NOVEMBER 2022

Ever more efficient – AVEVA's Engineering Portfolio Roadmap

Julien de Beer – Vice President, Engineering & Design, AVEVA

AVΞVA

Top Challenges for Owners and EPC in Project Delivery

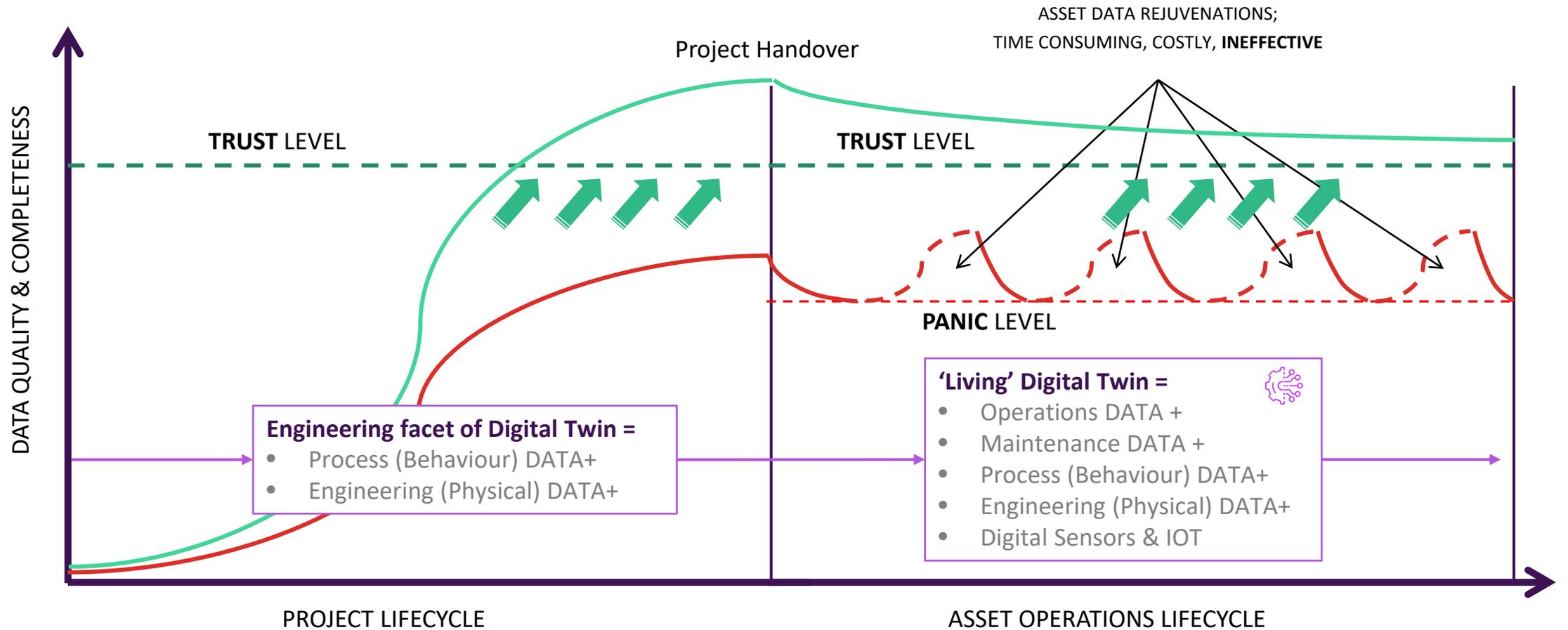**Top 5 challenges that prevented owner-operators from digitally enabling their most recently completed capital projects**

1	Limited interest and patience within on-ground project teams to drive data-driven digital decision making
2	Absence of a strategy and skills to build and deploy actionable insights with digital technologies
3	Siloed teams within and across project stakeholders
4	Poor understanding of how available data can be deployed for generating critical and tactical business insights
5	Inability of a stakeholder-driven strategy to execute shared incentive or collaborative contracting across the project value chain

Sustainability
Energy Transition
Carbon Reduction
Resilient Plant / Infrastructure

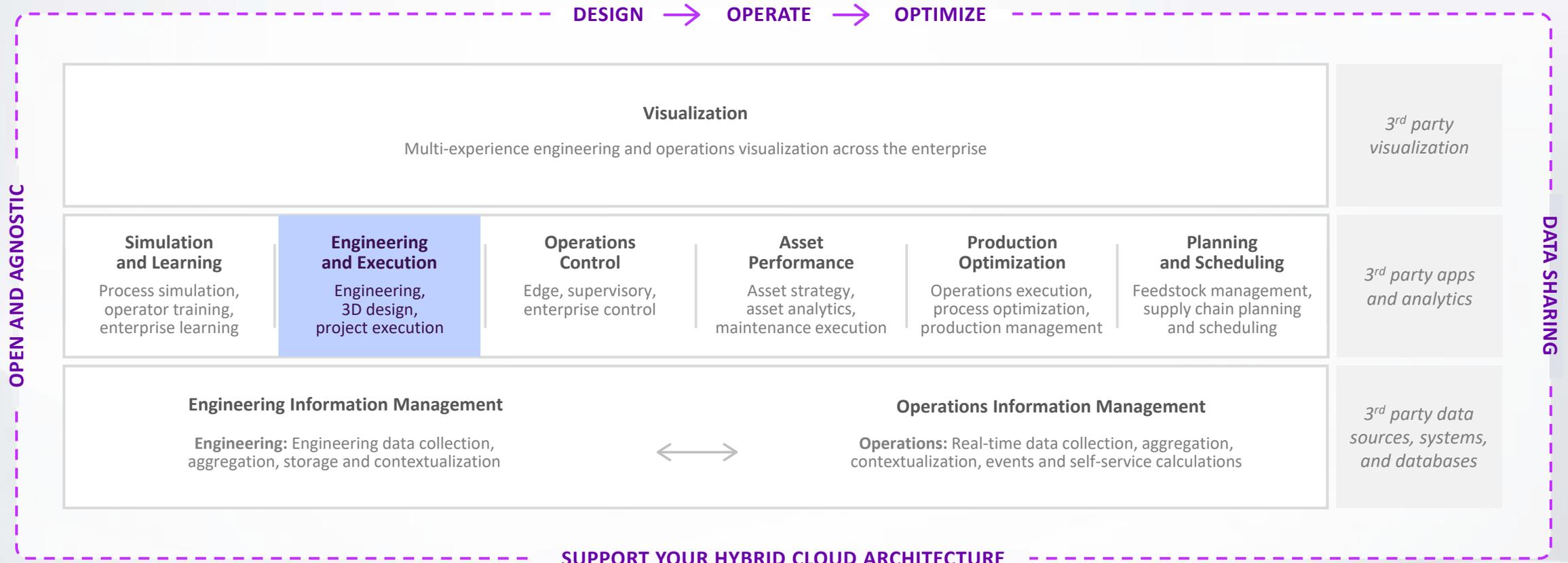**Top challenge faced by EPCs while executing the most recently completed capital project (by project stages)**

Business Development	Challenges creating accurate schedule, cost and benefit estimates
Project & Contract Management	Inability to integrate sustainability agenda with project partners
Design & Engineering	Managing engineering change impacts across project supply chain
Procurement	Fabrication facility equipment availability issues
Fabrication	Absence of a stakeholder-driven strategy to execute data-driven digital transformation across the project value chain
Construction & Commissioning	Limited ability to monitor productivity and verify time monitoring
Handover to Operations	Manually intensive process to manage data exchange, validation, and loading into operational systems
Operations & Maintenance	Lack of feedback of asset performance back to design and engineering

Source : AVEVA Customer Survey 2021, Accenture Capstone Framework Survey

AVEVA

Delivering the Digital Twin: Unified Data from CAPEX into OPEX

ASSET DATA REJUVENATIONS; TIME CONSUMING, COSTLY, **INEFFECTIVE**

Project Handover

DATA QUALITY & COMPLETENESS

TRUST LEVEL

TRUST LEVEL

PANIC LEVEL

Engineering facet of Digital Twin =
- Process (Behaviour) DATA+
- Engineering (Physical) DATA+

'Living' Digital Twin =
- Operations DATA +
- Maintenance DATA +
- Process (Behaviour) DATA+
- Engineering (Physical) DATA+
- Digital Sensors & IOT

PROJECT LIFECYCLE

ASSET OPERATIONS LIFECYCLE

AVEVA

Delivering a complete digital thread, purpose-built for industry

Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions

DESIGN → OPERATE → OPTIMIZE

OPEN AND AGNOSTIC

Visualization

Multi-experience engineering and operations visualization across the enterprise

3rd party visualization

Simulation and Learning	**Engineering and Execution**	**Operations Control**	**Asset Performance**	**Production Optimization**	**Planning and Scheduling**
Process simulation, operator training, enterprise learning	Engineering, 3D design, project execution	Edge, supervisory, enterprise control	Asset strategy, asset analytics, maintenance execution	Operations execution, process optimization, production management	Feedstock management, supply chain planning and scheduling

3rd party apps and analytics

Engineering Information Management

Engineering: Engineering data collection, aggregation, storage and contextualization

←→

Operations Information Management

Operations: Real-time data collection, aggregation, contextualization, events and self-service calculations

3rd party data sources, systems, and databases

DATA SHARING

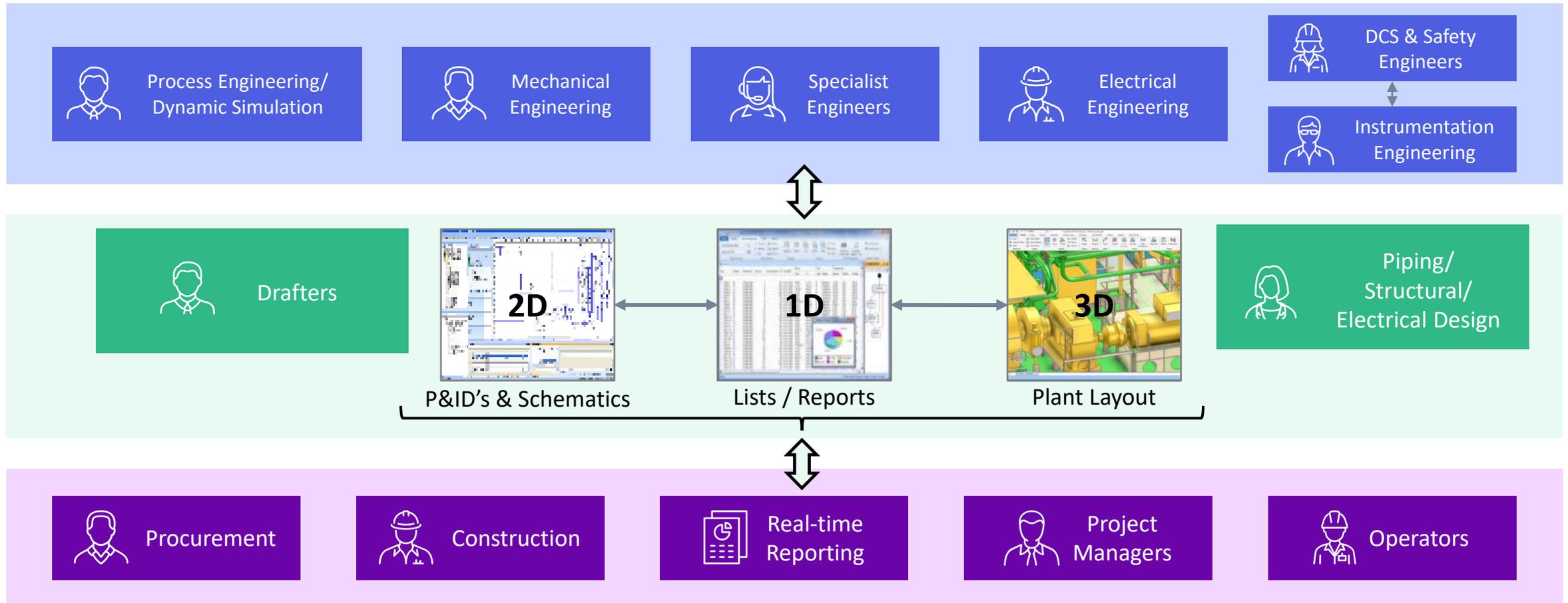**SUPPORT YOUR HYBRID CLOUD ARCHITECTURE**

20%+ TIC savings

AVEVA

Unified Engineering & Design
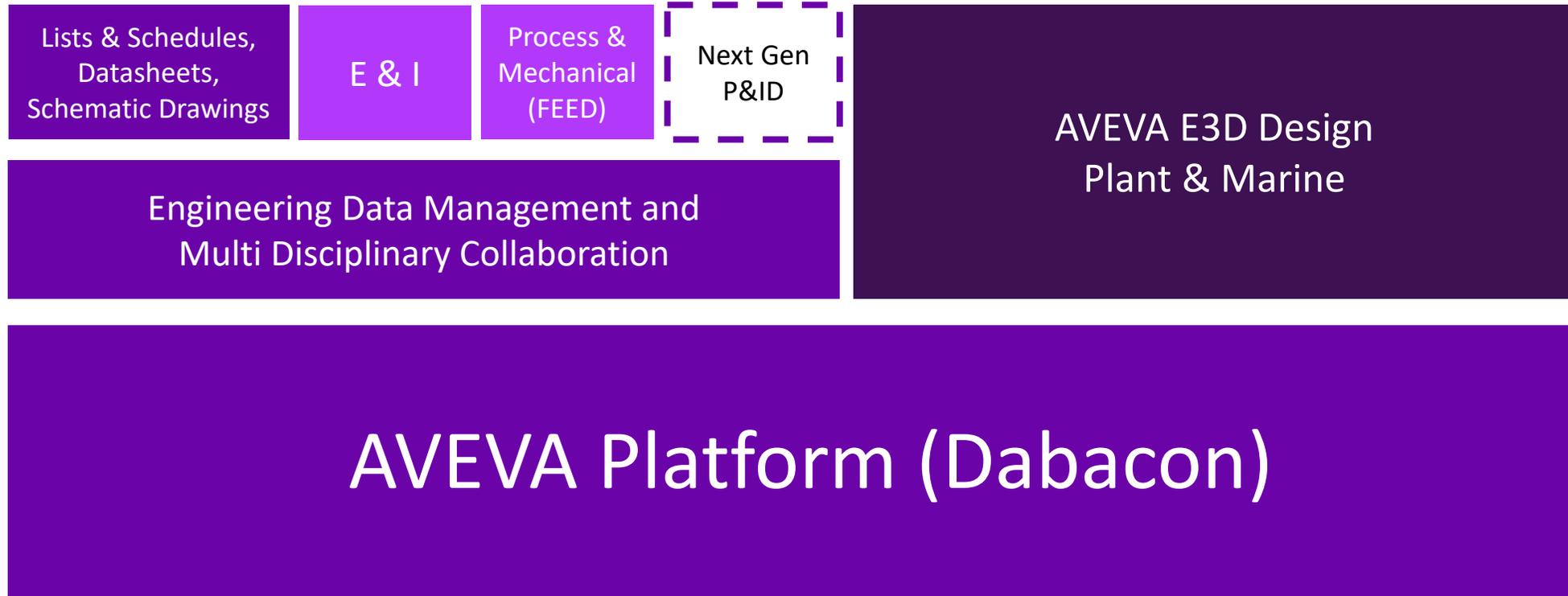
AVEVA

AVEVA Unified Engineering

1D, 2D, 3D multi-discipline engineering and design in a single, common database

Process Engineering/ Dynamic Simulation	Mechanical Engineering	Specialist Engineers	Electrical Engineering	DCS & Safety Engineers
				Instrumentation Engineering

Drafters

2D — P&ID's & Schematics

1D — Lists / Reports

3D — Plant Layout

Piping/ Structural/ Electrical Design

Procurement	Construction	Real-time Reporting	Project Managers	Operators

AVEVA

Single Authoring platform approach

Lists & Schedules, Datasheets, Schematic Drawings

E & I

Process & Mechanical (FEED)

Next Gen P&ID

AVEVA E3D Design Plant & Marine

Engineering Data Management and Multi Disciplinary Collaboration

AVEVA Platform (Dabacon)

AVEVA

Unified Engineering Evolution – 'Connecting' On-prem to Cloud

Products
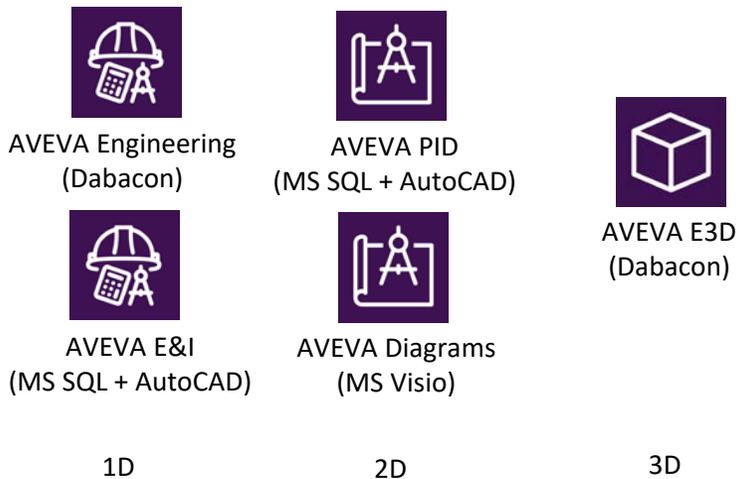
Suite

Hybrid

AVEVA Engineering
(Dabacon)

AVEVA PID
(MS SQL + AutoCAD)

AVEVA E3D
(Dabacon)

AVEVA E&I
(MS SQL + AutoCAD)

AVEVA Diagrams
(MS Visio)

1D   2D   3D

Unified Engineering (a la carte)

1D   2D   3D
(Dabacon + SQL + Visio + AutoCAD)

UE Cloud (VM)

(Dabacon + SQL + Visio + AutoCAD)

Unified Engineering

2D

1D   3D
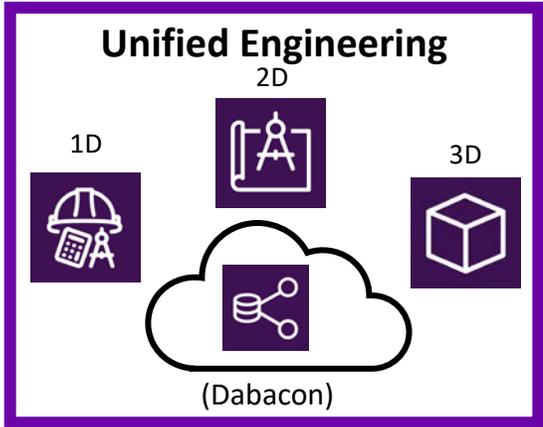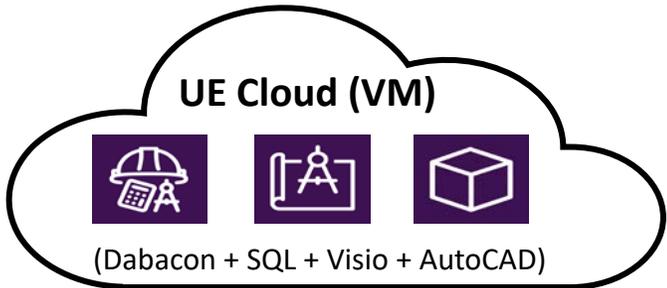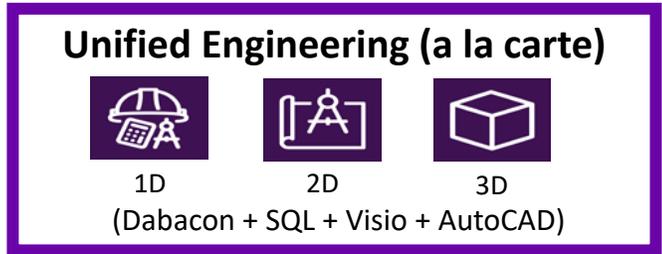
(Dabacon)

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AVEVA Unified Engineering Roadmap

- All Authoring Solutions on Dabacon
  - Electrical and Instrumentation
  - Next Generation P&ID
- Cloud UE Enhancements / Connect Evolution
  - Appstream vs AWS Workspaces – Enable Cloud UE Option in greater number of Regions and supporting Data Residency in countries
- Integration Enhancements
  - Secure File Share
  - AVEVA Engineering Integration Service (AEIS) Evolution of Data source to Data Source
  - REST API for applications & Corporate standardized Integration Central Cloud Data Management (Spectrum) – AVEVA E3D Design (Q1 2023)
- Hybrid Common Cloud Offer for Multi-site, Multi-region, Multi-organizations
  - Phased Release with 3D first, 1D/2D added in Q4 2023
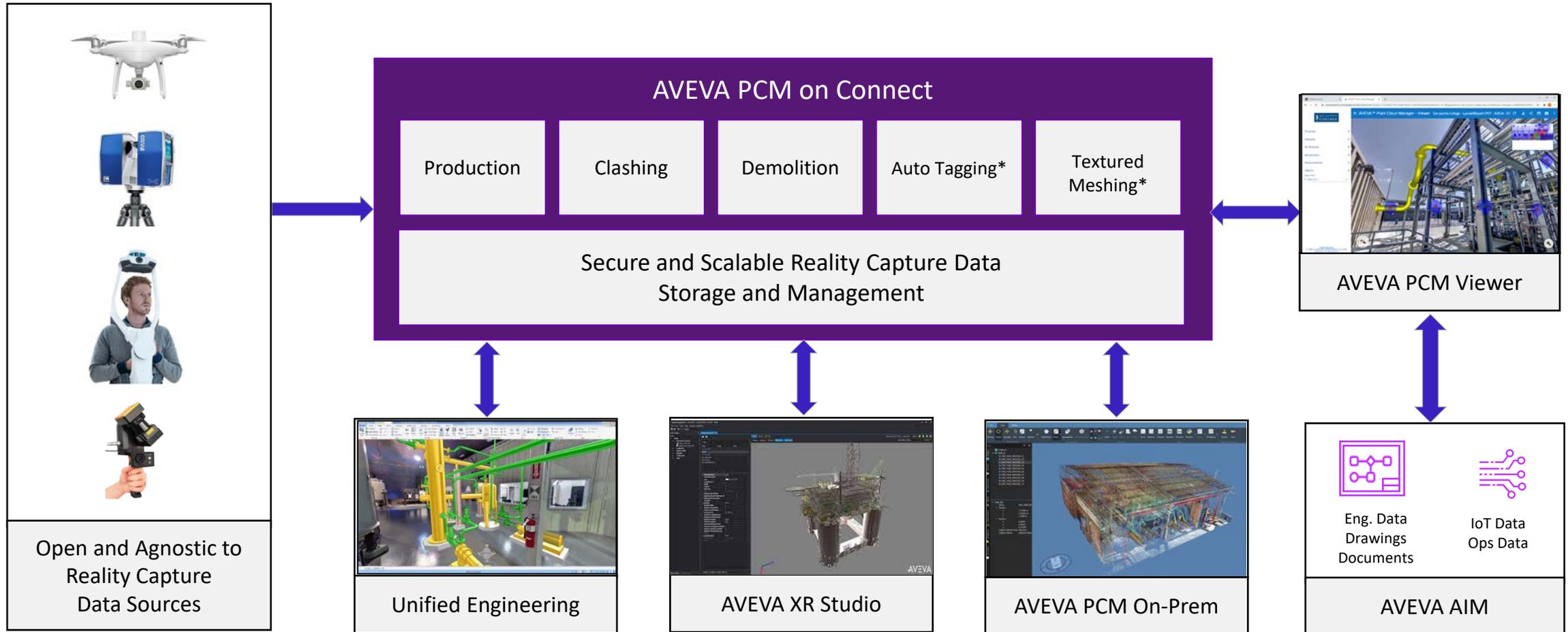 - Offer access from on-prem or cloud
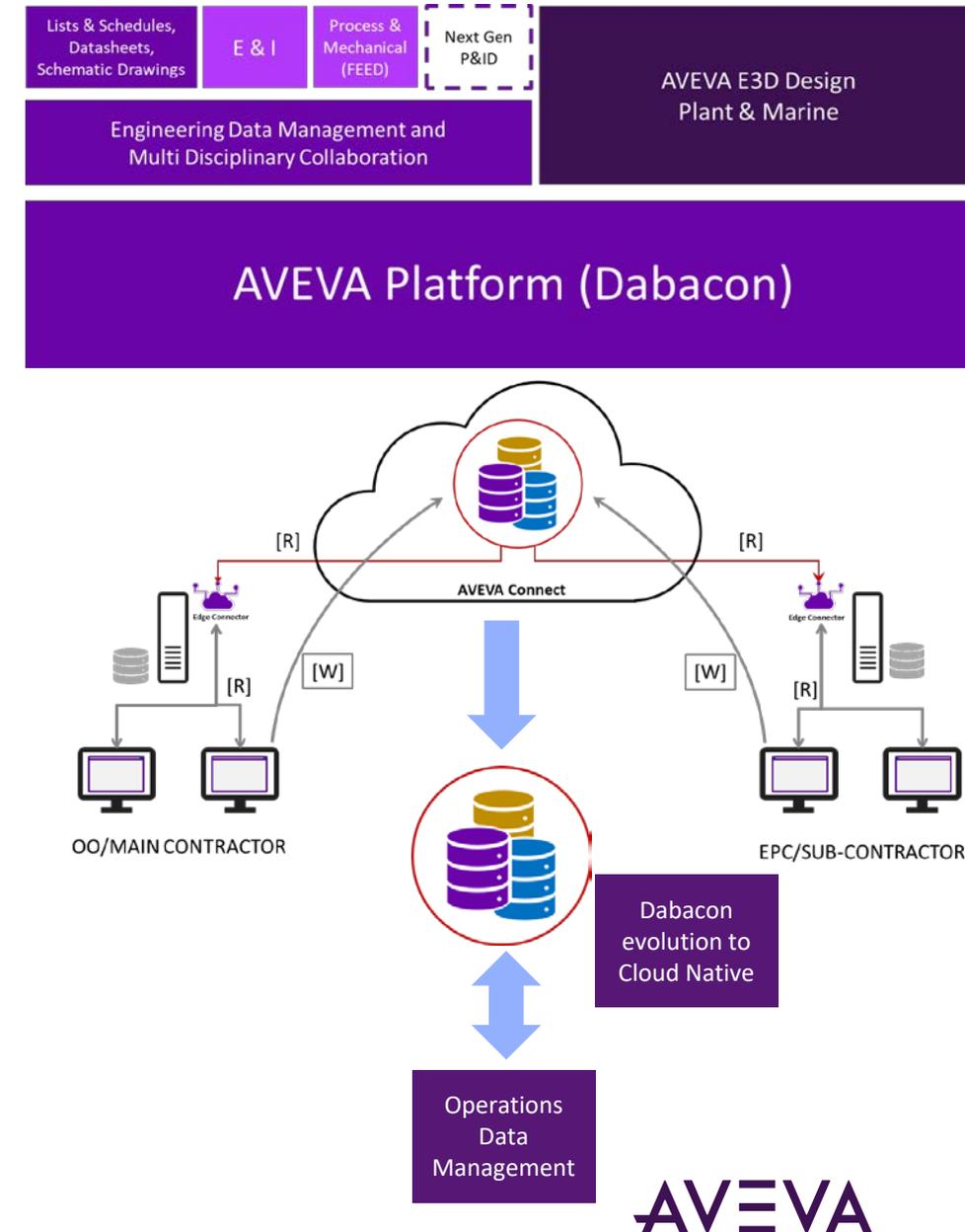
Point Cloud Manager
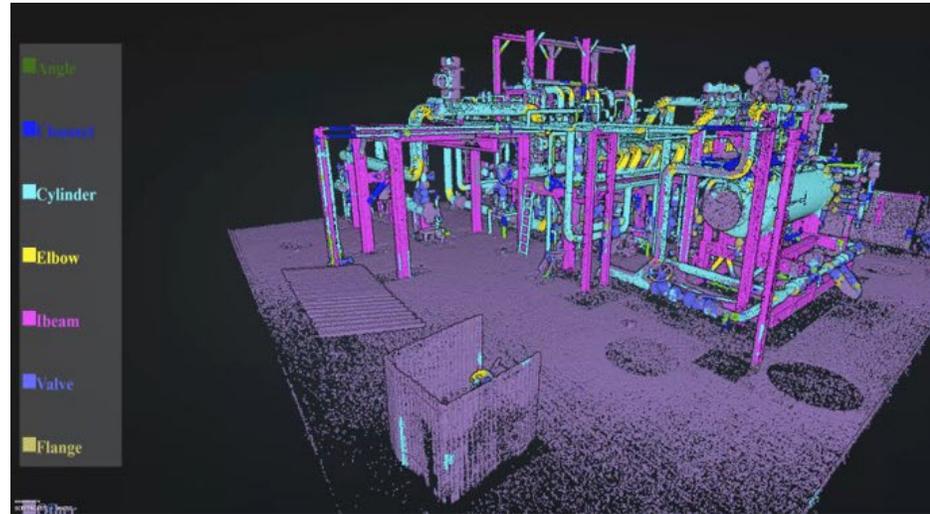
AVEVA

AVEVA PCM Mission: To deliver a platform that puts 3D reality capture data at the heart of the AVEVA Digital Twin

Open and Agnostic to Reality Capture Data Sources

AVEVA PCM on Connect

Production	Clashing	Demolition	Auto Tagging*	Textured Meshing*

Secure and Scalable Reality Capture Data Storage and Management

AVEVA PCM Viewer

Unified Engineering

AVEVA XR Studio

AVEVA PCM On-Prem

Eng. Data Drawings Documents — IoT Data Ops Data

AVEVA AIM

AVEVA

AVEVA's vision for Intelligent Pointcloud

- Automated classification and tagging of objects identified in 3D point clouds captured from laser scanning an asset - to intelligently unlock the content of 3D data

- Achieved through "Artificial Intelligence as a Service" which will trawl through Point Cloud data

- Eradicates the pain of manually locating and tagging key items such as vessels, pumps, pipes, valves, etc.

Project Execution

AVEVA

NextGen AVEVA Project Execution through partnership

Current Solutions
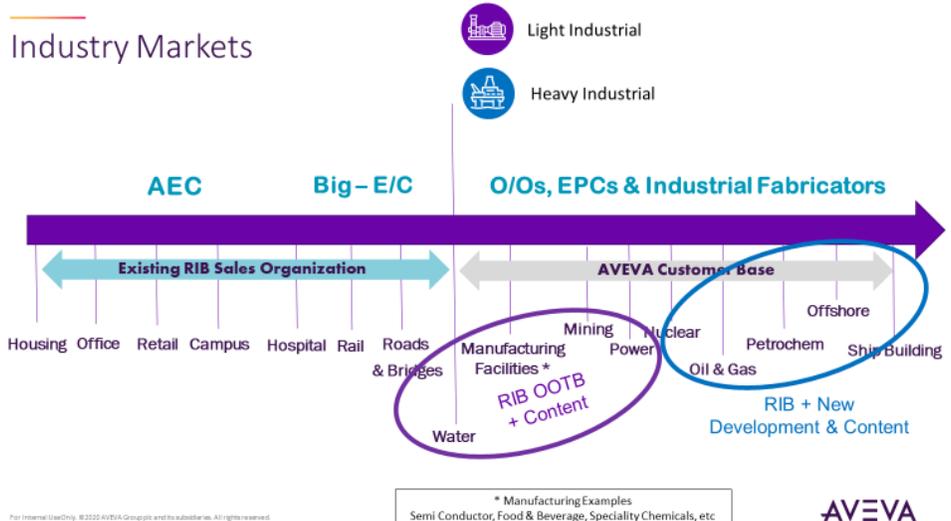
Enterprise Resource Management (ERM)

Contract Risk Management (CRM)

Construction Planning (AWP) : ERM

RIB MTWO for Light Industrial
- Cost Estimation
- Project Controls
- Model & Data Management

NEW

Coming Soon!

ERM: Materials Control – Track & Trace, Insights

Contract Risk Management: Smart Analytics, Workflow enhancement

Construction Planning (AWP): ERM + control tower

RIB MTWO for Heavy Industrial
- Cost Estimation and Project Controls
- Estimation integrated with AVEVA Simulation solutions
- Dashboarding & Connected Worker
- Integrated with AVEVA Solutions

NEW

NextGen UPE (Future Roadmap)

Enterprise Resource Management: NextGen +

Contract Risk Management: NextGen +

Construction Planning (AWP): VCM + AI

RIB MTWO:
- Cost Estimation and Project Controls
- Estimation integrated with AVEVA Simulation solutions
- Dashboarding & Connected Worker
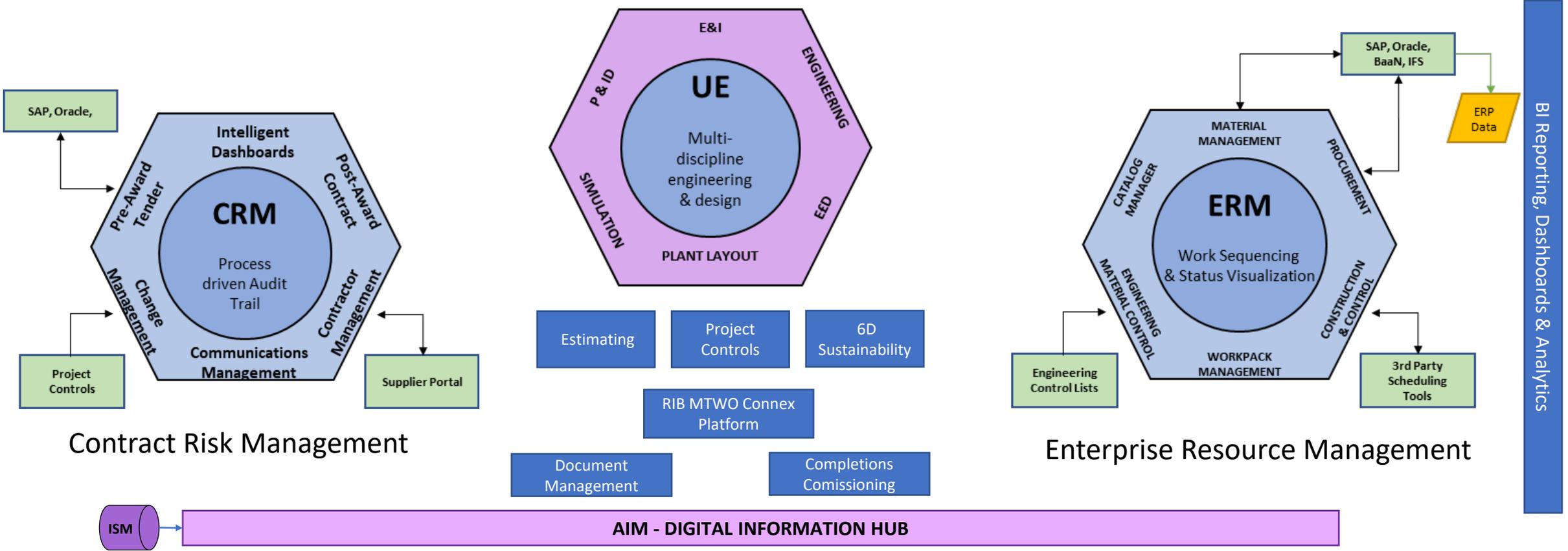- Integrated with AVEVA Solutions

Completions, Commissioning and WP Execution

Inspections (Weld and Flange Management)

Material / Asset Track & Trace

Document Management

NEW

Industry Markets

Light Industrial

Heavy Industrial

AEC   Big – E/C   O/Os, EPCs & Industrial Fabricators

Existing RIB Sales Organization   AVEVA Customer Base

Housing   Office   Retail   Campus   Hospital   Rail   Roads & Bridges   Manufacturing Facilities *   Mining   Power   Nuclear   Water   Oil & Gas   Petrochem   Offshore   Ship Building

RIB OOTB + Content

RIB + New Development & Content

Current AVEVA
From RIB
New

* Manufacturing Examples
Semi Conductor, Food & Beverage, Speciality Chemicals, etc

AVEVA

AVEVA Project Execution Solutions

Sustainability (Total Carbon Footprint Monitoring)

Contract Risk Management

Enterprise Resource Management

VISION — Deliver a fully capability set of project delivery applications that are integrated to the AVEVA digital platform that support our customers' ability to drive project value (25% TIC), delivery assurance and sustainability
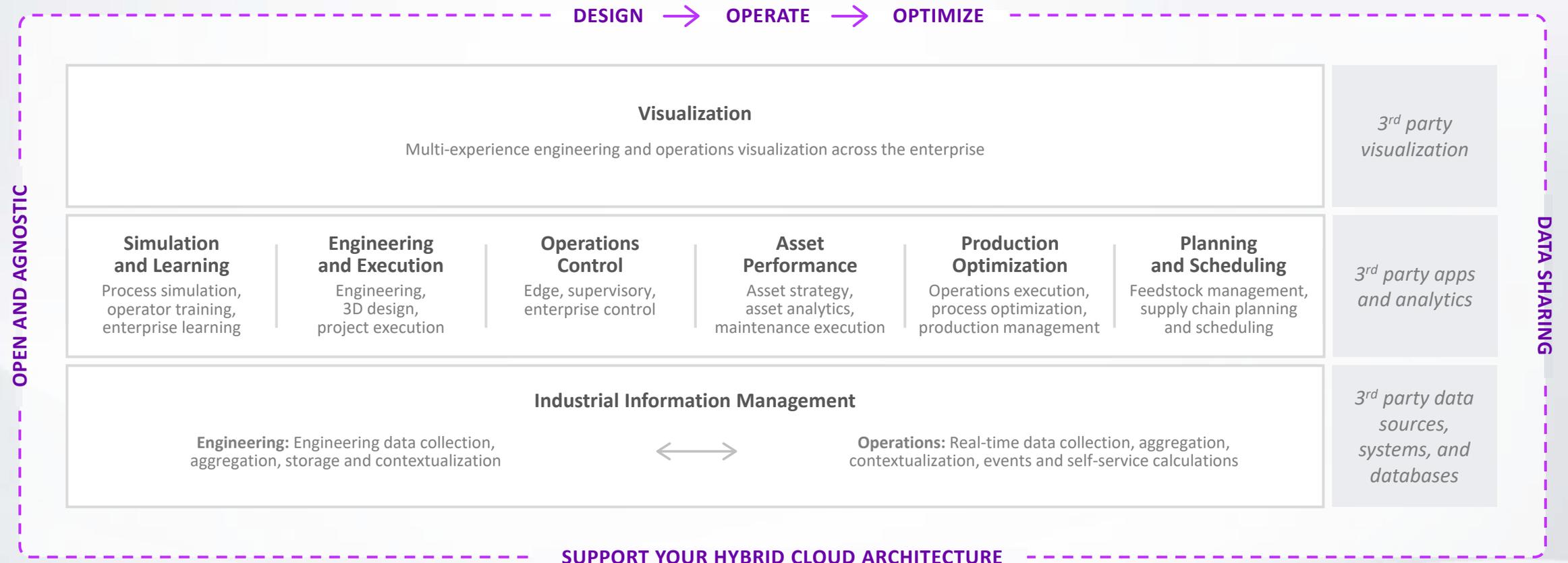
NOVEMBER 2022

Connect and Visualize – AVEVA's Engineering Information Management roadmap

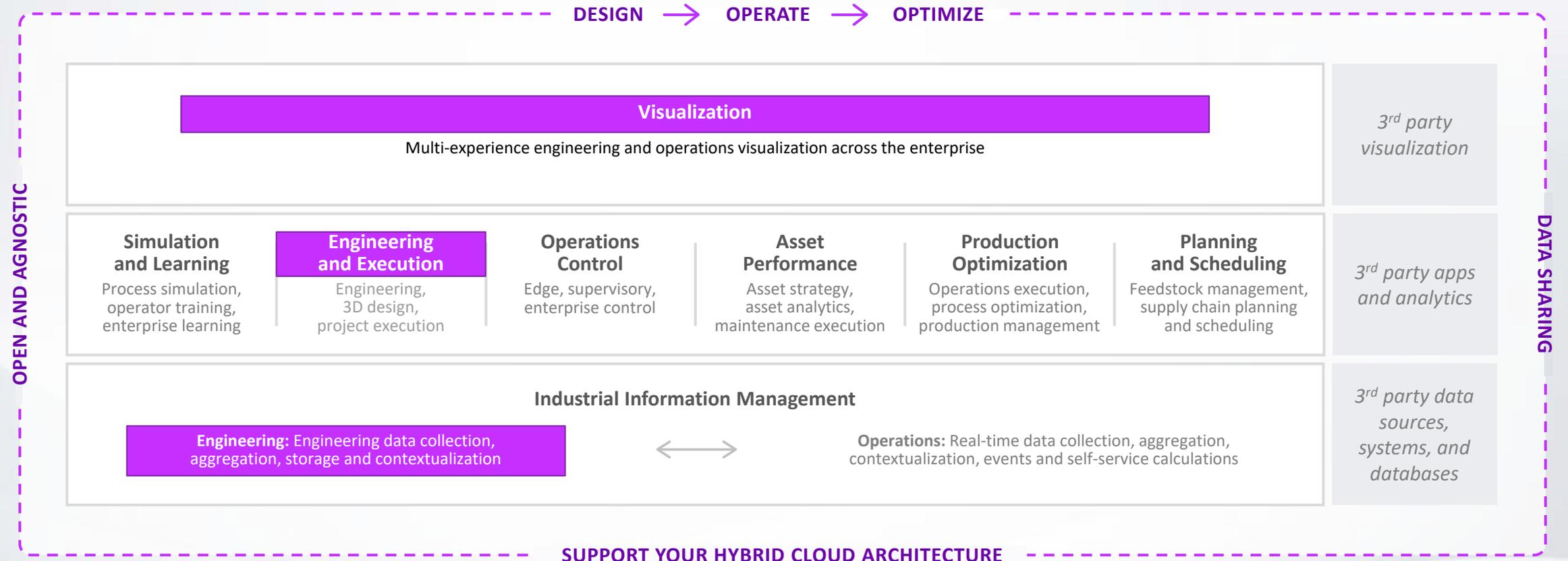Rick Standish – Vice President, Engineering Information Management, AVEVA

Delivering a complete digital thread, purpose-built for industry

Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions

DESIGN → **OPERATE** → **OPTIMIZE**

OPEN AND AGNOSTIC

DATA SHARING

Visualization
Multi-experience engineering and operations visualization across the enterprise

3rd party visualization

Simulation and Learning	**Engineering and Execution**	**Operations Control**	**Asset Performance**	**Production Optimization**	**Planning and Scheduling**
Process simulation, operator training, enterprise learning	Engineering, 3D design, project execution	Edge, supervisory, enterprise control	Asset strategy, asset analytics, maintenance execution	Operations execution, process optimization, production management	Feedstock management, supply chain planning and scheduling

3rd party apps and analytics

Industrial Information Management

Engineering: Engineering data collection, aggregation, storage and contextualization

←→

Operations: Real-time data collection, aggregation, contextualization, events and self-service calculations

3rd party data sources, systems, and databases

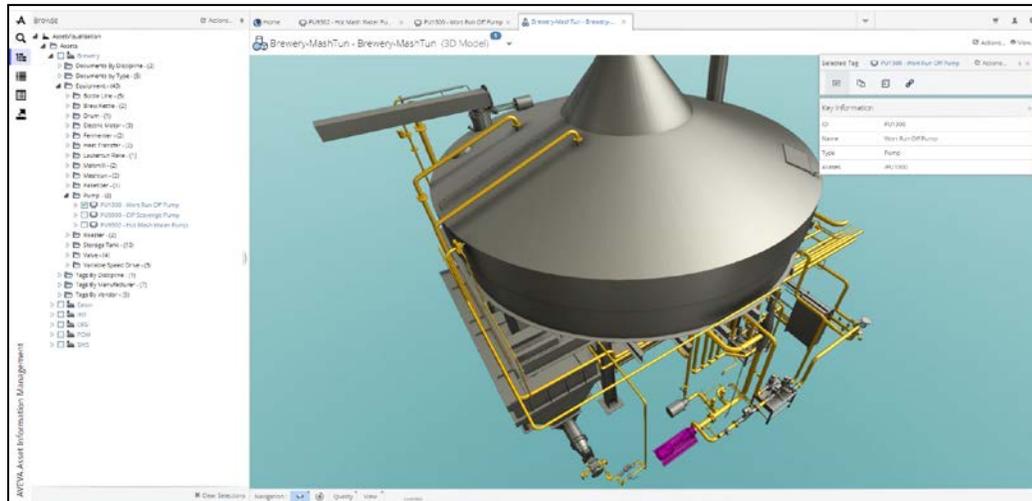**SUPPORT YOUR HYBRID CLOUD ARCHITECTURE**

AVEVA

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⟷

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SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

AVEVA

AVEVA Asset Information Management Roadmap

Redefining Asset Insights
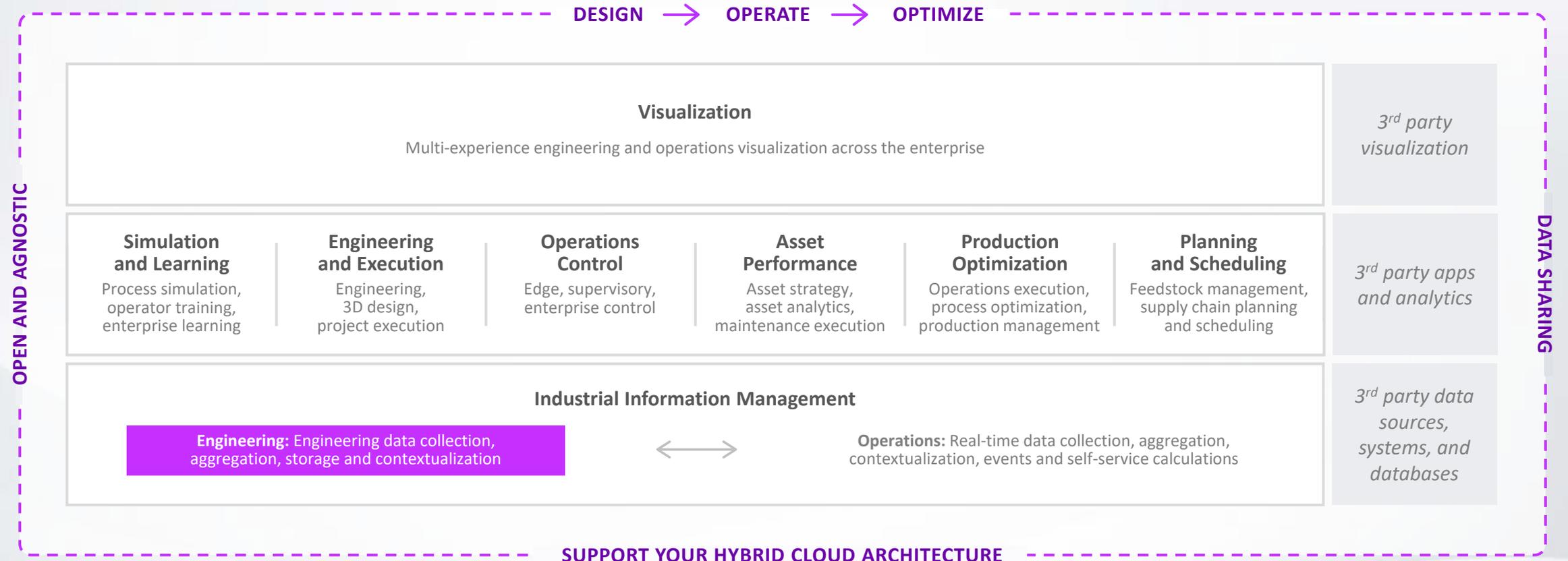

Scaling Visualization

AVEVA | Aras

Partnering for the Asset Lifecycle

AVEVA

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DATA SHARING

SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

AVEVA

The Digital Twin : Information mastery across the asset lifecycle

A unified data platform for better and faster decision-making combining both the engineering and operational data segments of industrial information.

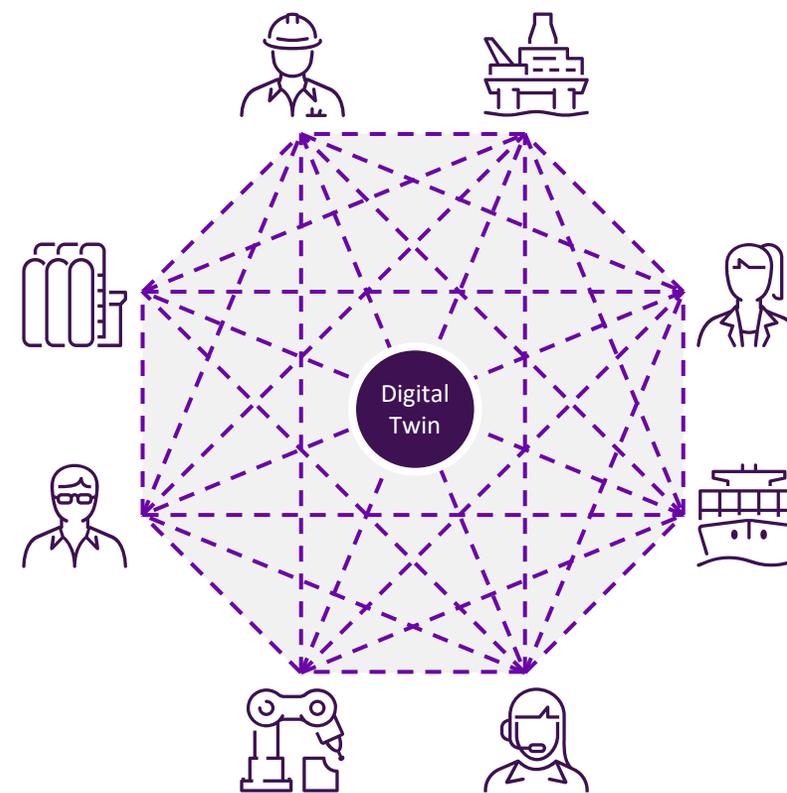|	
Data Aggregation	Aggregate and align information from multiple sources to create a single source of truth for a given piece of data
Data in Context	1D/2D/3D contextual enrichment of information to improve the quality and speed of decisions
Data Management	Configuration, change management, approval and baselining of engineering data and requirements.
Data Sharing	Democratize access to information for internal and external stakeholders (OEMs, Partners, etc.)

UNIFICATION OF DATA IN THE DIGITAL TWIN

Digital Twin

AVΞVA

Bringing the Digital Twin To Life

Physical Asset

Digital Twin

Information Standards Management

CORPORATE STANDARDS

| Native Formats | Spreadsheet | 3D Model | Laser Scan | Documents | Drawings | Images | Plant sequential Data | Maintenance Data | Inspections Data | Simulation Data | Spares Data |

Plant Structured and Unstructured Data   **Realtime data**   **Transactional data**
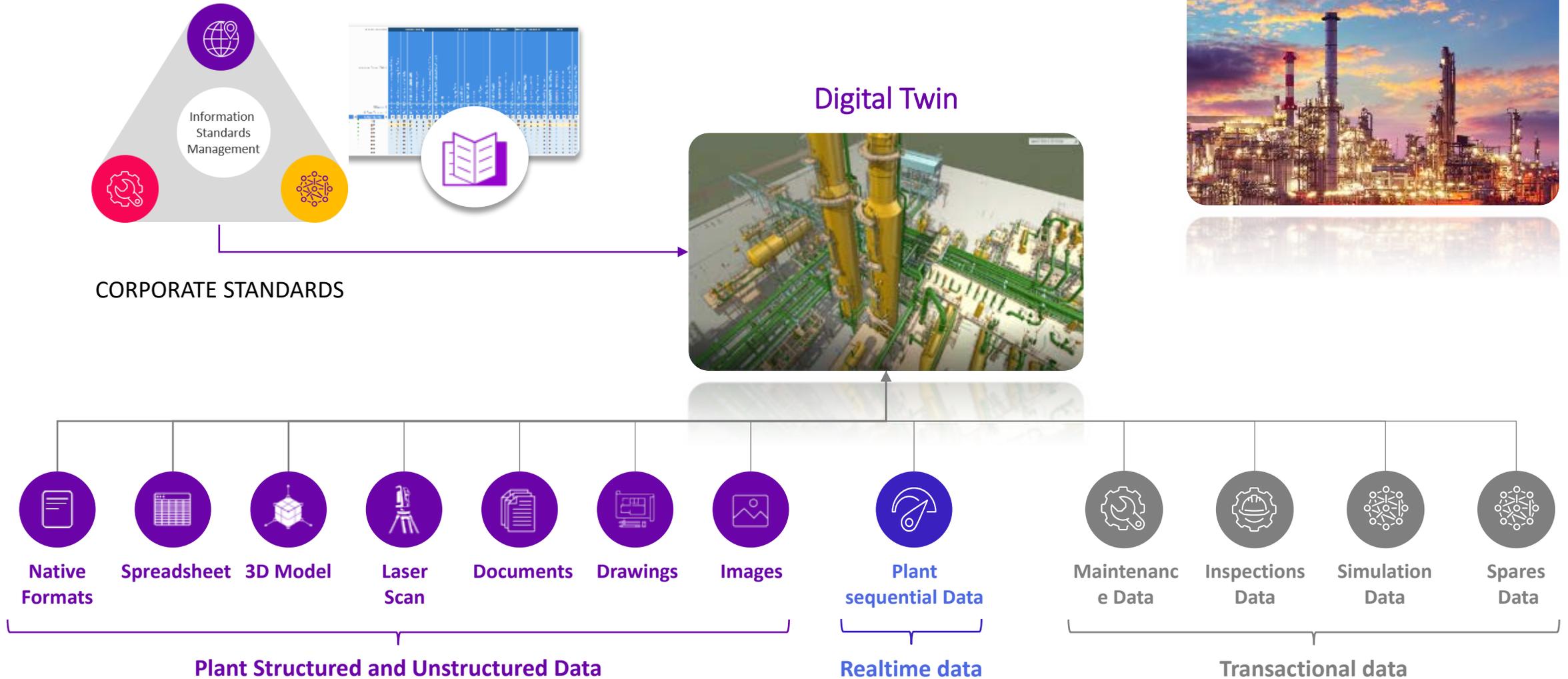
AVEVA

AVEVA Asset Information Management - Advanced
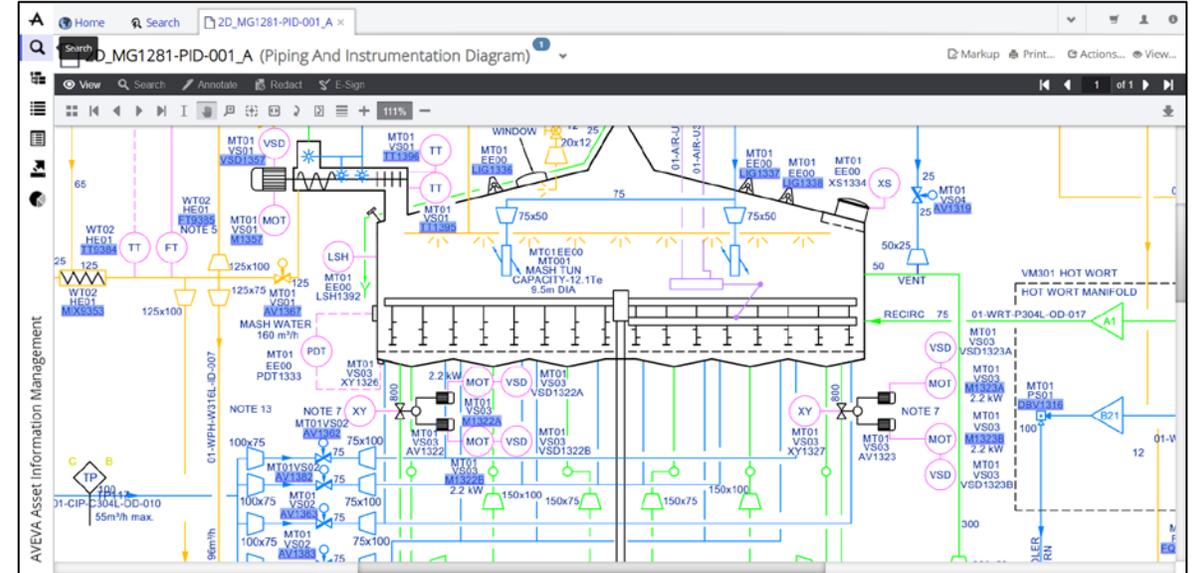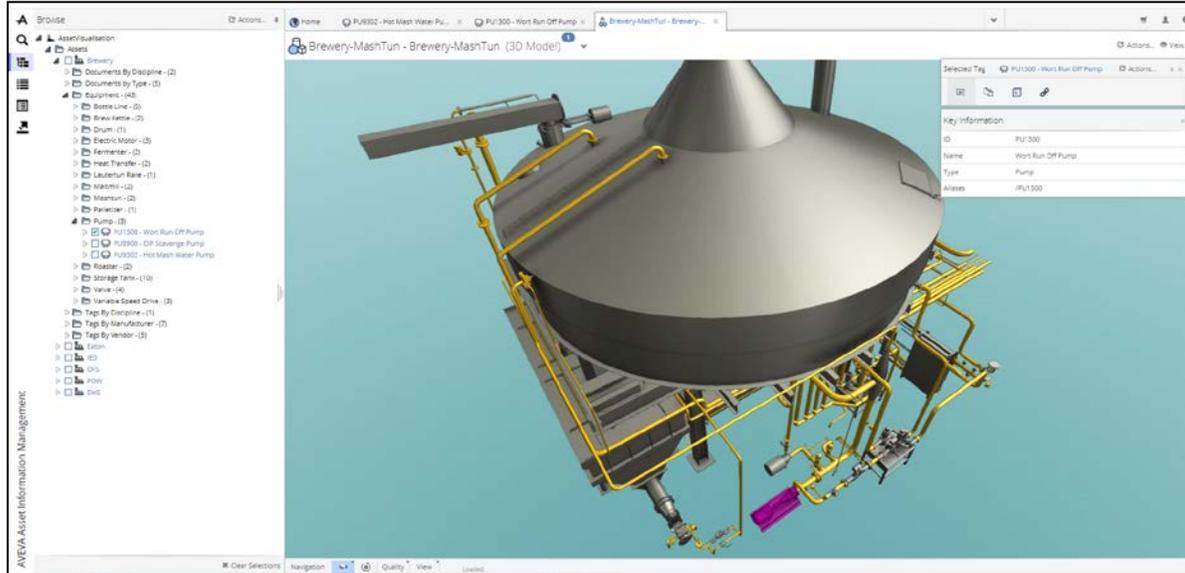
Eliminate data silos with all information available in one place

Improve safety and compliance with quick access to critical information

Gain the insights necessary for informed, good decision making

Save time and effort on finding and validating information

Empower teams to collaborate with a 360° view of data

Reduce costs and time to value with a cloud solution

AVEVA Asset Information Management™ 5.1.9 *The Future of Engineering Information Management*
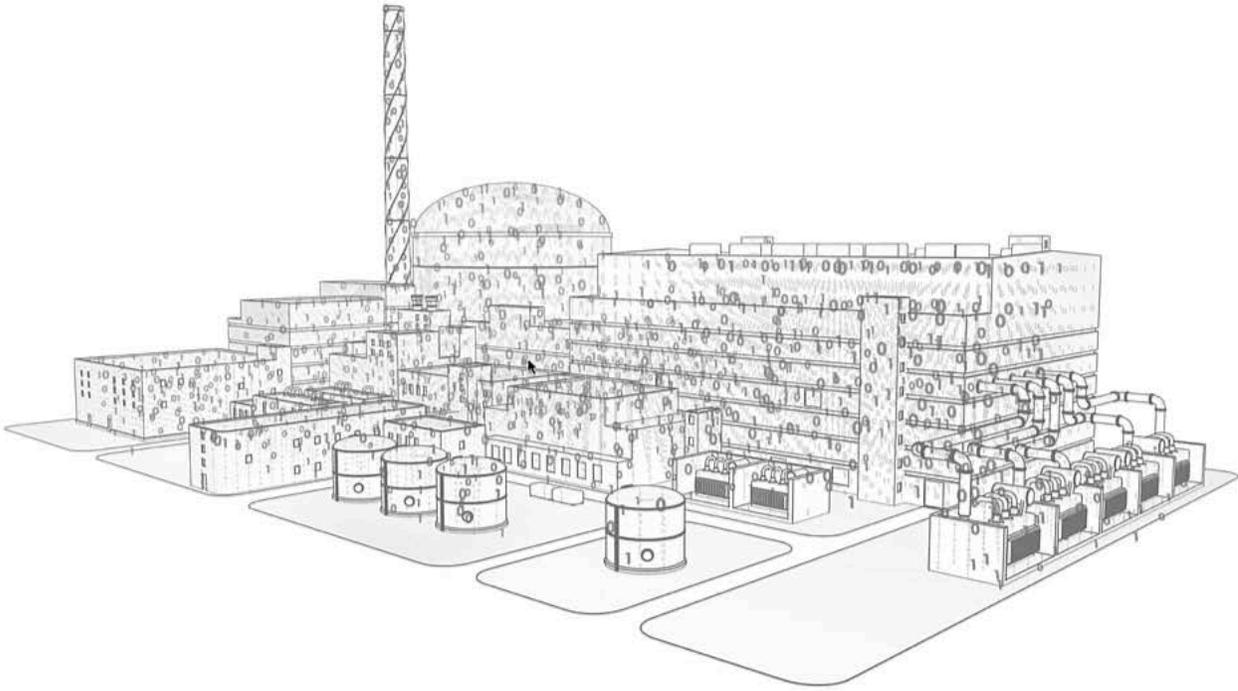
Powerful and effective
Information Management for
Engineering and Operations

Collect

Bring together information in multiple formats and from various source systems to create a complete cross-reference index with links to, and associations between, all items in the digital asset.

Locate

Provide fast and powerful search capabilities which, combined with its knowledge of tag and document associations, delivers efficient and effective location of information required for decision making.

Discover

Automatically extract and maintain tag to tag, tag to document, and document to document relationships. Exploiting this interconnectivity, it provides efficient navigation of the digital assets and aids in the discovery of new insights in your information.

View

Deliver high-quality web-based visualisation of tag data, documents, drawings, 3D models and laser scans. Automatic creation of hotspots and hyperlinks provides additional intelligence for easy identification and navigation of tags.

Report

Improve project and operational compliance by aggregating project and asset data to report on the quality, consistency, and completeness of your information.
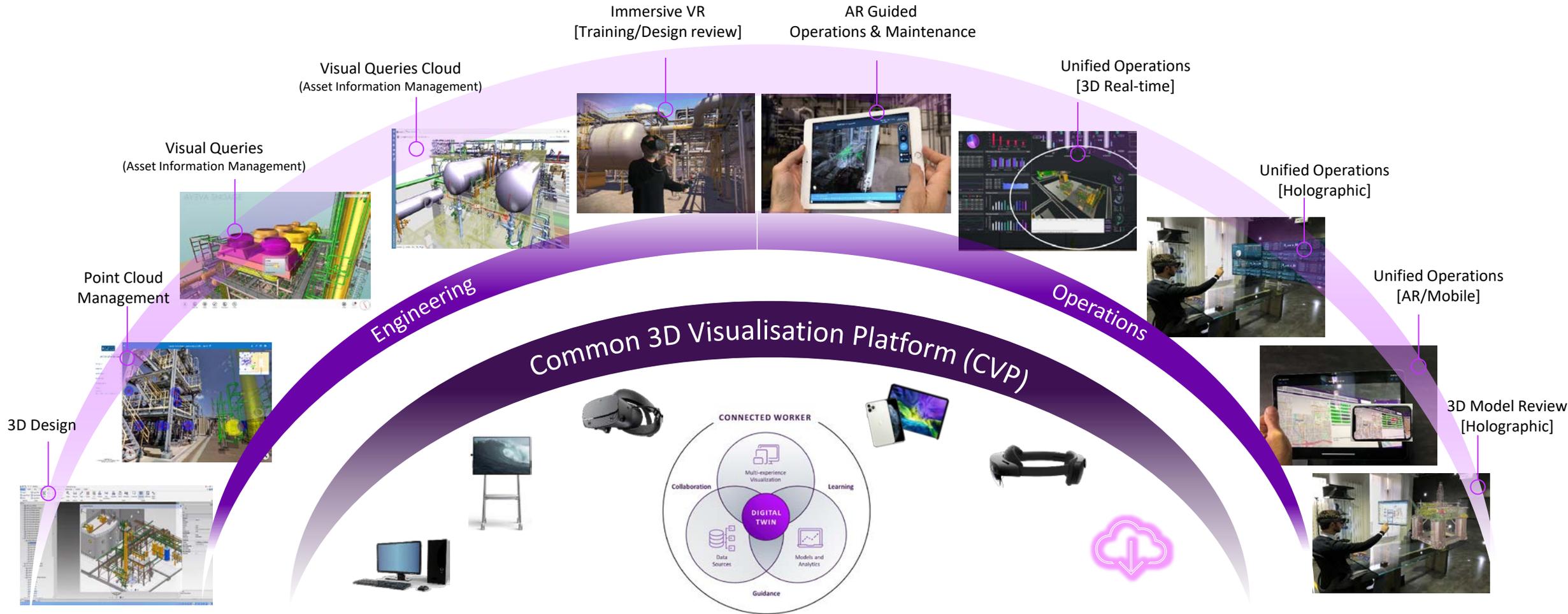
AVEVA Asset Information Management
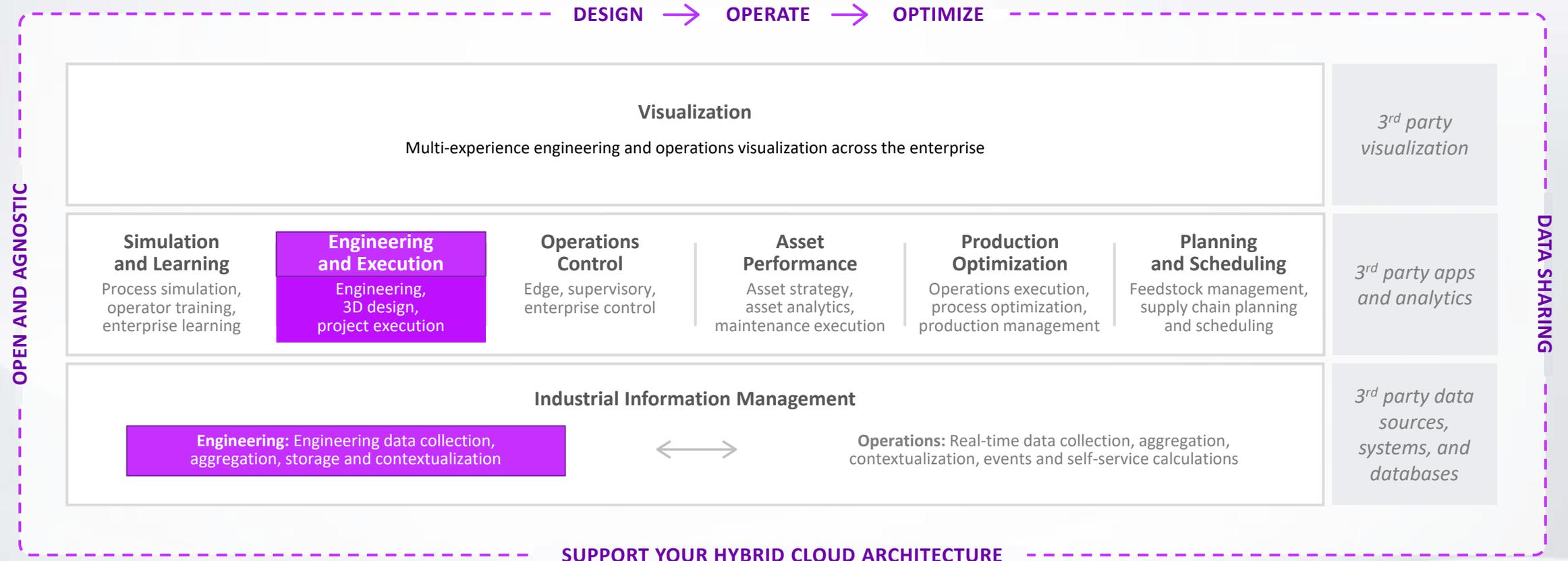
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Accelerate time to value with flexible, scalable, and trusted industrial hybrid SaaS solutions

DESIGN → **OPERATE** → **OPTIMIZE**

OPEN AND AGNOSTIC

Visualization
Multi-experience engineering and operations visualization across the enterprise

3rd party visualization

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Industrial Information Management

Engineering: Engineering data collection, aggregation, storage and contextualization ⟷ **Operations:** Real-time data collection, aggregation, contextualization, events and self-service calculations

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DATA SHARING

SUPPORT YOUR HYBRID CLOUD ARCHITECTURE

AVEVA

Redefining what can be asked and how we can ask it

Immersive VR
[Training/Design review]

AR Guided
Operations & Maintenance

Visual Queries Cloud
(Asset Information Management)

Unified Operations
[3D Real-time]

Visual Queries
(Asset Information Management)

Unified Operations
[Holographic]

Point Cloud
Management

Unified Operations
[AR/Mobile]

Engineering

Operations

Common 3D Visualisation Platform (CVP)

3D Design

3D Model Review
[Holographic]

CONNECTED WORKER

Collaboration

Multi-experience
Visualization

Learning

DIGITAL
TWIN

Data
Sources

Models and
Analytics

Guidance

AVEVA

Whole Asset Insights

Whole Asset Insights

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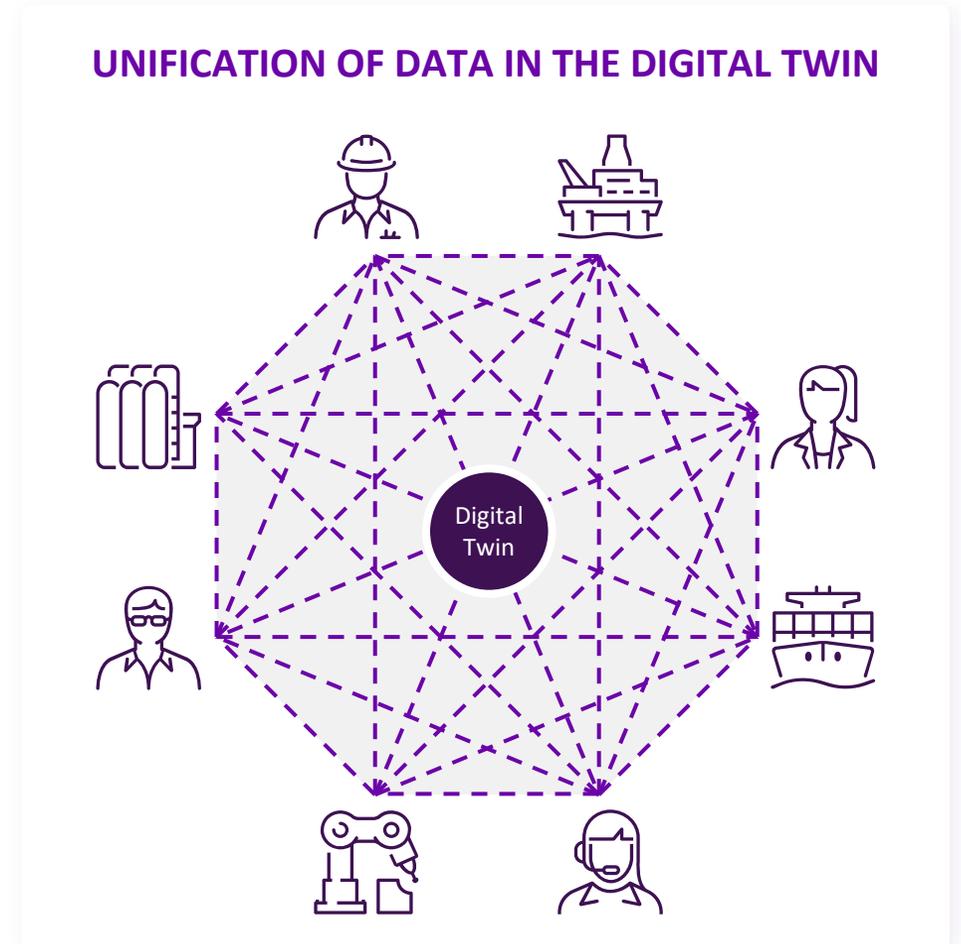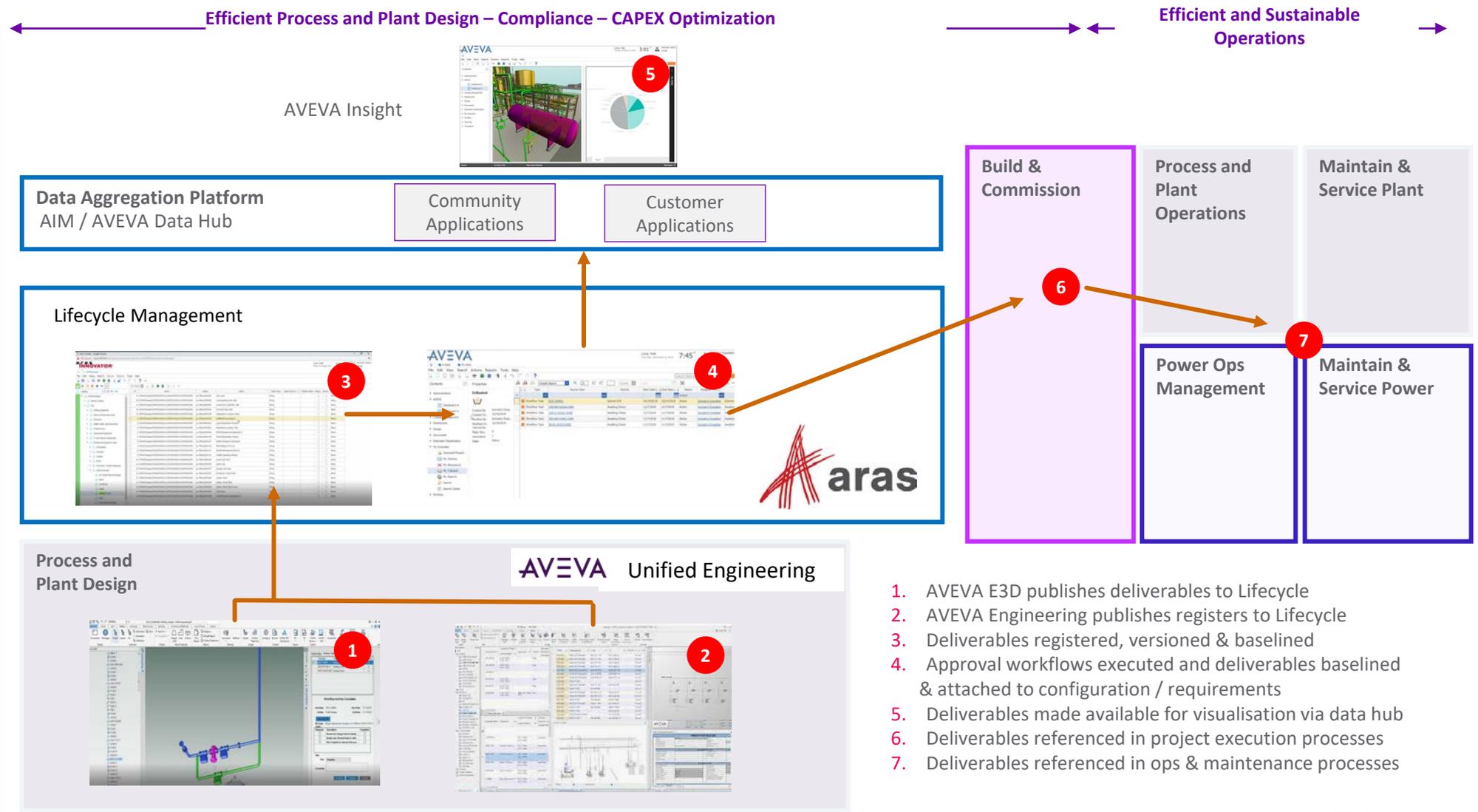| **Data Aggregation** | Aggregate and align information from multiple sources to create a single source of truth for a given piece of data |
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UNIFICATION OF DATA IN THE DIGITAL TWIN

Digital Twin

AVEVA

AVEVA Announces a Strategic Licensing Partnership with Aras

A unified data platform for better and faster decision-making combining both the engineering and operational data segments of industrial information.

Data Aggregation	Aggregate and align information from multiple sources to create a single source of truth for a given piece of data
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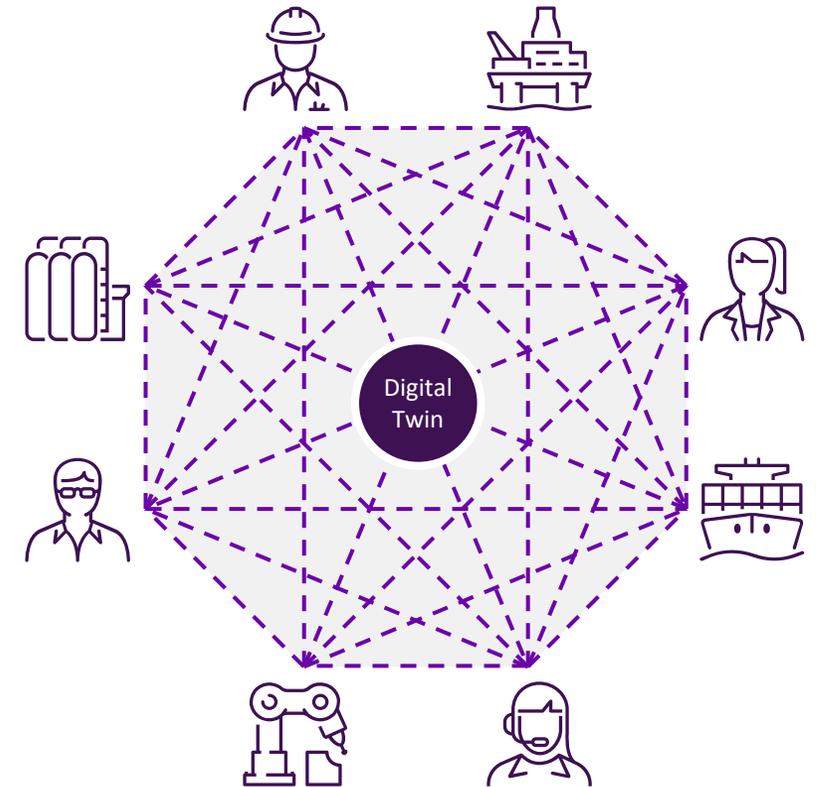
Digital Twin

AVEVA

Joint Value Proposition Example: System of Record for the Engineering Digital Twin (Aras – AVEVA)

Efficient Process and Plant Design – Compliance – CAPEX Optimization

Efficient and Sustainable Operations

Customer Problems to solve

Engineering system of record for the AVEVA Digital Twin

Change and workflow management for Engineering data

Data compliance and quality verification for Engineering Handover

Requirements and configuration management for regulated industries (e.g. Nuclear)

Sister ship and serial management for the marine industries

Product lifecycle management for highly complex ETO products

Visualization and community sharing of verified data for the extended supply chain

AVEVA Insight — 5

Data Aggregation Platform
AIM / AVEVA Data Hub

| Community Applications | Customer Applications |

Lifecycle Management — 3 — 4

aras

Build & Commission — 6

Process and Plant Operations

Maintain & Service Plant

Power Ops Management — 7

Maintain & Service Power

Process and Plant Design

AVEVA Unified Engineering — 1 — 2

1. AVEVA E3D publishes deliverables to Lifecycle
2. AVEVA Engineering publishes registers to Lifecycle
3. Deliverables registered, versioned & baselined
4. Approval workflows executed and deliverables baselined & attached to configuration / requirements
5. Deliverables made available for visualisation via data hub
6. Deliverables referenced in project execution processes
7. Deliverables referenced in ops & maintenance processes

AVEVA

Aras: Solutions Portfolio

Low-Code Platform

Digital Thread

Enterprise SaaS

aras INNOVATOR

Connectors to other Enterprise Apps

RE	SA	PM	SM	PE	CE	TD	MPP	QMS	DTC
Requirements Engineering	Systems Architecture	Program Management	Simulation Management	Product Engineering	Component Engineering	Technical Documentation	Manufacturing Process Planning	Quality Management System	Digital Twin Core

INDUSTRIAL LOW-CODE MODELING ENGINE

PLATFORM SERVICES

REPOSITORY

AVEVA

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VP Engineering & Design

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- julien.debeer@aveva.com

Rick Standish

VP Engineering Information Management

- AVEVA
- rick.standish@aveva.com

AVΞVA

Questions?

Please wait for the microphone.

State your name and company.

Please remember to...

Navigate to this session in the mobile app to complete the survey.

Thank you!

AVEVA
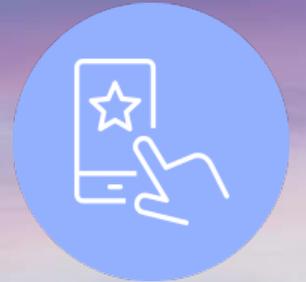
This presentation may include predictions, estimates, intentions, beliefs and other statements that are or may be construed as being forward-looking. While these forward-looking statements represent our current judgment on what the future holds, they are subject to risks and uncertainties that could result in actual outcomes differing materially from those projected in these statements. No statement contained herein constitutes a commitment by AVEVA to perform any particular action or to deliver any particular product or product features. Readers are cautioned not to place undue reliance on these forward-looking statements, which reflect our opinions only as of the date of this presentation.

The Company shall not be obliged to disclose any revision to these forward-looking statements to reflect events or circumstances occurring after the date on which they are made or to reflect the occurrence of future events.

AVEVA

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@avevagroup

ABOUT AVEVA

AVEVA is a global leader in industrial software, sparking ingenuity to drive responsible use of the world's resources. The company's secure industrial cloud platform and applications enable businesses to harness the power of their information and improve collaboration with customers, suppliers and partners.

Over 20,000 enterprises in over 100 countries rely on AVEVA to help them deliver life's essentials: safe and reliable energy, food, medicines, infrastructure and more. By connecting people with trusted information and AI-enriched insights, AVEVA enables teams to engineer efficiently and optimize operations, driving growth and sustainability.

Named as one of the world's most innovative companies, AVEVA supports customers with open solutions and the expertise of more than 6,400 employees, 5,000 partners and 5,700 certified developers. With operations around the globe, we are headquartered in Cambridge, UK and listed on the London Stock Exchange's FTSE 100.

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