BDS Edge computing offering

Introduction to edge computing & Atos value proposition

Atos

Big Data Revolution : Analytics and AI Everywhere

Critical Apps data is moving to the Cloud

by 2023, up to 30% of Business Critical Applications will be hosted in Public Cloud vs. less than 10% today*

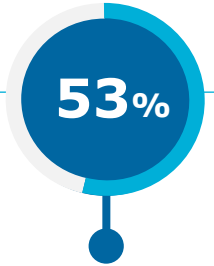
by 2025, up to 90% of enterprise-generated data will be produced and processed outside traditional data centers or a single centralized cloud*

IoT Data is moving to the Edge

AI Is Everywhere

by 2022, 20% of new industrial control systems will include AI-edge inference capabilities, up from less than 5% in 2020*

in 2020, only 53% of Enterprise AI proof of concepts were turned into production*

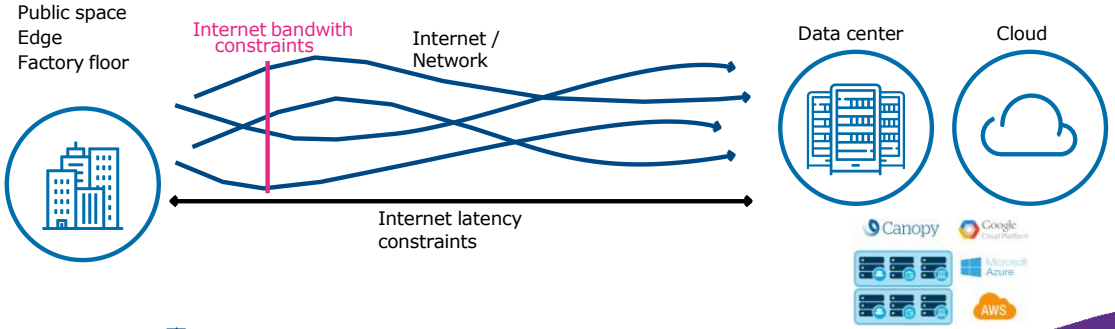


AI needs Industrialisation

* Gartner

Edge computing : facing the challenge of the data wave

Installing bigger pipes through the oceans or underground won't enable to handle the internet bandwidth produced because of the 5 reasons below.



1. Increasing the bandwidth

- a significant cost impact
- issue with the availability of high bandwidth connections in certain geographical regions

2. The latency constraints

Caused by :

- the electrical signal travel time
- the number of routing hops an IP packet needs to take in order to reach its destination.

3. Guaranteeing data privacy and compliancy with GDPR

Data transport and storage in a remote cloud risks spy, manipulation and violation of data privacy.

4. Internet connectivity

Network may experience unplanned outages in critical areas.

5.Recurrent cost

Complex AI solutions such as neural network-based video/image analytics require considerable GPU capacity to perform inference on cameras with high framerates or/and high resolutions.

Edge computing : facing the challenge of the data wave

The five pillars

Latency

Data is analyzed at its source, which enables the lowest latency possible.

Bandwidth

Only pre-processed data is sent to cloud or datacenter for mid- term analysis. It allows to maintain costs whatever the data amount.

Security and privacy

Critical data is kept at the data source which reduces vulnerability breaches or hacking.

Autonomy

Edge computing servers works autonomously even without any network and in critical environment.

Maintained cost

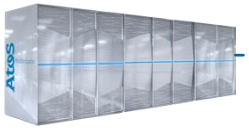
Whatever the data volume and complexity, the TCO is maintained.

Edge AI solutions transform IoT data into business insights

Connect securely Any Device Anywhere from Cloud to Edge

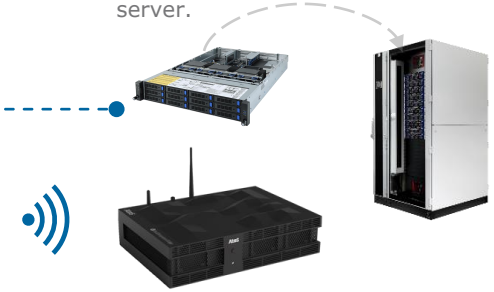
Core & Cloud

Connect and extend your capabilities to your new and existing applications in the data center and/or cloud.



Edge

High-end AI and machine learning capability, powered by the world's highest performing Edge Computing server.



Nano edge

Plug & play edge computing server allows connection to any analog or digital device with embedded OT security and local processing.

IoT/edge devices

OUR MAIN USE CASES

- Computer vision
- Predictions & anomaly detection

Edge computing
Portfolio overview

Business drivers

Edge computing Solutions

- AI PoC to Industrial Deployment
- Specialized in Predictive Analytics
- Specialized in Computer Vision
- Responsible AI
- Cloud to Edge infrastructure

Use cases

Video Analytics
Computer vision

Predictive Data
Analytics

Software

Atos Codex AI Vision

Partner solutions

IPSOTEK anyVision CLOUDERA

Platforms

Codex Datalake Engine

Ecosystems

vmware Azure IoT aws Anthos OPENSHIFT

Hardware

BullSequana SA

BullSequana Edge

BullSequana Edge nano

Partners

intel RITTAL NVIDIA AMD

Services

Strategy
Consulting
Data Science
Integration
ML-Ops
Managed Edge

HARDWARE

Full range of edge computing servers from edge datacenter/cloud to far edge

Hybrid infrastructure as the new normal

Management

Plug & play solutions

Edge Datacenter & Cloud

BullSequana SA

AI Training/Inference

Edge Datacenter & Edge Cloud for AI Training & Inference. It is optimal in case of large existing camera infrastructure. Datacenter infrastructure required.

Edge → Far Edge

BullSequana Edge

AI Inference outside the datacenter

This server delivers powerful AI Inference and data processing up to 20 cameras per server. It performs far edge fleet processing & management in case of complex models. It can be deployed outdoor in a shelter and indoor.

BullSequana Edge nano

AI Inference rugged

This is a plug & play server for computer vision & predictive analytic purposes. It can be deployed anywhere in a few minutes thanks to its direct camera plug option & ruggedized design and can support up to 2 cameras. It delivers real time inference thanks to its Nvidia Jetson GPU.

Edge computing hardware portfolio

Management

Plug & play solutions

Edge DC / Edge Cloud | Near Edge | Far edge

AI Training/Inference

Q2

- Ideal for centralized inference (smart city…) & AI training
- Edge Data container offer in co-operation with Rittal
- Up to 3 x A100 GPUs on BullSequana SA20G
- Up to 8 x A100 GPUs on BullSequana X410
- Up to 5000 TOPS

AI Inference

- Install anywhere
- Advanced security
- Powerful CPU / mem
- Powerful Edge inference with 2x Nvidia T4
- Up to 260 TOPS

AI inference in a rugged server

Q2

Nvidia Jetson

- Fanless rugged devices
- Extended temperature
- ARM and CUDA cores
- Up to 21 TOPS

Powerful, flexible and Ultra-scalable range

BullSequana Edge nano
Plug & Play computer vision & predictive analytics

BullSequana Edge
AI Inference
Far edge fleet management

BullSequana X400
AI Inference & Training
GPU and high storage capacity



Cliquez pour ajouter du texte

Spec	1 CPUs ARM	1 CPUs Intel	2 CPUs AMD	4 CPUs AMD
Cameras*	Up to 2 cameras	Up to 50 cameras	Up to 250 cameras	Up to 500 cameras
GPU	Embedded	1-2 (T4)	1-3 (A100)	4-6 (A100)
Disks	1	Up to 2	Up to 12	Up to 24

Depending on the location of the server, Atos can provide additional enclosures that are secured, cooled, fire resistant, …

*depends on the model size & complexity

BullSequana SA20G
AI Inference & Training

Outstanding AI inference & training capabilities

Latest AMD processors with up to 64 cores per CPU
High memory speed, up to 3200MHz
Wide storage technologies (Ultra-fast NVMe, SSD/HDD SATA/SAS) – up to 46 TB storage
Up to 5 NVDIA GPUs for enterprise graphic intensive

Networking & Embedded ports

2 x 1GbE LAN ports (1 x Intel® I350-AM2)
4 USB ports

Edge optimized security

Optional TPM 2.0

BullSequana Edge is multi platform certified

Microsoft Azure IoT
VMware
Nvidia NGC
RHEL

BullSequana Edge

AI Inference & Fleet management anywhere

Server class CPU
optimized for the Edge 16
very powerful CPU cores /
32 threads
Great for streaming data ingestion / analytics

Install anywhere

Does not need a Datacenter
Can operate in airports, shop/factory floors, …
ETSI EN 300 019 class 3.2 specs slightly relaxed +5°

Edge optimized security

Edge optimized security
Intrusion detection
Secure Firmware update Secure boot
TPM 2.0 FIPS 140-2

Outstanding AI acceleration capabilities

Up to 2 Nvidia T4 GPUs Up to 2 FPGAs
Powerful AI model inference for Video analytics

Flexible Radio and NIC networking options

Cabling independent
Up to 2 Radios 4G, Wifi, Lora
1 to 10 Gbps built-in, extensible to 100Gbps

Discover the video of the world's highest performing Edge Computing server **Link**

BullSequana Edge is multi platform certified

Microsoft Azure IoT
VMware
Nvidia NGC
RHEL

BullSequana Edge nano

Plug & play anywhere anytime

Exceptional inference capacities in a ruggedized server

- Nvidia Jetson Xavier GPU
- GPU performance up to 21 TOPS
- 3 x dual-core CPU clusters (six NVIDIA Carmel processor cores)
- Storage: 1 x M.2 2280 (M Key) SD Card 1 x Micro SD

Install in extreme conditions

- Ruggedized
- Operational Temperature -10 ~ 60 °C with 0.7 m/s air flow (Max-P ARM mode) Operating Humidity 95% @ 40 °C (non-condensing) Vibration 3 Grms @ 5 ~ 500 Hz, random, 1 hr/axisCamera POE cabe
- Flexible network options: 4G, Wifi, Lora
- Compact fanless design

Security

- Intrusion detection
- Secure firmware boot & update

Networking options

- 2 x embedded LAN port
- Support wireless without RED Certification

BullSequana Edge is multi platform certified

Microsoft Azure IoT

VMware

Nvidia NGC

RHEL

COMPUTER VISION

Atos

Computer vision: Why it matters ?

700m

Globally there are 770 million closed-circuit television surveillance cameras

10,8%

Computer vision market will know a CAGR of 10,8% by the end of 2026

90%

Today, with an accuracy about 90%, computer vision models are faster to detect and react to visual inputs than humans.

99%

By 2022, 99% of video/image content captured for enterprise purposes will be analyzed by machines rather than humans

80%

Today, 80% of the not-analyzed data generated are video and images

"Computer vision is set to become a massive disruptor in the 2023 time frame as the key precursor to create new business models, new forms of engagement and accelerates social change" Gartner, March 2020

The major computer vision usage types

Detection

Ex: Quality control
Default detection
Intruser detection
Event detection
Covid mask detection

Recognition

Ex: Facial recognition
Object recognition

Localization

Ex: Person searching
Product localization in storage or store

Motion analysis

Ex: Person tracking
Flow management
Crowd management
Customer path in retail store

What are the stakes in computer vision?

Performance

Accuracy

TCO

Privacy & security

Ethical & unbiased

Atos Computer Vision platform

Ethical & Trustable AI platform

Public Sector

Energy & Utilities

Manufacturing

Retail

Travel & transportation

Healthcare

Video analytics software stack

Detection | Localization | Recognition | Motion analysis

Infrastructure from Cloud to Edge

Private or public

Google Anthos Bare Metal

BullSequana SA

BullSequana Edge

BullSequana Edge nano

Services

Strategy
Consulting
Data Science
Integration
ML-Ops
Managed Edge

Video analytics software stack

Ingest, interprete and understand AI models in real time to detect, recognize, localize and analyze motion to solve business challenges.

Our features

Detection

- Violence detection & police support
- Real-Time Alert
- Person detection
- Watchlist Alerting
- Automated surveillance
- Intrusion detection

Localization

- Live investigation
- People tracking

Recognition

- Non-facial body recognition
- Facial recognition
- Touchless Access Control
- Recognition with Masks

Motion analysis

- Crowd management
- Internal Zone Control
- Track multiple targets simultaneously
- Occupancy Counting
- Traffic management

Codex AI Vision

IPS TEK
Artificial Intelligence Video Analytics

anyVISION

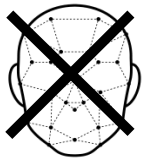
SAFR

Codex AI Vision, Atos patented AI solution

Improve citizen safety with AI-based Video Intelligence

GDPR

- Take **immediate** actions
- Increase security officer's **efficiency** in tracking and searching tasks
- **Reduce cost** of monitoring and lost person search.
- Respect people privacy: **No Facial** recognition
- Deploy centrally or at the **edge**



Codex AI Vision: real time people search feature without facial recognition

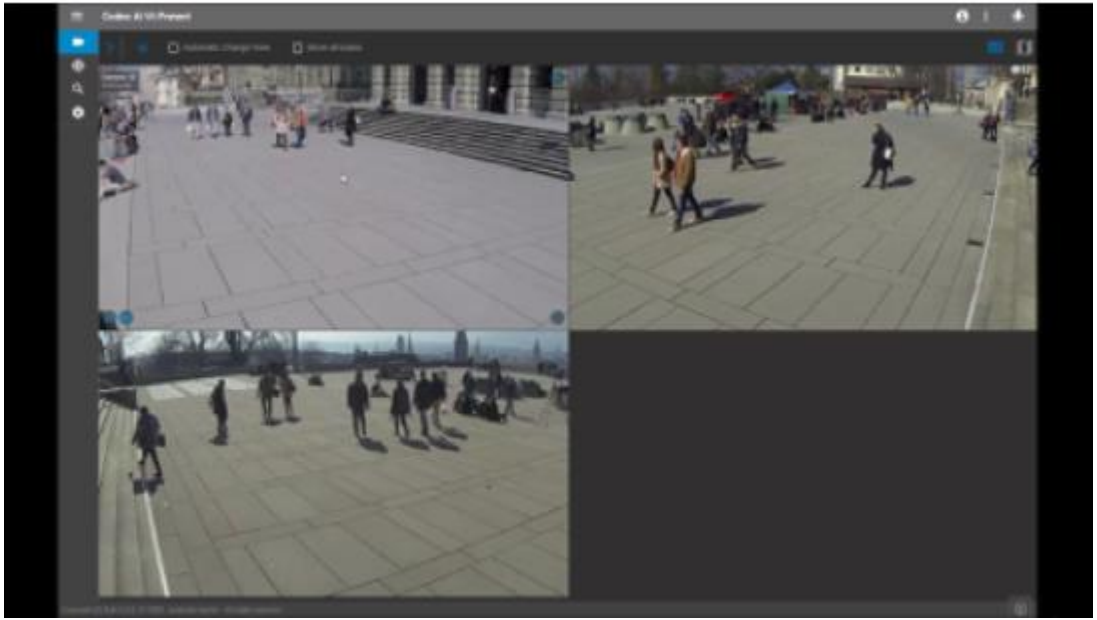
Search in live feeds on multiple cameras

People Search by Attributes

- Specify a person from unclear witness information: color of clothes (Top, Shoes, Bag, hat, scarf , glasses..)

People Search by photo

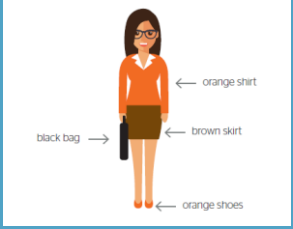
- Search from a photo

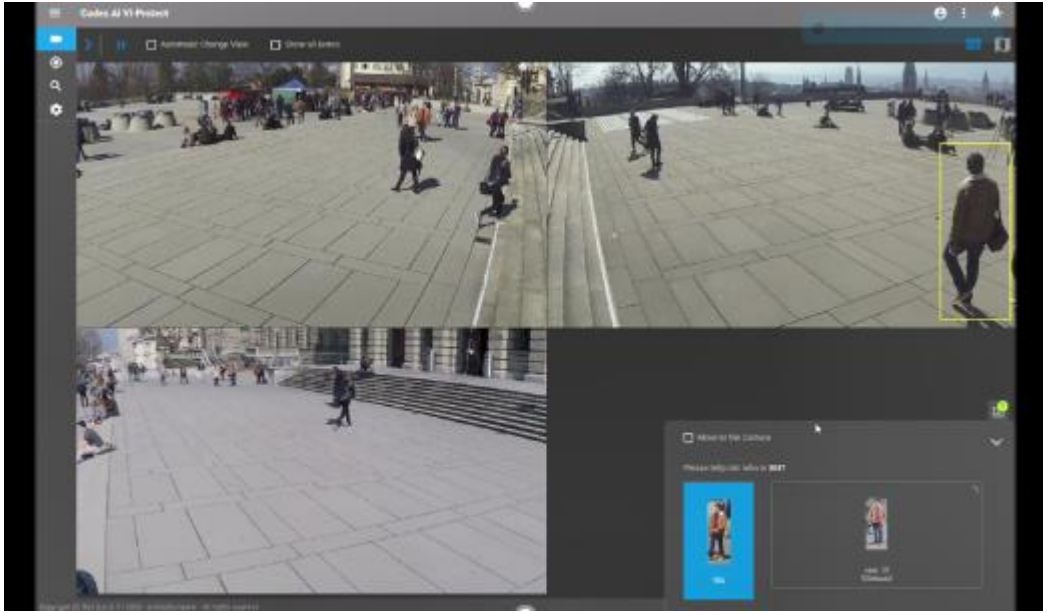


Codex AI Vision: Real time people tracking without facial recognition

People tracking

- Start tracking from any people detected on the camera network
- Patented **Body recognition** from different angle of view to reidentify the person
- Patented Multi-camera **digital signature** sharing





PREDICTIVE ANALYTICS

AI Edge Analytics

Edge Integration into Analytics, ML-Ops and Industrial Swarm Edge

Public Sector	Energy & Utilities	Manufacturing	Retail	Travel & transportation	Healthcare
					

Expertise & Consulting

Data Science, Data Engineering & ML-Ops

Use case: Real-time Analytics , Predictive maintenance, AI enhanced DC and Edge management

Software / Appliance

- Atos Codex Datalake Engine based on Cloudera
- ML-Ops with Atos zData platform
- IoT Swarm with Atos Codex Smart Edge

Infrastructure

Google Anthos Bare Metal

BullSequana SA

BullSequana Edge

BullSequana Edge nano

Outcome as a Service

Goli Nutrition

Example of a Cloud to Edge environnement for prescriptive analytics

THE CHALLENGES

- Goli Nutrition, an innovator in health and creator of the world's first apple cider vinegar (ACV) gummy, is experiencing exponential growth.
- But Growth is limited to production capacity
- Down time on the manufacturing lines is extremely critical
- Goli is in the process of scaling manufacturing lines from 2 to 7 lines and want to get ahead on the predictive maintenance of the lines : anticipate machine failure, monitor asset behavior and analyze trends with robust reporting tools in their factories.

THE SOLUTION

Atos is providing Predictive Maintenance-as-a-Service by implementing data processing and data science software that leverages compute at the edge to produce predictive insights to maintenance and operations centers.

THE BENEFITS

Edge devices will provide real-time data science predictions and data ingestion to anticipate machine failure, monitor asset behavior and analyze trends with robust reporting tools.

Cloud to Edge Data Environment

Atos zData

Data Exploration
Model Development
Model Training

AI/ML Workbench

- Enterprise Data Science Platform (Domino)
- Container Integration (Rancher)

ML-Ops
Self-serve
Collaborative

Data Integration
Streaming Platform
Data Lake

Core

- Unified Integration Platform
- Distributed Streaming Platform (Kafka)
- Kubernetes Management (Rancher)
- High Perf Object Storage (Minio)

Fully integrated & managed

Fleet management
Data router

Edge to Core

- Multi-cluster Container Mgmt
- Machine to Profile Matching
- Edge Data Router

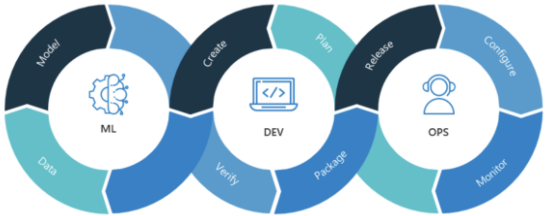
Control Plane

Predictive Maintenance
Recommender Systems
Computer Vision

Edge

- Edge/Branch Ops
- Edge Container Mgmt
- Edge OS (K3)

Container operated, GPU-driven Edge



On-Premise,
OneCloud,
any Cloud
Cloud-Agnostic

ML-Ops CI/CD/CT platform

CLOUD TO EDGE

Transformation is shifting to the edge

By 2023

50%

of enterprise data will be generated outside of the core.

Gartner 2021 Strategic Roadmap for Edge Computing November 3, 2020

By 2025

75%

of data will be processed outside the traditional data center or cloud.

How to invest in edge computing, Nasdaq, November 2020

To get more business value from data, organizations need to analyze it near where it's produced and consumed: at the edges of the organization's infrastructure.

What organizations want to achieve at the edge

	**Retailers**	want to process payments, run video surveillance, and make customer-specific offers locally in real time
	**Manufacturers**	need to process industrial IoT data instantly to optimize robotic production lines and maximize quality
	**Telcos**	want to develop offerings that incorporates edge processing to empower smart cities and autonomous vehicles
	**Energy and utilities**	need to monitor and manage remote infrastructure like pipelines and sub-stations and respond instantly to anomalies

The challenges of centralized data processing

Computing power sits in the data center, but data is generated and consumed at the edge.
This creates four main challenges:

Connectivity

Bandwidth and latency constraints make processing edge-generated data in the data center too slow for real-time applications

Applications

Utilizing multiple clouds and edge devices makes application management more complex

Security

Industrial IoT and edge devices can be soft targets for cybersecurity attacks

Management

Managing the whole environment from core to cloud to edge can be a burden on resources

Your challenges

Sidestep bandwidth and latency issues

Application management

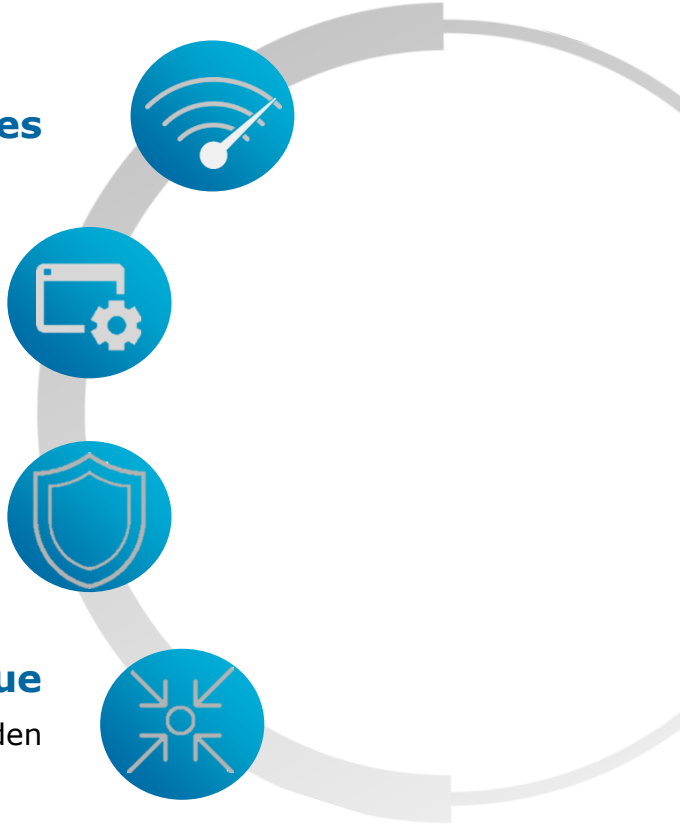
Multi-cloud and edge can increase application complexity

Ensure security as you embrace edge

The proliferation of devices at the edge can increase security risk

Focus your resources on adding value

Moving to the edge can increase your IT operations & management burden



How do we solve your challenges?

Put processing power right where it's needed – at the edge

- A unified, end-to-end infrastructure
- Seamless architecture from data center to cloud to edge
- Run video and IoT analysis in real time

Adopt a container-based architecture that supports multi-cloud and edge

- Run legacy and cloud-native apps at the edge
- Run real time analytics workloads at the branch
- Create and deploy one application everywhere

A pre-configured, end-to-end security solution in which all components are fully integrated

- Workloads are encrypted and security policy is enforced from data center to cloud to edge
- Manage patching across the entire ecosystem centrally
- Keep devices, applications and data secure and up to date
- Edge servers are secured physically and logically, and data is protected in motion and at rest

Let Atos manage your entire infrastructure for you

- Deployment, monitoring and maintenance management from data center to cloud to edge
- Benefit from our automated platforms, processes and economies of scale
- Concentrate on adding business value
- Advancing your organization's digital transformation

Overview of Atos Anthos Bare Metal

Simplified applications

Google Anthos
Application management platform
Develop, deploy and manage legacy and cloud-native applications anywhere

Harmonized infrastructure

Anthos Bare Metal
Multi-cloud orchestration
Manage edge devices, data center, and multiple public clouds – as one

BullSequana Edge
Powerful AI inference

BullSequana S series
Exceptional scalability

Data center

Public clouds
GCP, AWS, Azure

Integrated security

Integrated end-to-end security

Managed services

Atos Managed Services
People, platforms, processes, automation
Free-up your talent from infrastructure management

REFERENCES

Atos

In 2020 we are delivering Edge at scale

300+ Edge Deployments in Oil & Gaz

20+ Countries

25+ Edge customers signed in H2

5 We address every Atos verticals

25+ AI solution partners

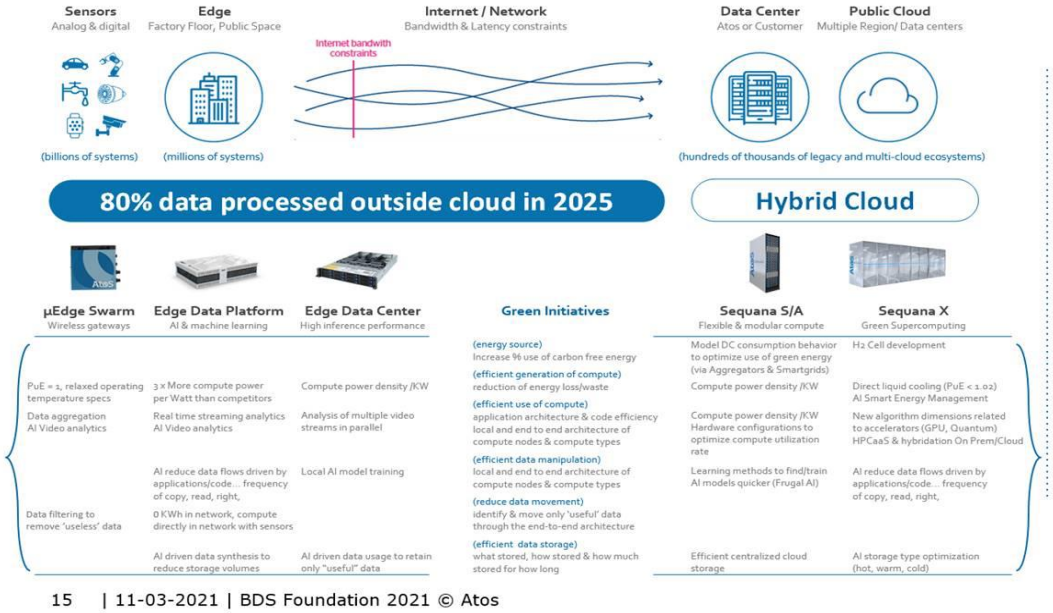
20 000+ Edge Analytic devices planned in Retail in 2021 with Goli

AI, Analytics & Edge – 2020 success stories

Our offering is engaged in decarbonation & more ethical AI

Edge to Cloud decarbonization

Compute continuum(data) + AI = optimized energy consumption



15 | 11-03-2021 | BDS Foundation 2021 © Atos

CONSIDERATIONS

Reduce usage of non green energy and overall energy consumption with a set of **GREEN COMPUTE PRODUCTS** and AI capabilities that impact decarbonization levers:

1. **TRADITIONAL DECARBONIZATION LEVERS…**
   a. **Energy Source** : increase percentage of carbon free/friendly energy sources used to power data centers and edge locations.
   b. **Efficiency** : reduce energy "lost" in operations. Ensure energy consumed is being used to "efficiently generate compute" capacity
   c. **Effective**: reduce energy "used" or "required". Determine right time, right infrastructure, right parameters to optimize energy usage per application profile… "efficiently consume compute" capacity that has been generated

2. **DATA USAGE EFFICIENCY (DUE)…**
   a. **Create/Capture** : efficient data capture… with high performance energy efficient compute hardware at the µEdge
   b. **Manipulate**: treat data close to its 'origin' of capture. Optimize the copy, consumption, transformation and analysis of the data as well as reduce the recursion rate of data – the rate at which the same data is processed again
   c. **Store** : optimize how data is stored (hot, warm, cold), how much is stored and how long it is stored at each location in the compute continuum considering SLA and compliancy requirements
   d. **Move**: reduce amount and how often data is moved through the compute continuum based on use case SLA requirements

Atos

Why Atos Computer Vision offering?

Gartner named BullSequana Edge as an

« Edge AI Innovator 2020 » for Atos patentent Codex AI Vision solution and BullSequana Edge server

Strong ecosystem of industrial & academic partnerships

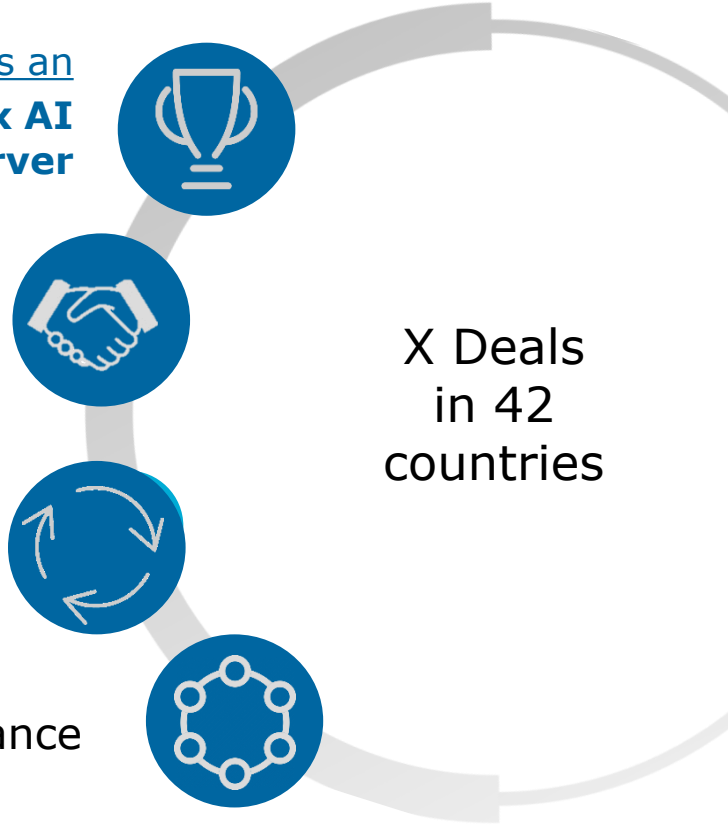
anyVISION. A BETTER TOMORROW

IPS TEK Artificial Intelligence Video Analytics

SAFR from realnetworks

End-to-end offering including far edge to edge datacenter/cloud hardware, software, professional services and ready-to-go use cases.

Expertise in management & maintenance

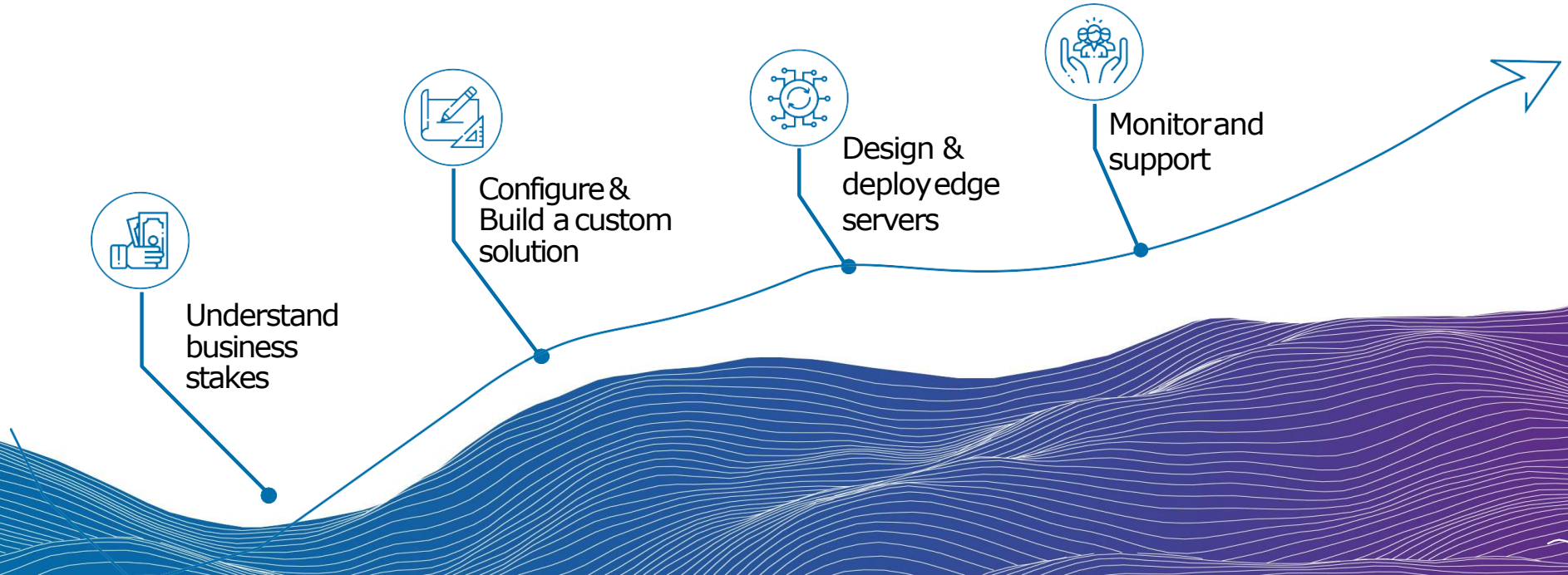


X Deals in 42 countries

Atos

Atos delivers an end-to-end edge computing approach

- Atos business and technology expertise
- **Full edge infrastructure** from **edge devices, edge inference to edge training servers**
- **Best scalability to fit your business needs**
- Our servers deliver the highest performance to support AI workloads **while support constraints of size, weight and environment**



Why just dream ?

Atos