

HPC-AI for Hybrid Env.

Atos-KR

Sang-moon.lee@atos.net



Atos

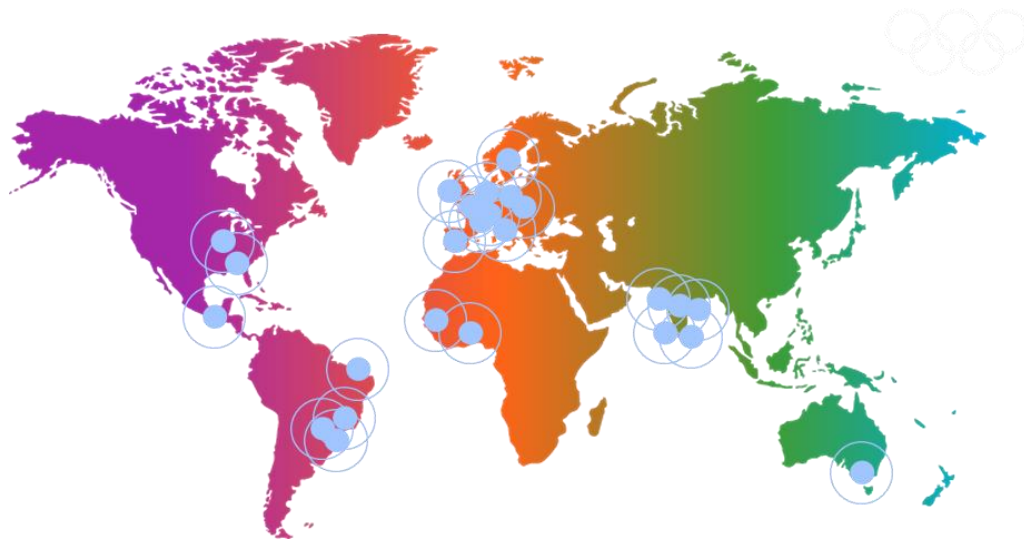
Atos HPC, AI & Quantum

Worldwide Leader with rapid growth

€11.2B
OE in 2021
(105K employee)


Present in
71 countries


TOP 5
Worldwide



#1
Ranking
in
Europe
India
Latin America

400+ Customers
700+ Experts



Atos

Atos HPC, AI & Quantum today

Worldwide Leader in HPC, AI & Quantum

#1 in Europe, #3 Globally*

Delivering major European Centers

#1 in South America & India

Delivering major supercomputers

Increasing our worldwide footprint

In APAC, South America, North America & MEA

Supplying Industrial Partners

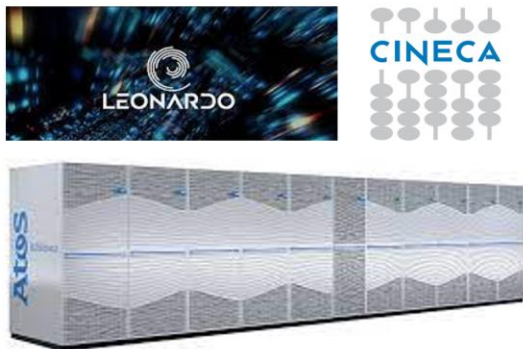
With complex and optimized solutions



*Hyperion 2022- Supercomputing market segment

EuroHPC (2021~2022)

Selected in 6 out of 8 tenders



CINECA – **Leonardo** (Italy) 320 PFlops



LuxProvide – **Meluxina** (Luxembourg) 18.7 PFlops



IZUM – **Vega** (Slovenia) 10.11 PFlops



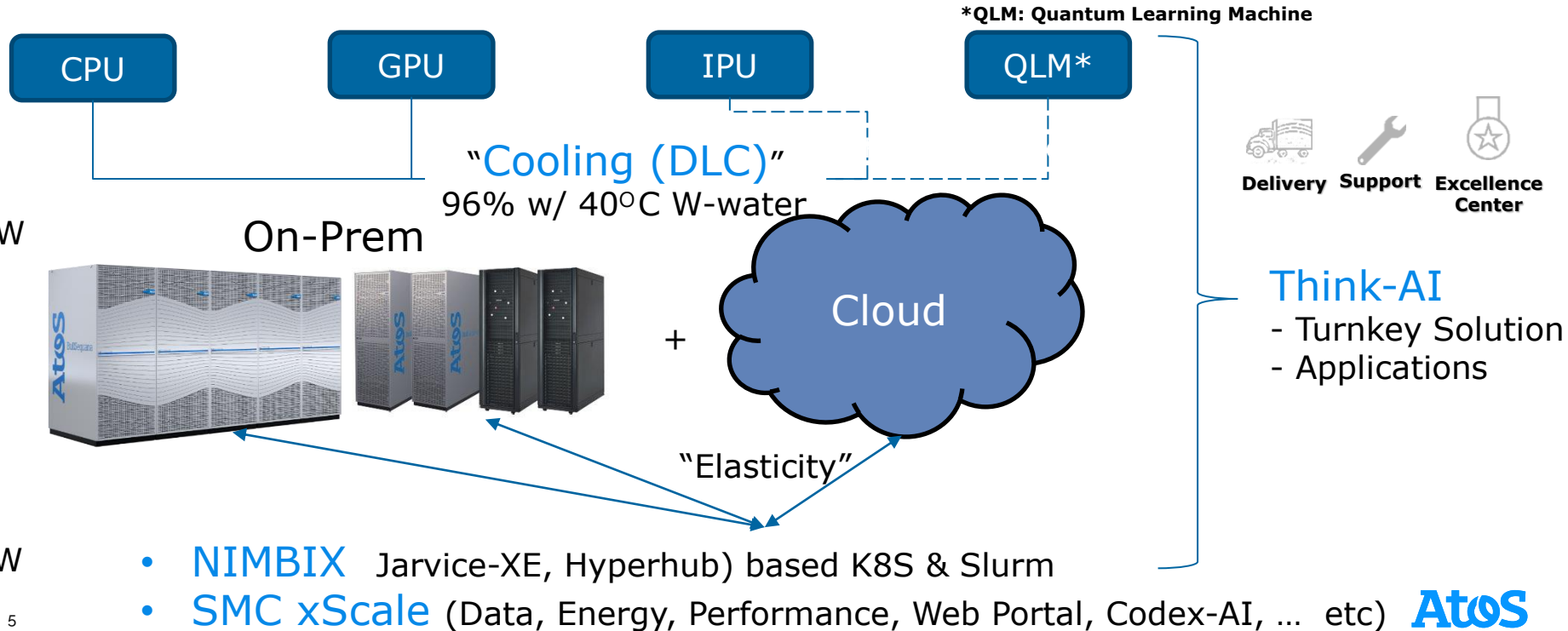
NCSA – **Discoverer** (Bulgaria) 6 PFlops



MACC – **Deucalion** (Portugal) 5 PFlops

Design & Deliver the most efficient solution

- All-in-One Rack: Assemble efficiently with Computing, Networking, and Cooling



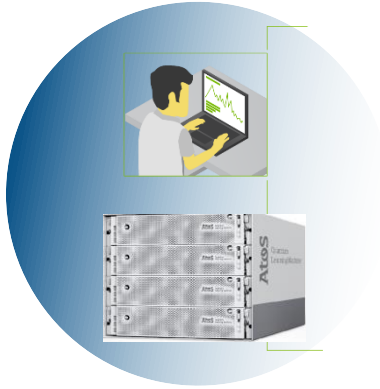
Content overview

01. Hybrid Infrastructure
Multi-clusters, Datacenters & Cloud
02. Energy Reduction (Decarbonization)
Rack w/ DLC
03. Scenario Based AI solution
04. Questions

Where HPC compute

HPC is Everywhere : from CCTV analysis to Engineering on HPC-AI cluster

Your owned Private or Public resources



Development

PC, WSTN, VDI
- CPU, QLM*



HPC Engineering

HPC Cluster
- CPU, FPGA
- GPU, IPU
- QLM

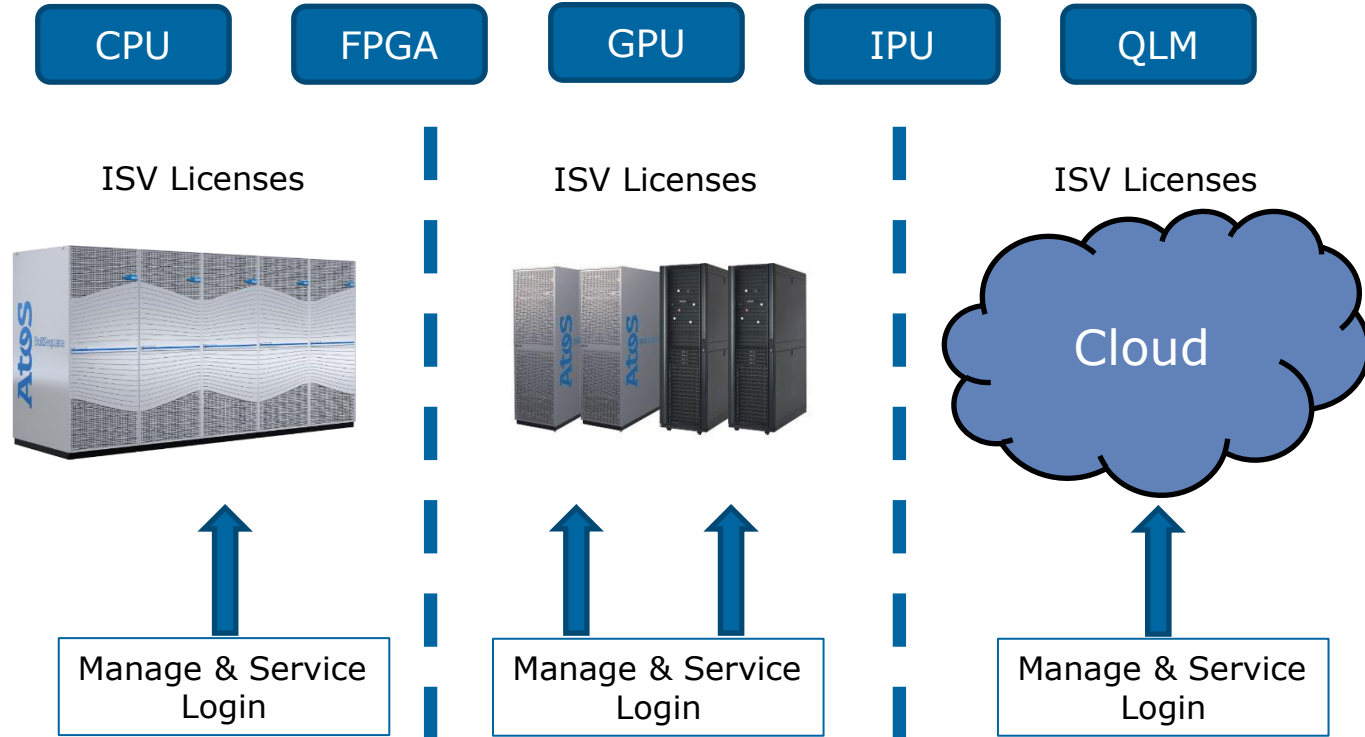


Pay-per-Use

Cloud
- CPU
- GPU, IPU
- QLM

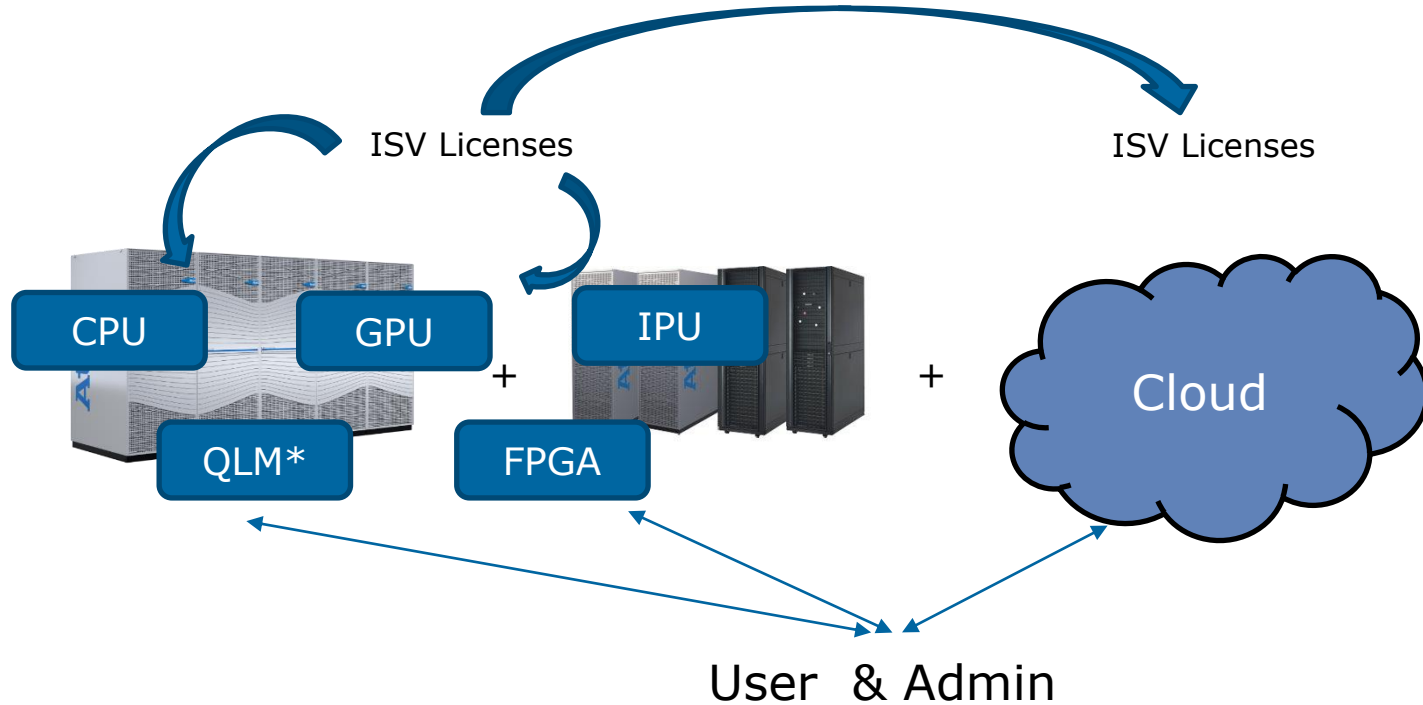
Real-Life Management

Different CPU & Accelerator Clusters



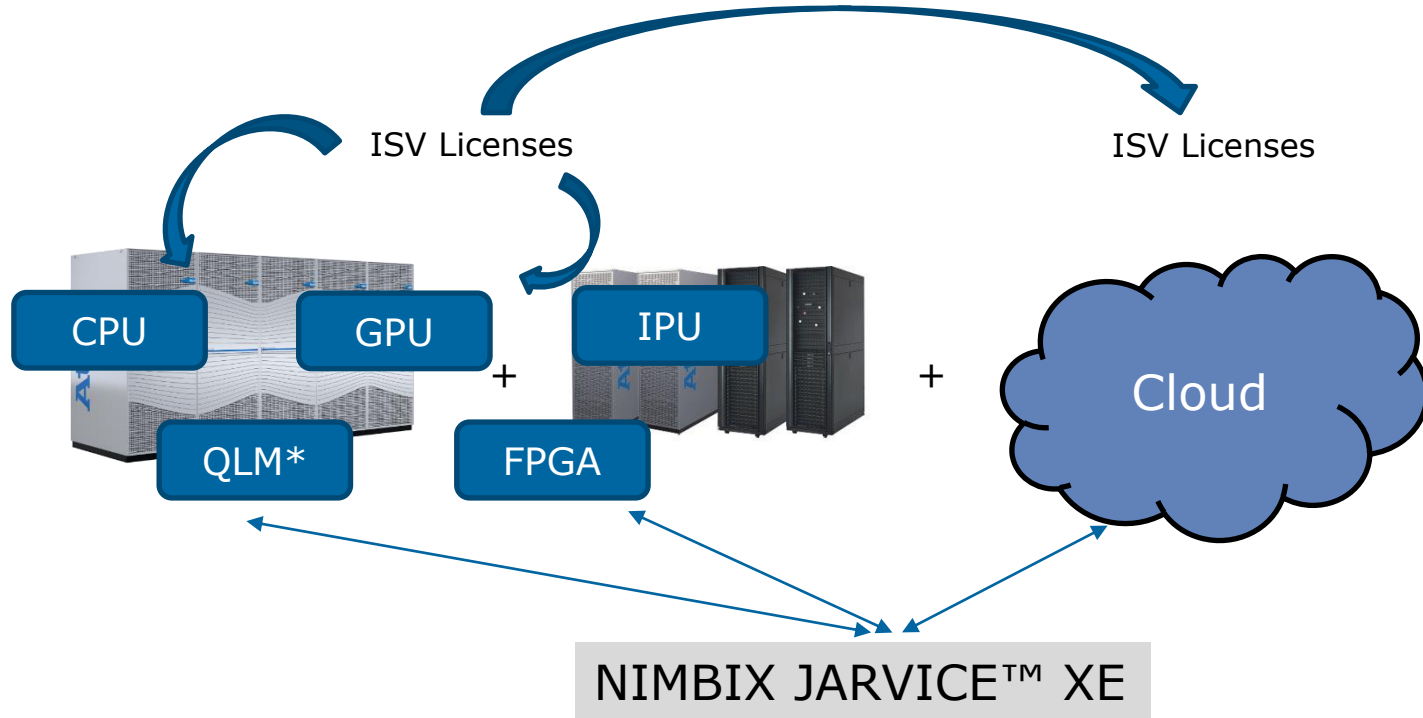
What if we can have !!!

User-friendly Env. & One place to manage



This is the solution !!!

User-friendly Env. & One place to manage



JARVICE™ XE

Hybrid computing SW solution

- Operates across multi-cloud, multi-Onprem-datacenter, and multi-compute cluster
 - ✓ Simplified Administration for HPC Admins and Enterprise IT
 - ✓ Unified SaaS Platform for HPC-AI
 - ✓ Containerized Application Distribution and Deployment
- Provides detailed information;
 - ✓ job level, application level, machine level, user-level metrics and accounting
- Work as role-based access controls;
 - ✓ Set various limits across teams, zones, clusters, machines, and application level
- Provides a cross platform UI and API for running applications and workflows
 - ✓ Support both interactive and batch
 - ✓ Simple point-click-run workflows on any infrastructure

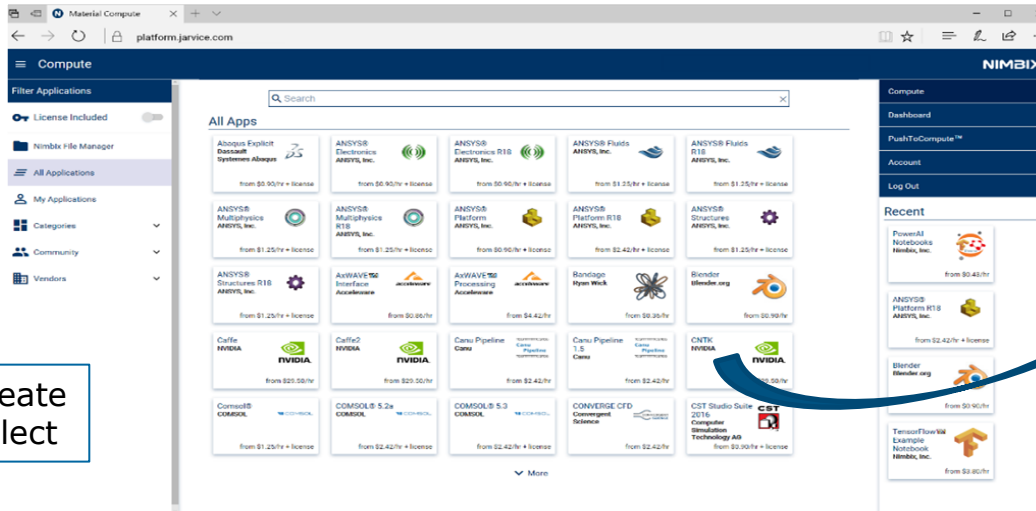
JARVICE™ XE

Focus on User computing service

- Workflow (Click-Click-Run)



- Hyper Hub (Application Catalog)

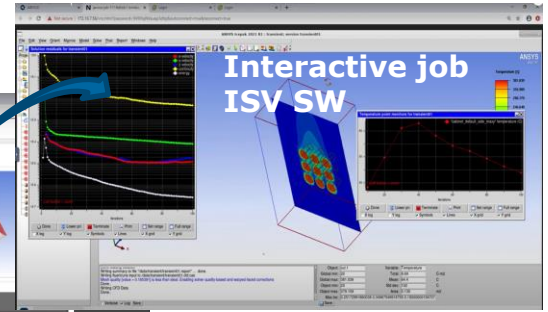
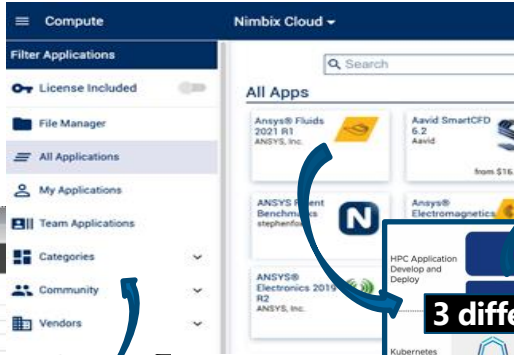
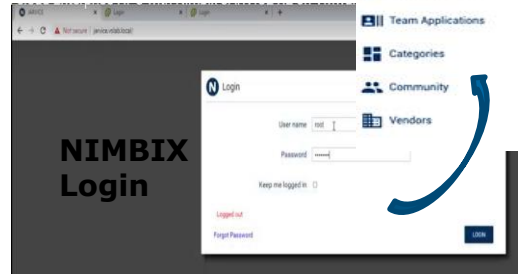


- Admin → Create
- Users → Select

- Point-and-Click
- User defined Env.
- Containerized deploy
- 3rd ISV SW supports
- Support workflows

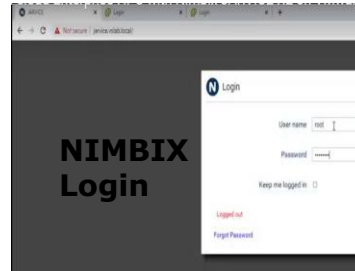
JARVICE™ XE

Job Workflow

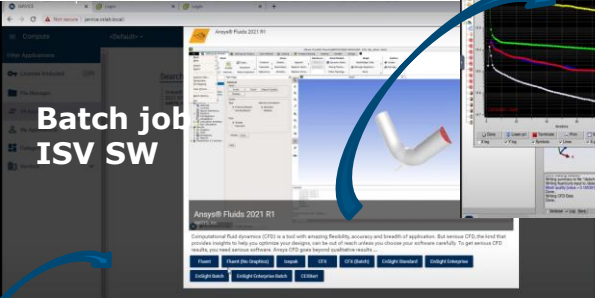
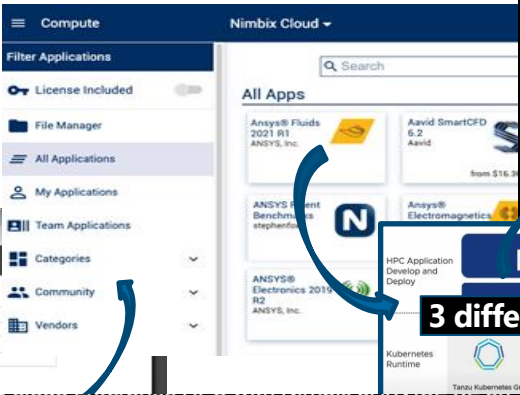


JARVICE™ XE

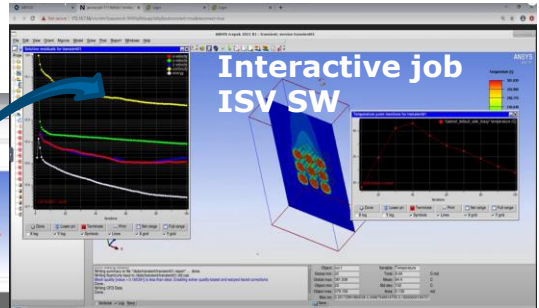
Job Workflow



NIMBIX Login



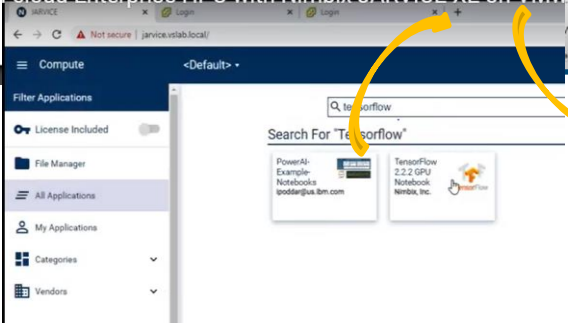
Batch job ISV SW



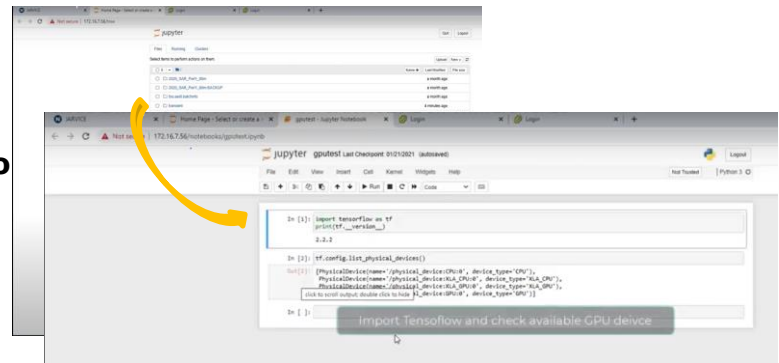
Interactive job ISV SW



3 different clusters



Jupyter notebook



Content overview

01. Hybrid Infrastructure
Multi-clusters, Datacenters & Cloud
02. Energy Reduction (Decarbonization)
Rack w/ DLC
03. Scenario Based AI solution
04. Questions

◆ Cooling #1 (Rack - Hydraulic)

96% of the dissipative HEAT is captured w/ 40° C W-water

- The primary cooling loop (customer) + internal 2nd cooling loop (Atos)
- The internal cooling loop work with 3 x Hydraulic Chassis (**2 active + 1 redundant**)
 - Temperature, pressure & leakage sensors
 - Control & Monitoring board
- Blades Units with the most appropriate components
 - Intel, AMD, ARM, NVIDIA, SiPearl

***ATOS Rack PUE < 1.02**

Scalar Compute Nodes

Acceleration Nodes

X2410
AMD  ROME / MILAN



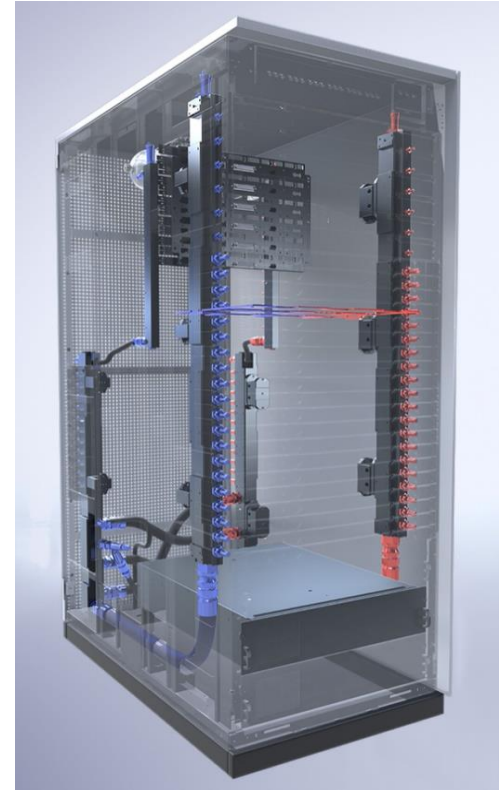
X2415
NVIDIA  AMPERE AMD 



X1120
intel  SKYLAKE / CASCADE LAKE



X1125
NVIDIA  VOLTA intel  SKYLAKE / CASCADE LAKE

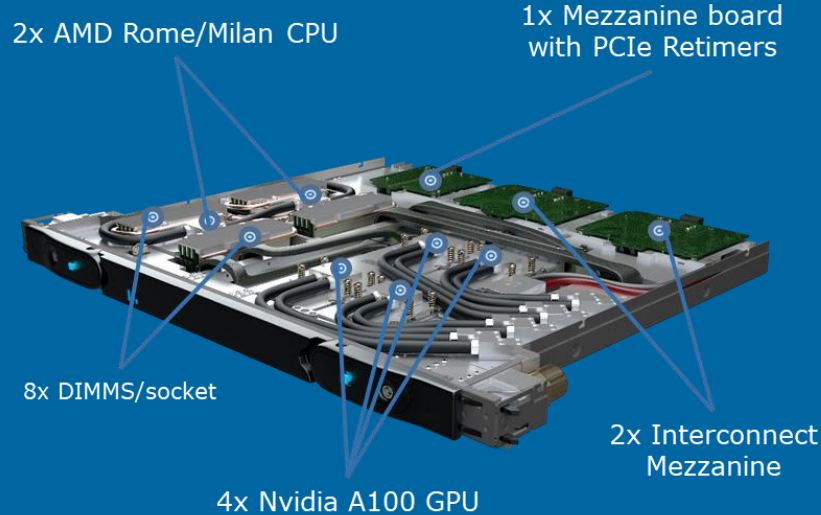


◆ Cooling #2 (Blades - DLC + Coldplate)

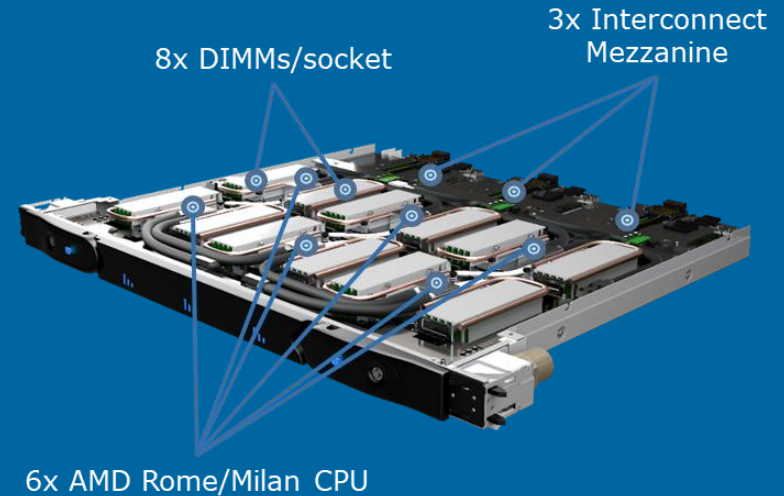
CPU (Intel, AMD, ARM), GPU (NVIDIA), Network (BXI, MLNX)

- Rear-door Cooling : IPU / QLM / DDN

X2415: HGX A100



X2410: EPYC Rome/Milan



2x Interconnect Mezzanine boards (BXI or HDR)
Optional 1x M.2 (or 1x 2.5" 7nm) SATA SSD up to 1.92TB or 1x M.2 NVMe SSD up to 3.84TB)

◆ Racking Capability (a Full Rack XH2000)

CPU / GPU / IPU

Full Racking		CPU (X2410)	GPU (X2145)	IPU (M2000)
Vender		AMD	NVIDIA (SIMD)	Graphcore (MIMD)
# of nodes		96 (2 socket)	32 (2 CPUs+Redstone)	32 (4 colossus/M2000)
# of cores		12,288 (64core/S)	128 (A100 GPUs)	128 (IPUs)
Max Mem	DDR	98.3TB	32.8TB	8TB
	Accel.		10.2TB (HBM 320GB board)	8.2TB (SRAM 115.2GB board)
Performance		481 TF (FP64)	2.5PF (FP32)	8PF (FP32)
Space		XH9000(0.9m ²), Storage (0.72m ²), Service-nodes (0.72m ²)		
Elec. Power		~89.7KW	~79.3KW	~38KW
Weight		2016 kg (DLC)	1,998 kg (DLC)	1,246 kg (wcd* 150 kg)

Content overview

01. Hybrid Infrastructure
Multi-clusters, Datacenters & Cloud
02. Energy Reduction (Decarbonization)
Rack w/ DLC & WCD
03. Scenario Based AI solution
04. Questions

Patented Scenario-Based Detection

- Configuration Interface for VISuite
- Select from 30+ Modules
- Each Module Individually Configured
- Combine Using IF/AND/OR/NOT Logic
- Full Rule Can Be Exported As Template
- 80+ Proven Templates Available
- Up to 32 Rules on 1 Camera

Abandoned Vehicle

Rule name: Abandoned Vehicle

Description:

Condition 1: Timeout 30 Sec, Func: AND

Condition 2: Timeout 30 Sec, Func: AND

Condition 3: Func: AND

Event 1: Surface 0 Sec, Func: AND

Event 2: Surface 0 Sec, Func: AND

Event 3: Surface 0 Sec, Func: AND

Proximal Exit Zone, Ground Plane

Proximal Proximity Advanced, Ground Plane

Terminated Exit Zone, Ground Plane

Abandoned Vehicle, Marked, Colour: #

Zone Settings (Advanced view)

Zone Name: Zone1

Preset ACl: Ground Plane

Function: Exits Zone

In Zone Period (Sec): 1

Stationary Period (Sec): 0

Movement Pattern: Any

Lower Speed Limit (mph): 0

Upper Speed Limit (mph): 0

Lower Average Speed Limit (mph): 0

Upper Average Speed Limit (mph): 0

Number Plate Recognition: Not Required

Zone Projection Plane: Ground Plane

Classification: Unassigned

Trigger on (Object): ALL

Object class: Any, None (Use ACl as minimum object size)

Object colour: [Color Wheel]

Statistics Functions: Counting will count each object detected and groups them by object type. Average, Min and Max operate on the object speed and height.

Count:

Max:

Average:

Zero Average:

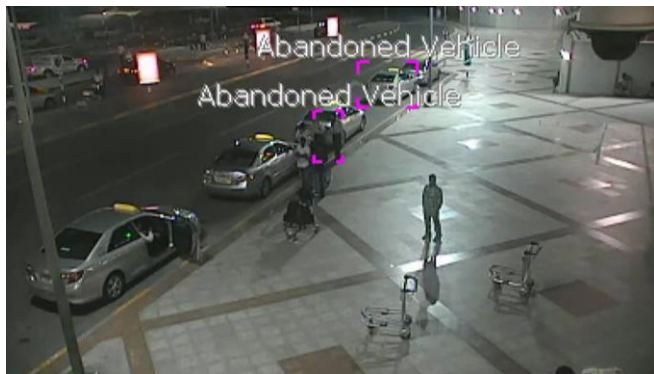
Min:

Preview Preset: The rule is not applied to any presets

VISuite Artificial Intelligence		VISuite Face Recognition	
Type	Icon	Type	Icon
In Zone	[Icon]	Proximity Zone	[Icon]
Zone Intersection Counter	[Icon]	Proximity Advanced	[Icon]
From Zone A to B	[Icon]	People Counting	[Icon]
In Zone A NOT B	[Icon]	AI Detector	[Icon]
In Zone A AND B	[Icon]	AI Counter	[Icon]
Appears In Zone	[Icon]	Change Detection	[Icon]
Disappears In Zone	[Icon]	Object Introduced	[Icon]
Enters Zone	[Icon]	Object Removed	[Icon]
Exits Zone	[Icon]	Direction of Motion	[Icon]
Travels In Zone	[Icon]	Colour Detector	[Icon]
Traversal Time and Speed	[Icon]	Overcrowding	[Icon]
No Track Zone	[Icon]	Congestion	[Icon]
Dwell Time	[Icon]	Activity	[Icon]
Proximity Detection	[Icon]	Smoke	[Icon]
		Crowd Behaviour	[Icon]

Other Functions	
Type	Icon
Auxiliary Inputs	[Icon]
No Video	[Icon]
Poor Video	[Icon]
Scene Change	[Icon]
Out of Preset	[Icon]

VISuite License Plate Recognition	
Type	Icon
Number Plate Detection	[Icon]
Number Plate Recognition	[Icon]
Average Speed	[Icon]



AIVA – Metadata Generation



Object ID	11578
Object Type	Person
Camera No	0134
Latitude	51.42062
Longitude	-0.20895
Time	1614256855
Velocity	1.3
Direction	56
Associated Objects	Backpack
Upper Body Colour	Red
Lower Body Colour	Black

Object ID	11685
Object Type	Van
Camera No	0083
Latitude	51.42032
Longitude	-0.20925
Time	1614256985
Velocity	6.7
Direction	234
Associated Objects	--
Object Colour	Red

Manufacturing Receiving & Shipping Areas

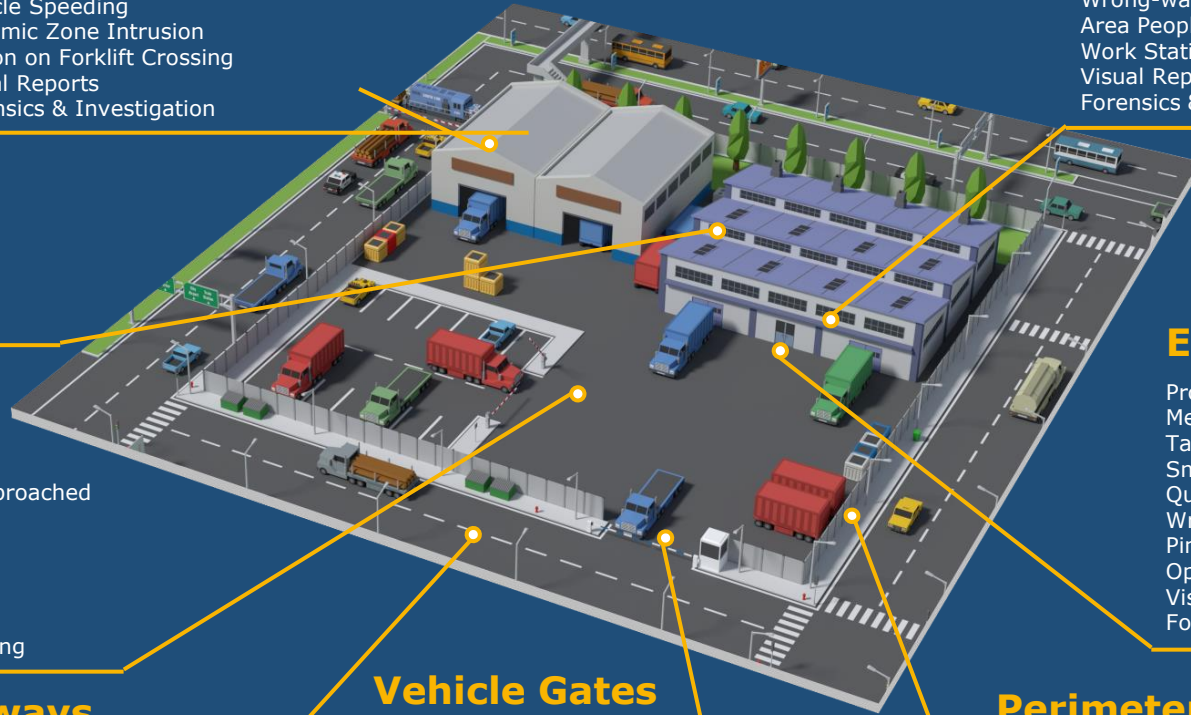
- Smoke Detection
- Vehicle Speeding
- Dynamic Zone Intrusion
- Person on Forklift Crossing
- Visual Reports
- Forensics & Investigation

Manufacturing Line

- Person in Hazard Zone
- PPE Monitoring
- Smoke Detection
- Wrong-way Detection
- Area People Counting & Location
- Work Station Activity Monitoring
- Visual Reports
- Forensics & Investigation

Breakrooms

- Proximity Detection
- Smoke Detection
- Open Area People Counting
- Activity Monitoring
- Visual Reports
- Forensics & Investigation



Vehicle Areas

- Intrusion Detection
- High Value Goods/Wagon Approached
- Smoke Detection
- Obstruction in Roadway
- Bay/Parking Occupancy
- Vehicle Speeding
- Wrong-way Detection
- Illegal Vehicle Stopping/Parking

Entrances

- Proximity Detection
- Metal Detector Bypass
- Tailgating Detection
- Smoke Detection
- Queue Management
- Wrong-way Detection
- Pinch-Point People Counting
- Open Area People Counting
- Visual Reports
- Forensics & Investigation

Roadways

- Vehicle Intrusion
- Congestion Detection
- Wrong-way Detection
- Illegal Vehicle Stopping

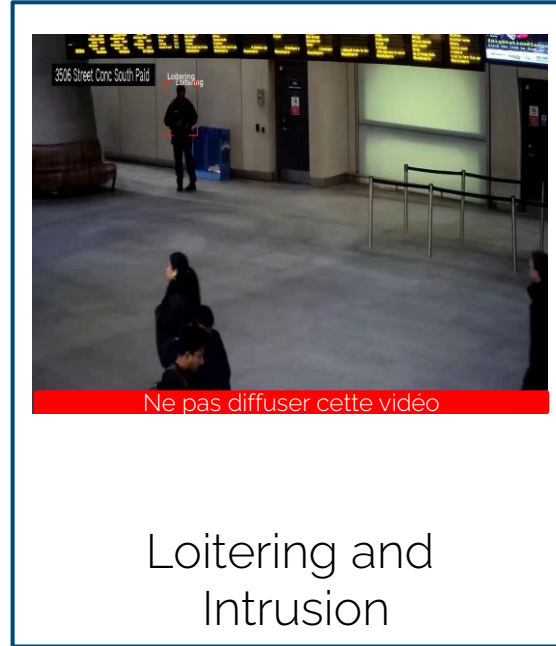
Vehicle Gates

- ANPR Vehicle Arrival Alerts
- ANPR Forensic Search
- ANPR Time In Area
- Vehicle Counting/Type Reports
- Vehicle Speeding
- Wrong-way Detection

Perimeter

- Intrusion Detection
- Dynamic Zone Security
- Perimeter Protection
- PTZ Tracking

Use cases « Search, Intrusion, Emergency, »

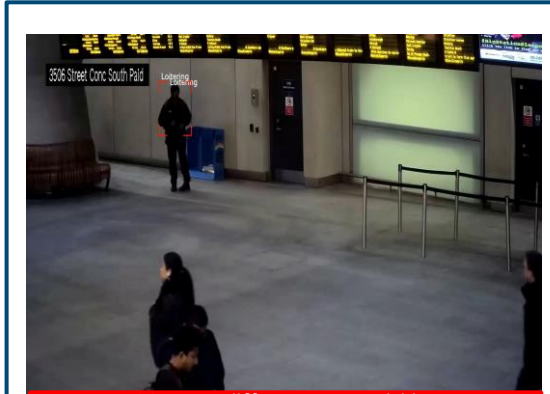


→ Searching, Intrusion, and Emergency

Use cases « Alert Detection »



Emergency Person
(Falling)



Loitering and
Intrusion



Smoke Detection
(Fire)

→ Observe (Yellow), Decide (Red), and Notify (Call, SNS)

Ipsotek Experience

TRANSPORTATION

CITY SURVEILLANCE

PUBLIC SPACES



CRITICAL INFRASTRUCTURE

COMMERCIAL

GOVERNMENT **Atos**

Summary

Toward an Exascale with Energy Efficient Computing

- SW → Hybrid computing solutions

- ✓ JARVICE™ XE

: Compute across multi-Cluster, /-Datacenter, /-Cloud Env.

- HW → Energy saving Servers and Rack

- ✓ DLC (Direct Liquid Cooling)

: PUE < 1.02, Best full-packed Rack (DLC)

- Application → Scenario Based AI solutions

- ✓ Video Analytics

Thank you!

For more information please contact:
sang-moon.lee@atos.net

Atos, the Atos logo, Atos|Syntel are registered trademarks of the Atos group.
June 2021. © 2021 Atos. Confidential information owned by Atos, to be used by the recipient only. This document, or any part of it, may not be reproduced, copied, circulated and/or distributed nor quoted without prior written approval from Atos.

