

# AI Everywhere with Hardware and Software Accelerators

Bridging the Gap from Data to Insights

Wei Li – VP/GM AI & Analytics



# AI from Research to Production



Data

to



Insights

# Today's AI is Complex...

## Data

Text  
Videos  
Files  
Images

87%\*

of AI concepts fail to become a reality.

Energy  
Finance  
Healthcare  
Automotive  
Retail  
Science

## Insights

Fragmented  
Solutions & Data

Lack of AI  
Expertise



Data

The background image is a photograph of the Golden Gate Bridge in San Francisco at sunset. The bridge's suspension cables and towers are visible against a sky with orange and purple hues. In the foreground, there are dark, silhouetted rocks. Overlaid on the image are several semi-transparent rectangular boxes in blue, orange, and white, along with small white and orange squares, suggesting data points or regions of interest. A vertical blue line is also present on the left side of the bridge.

Insights

We need Software and Hardware  
to bridge the gap for AI

text

docs

files

An Amsterdam City-Center  
Bridge

images

videos

audio

Data

Insights

# A unique mix of solutions

For domain-specific needs

finance

automotive

energy

healthcare

retail

science

AI World Summit 2022

intel®

# Intel AI

Democratizing AI for everyone to bring it everywhere



Data

Simplicity

Performance



Insights

# Intel AI

Democratizing AI for everyone to bring it everywhere

## Simplicity



Bring AI to your business today with  
AI Solutions



Simplify AI development with  
Toolkits and Blueprints



Boost compute performance with  
Libraries and Frameworks



Build the most suitable infrastructure with  
Rich Portfolio of Hardware

## Performance

Data

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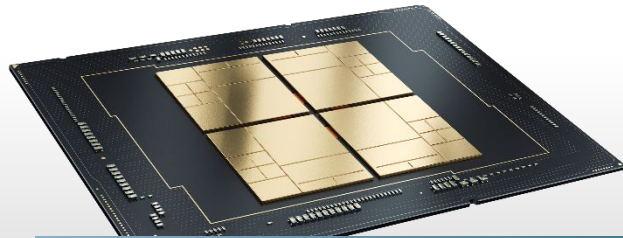
Insights

# Hardware Portfolio



## 4<sup>th</sup> Gen Intel Xeon Scalable Processor

Architected for AI



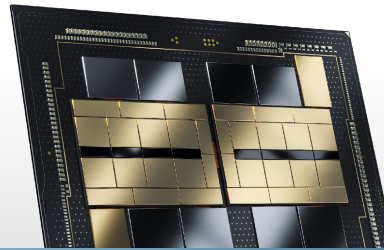
New Advanced Matrix Extensions  
Intel® AMX

Up to  
8x gen-on-gen  
compute increase



## Intel Datacenter GPU Previously codenamed "Ponte Vecchio"

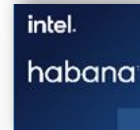
Super-Charged GPU for HPC & AI



Xe Matrix Extensions  
Intel® XMX

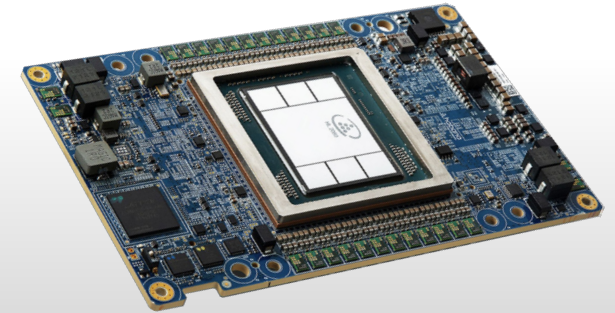
Outperforms NV A100  
Training & Inference

PVC B step @ 1.4GHz vs. A100 (80G) Resnet 50



## GAUDI<sup>2</sup>

Dedicated Deep Learning



~2X Training vs. NV A100  
BERT, ResNet 50 Throughput

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# Unlocking TensorFlow for All TensorFlow +

Increased  
Performance  
By Default on CPU



& Tensorflow 2.9

No code  
change

3x perf

Extending  
Architecture Support



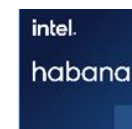
CPU



GPU

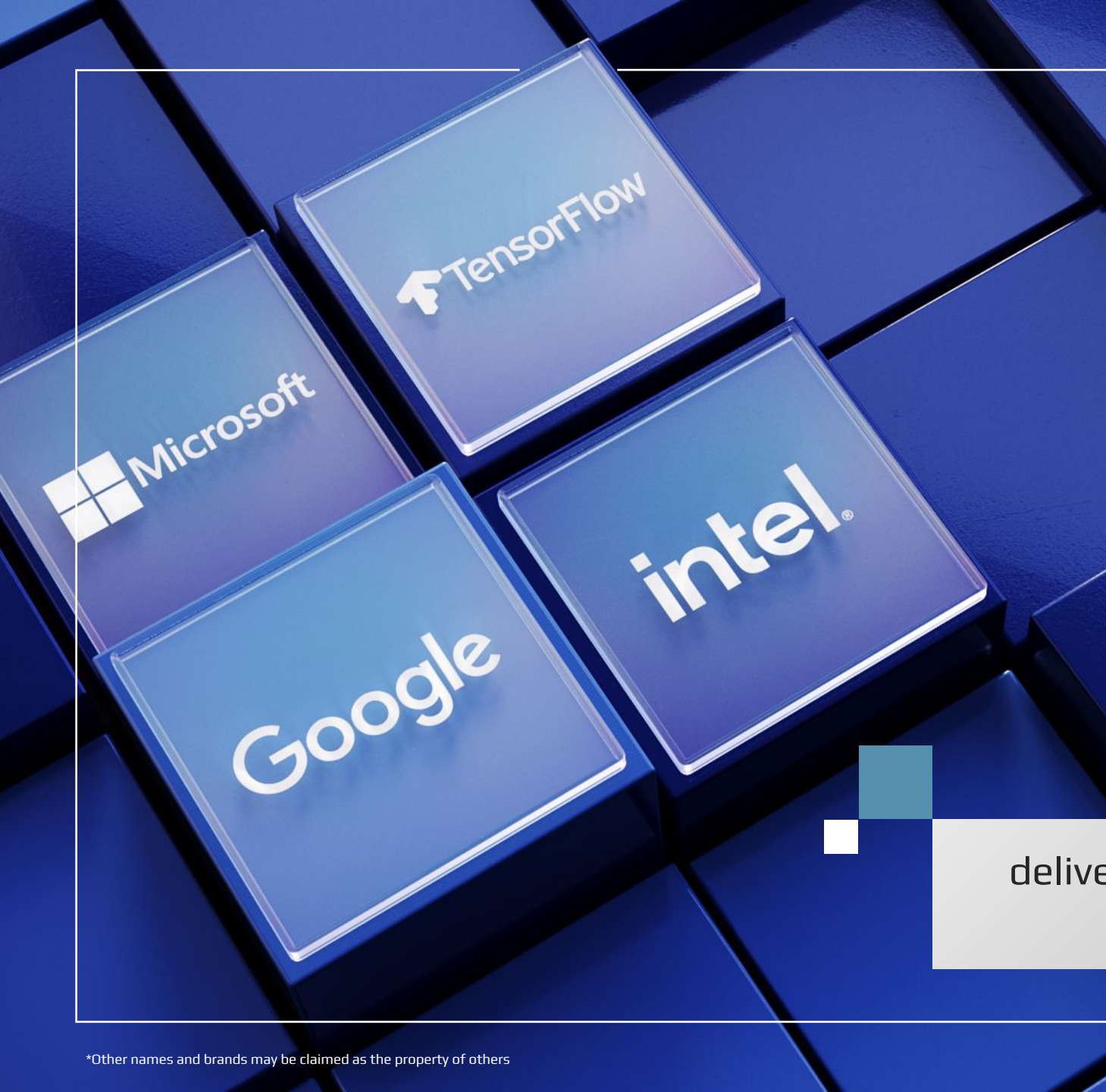


Accelerator



3<sup>rd</sup> Party \*

arm



NEW

# Intel takes ownership

of all future  
Windows builds of  
TensorFlow

delivering more AI performance to more  
devices

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End-to-End Approach

# AI Reference Kits

Open Source

Pre - Built

Enterprise Contexts

Intel-Vetted Datasets

Reducing  
Time to Model

10-100x  
Performance  
gain

## Reference Kit Library

Predictive  
Asset  
Analytics

Quality Visual  
Inspection

Intelligent  
Indexing

Customer  
Care Chatbot

NEW

Document  
Automation

NEW

Disease  
Prediction

NEW

Medical-Imag  
ing Diagnostic

NEW

Digital-Twin

NEW

Card-Fraud  
Detection

# Inside a Reference Kit...



## Disease Prediction

Create a holistic view of patient's health and predict the probability of 40+ diseases.

**Task**  
Multi-class classification to predict the prognosis probabilities from the patient symptoms

**Datasets**

4962 paragraphs in CSV format

Synthetically Generated Sentences

**Model**

ClinicalBERT with classification

**Technologies**

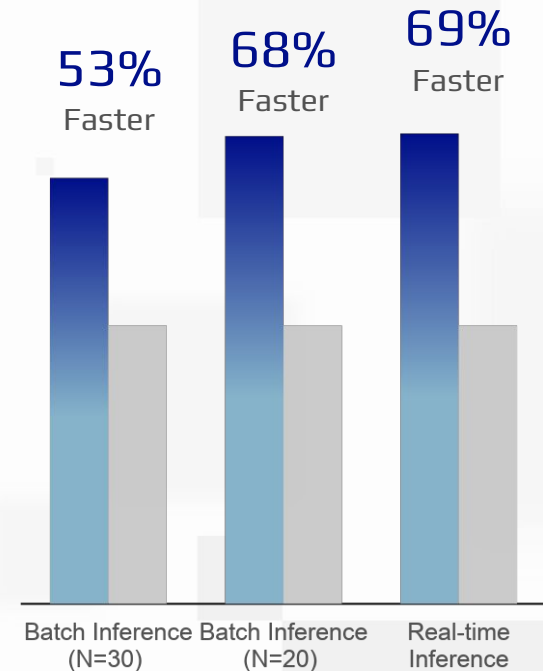
Intel Extension  
PyTorch

 **Hugging Face**

Intel® Neural Compressor

## Results

vs. non Intel-optimized code



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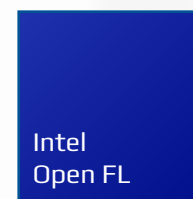
FRONTIER  
DEVELOPMENT  
LAB

# FDL with NASA is Tackling Space Exploration

## Using Intel® AI Technologies

Our partnership with Intel AI gives us access not only to the **cutting-edge hardware and software tools**, but also the **technical expertise** on a broad range of topics, including algorithm selection, data optimization, research direction, and effective ways of applying the technology.”

James Parr, Director, Frontier Development Lab



# Intel's End-to-End AI Pipeline

Simplicity

Simplicity

AI Solutions



LAIKA



Azure



abbvie



...

AI Disruptors



Intel Developer Cloud

Vertical AI



MLOps/Cnvr.io

Containers

AI Reference Kits:

Fraud Detection, Digital Twin, Document Automation

Domain Kits:

Privacy Preserving ML (PPML), RecSys, Explainable AI (XAI), Time Series ...



Intel AI Kits

Intel Neural Compressor

XGBoost



PyTorch

python

oneDNN

oneDAL



oneCCL

oneMKL

Rich Portfolio of Hardware



xe



Performance

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\* Other names and brands may be claimed as the property of others

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# ...our ambition

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with Software and Hardware



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[ai.intel.com](https://ai.intel.com)

[developer.intel.com/ai](https://developer.intel.com/ai)