HOW TO BUILD A MODERN AI
FOR THE UNKNOWN IN MODERN DATA
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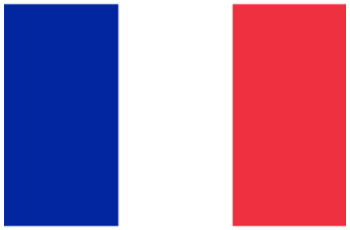
Official Languages Act (1969/1988)



Translation Bureau

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AUDIO | Online translator helps federal workers 'do their job,' say defenders

French-English translator developed by National Research Council over 10 years

CBC News Posted: Feb 04, 2018 5:14 PM ET | Last Updated: Feb 04, 2018 5:14 PM ET

Donna Achimov, the Translation Bureau's chief executive officer, says the tool is meant to help workers wade through technical documents and compose minor communications between staff, such as emails and texts, which aren't normally sent to the bureau for translation. (CBC News)

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- MP wants to reconsider launch of French-English online translator for federal workers

The federal departments behind a translation tool that has been criticized as "clumsy" are defending the software as a way for employees to gain confidence working in both official languages.

- **Online French-English translator for federal workers erodes bilingualism, MP says**

The online tool was developed by the National Research Council and will be operated by the government's Translation Bureau when it is launched for 350,000 workers across the country on April 1.

It was tested in a pilot project with 300 public servants last summer.

The tool comes as the bureau's workforce has shrunk from 2,000 to a little more than 1,300 employees over the course of five years.

Translation Bureau CEO Donna Achimov said the tool is not meant to replace human translators but to help government workers build confidence crafting short emails in both official languages.

"Over a million uses a week of Google Translate happen in government without government terminology," she told CBC Ottawa's Alan Neal on *All In A Day*.

"We're sitting on hundreds and thousands and millions of words and phrases that we've already translated. And so what we wanted to do is to provide a tool for comprehension."

The program, called Portage Statistical Machine Translation, was developed over the course of 10 years, said Joel Martin, director of research and development at the NRC's information and communications technologies division.

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Ottawa (Kanata - Orléans)	Gatineau	Petawawa	Cornwall	Kingston
20°C	20°C	18°C	n/a	19°C

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SLATOR
Language Industry Intelligence

Visibility, collaborat – all in **real-time!**

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Industry News

Woes of Canada's Translation Bureau Compounded By Minister's Response

by Marion Marking on October 28, 2016

Reactions ranged from "disappointing" and "lacking" to "insulting," "shocking" and "jaw-dropping." The Canadian government, already under fire from several quarters due to, among other things, the downsizing of the Translation Bureau's workforce, the rollout of its homegrown machine translation tool Portage, and the planned use of a vetting system that favors the lowest-bidding freelancers, is embattled once again.

The heat is specifically directed at the Department of Public Services and Procurement, which oversees the Translation Bureau. The reason, Minister Judy Foote's response to the recommendations of the House of Commons Standing Committee on Official Languages regarding the Translation Bureau, which falls under Foote's purview.

ADVERTISEMENT

Your tool for translation...

Foote, the most popular MP candidate in last year's federal elections, topping it with an 82% landslide, heads the Department of Public Services and Procurement. A Liberal, Foote was sworn into the Cabinet along with Prime Minister Justin Trudeau in November 2015. Supported by, among others, Canada's labor unions, the Liberal Party won last year's elections for the first time in nine years by a huge margin.

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DAWN OF 4TH INDUSTRIAL REVOLUTION

BIG DATA, AI DRIVING CHANGE IN EVERY INDUSTRY

1st Revolution
1760-1820's
Steam Power
Rural to Industrial

2nd Revolution
1870-1914
Electricity
Industrial to Mass Production

3rd Revolution
1980-2010
PC
Mass production to Digital

4th Revolution
2010-now
AI, Big Data & IoT
Digital to Intelligence

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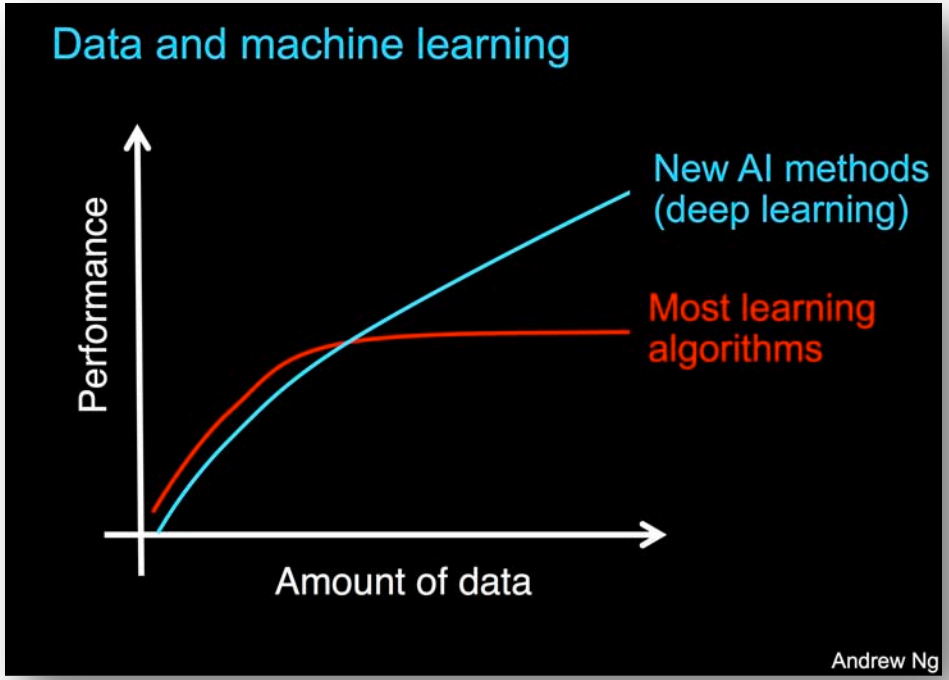
DATA IS VITAL TO MACHINE LEARNING

OBSERVATION BY PROF. ANDREW NG, AI LUMINARY



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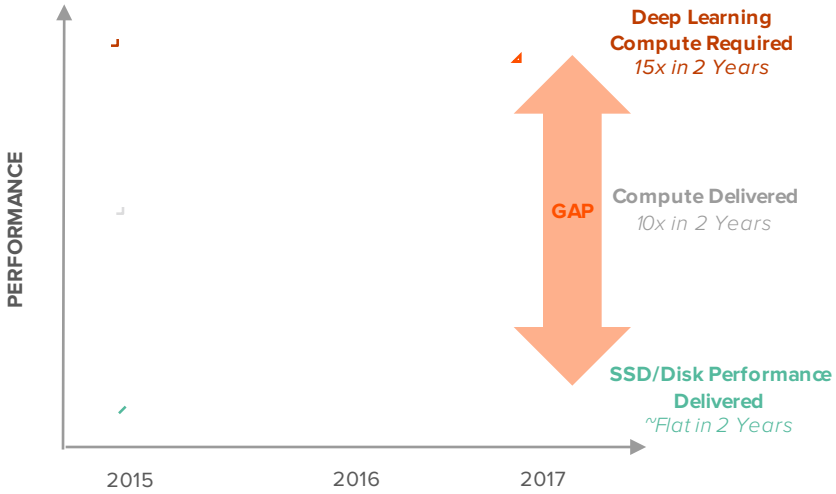
VALUABLE DATA STUCK IN NEUTRAL

LEGACY, RETROFIT STORAGE BUILT ON SERIAL TECHNOLOGIES, PERFORMANCE GAP GROWING

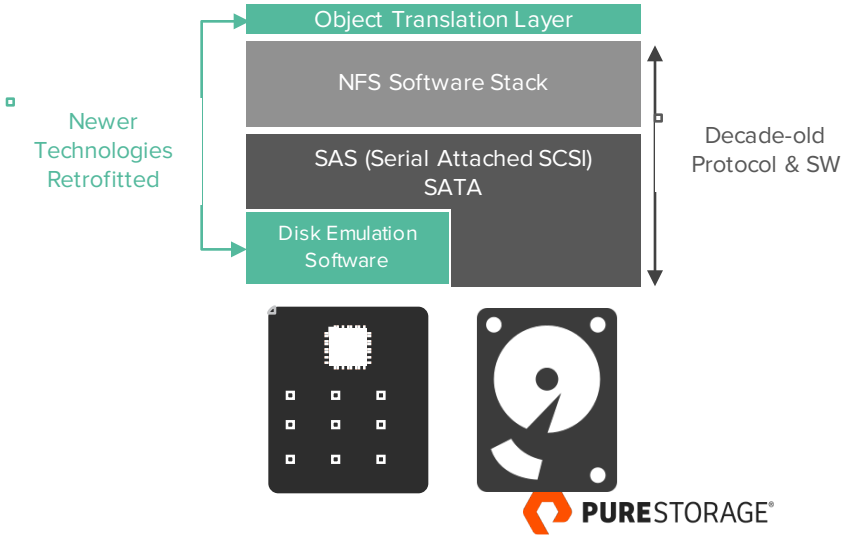
STORAGE TECHNOLOGY NOT KEEPING UP

Gap Will Only Grow Worse



LEGACY & RETROFIT STORAGE

Built on Decade-Old Serial Technology



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STORAGE FOR AI:
BOTH A TRUCK AND A RACE CAR

CAPACITY
LARGE FILES
THROUGHPUT
SEQUENTIAL ACCESS

CONCURRENCY
SMALL FILES
LATENCY
RANDOM ACCESS

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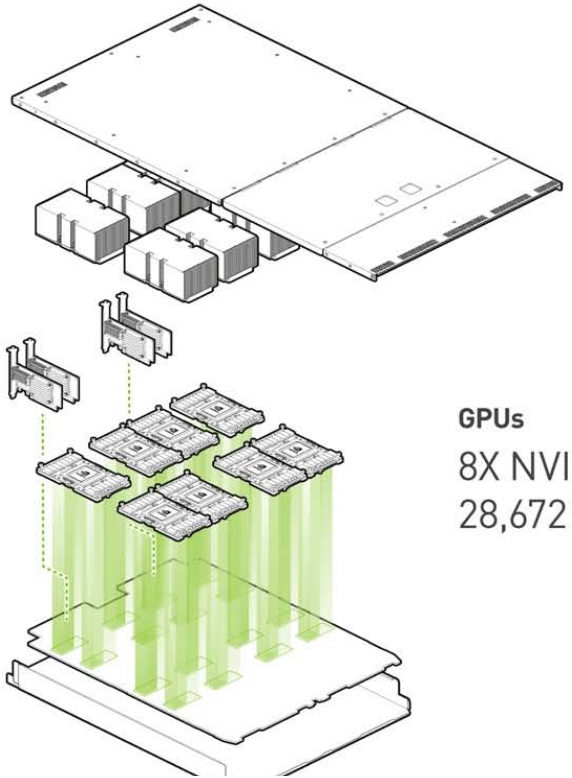
SOUL OF DGX-1 IS PARALLEL



NETWORK INTERCONNECT
4X InfiniBand™ 100 Gbps EDR
2X 10GbE

GPUs
8X NVIDIA Tesla® P100 16GB/GPU
28,672 Total NVIDIA CUDA® Cores

GPU INTERCONNECT
NVIDIA NVLink™
Hybrid Cube Mesh

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SOUL OF FLASHBLADE IS PARALLEL

POWERING 75 BLADE-SCALE IN SINGLE IP WITH PURITY FOR FLASHBLADE

Purity FB 2

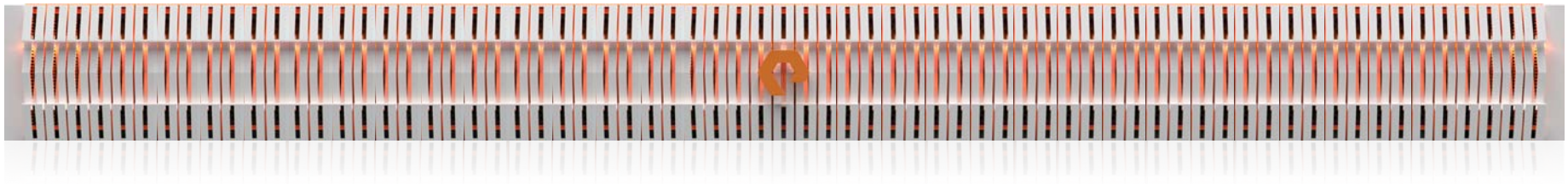
NATIVE OBJECT >_OBJECT

NATIVE NFS/SMB >_NFS >_SMB

KEY-VALUE DATABASE STORE FOR DISTRIBUTED PARTITIONS

KEY
VALUE

BILLIONS & BILLIONS OF OBJECTS



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75 blade feature is subject to GA release

THREE ESSENTIAL THINGS FOR AI

FRAMEWORKS & APPLICATIONS

Caffe2

mxnet

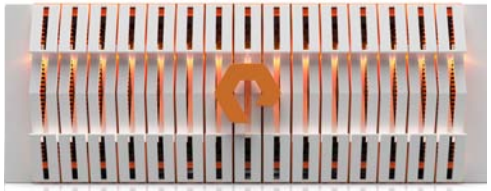
PYTORCH

TensorFlow

COMPUTE
FROM CPU TO GPU SERVERS

NVIDIA

STORAGE
POWER ENTIRE AI PIPELINE



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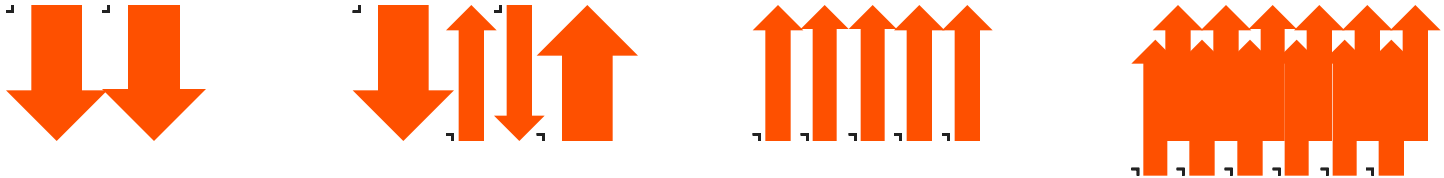
WIDE RANGE OF NEEDS IN THE PIPELINE

SIGNIFICANT CHALLENGE TO LEGACY STORAGE

INGEST	CLEAN & TRANSFORM	EXPLORE	TRAIN
From sensors, machines, & user generated	CPU Servers	GPU Server	GPU Production Cluster

IO PROFILE



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REAL WORLD PIPELINE IN AN AUTONOMOUS CAR COMPANY

INGEST

CLEAN, LABEL, RESIZE

EXPLORE

TRAIN

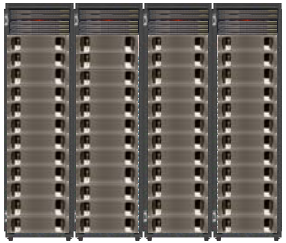
INFERENCE IN VIRTUAL WORLD

CPU Servers

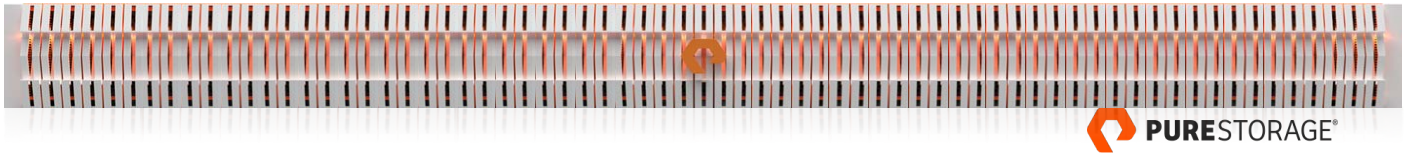
GPU Server

GPU Production Cluster

GPU Production Cluster



10'S OF PB
COLD STORAGE



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AI SYSTEMS DESIGN PATTERNS

GOAL IS TO KEEP THE GPUs 100% BUSY

FULL TRAINING WORKFLOW

BENCHMARK SETUP

Setup #1: DGX-1 with 4x Local SSDs

Setup #2: DGX-1 with 1x FlashBlade

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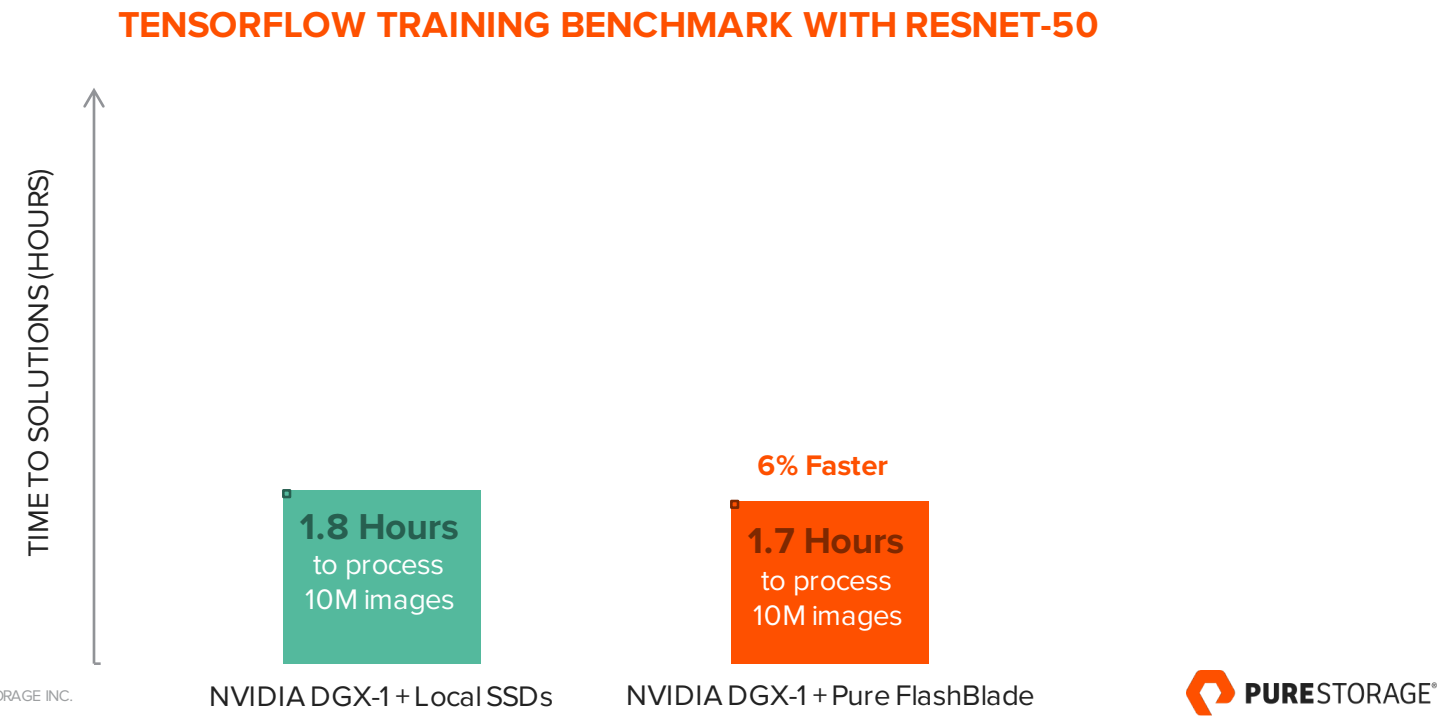
RESULT: FLASHBLADE vs LOCAL SSDs



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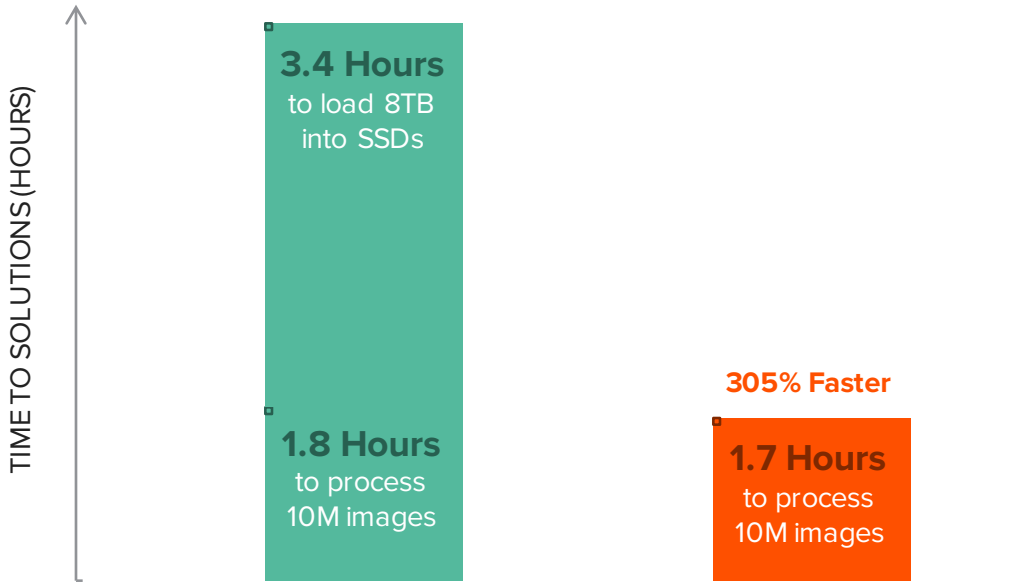
RESULT: 3X FASTER END-TO-END

TENSORFLOW TRAINING BENCHMARK WITH RESNET-50



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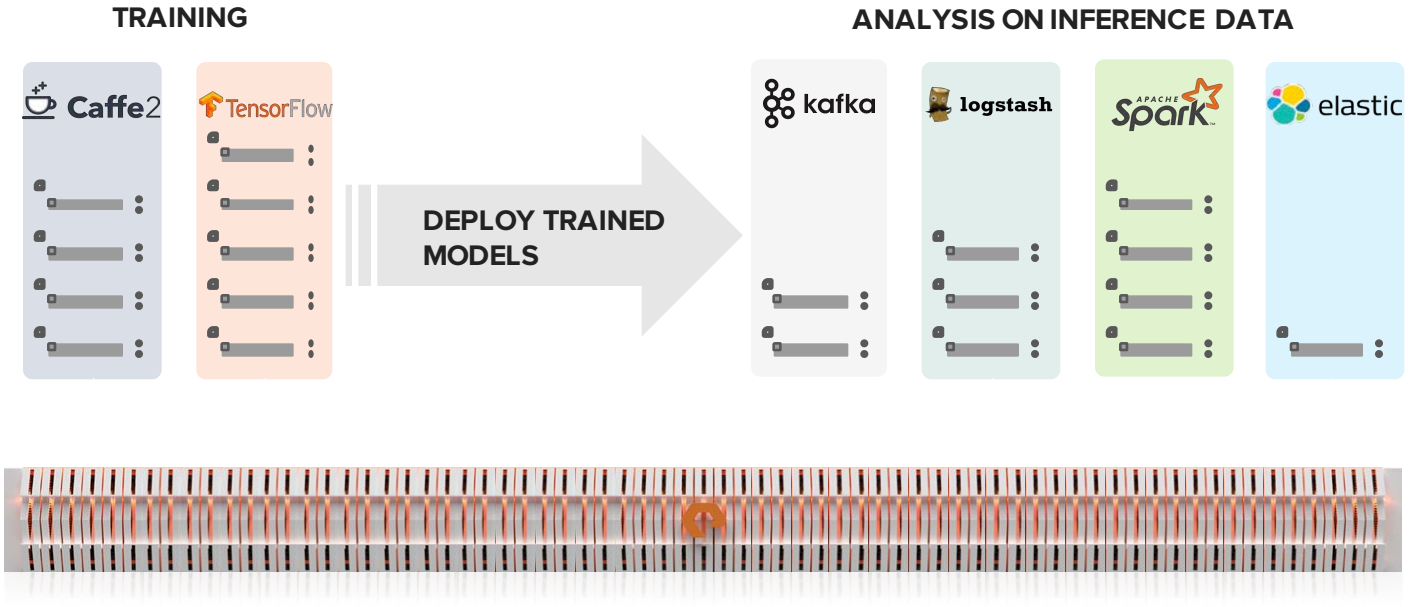
ANALYTICS FOR PRODUCTION DATA

"TUNED FOR EVERYTHING" DATA PLATFORM FOR BOTH TRAINING AND INFERENCING WORKLOADS



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ONE OF THE
WORLD'S LEADING AI
SUPERCOMPUTERS

WORLD'S FASTEST
RACE CARS

WORLD'S FASTEST
WEBSCALE DATABASE
RESTORES

WORLD'S MOST
ADVANCED PLANES,
TRAINS, AUTOMOBILES,
AND ROCKETS

Make it real.

MAKING AUTONOMOUS CARS POSSIBLE BY 2021

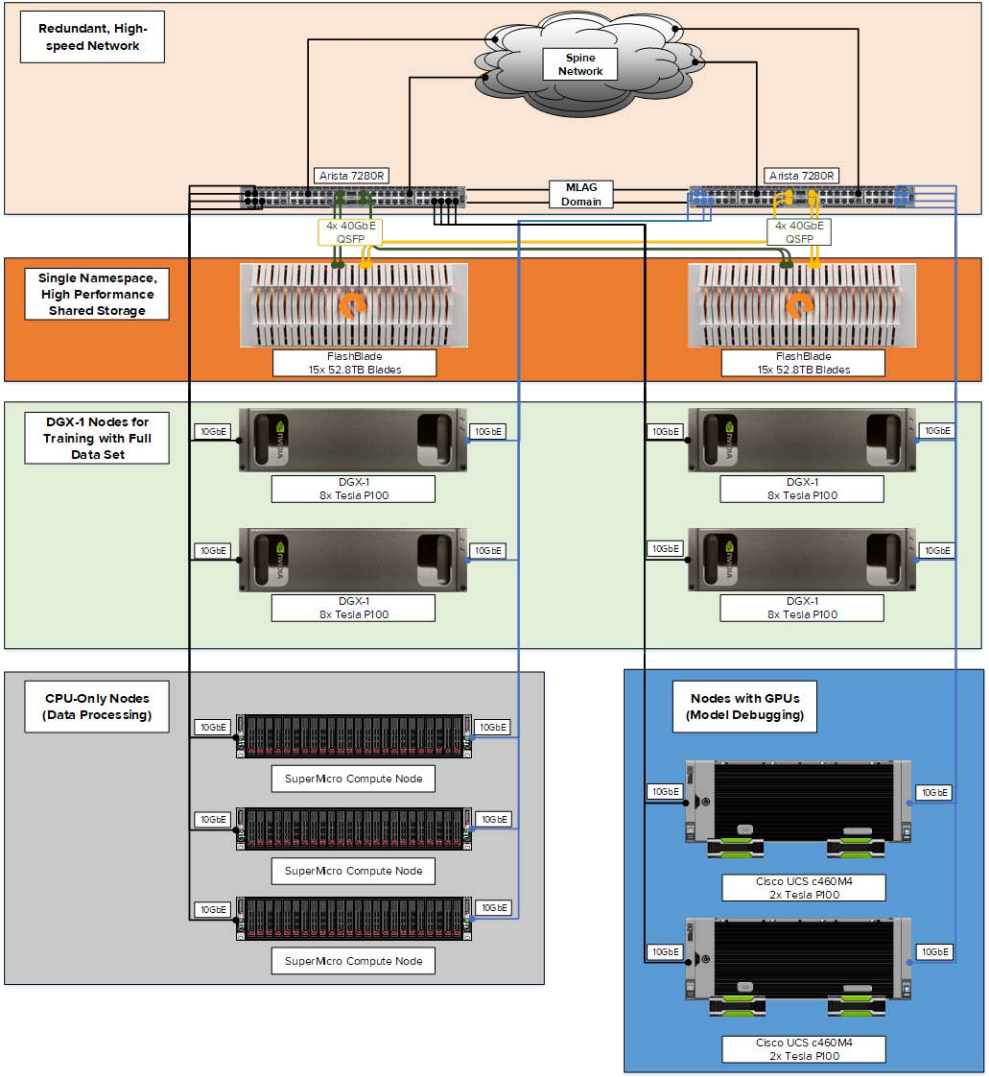
Zenuity, a joint venture of Volvo and Autoliv, aims to build autonomous driving software for production vehicles by 2021. They chose to build their deep learning infrastructure with NVIDIA DGX-1 servers and Pure FlashBlade systems to accelerate their AI initiative.

AUTONOMOUS VEHICLE SOFTWARE COMPANY

4 NVIDIA DGX-1
DL Training Cluster

2 PURE FLASHBLADE
Over 1 PB of training data w/ performance headroom

ENTIRE AI PIPELINE ON A SINGLE HUB
Preprocessing, Exploring, and Training on FlashBlade



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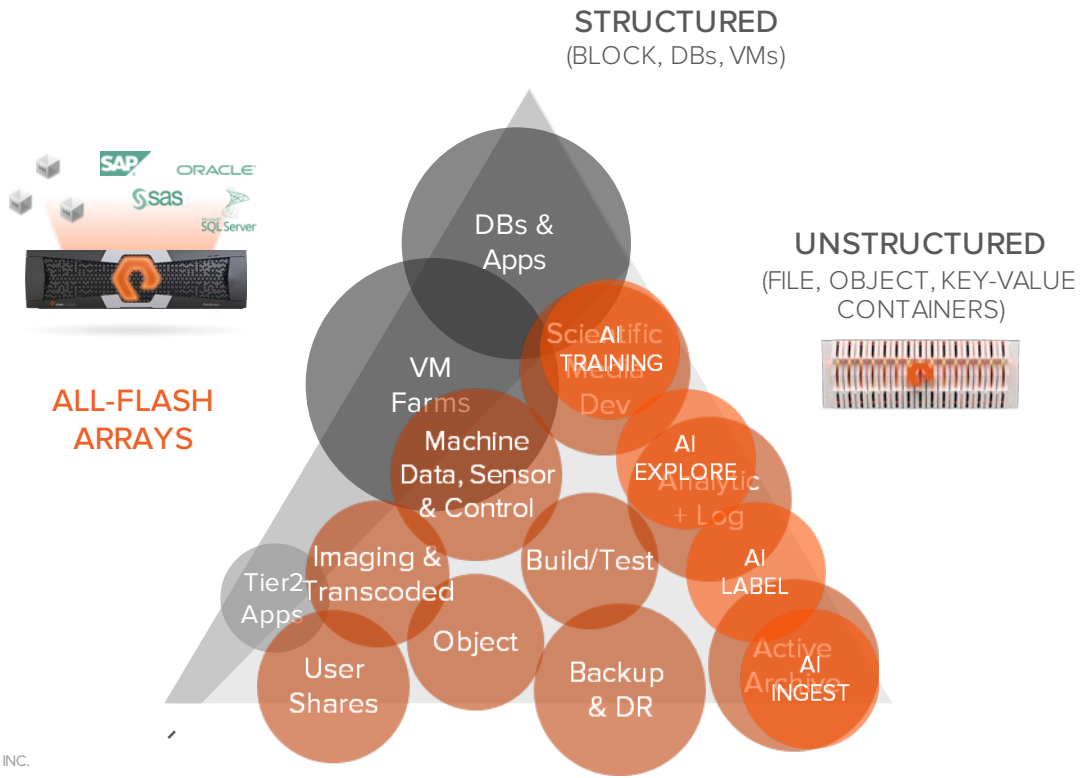
AI EXPANDED OUR VIEW OF THE WORLD



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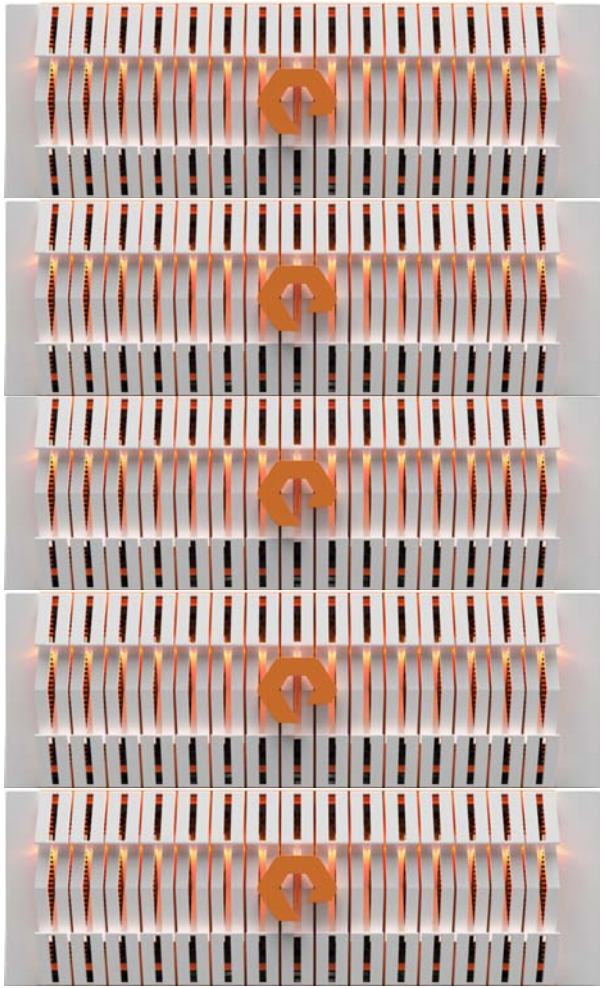

FLASHBLADE

INDUSTRY'S FIRST DATA HUB PURPOSE-BUILT FOR AI & DEEP LEARNING

BLADE

Powerful, Elastic Data Processing & Storage Unit

FB 2

PURITY

Massively Distributed Software for Limitless Scale

SCALE-OUT FABRIC

Software-defined fabric that scales linearly with more data & clients

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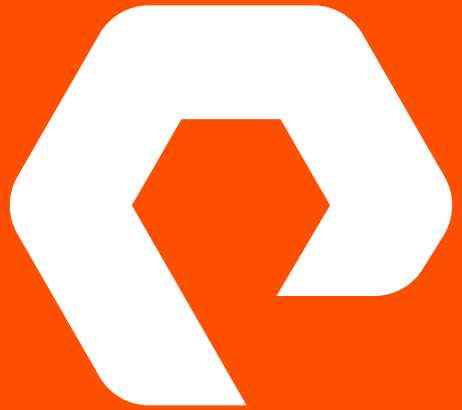
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