

Enrich Your Data Capital With AI

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DELLTechnologies

The Digital Future



Every organisation needs to be a digital organisation,
powered by data, running in a multi-cloud world.



Over the next decade

The pace of transformation will only increase.

We are now in the Data Era

Digital Laggards

Do not have a digital plan; limited initiatives & investments in place

Digital Followers

Very few digital investments; tentatively planning for the future

Digital Evaluators

Gradually embracing digital transformation & planning for the future

Digital Adopters

Have a mature digital plan, investments & innovations in place

Digital Leaders

Digital transformation is ingrained in the DNA of the business

2016

2018

15%

9%

32%

30%

34%

33%

14%

23%

5%

5%

Dell Technologies Digital Transformation Index

Automotive Data Capital



Identify

Analyze

Plan

Deploy

Every company is now a technology company
Automotive Data = Competitive Advantage

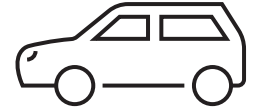


Dell EMC Automotive Industry Leadership



Supplying 80% top Auto OEM / Tier 1

Shipped more than 1EB to >40 customers for ADAS



Member Automotive Edge Computing Consortium - AECC

DENSO



TOYOTA

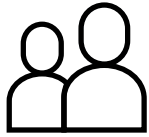


SAMSUNG

Charter / Sponsor Members

What is Data Capital?

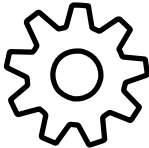
TRADITIONAL ASSETS



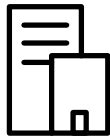
Human capital



Intellectual property



Operations



Infrastructure

101
110
01011
DATA CAPITAL

Data is rapidly becoming organizations' most valuable asset

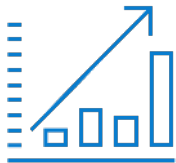
CHALLENGE:

Transforming data into value



Unstructured Data market trends

Stand in the way of realizing data capital



Explosive data growth

Continued growth due to large, complex workflows in industries such as M&E, Life Sciences, and EDA



Dispersed data

Data is spread across storage platforms and the cloud, often trapped in silos



Collaborative projects

Workloads becoming more collaborative with multiple content creators

The DATA fueling AI is different

75 ZB

By 2025

Data Growth



Text Data



Images

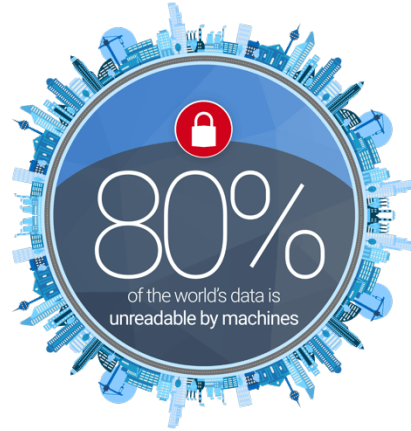


Video



Audio

>80% Data is
Unstructured



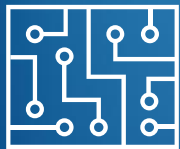
No Longer Human
Parsable



Historical Data Sets
bring massive value

This is the SWEET SPOT for AI
The DATA becomes CODE

General Challenges Facing Deep Learning



Powerful,
accelerated
compute



Compute
& analytics
at the edge



High-performance
storage & data
protection



Multi-cloud
operating
models



Software-
defined
infrastructure



Data
mobility

1 Ecosystem

- Frameworks selected isolated
- Use of certain environments predefined (i.e. container, GPU)
- Ecosystem Sprawl (too many options)

2 Production Readiness

- Integration in Operation
- Patch Management
- Update of depending libraries

3 Agile methodologies

- Automation of training and inference
- Typically not driven from IT

4 Scalability

- Scaling from a few to hundreds of Data Scientists
- Scheduling of training jobs
- Hybrid Cloud integration

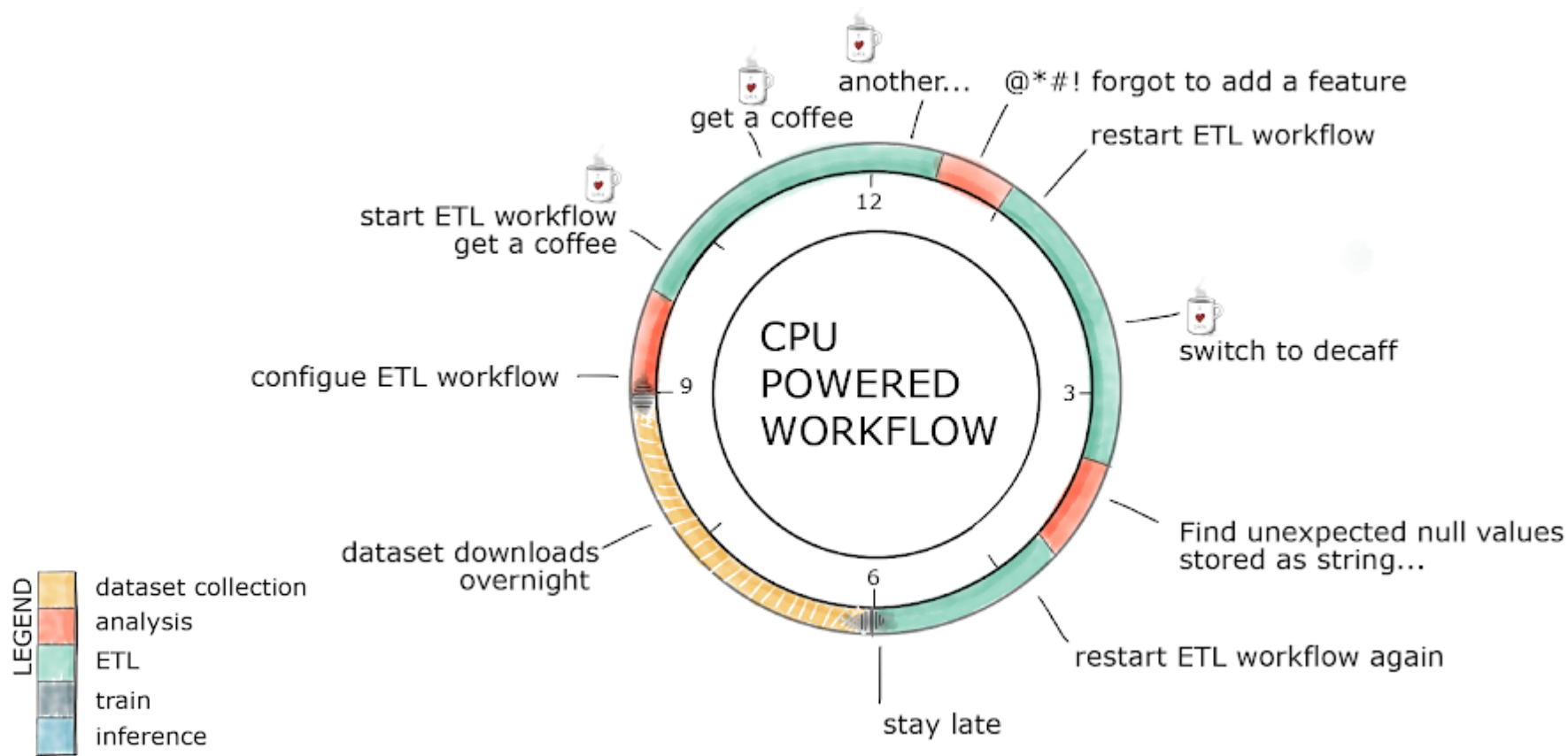
Flexibility makes AI an integral part of IT



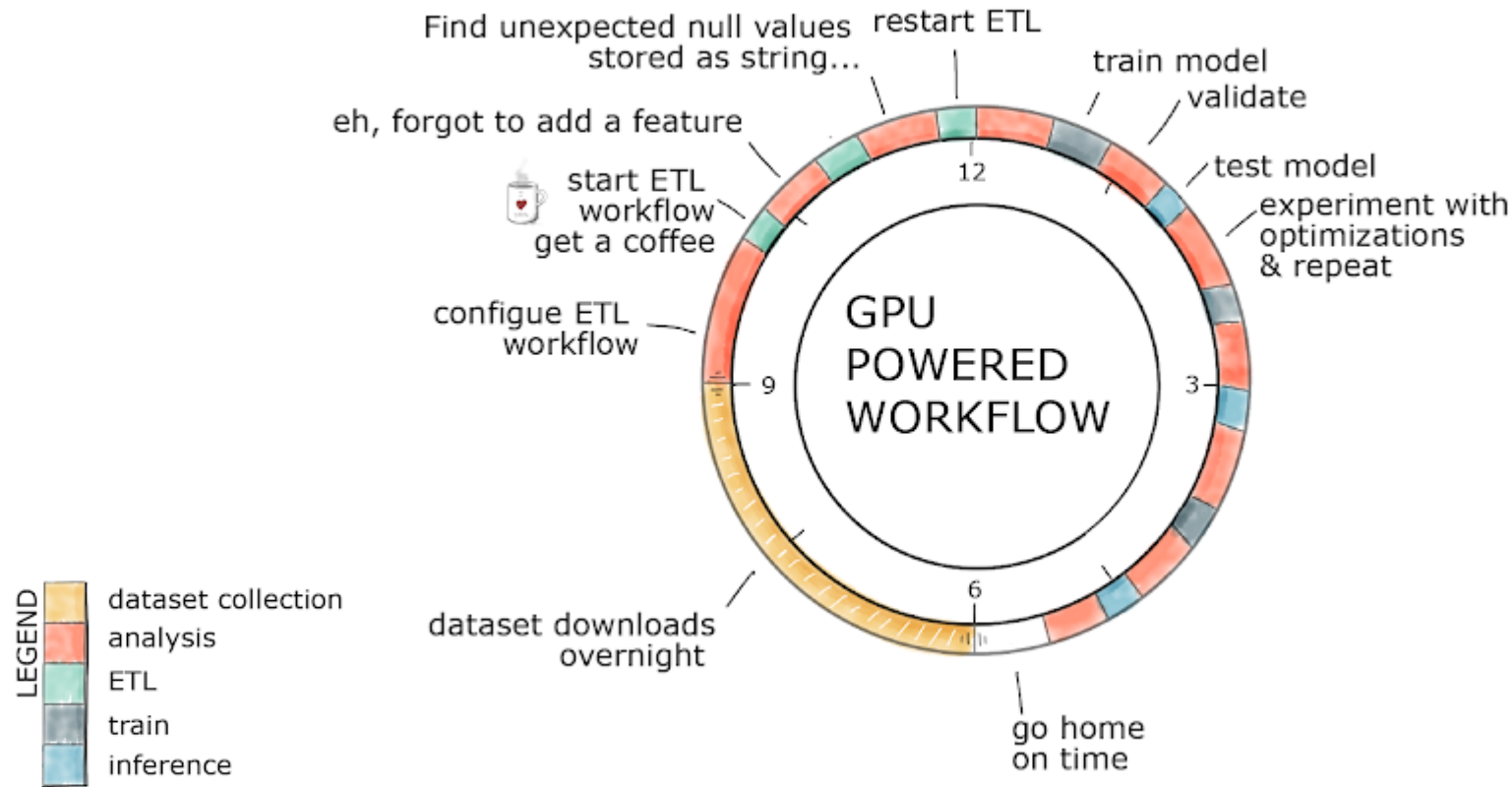
Minimize cost and time to market with in-place AI

Improve IT re-use and agility with ability to work with any compute or application

Day in the life of a data scientist



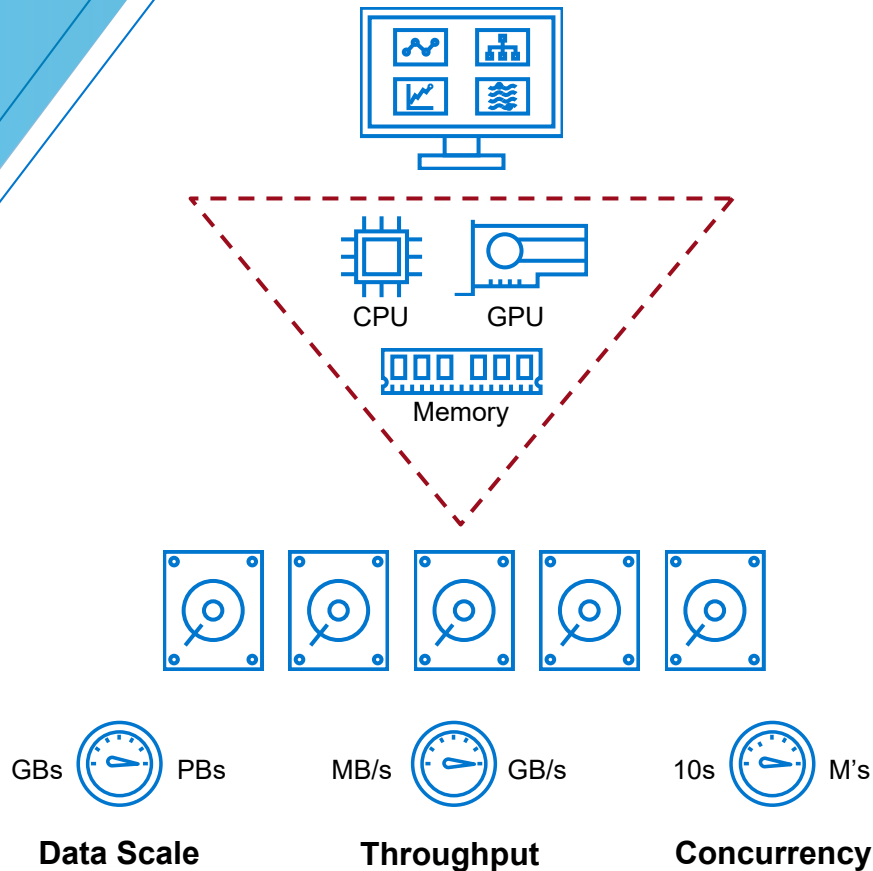
Day in the life of a data scientist



Accelerate Innovation

I/O bottlenecks AI outcomes

- **Lengthens** model development cycles
- **Difficult to** capture the full value of GPU
- **Limits** analytic accuracy
- **Hard to scale** to large-scale production



Dell EMC Isilon simplifies data management for AI

Eliminates the I/O bottlenecks at any scale

**9x more
IOPS***

**18x more
bandwidth***

**21x more
capacity***



Support
1000s
of GPUs

10s of TBs to 10s of PBs

Up to **millions**
of concurrent
connections

* Compared to closest competitor based on Dell EMC internal analysis, June 2018. Ad # G17000096

Dell EMC Deep Learning solutions with NVIDIA®

Only vendor to offer flexibility & informed choice with NVIDIA, the leader in AI



Ready Solution for AI: **Deep Learning with NVIDIA**

- C4140 1RU PowerEdge Servers with V100 GPUs
- 4-way high GPU NVLink Interconnect
- All Flash F800 Isilon
- Data Scientist Portal and Bright Cluster Manager

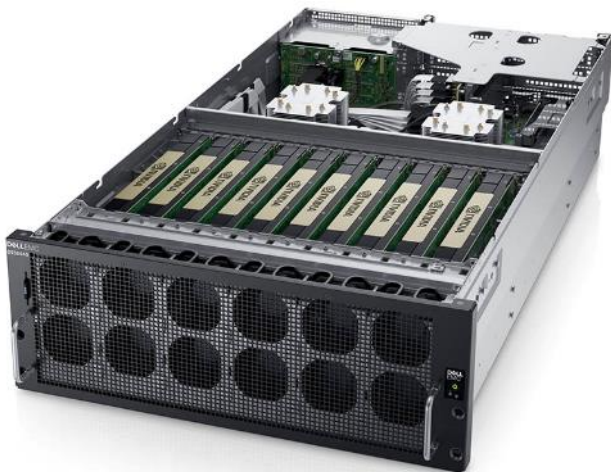


Extreme Deep Learning with **NVIDIA DGX-1 with Isilon**

- DGX-1 3RU Servers and Software
- 8-way GPU NVLink interconnect
- All Flash F800 Isilon
- DL Libraries/containers from NVIDIA GPU Cloud (NGC)

Dell EMC Deep Learning solutions with NVIDIA®

Next Generation GPU Server Platforms



Dell DSS 8440

- Up to 10 NVIDIA V100 GPU cards
- Compact 4RU chassis
- Switched PCIe fabric for rapid I/O
- Up to 10 local NVMe drives

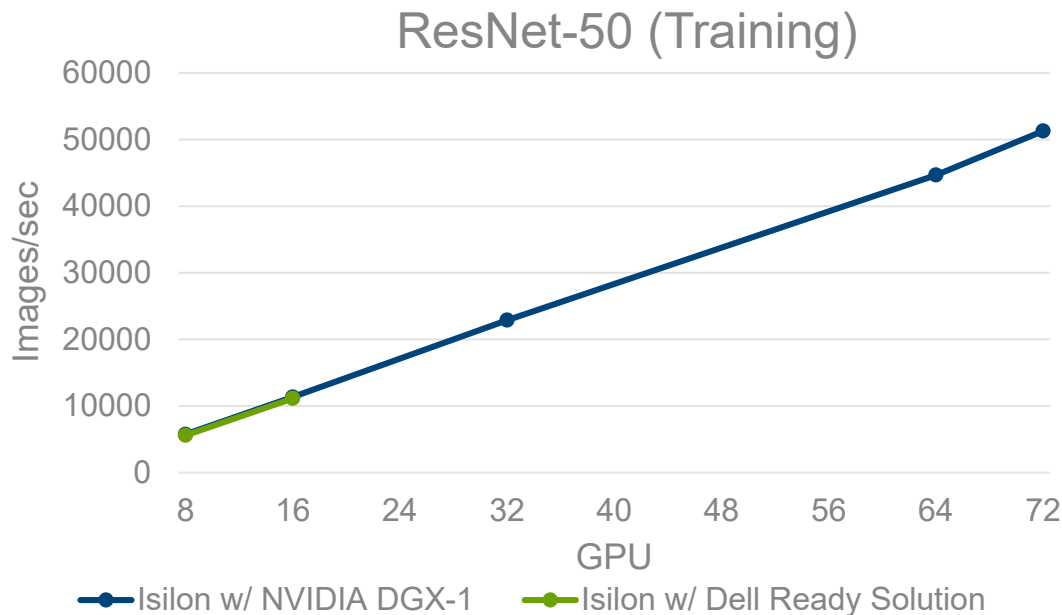


NVIDIA DGX-2

- 16 V100 GPU cards
- 10RU Chassis
- NV Switch fabric
- 8 local NVMe drives for data

Isilon Powered DL Solution Comparison

Isilon is the ideal storage complement to NVIDIA GPU AI workloads



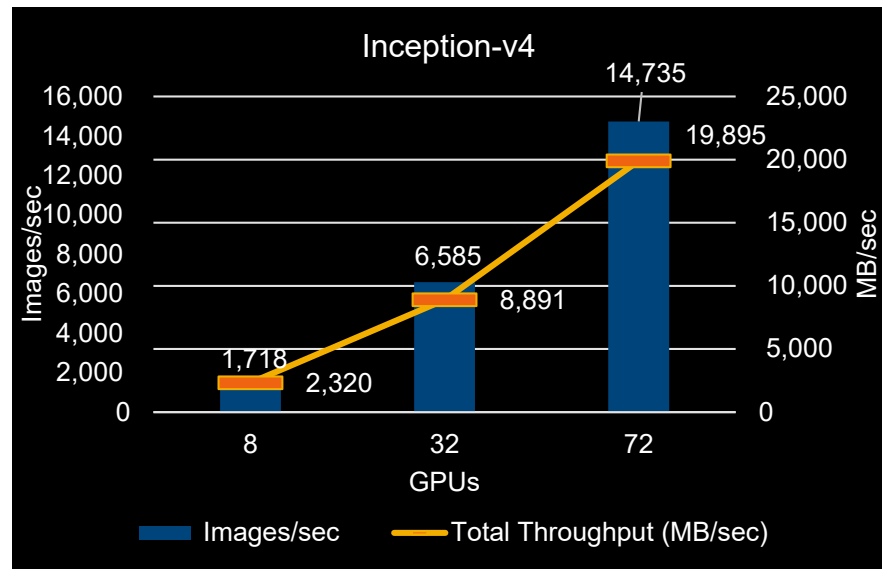
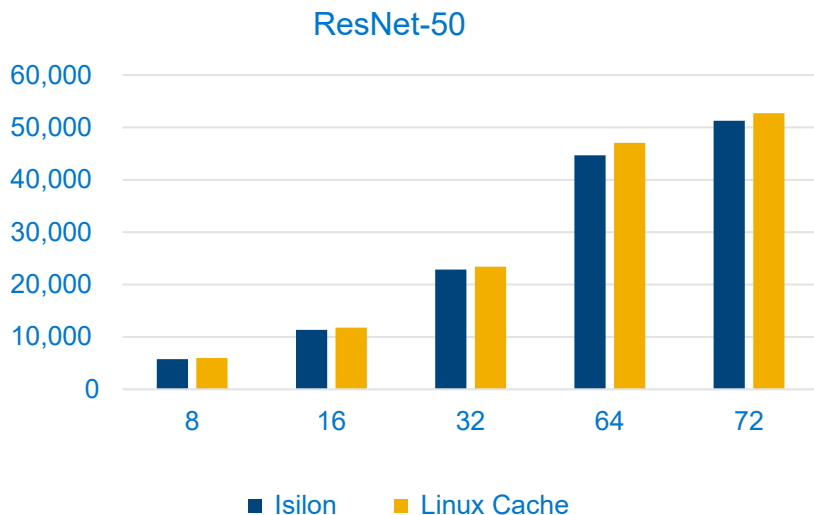
Highlights

- **Identical industry leading results** for both Isilon-based options
- **Record performance:** 96% or more of theoretical max
- **Linear Scaling:** From 8 to 72 GPUs
- **Maximum GPU ROI:** GPUs > 96% utilization



Isilon with NVIDIA GPU: Benchmark results

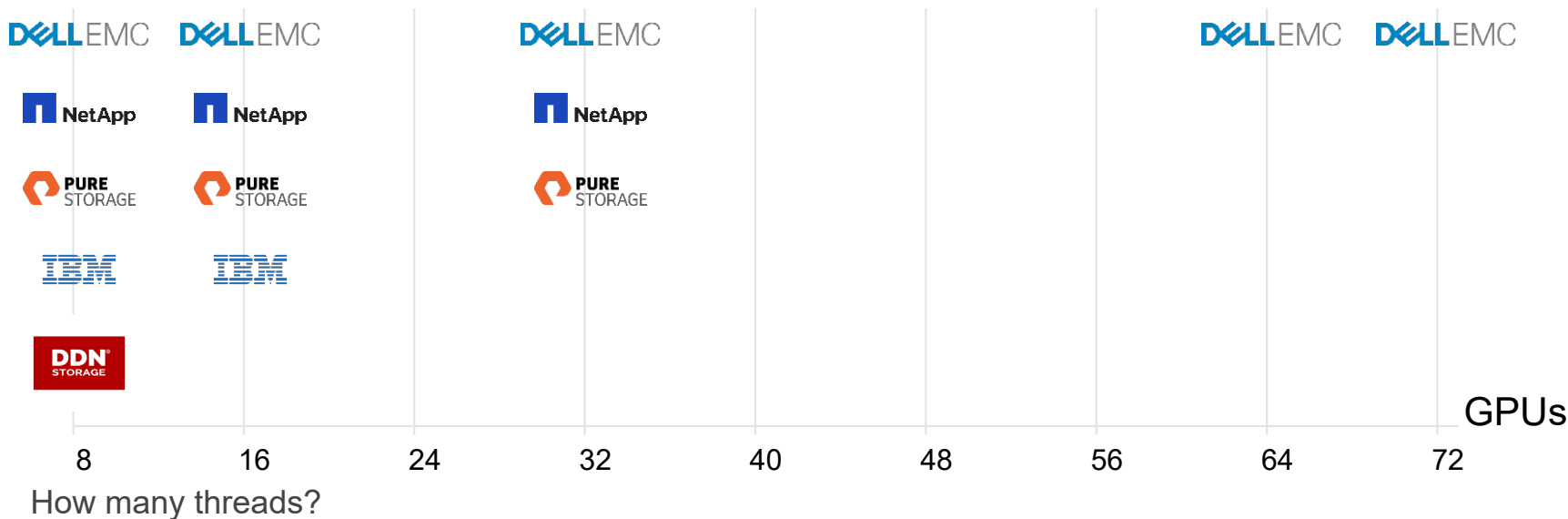
Training: Image Classification with TensorFlow and 22 TB ImageNet



- 97% GPU utilization or higher
- Linear Scaling from 8 to 32 to 72 GPUs
- Delivers up to 19.9 GB/s

Published AI Benchmarks

The true meaning of “Performance at Scale”



NVIDIA V100 GPU has 640 Tensor Cores x 72 = 46,080 parallel tasks

NVIDIA V100 GPU has 5,120 CUDA Cores x 72 = 368,640 parallel tasks

<https://blog.dell EMC.com/en-us/accelerating-ai-deep-learning-dell-emc-isilon-nvidia-gpus/>

Dell EMC powers AI innovation



Restoring a
sense of sight
to the vision
impaired



Paving the way to
a brighter
industrial future



Fighting fraud
with AI
automation

AI training ADAS / Autonomous Vehicles

GOAL: REDUCE TRAFFIC
ACCIDENTS BY UP TO 80%



Z E N U I T Y

Make it real.

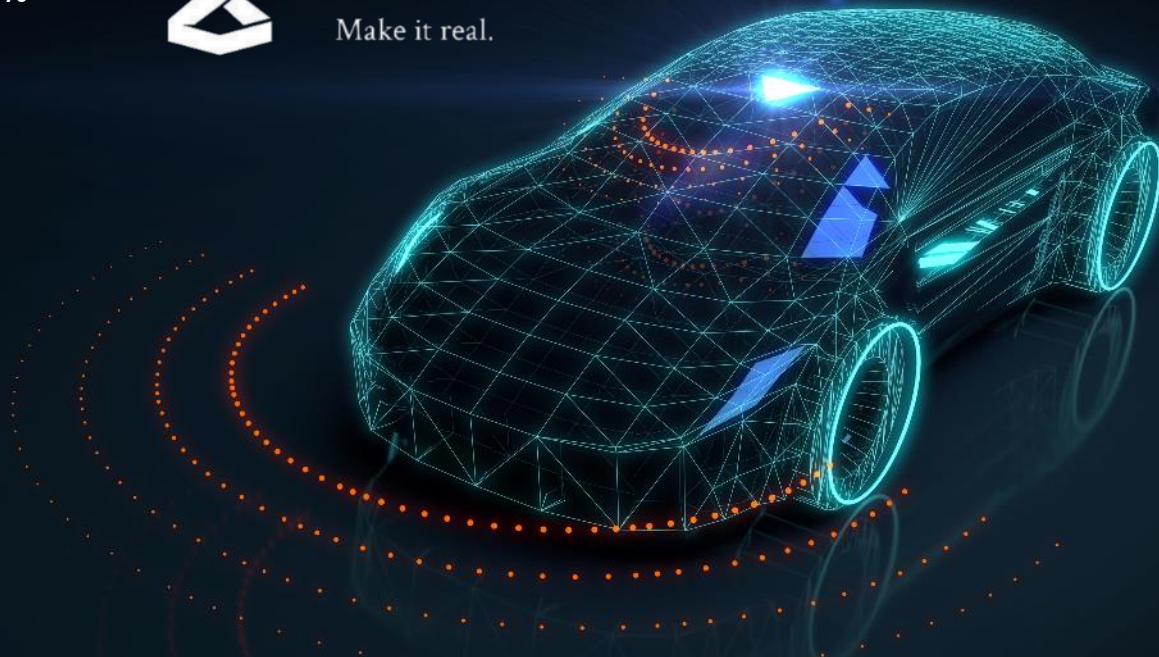
What it Takes

30 cars

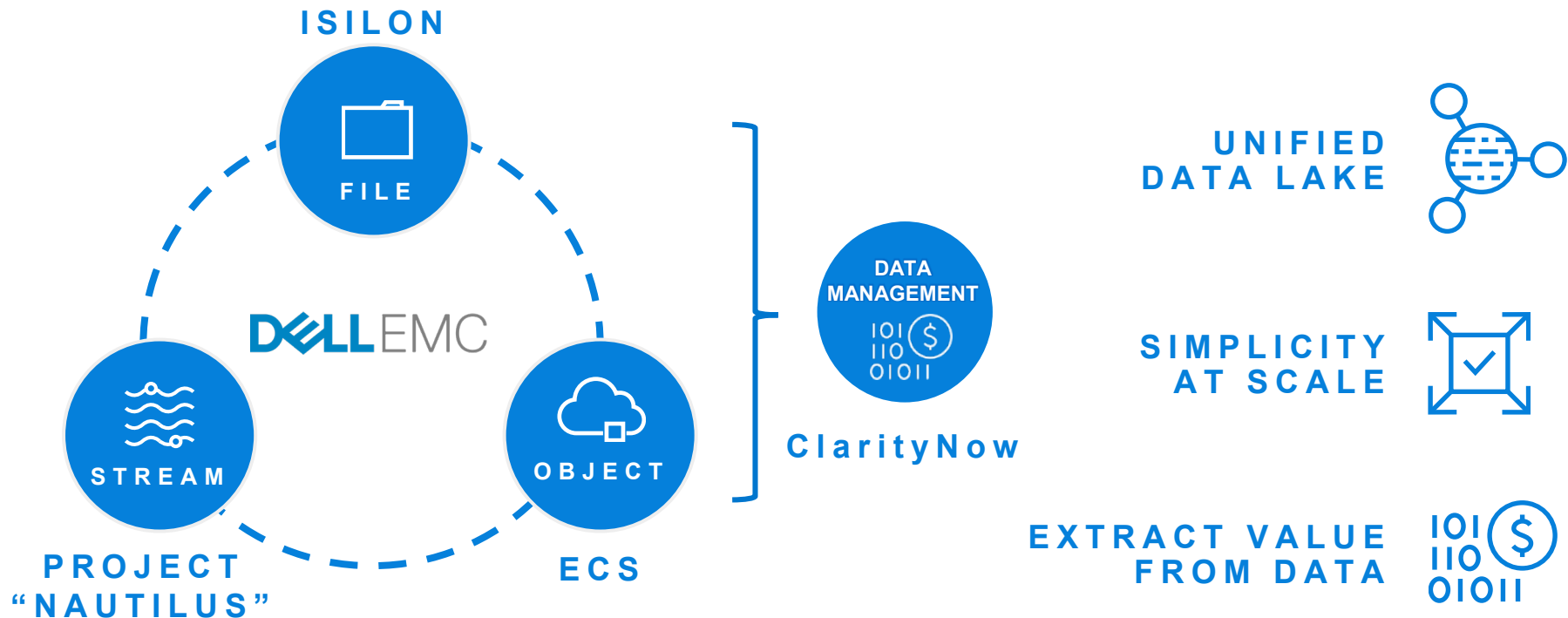


4.4PB / Month

[Play Video](#)



Dell EMC Unstructured Data Solutions Vision



The future of AI is now

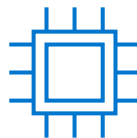
You've never had access to so much data and the power to do something with it



MORE DATA

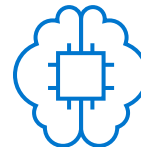
There is increased **data available to fuel AI** — with more being generated every second.

Most of this is data is unstructured in nature.



COMPUTING POWER

Multi-threaded Compute now power algorithms, processing in real time, facilitating quick identification of trends and patterns.



AI INNOVATION

We can now **train machines** to use data to sense, learn, reason, make predictions and evolve.

DELL Technologies



DELL EMC

Pivotal

RSA

Secureworks

virtustream

vmware