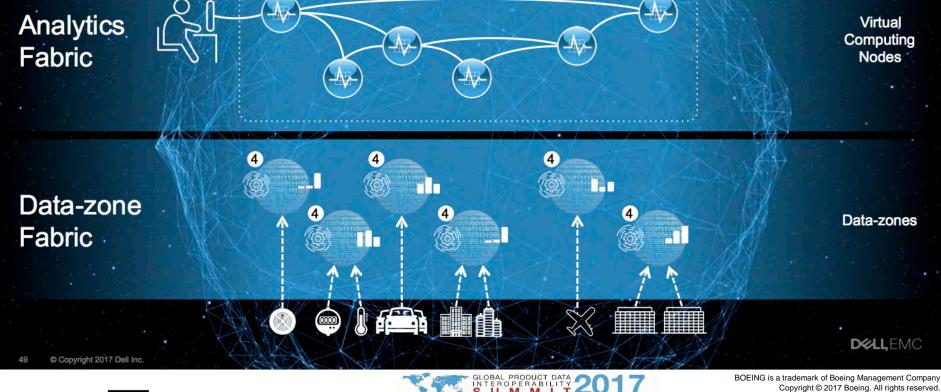
🧱 ELYSIUM

Parallel and distributed computation

BOEING

2 ELYSIUM

ORTHROP GRUMMAN



Virtual Computing Cluster

Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 50

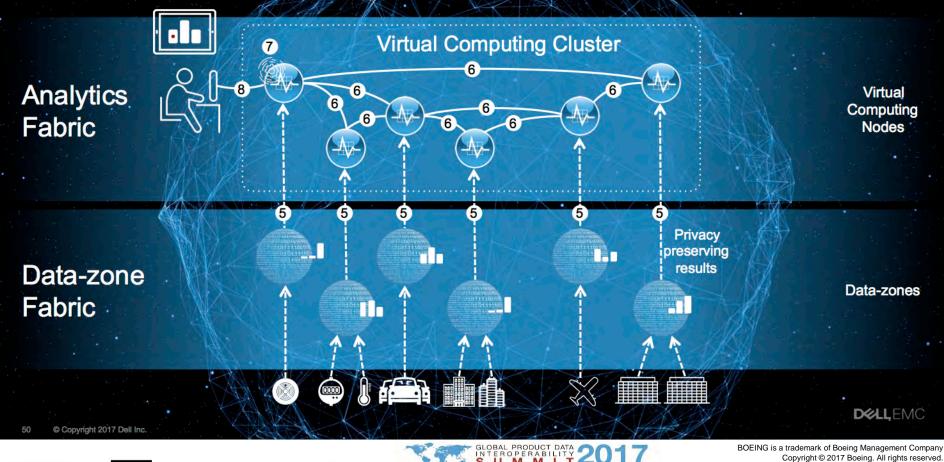
🧱 ELYSIUM

Privacy-preserving results shared

BOEING

2 ELYSIUM

NORTHROP GRUMMAN



Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 51

Broad Range of Data-zones



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 52



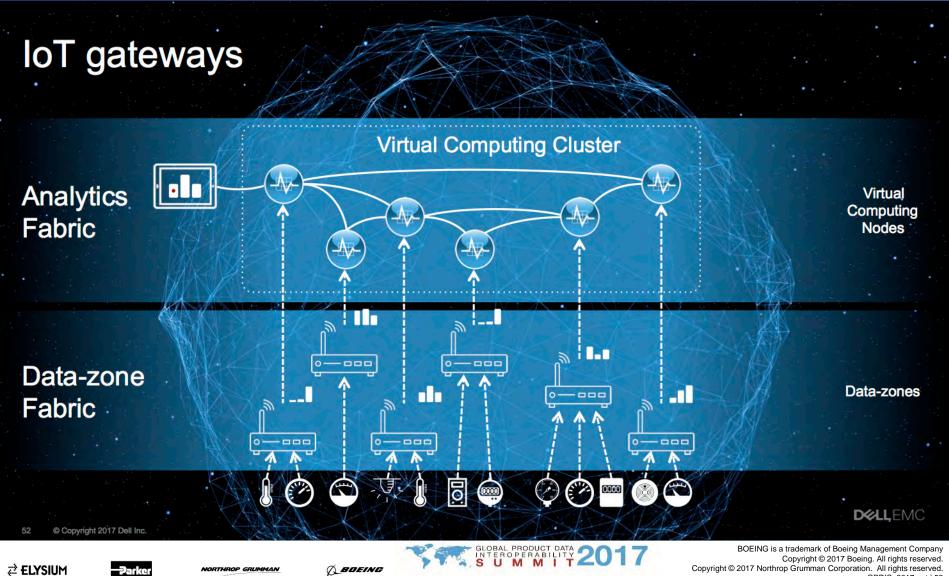
NORTHROP GRUMMAN

BOEING

ELYSIUM

Parker Aerospec

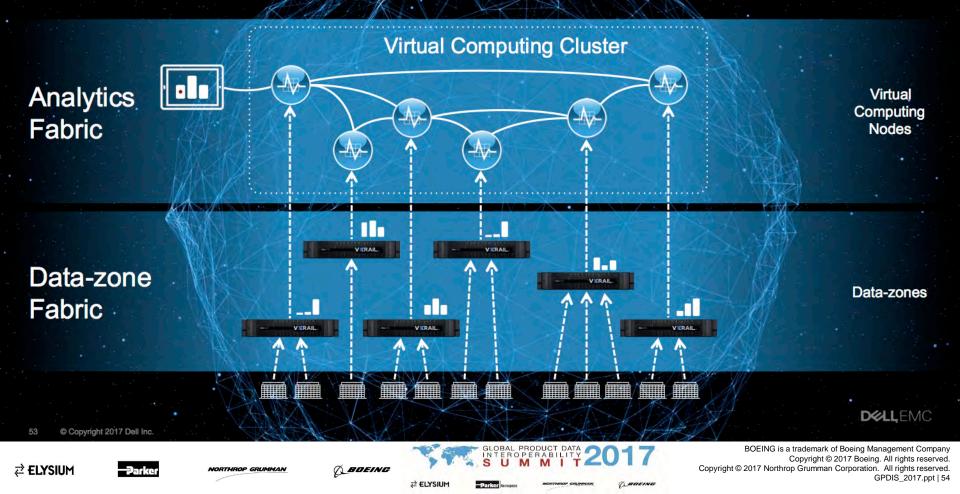
OBAL PRODUCT DATA



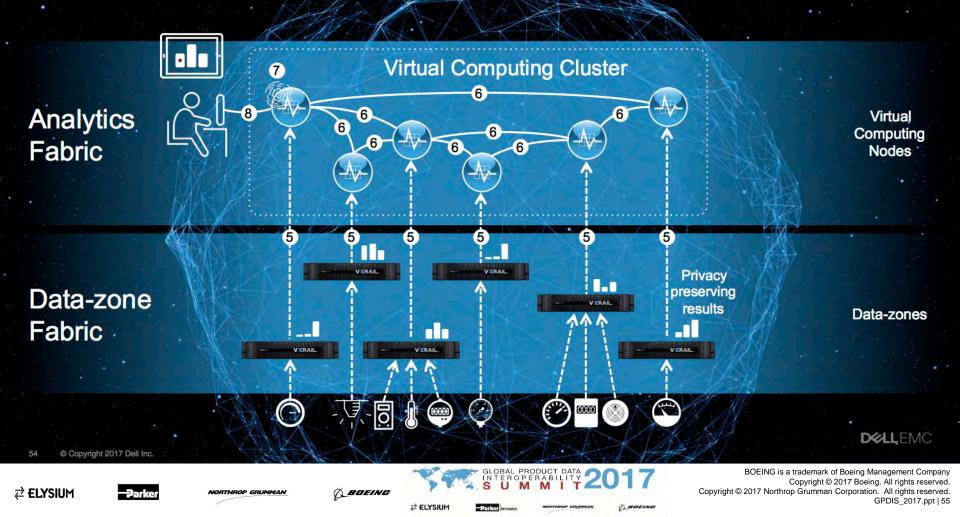
ELYSIUM

GPDIS_2017.ppt | 53

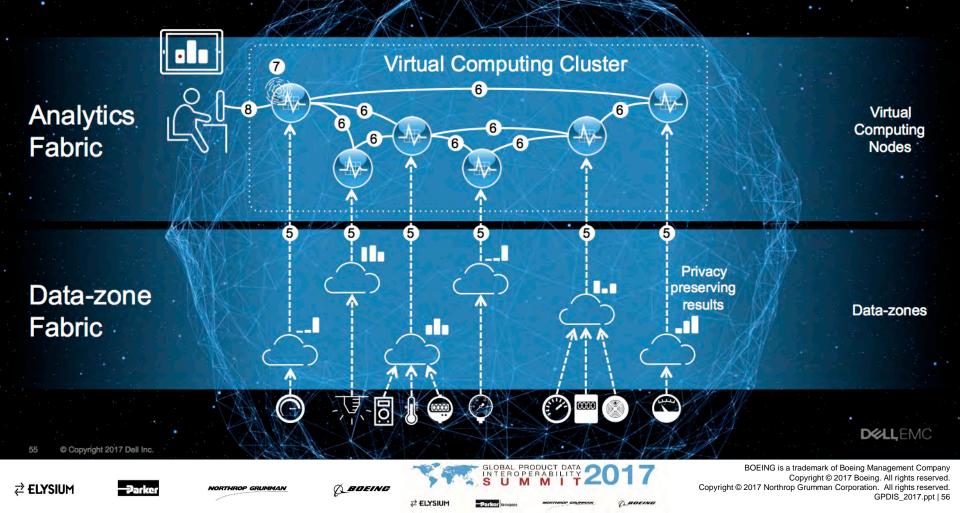
HCI receiving data from digital buildings



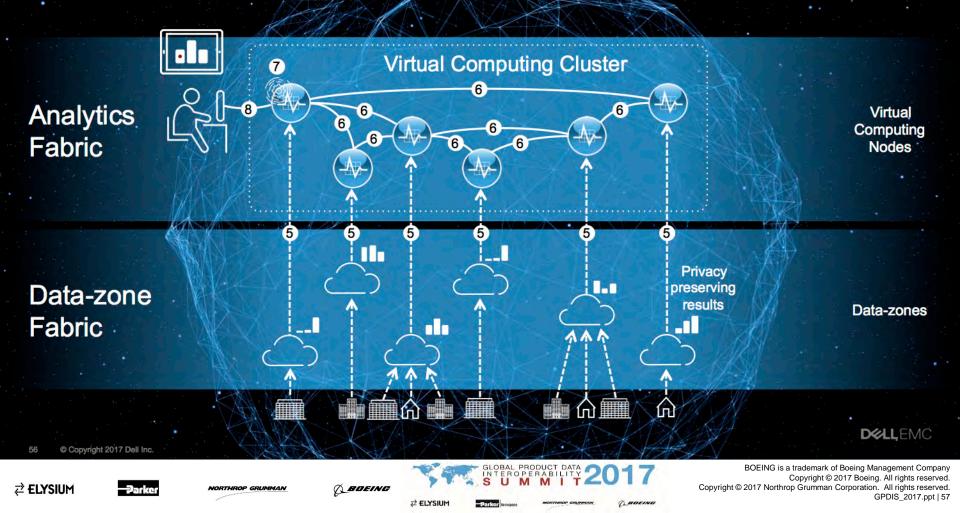
HCI receiving data from sensors



Cloud instances receiving data from sensors



Cloud Instances receiving data from Digital Buildings



Computing nodes become virtual nodes in a virtual computing cluster at scale Connecting clusters at the analytics layer

Virtual Computing Cluster

Data-zone Fabric

Analytics

Fabric

Virtual Computing Nodes

Data-zones

DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 58

57 © Copyright 2017 Dell Inc.







BOEING

NORTHINO

Rebirth of data science

DELLEMC

58 © Copyright 2017 Dell Inc.

🛱 ELYSIUM 📃





BOEING

ELYSIUM



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 59

Benchmarking



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 60

ି



NORTHROP GRUMMAN

BOEING

ELYSIUM

Parker Aeresp

OBAL PRODUCT DATA

Parameters for Histogram & Median Use Case

- Attribute selected: age, ranging form 20 to 80 •
- Number of records: 275 total •
- Three data-zones:
 - purple,
 - blue, and
 - gray



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 61



22 ELYSIUM

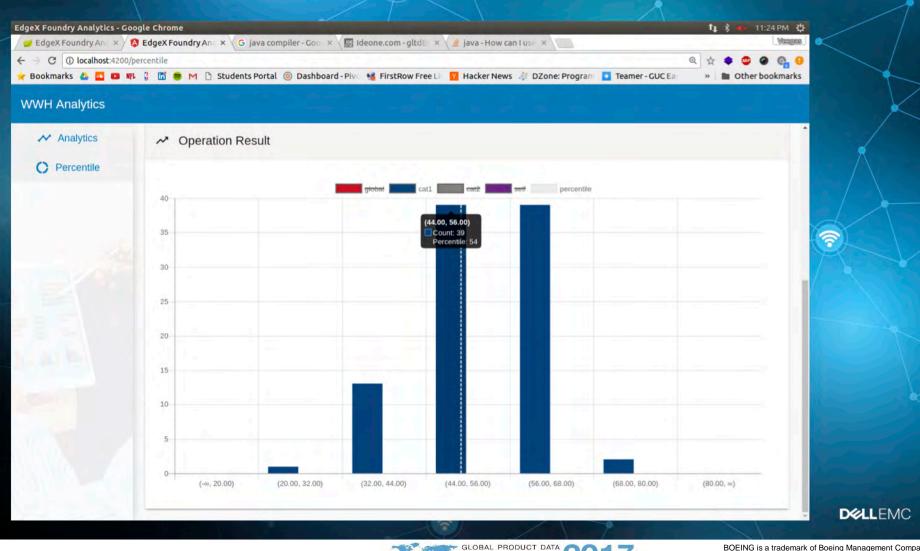
BOEING



C O localhost:8080					
ookmarks 🝐 🔤 💷	NFL 🖁 🛅 📵 M 🗋 Students I	Portal 🔞 Dashboard - Piv 🛛 😼 FirstRow Free Lin 📔	Hacker News 🛷 DZone: Program 📘 Team	ner - GUC Ea 🔋 🖿 Other bookr	narks
VH Analytics					
✓ Analytics	1	10			
C Percentile	tment				Ā
C I creentine	unent	zones in comparison to global			
	sex				
	age	Percentile Value	Precision 0	Security Points 5	
	and the second sec	Between 0-100	Higher precision means a more accurate percentile, but will take		2
	stage	Minimum	more timé Maximum		
	gibleed	20	80		
				Clear Execute	18000
	1. 101 6.4.4				
	≁ Operation Res	sult			
		global catž	cat2 self percentile		
	120				
	100				DELL
				and the free	

₽.

Analytics								
Analytics Percentile								
	The operation result will Columns age	Percentile Privacy Preserving Percentile	Precision 0	Security Points. 5				
	Slices 5	Millimons 20	Higher precision means a more accurate percentile, but will take more time Maximum 80					
				Clear Execute				
	✓ Operation F	Result						
	120	giobal catt catt	at2 setf percentile					
	100							



ROPERABILIT

🛱 ELYSIUM

NORTHROP GRUMMAN

BOEING

같 ELYSIUM

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 64

🛱 ELYSIUM

Parke

WH Analytics							
	✓ Operation R	esult					Î
O Percentile							
	80	-24	giobal Canad ca	ti cat2	self percentile		
				(56.00, 68.00			
	70			Percentile	:: 63		1
	60						
	50						
							×
	40						
	30						2
	20						
	10						
							Sec. 1

BOEING

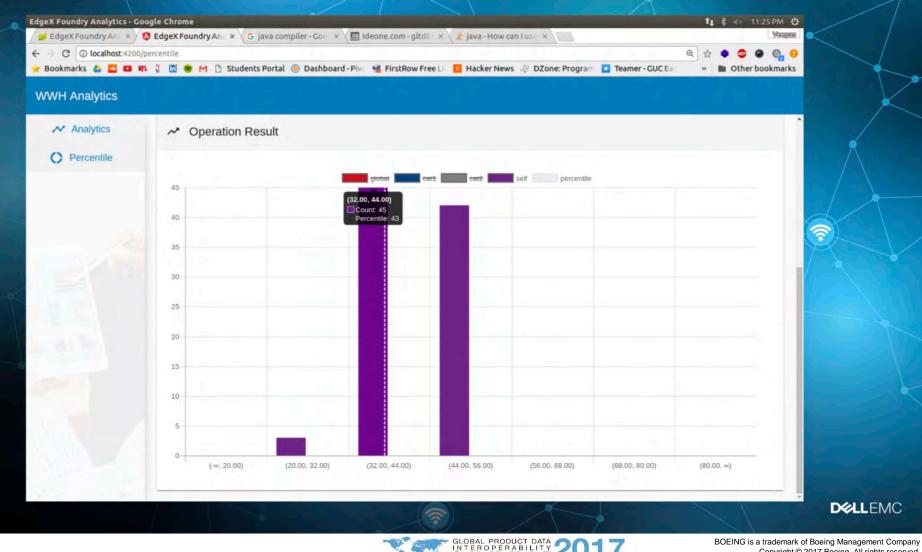
ELYSIUM

NORTHROP GRUMMAN

DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 65

ABBEING



Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 66

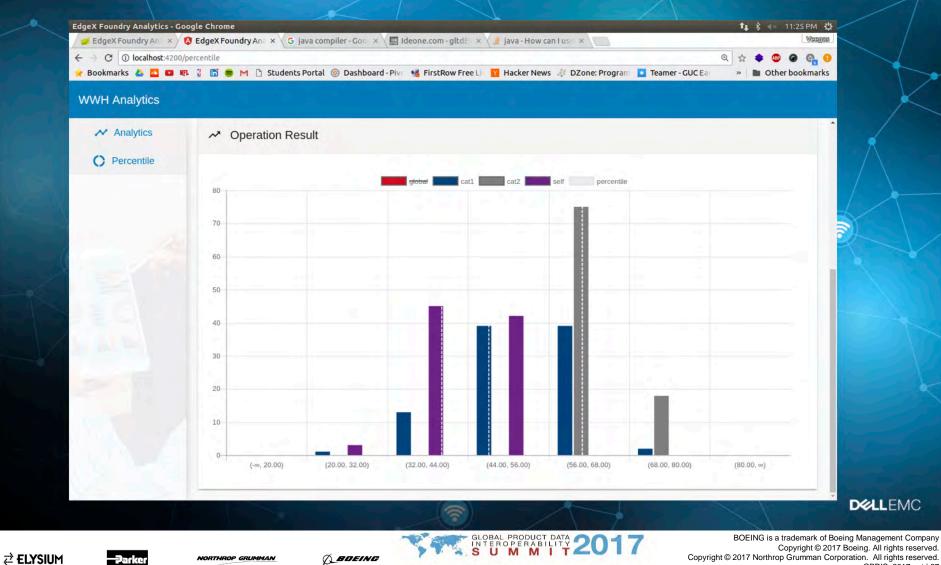
NORTHROP GRUMMAN

ELYSIUM

IMMAN

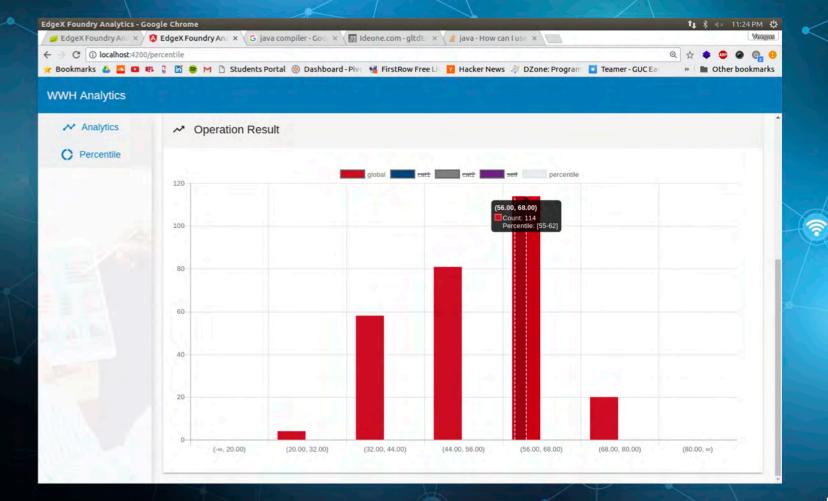
BOEING

ELYSIUM



ELYSIUM

Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 67



GLOBAL PRODUCT DATA

ROPERABL

DELLEMC

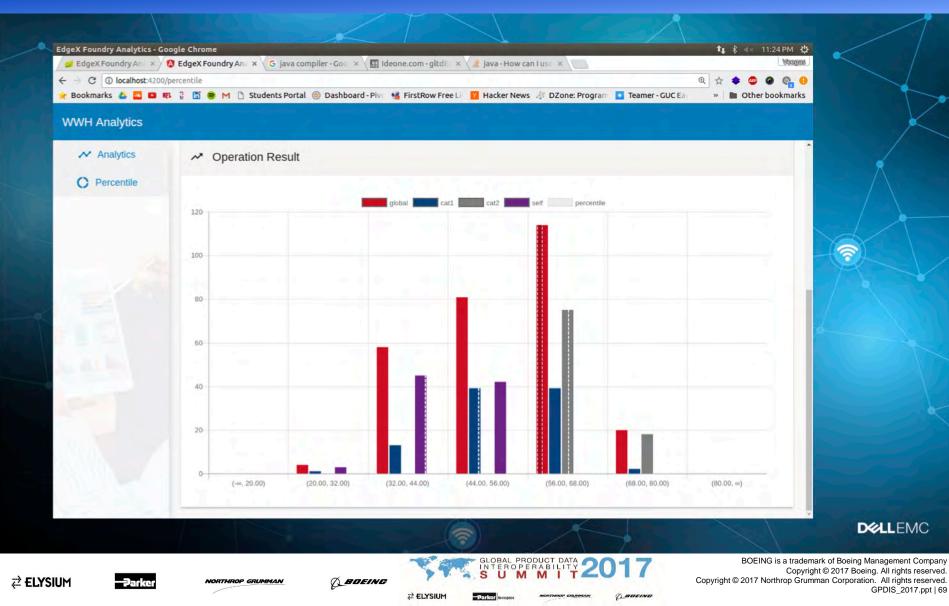
BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 68



NORTHROP GRUMMAN

DBOEING

ELYSIUM



Summary of Results

- Main Cluster: Percentile value: 43 (2nd slice)
- Remote cluster 1: Percentile value: 54 (3rd slice)
- Remote cluster 2: Percentile value: 63 (4th slice)
- Global Percentile Range: 55 56 (4th slice)







22 ELYSIUM



WWH Fabrics

Because "the future is federated"

frank frank

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 71

DELLEMC





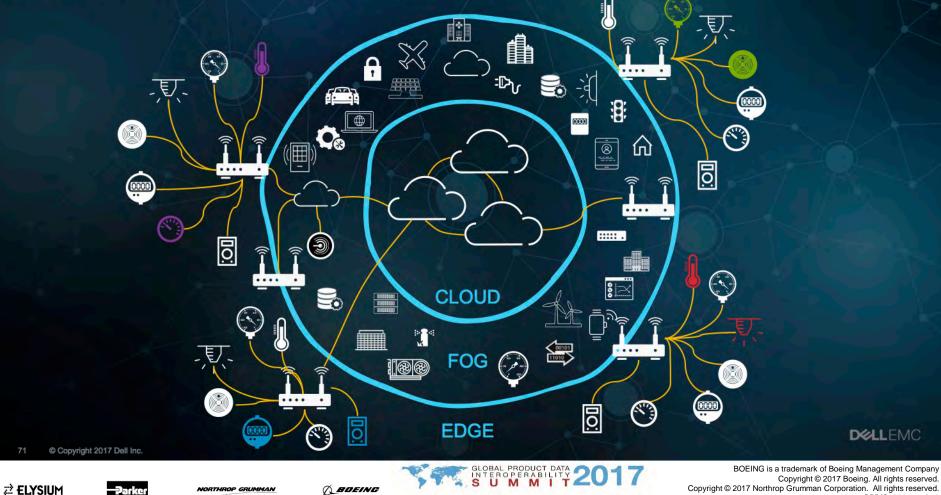




OBAL PRODUCT DATA

NORTHROP GRUMMAN

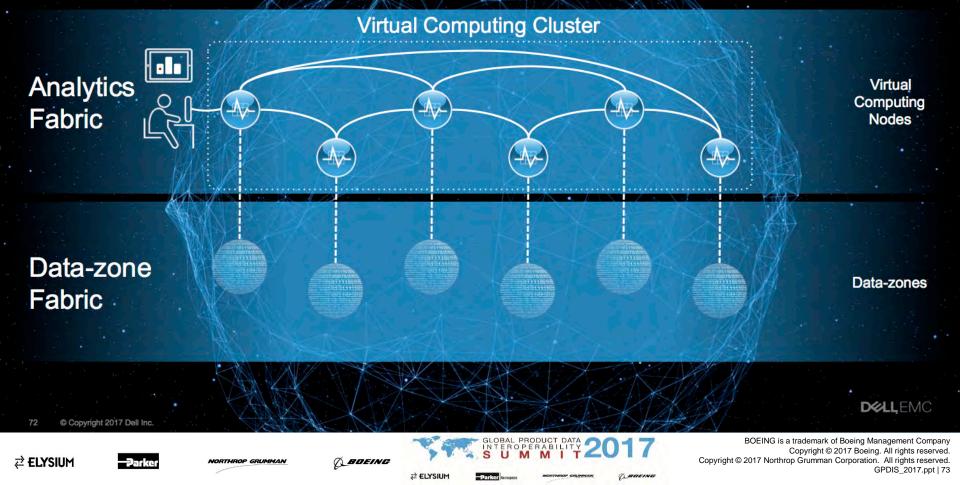
Federate analytics per geography

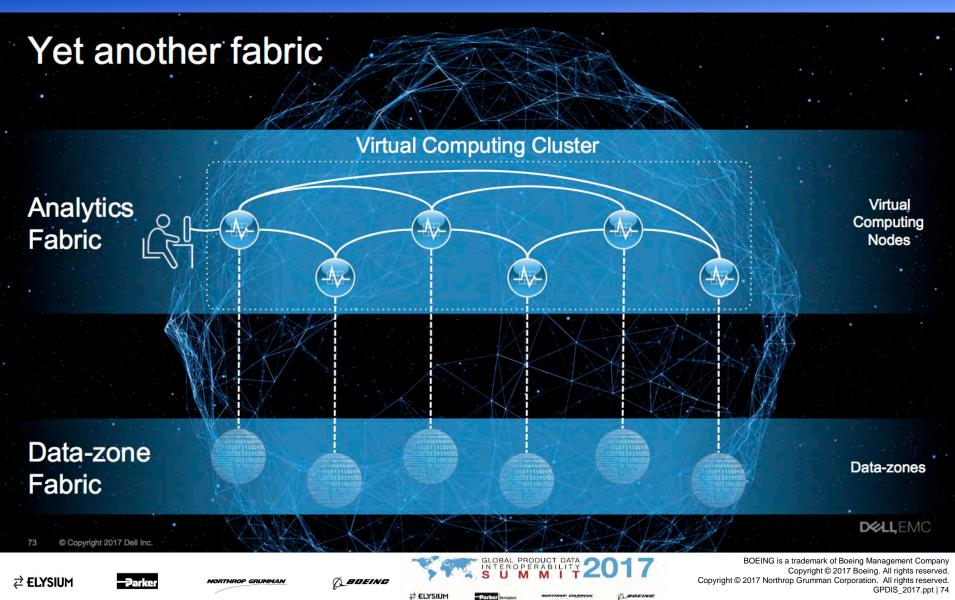


ELYSIUM

Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 72

How all these connections get established?





🧱 ELYSIUM

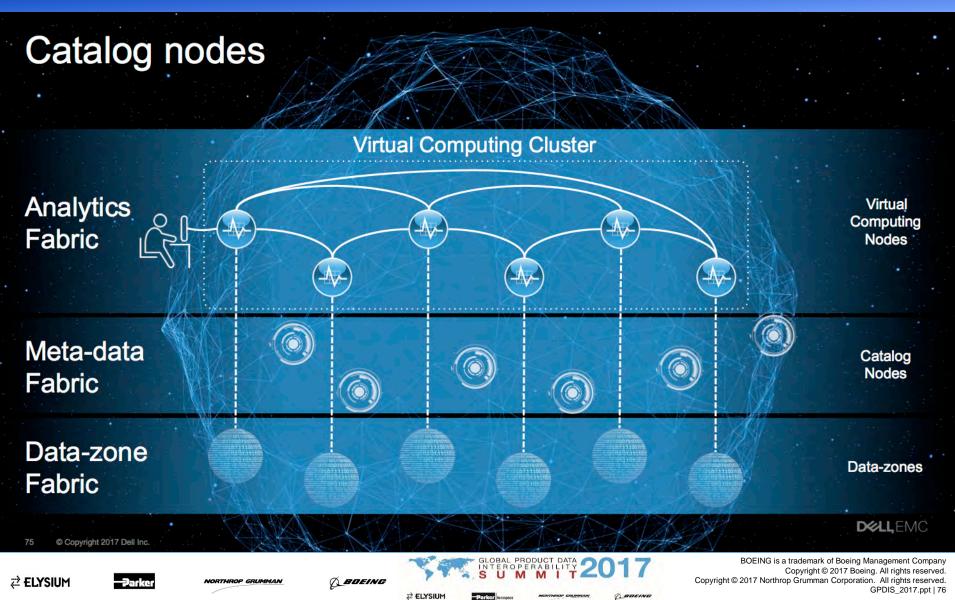
The meta-data fabric Virtual Computing Cluster Analytics Fabric Virtual Computing Nodes -1/-Meta-data Fabric Data-zone Data-zones Fabric DELLEMC © Copyright 2017 Dell Inc. BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved.

BOEING

2 ELYSIUM

IORTHROP GRUMMAN

Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 75



Persona

A specific, fictional representation of a person who is very likely to represent your ideal customer. A persona is a prototype of your user.

https://content.pivotal.io/blog/how-to-define-your-persona-part-2

76 © Copyright 2017 Dell Inc.

🧱 ELYSIUM

DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 77







ELYSIUM

OBAL PRODUCT DATA

Business value creator

Virtual Computing Cluster

Analytics Fabric

Virtual Computing Nodes

OBAL PRODUCT

Data Scientist

DELLEMC

© Copyright 2017 Dell Inc.

2 ELYSIUM





BOEING

ELYSIUM

Business value harvester

Virtual Computing Cluster

Analytics Fabric

Virtual Computing Nodes

DELLEMC

Analytics Explorer

78 © Copyright 2017 Dell Inc.

₽ ELYSIUM







ELYSIUM

OBAL PRODUCT DATA

Continuous feedback loop

Virtual Computing Cluster

Analytics Virtual Computing Fabric Nodes 6 Data Scientist Analytics Data Explorer **Analytics** Scientist Data Explorer Analytic Scientist Explorer DELLEMC © Copyright 2017 Dell Inc. 79 OBAL PRODUCT DATA BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. 🧱 ELYSIUM BOEING Copyright © 2017 Northrop Grumman Corporation. All rights reserved. NORTHROP GRUMMAN GPDIS_2017.ppt | 80 # ELYSIUM

Together, business transformation happens

Virtual Computing Cluster

Analytics Fabric

Virtual Computing Nodes

DELLEMC

Analytics Explorer



Data Scientist

80 © Copyright 2017 Dell Inc.

₽ ELYSIUM





BOEING

Analytics requires data and processing capacity

Data-zone Fabric

Data-zones

DELLEMC

© Copyright 2017 Dell Inc.

🤃 ELYSIUM



BOEING

Arrange Monthere

Data architects manage data

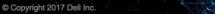


Architect

Data-zone Fabric

Data-zones

DELLEMC



₽ ELYSIUM







ELYSIUM

Month

OBAL PRODUCT

Administrators provision processing nodes

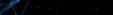


System Administrator

Data-zone Fabric

Data-zones

DELLEMC



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 84



🤃 ELYSIUM 🥏





BOEING

2 ELYSIUM

Together, data and processing capacity are created







System Administrator

Data-zone Fabric

Data-zones



84 © Copyright 2017 Dell Inc.

🛱 ELYSIUM





BOEING

Different data-zones, different set of owners



Data



Syst Architect Admin

Data System Architect Admin

Data System Architect Admin

Data System Architect Admin Data System

Architect Admin

Data System

Admin

Architect

Data-zones

Data-zone Fabric

DELLEMC

85 © Copyright 2017 Dell Inc.

🧱 ELYSIUM



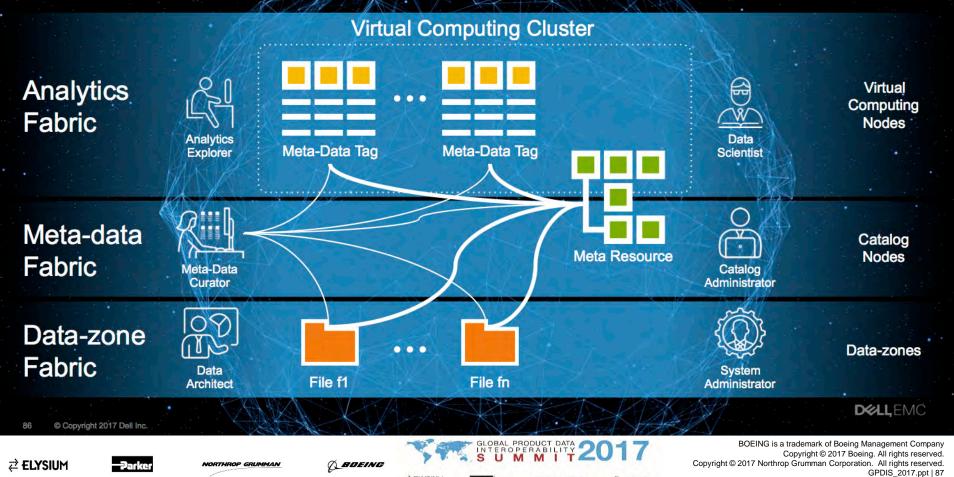


BOEING

2 ELYSIUN

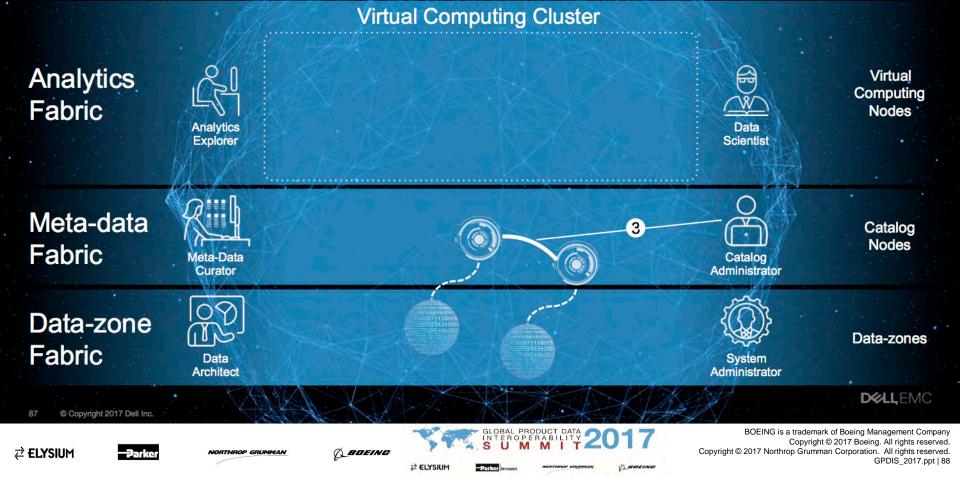
OBAL PRODUCT

Meta-data curator catalogs it all

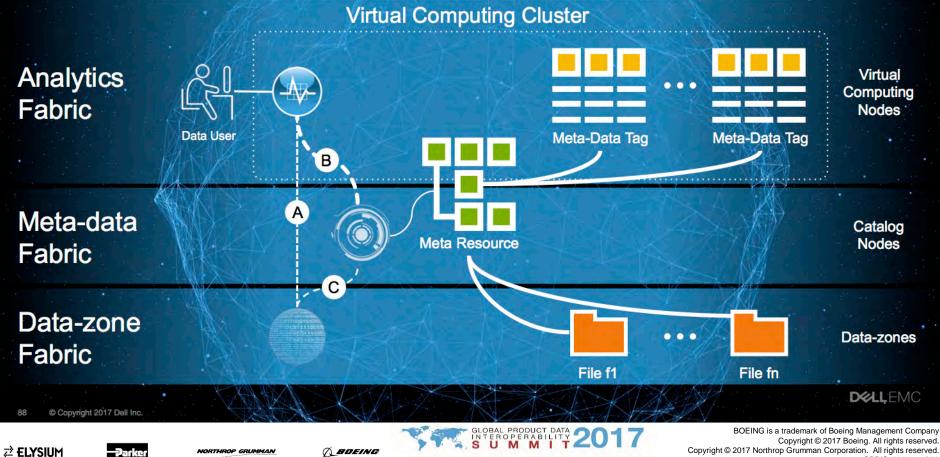


ELYSIUM

Creating the meta-data fabric



Computing nodes become virtual nodes in a virtual computing cluster at scale



ELYSIUN

GPDIS_2017.ppt | 89

Some people make it happen

Some people watch it happen

Some people do not know what happened

89 © Copyright 2017 Dell Inc.

🛱 ELYSIUM



NORTHROP GRUMMAN

BDEING



BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 90

DELLEMC

Think bigger data...

Think distributed bigger data... Think world wide scale, distributed bigger data...

DELLEMC

Copyright 2017 Dell Inc.

2 ELYSIUM



NORTHROP GRUMMAN





Dawn of a new era

91 © Copyright 2017 Dell Inc.

DELLEMC

₽ ELYSIUM

NORT



BOEING

₽ ELYSIUM

-

-Darker human

GLOBAL PRODUCT DATA

ABBEING

Technology leadership is a team sport We are better together

DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 93

🤃 ELYSIUM



ORTHROP GRUMMAN

BOEING



OBAL PRODUCT DATA

Better together because... only together we can do things no one else can

93 © Copyright 2017 Dell Inc.

DELLEMC









The time is now To change the world ...one challenge at a time

DELLEMC

4 © Copyright 2017 Del Inc.

🧱 ELYSIUM









OBAL PRODUCT DATA

Let your transformation begin!

95 © Copyright 2017 Dell Inc.









BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 96

DELLE

Thank you!

96 © Copyright 2016 Dell Inc.

DELLEMC

BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 97







₽ ELYSIUM

OBAL PRODUCT DATA

OPERABILIT

DEINO

D LTechnologies



D&LLEMC Pivotal.

RSA

Secure Works

virtustream

vmware[®]

₽ ELYSIUM

NORTHROP GRUMMAN





BOEING is a trademark of Boeing Management Company Copyright © 2017 Boeing. All rights reserved. Copyright © 2017 Northrop Grumman Corporation. All rights reserved. GPDIS_2017.ppt | 98

ELYSIUM

DELEMC

DELLEMC

98 © Copyright 2017 Dell Inc.

🛱 ELYSIUM 🚽 Əarkei





BOEING



13

-The last

GLOBAL PRODUCT DATA

M

ABBEING