EDGE X FOUNDRY™

Vertical Solutions Working Group

June 30, 2020

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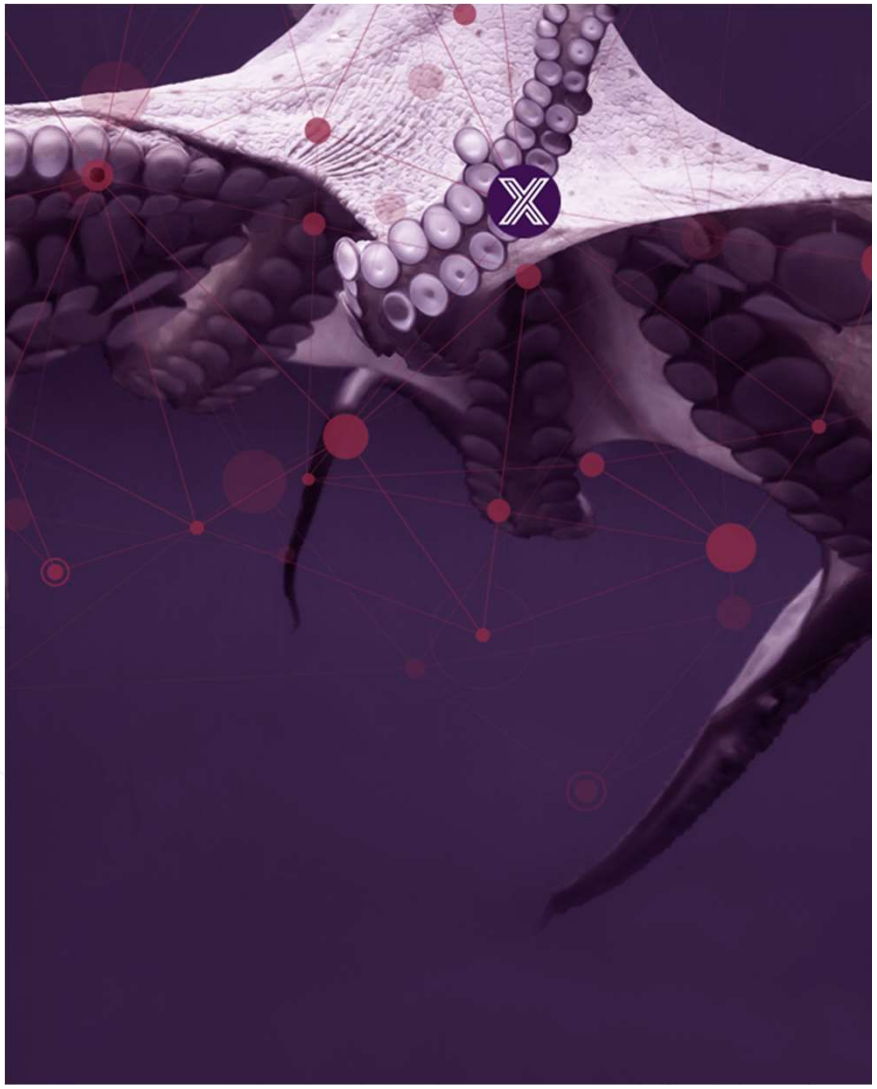

EDGE X FOUNDRY™

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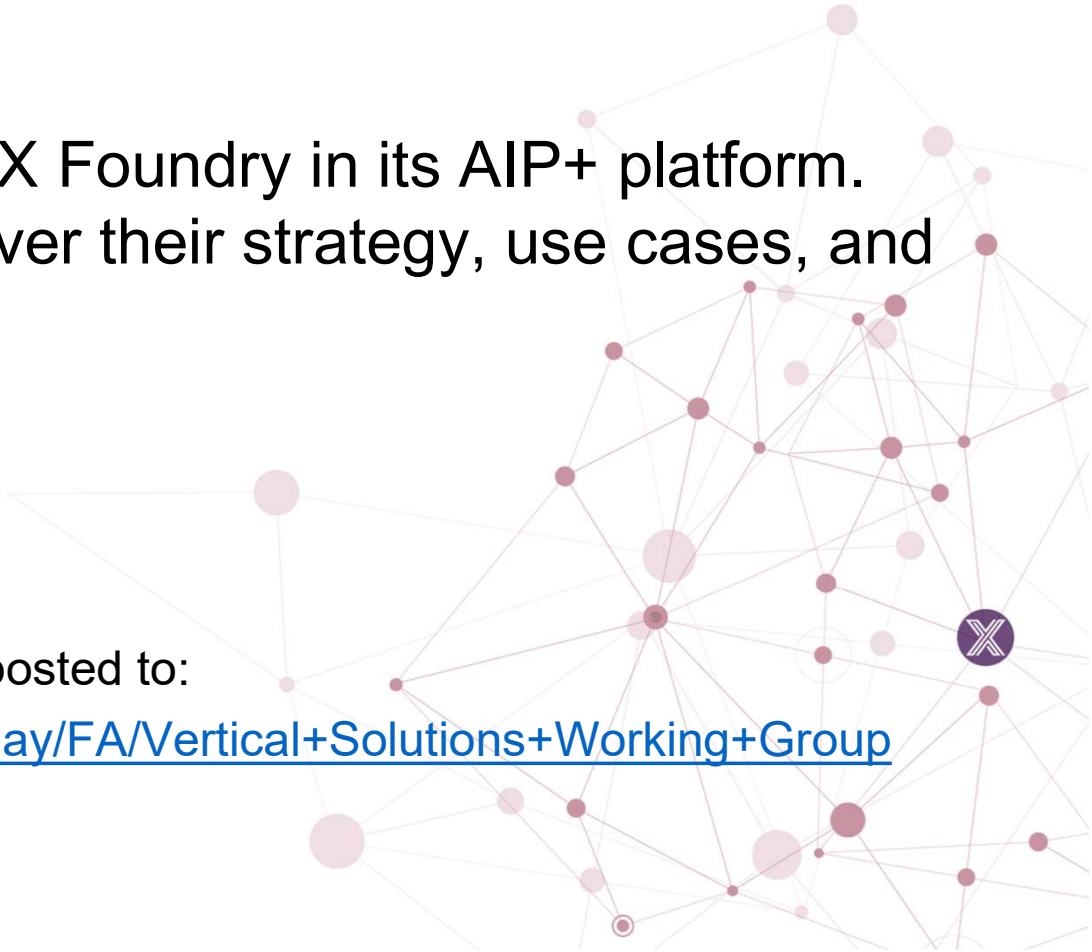
EDGE X FOUNDRY™

Agenda

Accenture is using EdgeX Foundry in its AIP+ platform. This presentation is to cover their strategy, use cases, and more.

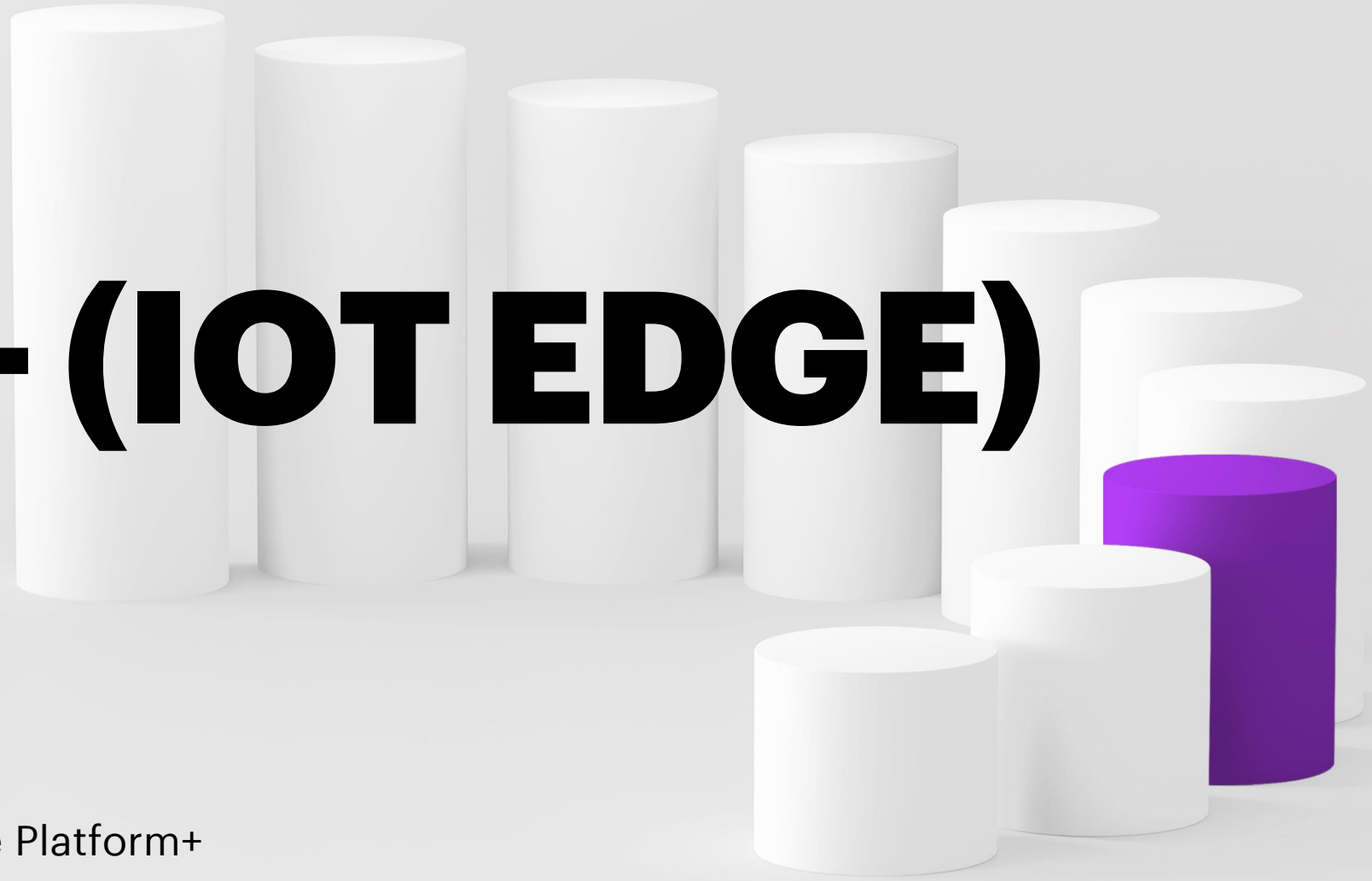


Meeting recording & slides to be posted to:

https://wiki.edgexfoundry.org/display/FA/Vertical+Solutions+Working+Group

Accenture Applied Intelligence

AIP+ (IOT EDGE)



Applied Intelligence Platform+

AIP+
Applied
Intelligence

By way of an introduction.....

Name : **Allan Haughton**

Employer : **Accenture - Applied Intelligence Platform (AIP+)**

Role : **AIP+ IOT Gateway Development (Global Lead)**

Leading a multinational team to create an advanced Edge Analytics gateway as part of the AIP+ initiative. Also working with the Accenture Security Practice to create IOT security thought leadership material, and representing Accenture IOT Security at international events

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AIP+ Applied Intelligence

INDUSTRY EXPERTISE

- Aerospace & Defense
- Automotive (Mobility)
- Banking
- Capital Markets
- Chemicals
- Comms & Media
- Consumer Goods & Services
- Energy
- High Tech
- Health
- Industrial
- Insurance
- Life Sciences
- Natural Resources
- Public Service
- Retail
- Software & Platform
- Travel
- Utilities

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AIP+ Cloud platform

Services+

- 24x7 Support
- Service Management
- Maintenance
- Enablement Support
- Performance Benchmarking
- Application Configuration & Support
- Data Services
- Platform Advisory & Implementation Services
- Data Governance
- Deep Monitoring & Prediction

Intelligent Solutions — E2E, Industry-specific

data foundation layer, analytical records, model templates

✱ **20+ Industry Solutions:** Applied Connected Home+, Applied Building Access+, Applied Customer 360+, Applied Asset Performance+, Applied Digital Twin+, Applied Mobility+, Applied Customer Engagement+...

AIP+ Powered Apps

Un-trap data and unlock new speed to value

✱ **265+ apps:** Workforce Analyzer, Network Cost Optimizer, Commercial Insights Visualizer, Digital Worker, Marketing Mix Optimizer, Telco Retail Forecaster...

Engagement+ — Turn insights into action and extend capabilities with living, learning experiences

Rapid Application Workbench	Experience Builder	Conversational AI Builder
Low-code/no-code development of industry & domain-relevant applications	*Choreograph real-time events, contextual data & corresponding actions.*	*Rapidly build virtual agent solutions in a technology-agnostic environment.*

Cognition+ — Turn insights into action and extend capabilities with living, learning experiences

Data Science Workbench	Model Catalog	Model Manager
Data Scientist Playground	*Model publication and reuse*	*Model operationalization*

Analytics records – AI/ML models library –Data services – AI engines – Content analytics – Automation

Data Supply Chain+ — Connect the enterprise by automating the collection, integration of **all data.**

DBMS · Files. · Social · News · Device · Sensor

- Ingestion
- Preparation
- Transformation

Core+ — Networking, Computing and storage infrastructure services

Automation – Orchestration – Provisioning – Configuration – Deployment – Enablement

Platforms

amazon web services · Azure · Google Cloud Platform · Alibaba Cloud

Security & Governance

- Security Framework
- Tenant & Application Segregation Policies
- ISO & HiTrust Certification
- CDP-GDPR Ready
- FedRamp Certified (AFS)
- HIPAA Compliance
- Certificate Authority
- Vault
- User Store
- Antivirus
- Authentication & Authorization

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AIP+ Applied Intelligence

A collection of **modular, pre-integrated AI services and capabilities**

augmented by **Accenture IP**

that helps accelerate and scale new outcomes

Speed to Value

- Fast E2E solution provisioning
- Pre-built modules to accelerate customization to your business needs
- Rapid application prototyping

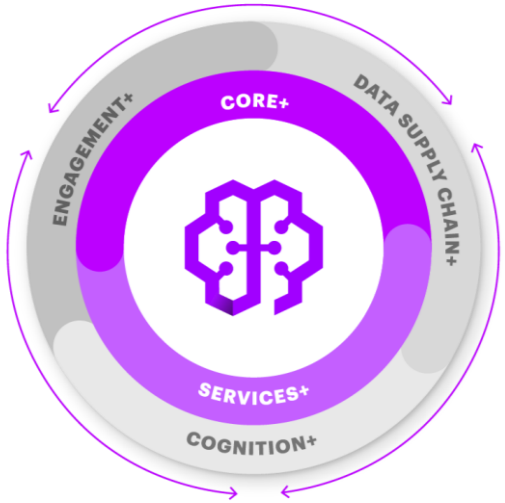
Speed to Confidence

- E2E Security
- Data governance services & capabilities (GDPR, CCPA, HDS, HiTrust© etc.)
- Patented, competitively differentiated Accenture IP

Speed to Scale

- Pre-built industry and functional solutions
- Automated data science tools, empowering more people to benefit from AI

AIP+ : Speed to Outcomes



Flexible Commercials

- **as-a-service** (pre-integrated solutions & support)
- **as a collection of accelerators for integration** (existing infrastructure)

Core+ for speed to deployment -
accelerate setup, management, monitoring and deployment of new intelligence with integrated, as-a-service technologies.

Services+ for speed to confidence –
maximize performance with value-added services like architecture advisory, system/platform consultation, and implementation delivered by our experts.

Data Supply Chain+ for speed to connectivity –
connect the enterprise by automating the collection, integration and mobilization of data.

Cognition+ for speed to intelligence –
empower users with AI applications and automated data science while crafting new insights and continuously learning systems.

Engagement+ for speed to action –
turn insights into action and extend capabilities with living, learning experiences.

Applied Intelligence Solutions for speed to scale –
pre-built solutions to enrich services with industry and functional IP.

Introducing the AIP+ Edge

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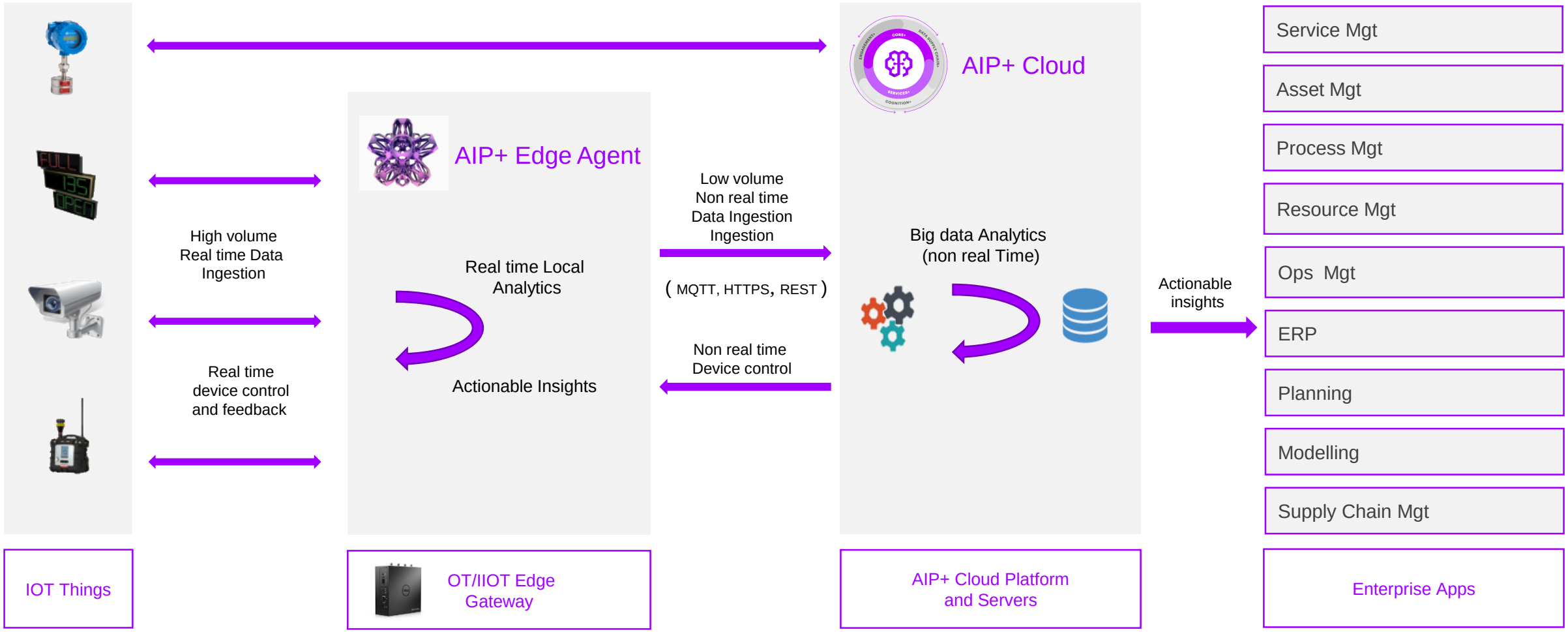
Extending AIP+ for Distributed Analytics

The AIP+ Edge Agent extends the AIP+ analytics capability by acting as an intelligent node
Operating close to IOT/IIOT information sources to enable real time insights and actions at the edge



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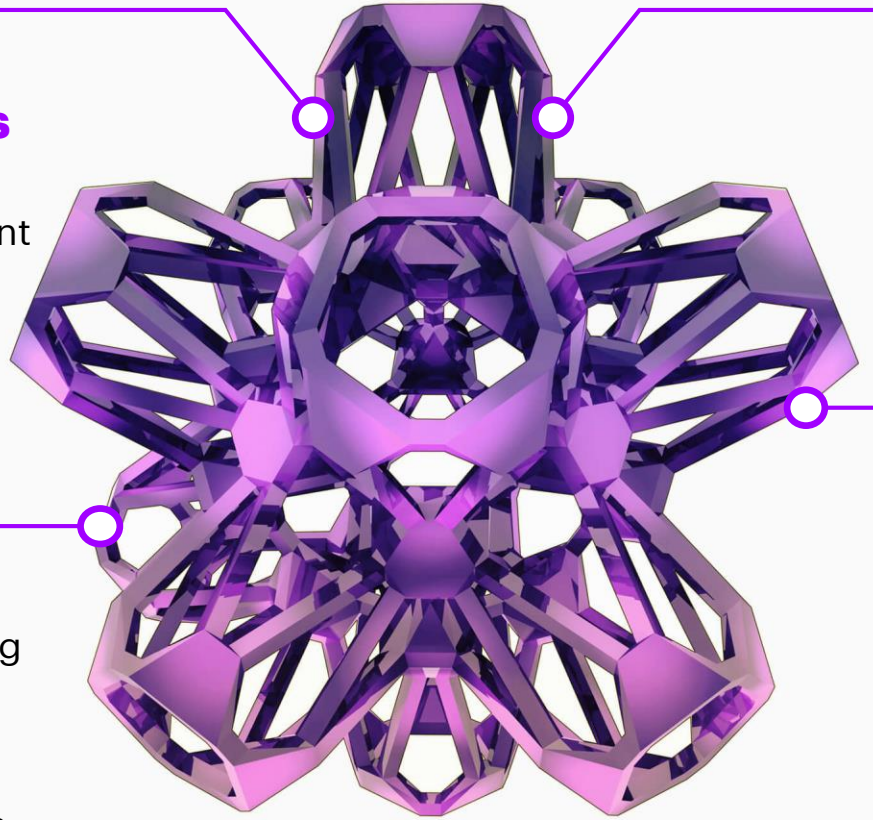
AIP + Edge : Speed to Intelligence

End-to-End development and deployment for Rules and Models

- Integration with AIP+ Data Science Tools
- Model / Rules Authoring and Management
- Low-Code/No-Code Edge Pipeline Configuration
- Automated Deployment to Devices

Edge-Optimized Analytics & ML

- Models, Applications and Rules executing at the Edge
- Support for Model quantization & AI accelerated Hardware
- Fast and memory efficient data ingestion with Chronicle smart storage
- Edge Efficient Model portfolio



Wide device range

- Modular architecture supports all device types
- Extensive range of hardware, OS, and Edge protocols
- Commercially supported Edge framework

Cloud-independent Edge

- Open source and container-based Edge Agent
- Edge Models and Applications reusable across PaaS providers : GCP, Azure, AWS....
- Expanding EdgeX content ecosystem

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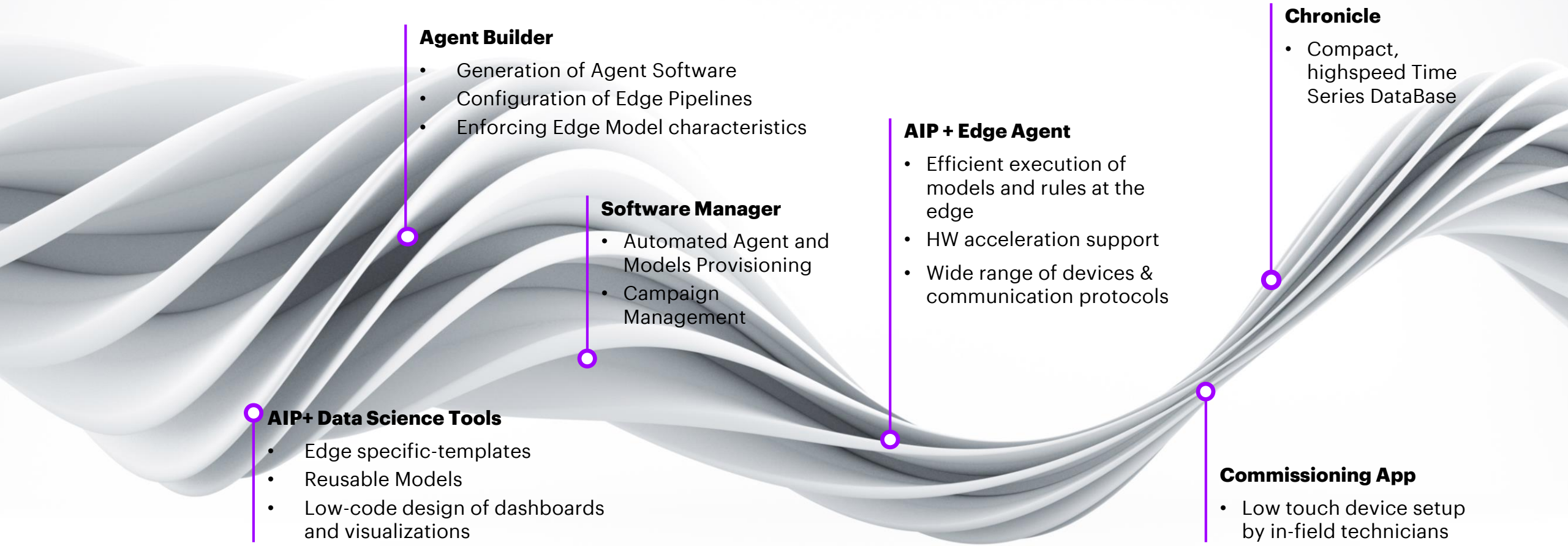
AIP+ Edge : Key Features

End-to-End tools & edge software enabling intelligence on multitudes of devices



Agent Builder

- Generation of Agent Software
- Configuration of Edge Pipelines
- Enforcing Edge Model characteristics

Software Manager

- Automated Agent and Models Provisioning
- Campaign Management

AIP+ Data Science Tools

- Edge specific-templates
- Reusable Models
- Low-code design of dashboards and visualizations

AIP + Edge Agent

- Efficient execution of models and rules at the edge
- HW acceleration support
- Wide range of devices & communication protocols

Chronicle

- Compact, highspeed Time Series DataBase

Commissioning App

- Low touch device setup by in-field technicians

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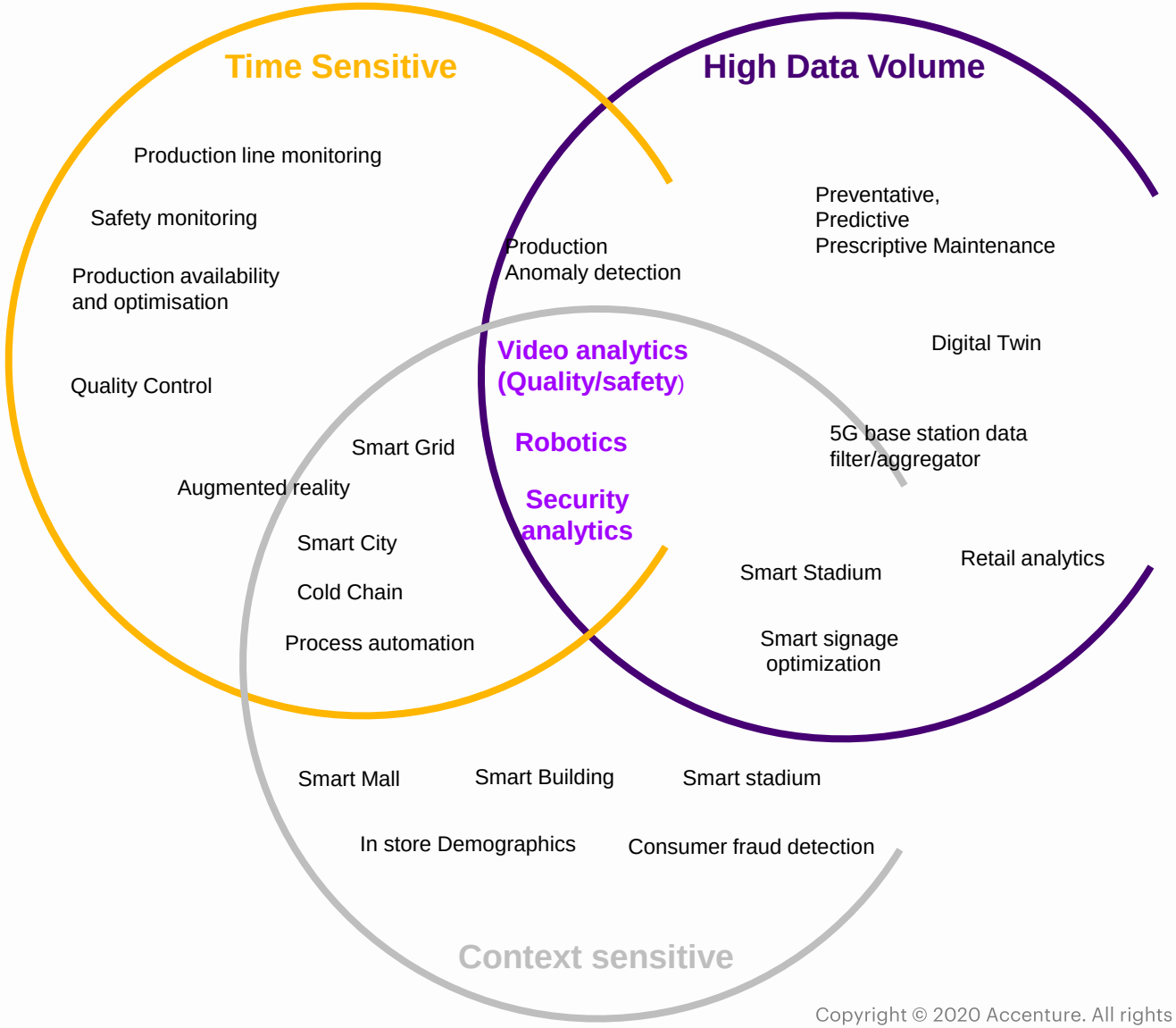
Edge Intelligence - Key Applications



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Why we chose EdgeXFoundry

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The reality of the IOT – it's really hard !!!!

IOT solution landscape is fragmented

- Numerous options for cloud or on-premise analytics platforms.
- Wide variety of IOT device manufacturers
- Multiple OS choices and variants
- Variety of chip architectures
- Many competing IOT frameworks
- Vast amount of IOT protocols – some proprietary, some standards based, some evolving, some with incomplete implementations
- Varying degrees of device intelligence

And there are many operational challenges

- long design lives means obsolescence has to be factored in
- Autonomous operation requires high reliability
- Remote deployed locations require secure remote access for maintenance/debug.
- Safety is often key design requirement.
- High operational availability expectations mean that patches and upgrades can require weeks of planning to avoid outages
- Faults in the IOT network are difficult to find and fix.

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What I like about EdgeX Foundry

Being able to select an IOT Edge framework designed from the ground up to be Hardware and OS agnostic, with multiple options for cloud connectivity was a good starting point

But, the real clinchers were the

- **rich variety of IOT protocol connectors (greater use case covveage)**
- **incredibly flexible Microservice Architecture (easy to integrate Accenture IP)**
- **Ability to download and execute dockerized images (analytics technology agnostic)**

EdgeX Foundry allows Accenture to concentrate on the Analytics models that generate value for our clients without needing to worry about the underlying gateway technology or connectivity, and to do this safe in the knowledge that the gateway solution can be ported to multiple IOT gateway devices with minimal effort

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AIP+ Edge Agent Foundation : EdgeX Framework

EDGE X FOUNDRY™

Platform Architecture

"NORTHBOUND" INFRASTRUCTURE AND APPLICATIONS

LOOSELY-COUPLED MICROSERVICES FRAMEWORK

CHOICE OF PROTOCOL

CONTAINER DEPLOYMENT

REMOTE/LOCAL GUI

REVERSE PROXY

EXPORTING AND APPLICATION SERVICES

ADDITIONAL SERVICES

APPLICATION SERVICE

SDK

SUPPORTING SERVICES

RULES ENGINE

SCHEDULING

ALERTS & NOTIFICATIONS

LOGGING

ADDITIONAL SERVICES

ADDITIONAL SERVICES

MANAGEMENT

SECURITY

ADDITIONAL SECURITY SERVICES

ALL MICROSERVICES INTERCOMMUNICATE VIA APIs

CORE SERVICES

CORE DATA

COMMAND

METADATA

REGISTRY & CONFIG

MGMT SERVICE AGENT

DEVICE SERVICES (ANY COMBINATION OF STANDARD OR PROPRIETARY PROTOCOLS VIA SDK)

SECRET STORE

REST

OPC-UA

MODBUS

BACNET

ZIGBEE

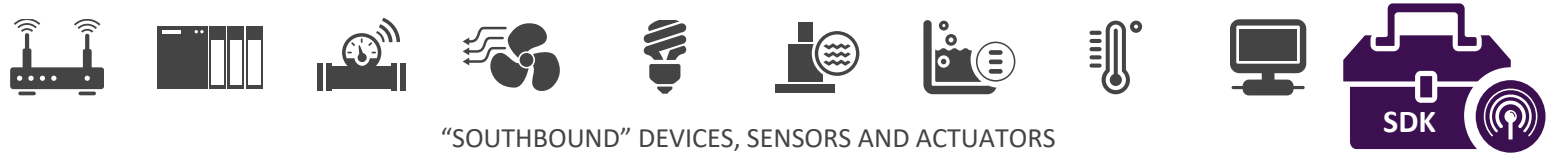
BLE

MQTT

SNMP

VIRTUAL

ADD'L DEVICE SERVICES



"SOUTHBOUND" DEVICES, SENSORS AND ACTUATORS

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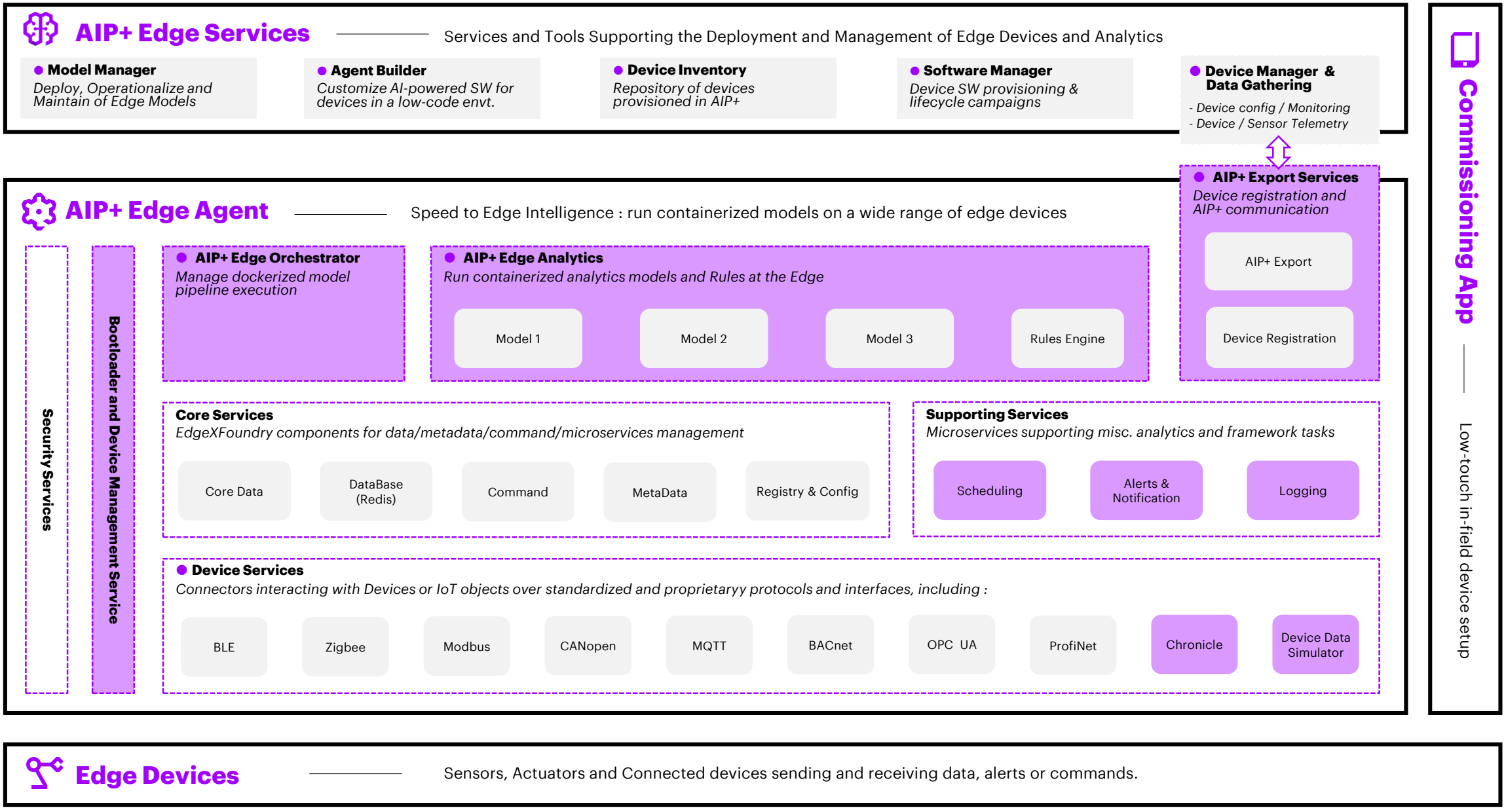
AIP+ Edge Agent - Architecture



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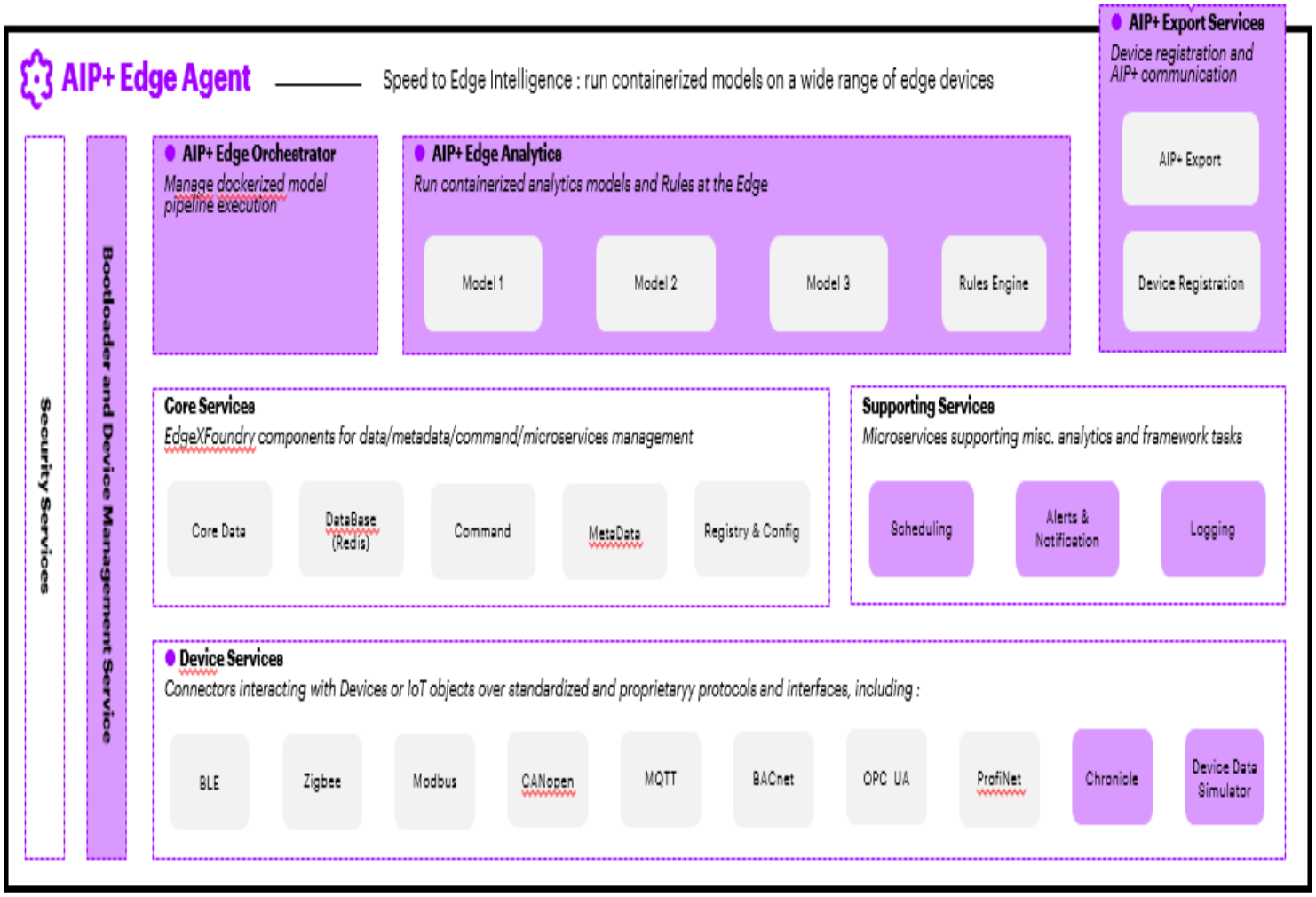
AIP+ Edge Agent - Accenture Extensions to EdgeX



AIP+ Edge Orchestrator / SMA

- Provisioning / Management of Edge micro-services
- Sequencing / Orchestration of Edge data pipelines
  - Sensors / models / rules / apps / export
  - Serially and in Parallel

AIP+ Services

- Export Services for communication to AIP+
- Custom Alerts & notification, scheduling, logging

Device Data Simulator

- Allows IOT device interactions to be simulated
- Enables test Automation
- Can replay captured Video for analytics use case reproduction and training

Chronicle TSDB

- Low-footprint, low-power, efficient TSDB
- Device Service to store sensor data at high fidelity

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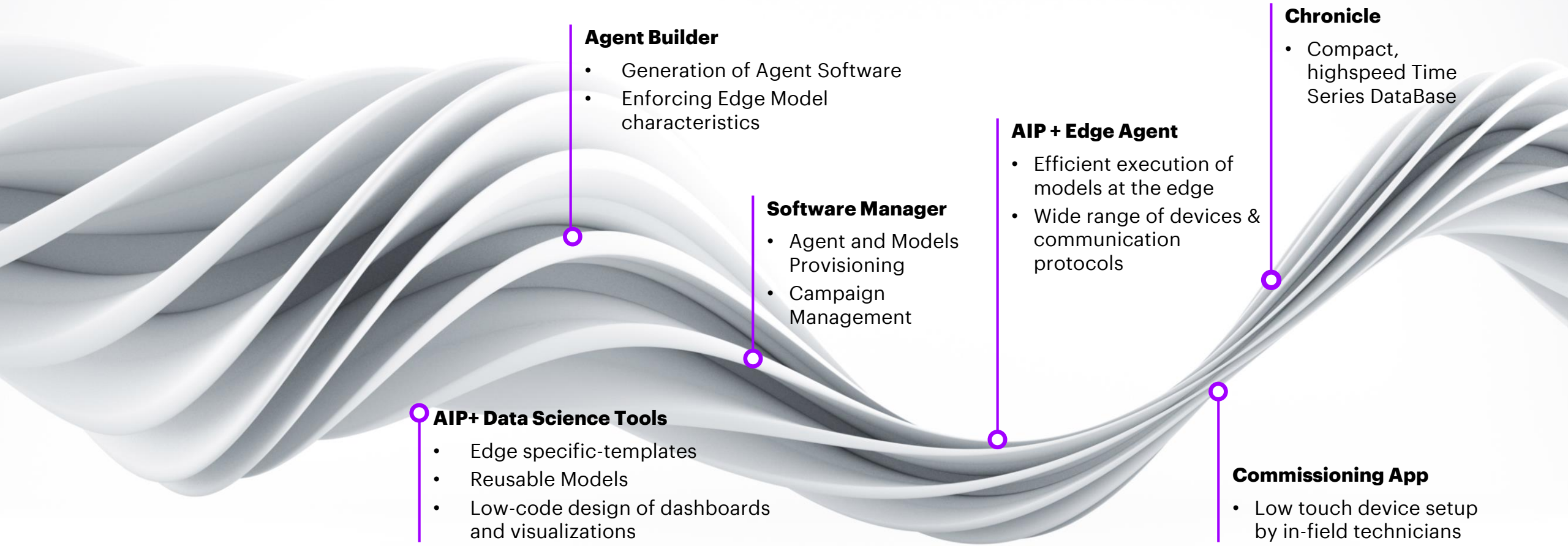
AIP+ Edge is part of an end to end solution

Accenture provides End-to-End tools & edge software enabling intelligence on multitudes of devices



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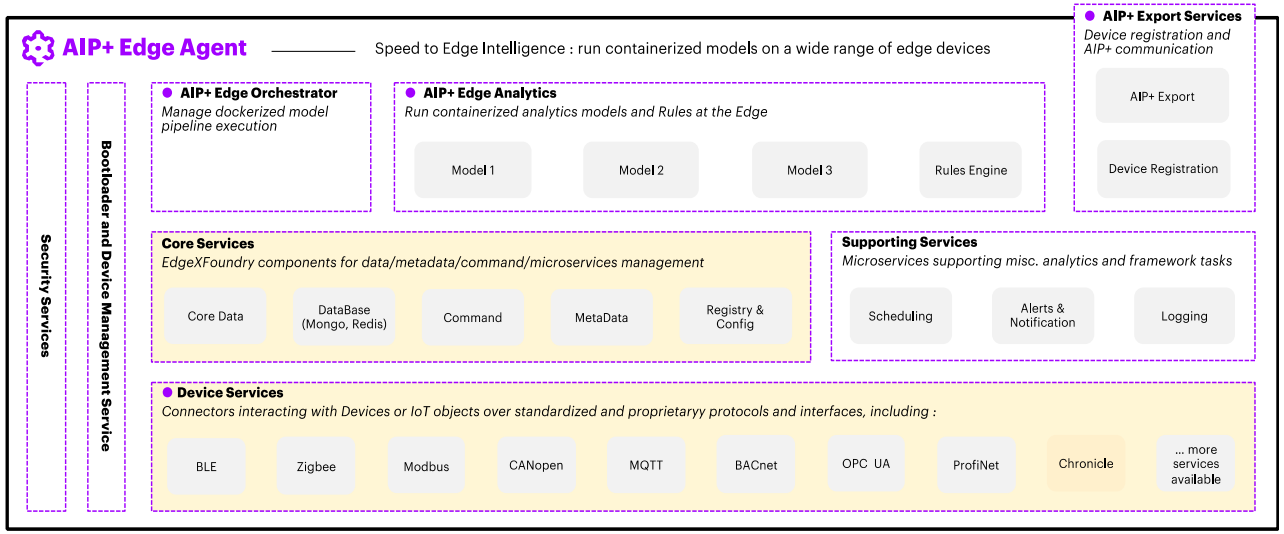
IoTech Edge XPert – the Commercial EdgeX Framework

Accenture has selected IotTech's EdgeXpert implementation of EdgeXFoundry as the foundational component for AIP+ Edge gateways. This gives Accenture the security of technical support – particularly with respect to the wide number of IOT protocol connectors provided by EdgeXPert

Supported IoT protocols

Available
- ModBus (RTU and TCP)
- BACnet (MSTP and IP)
- OPC UA
- MQTT
- Bluetooth Low Energy (BLE)
- Zigbee
- EtherCAT
- PROFINET
- Grove Sensor
- File
- Virtual
- CAN

On Roadmap
- OPC UA (Pub/Sub)
- Simulink
- IO-LINK
- EtherNet/IP



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Where I would like EdgeX to head

Accenture is investing significant effort into ensuring that EdgeX is a valuable component in AIP+ distributed analytics models .

It would be wonderful to collaborate on some of the generic issues with deploying, configuring, monitoring and maintaining IOT devices and networks in the field

- **Tooling to support remote IOT device deployment, configuration, monitoring and administration – including remote login and debug capability**
- **Support for Intelligent connected IOT devices (cameras, semi autonomous devices, distributed analytics pipelines)**
- **Recommended frameworks – especially with respect to Video analytics and Robotics.**
- **Certification schemes for supported/recommended devices.**
- **Better realtime /deterministic support (e.g IoTech's XRT)**

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Thank You!

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