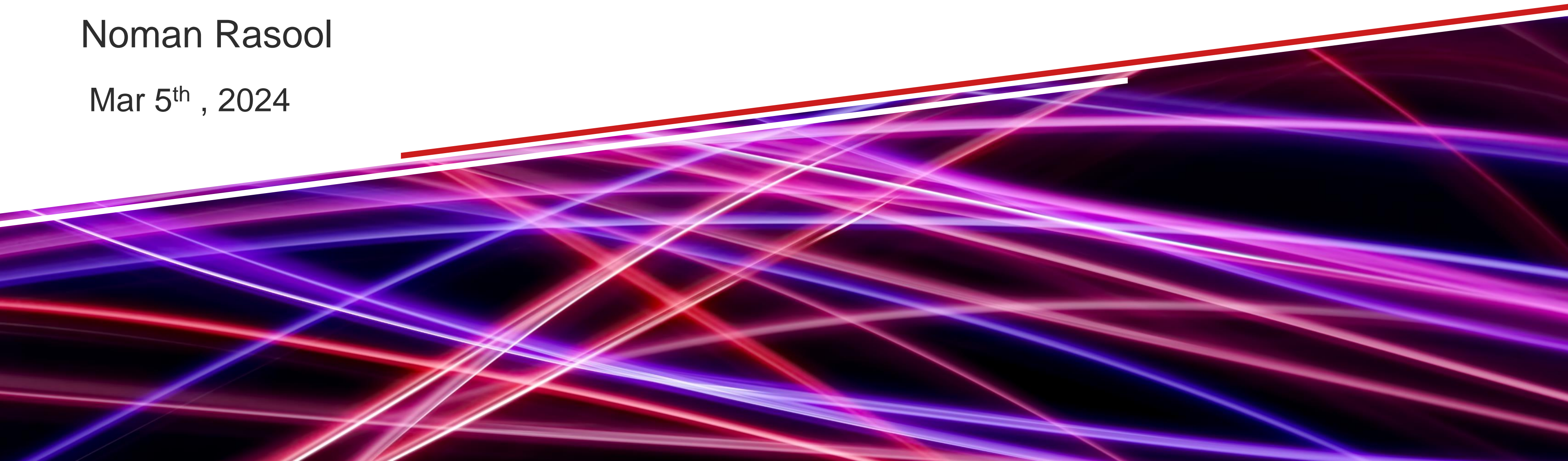


ACE 2024

Aras Cloud Migration and MPP Incorporation in Svante Inc

Noman Rasool

Mar 5th , 2024

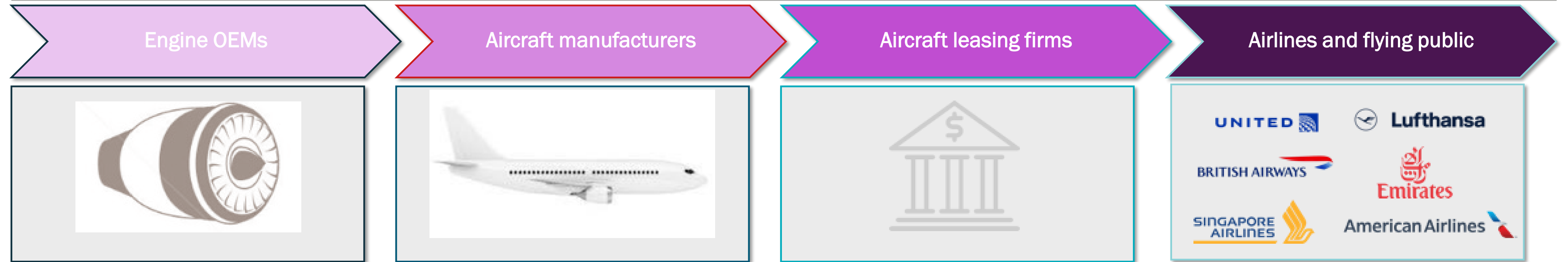


Agenda:

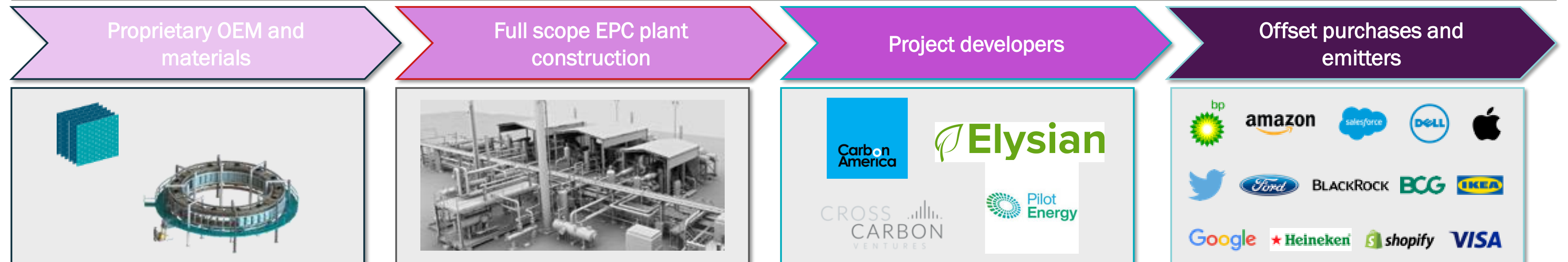
- Company Overview - Svante Inc
- Aras PLM Cloud Migration - SaaS
- Aras MPP Pilot success - MVP
- Wrap up and Q&As

“Picks and Shovels”: Building a scalable industry

Airliner industry value chain



Carbon capture and removal value chain



Analogous to the airline industry, Svante is the engine OEM for the carbon capture and removal value chain providing the technology, manufacturing the equipment, and the ongoing filter replacements

Svante HQ & Global Center of Excellence



Sq. ft

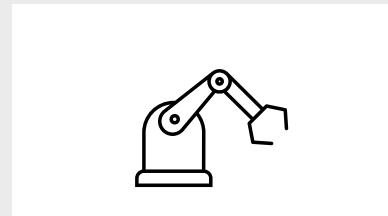
141,000

Staff

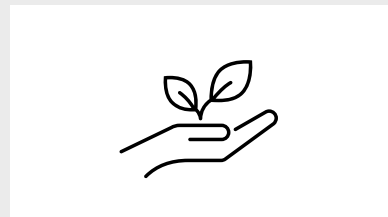
500+

Thru-put

10 million+ TPA CO₂ equivalent in point-source filters



Production line automation



Sustainability & net-zero building targets



Based in

Burnaby, BC, Canada



300x

Technology scaleup



\$500M+

Raised to date (USD)



\$1BN+

Valuation (USD)



15+

Years of R&D



90%

Of carbon capture & removal market



0

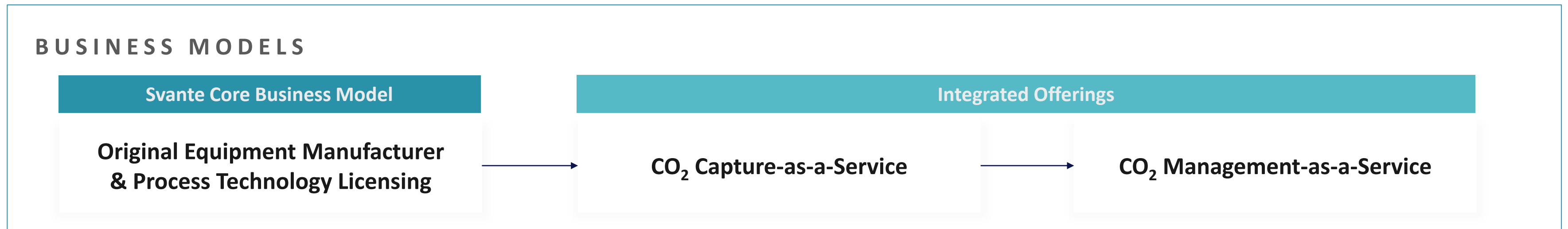
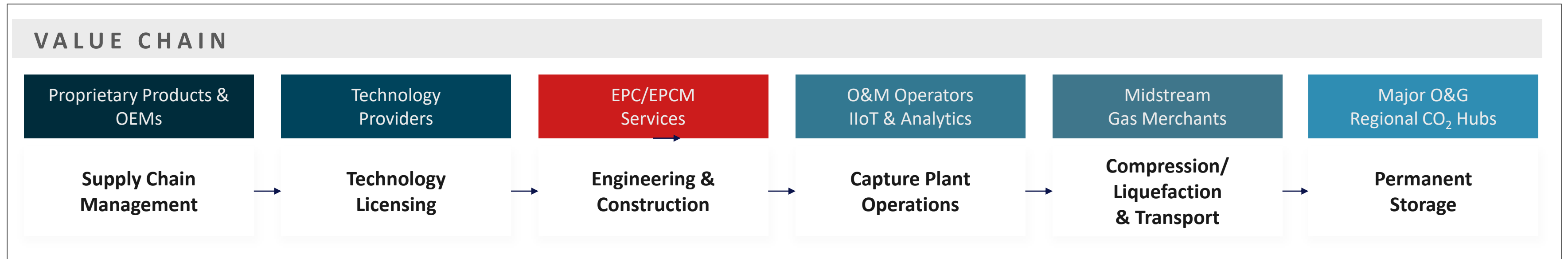
Chemical emissions



122

Global patents

Partnerships Across the Carbon Capture & Removal Value Chain



PARTNERSHIPS

STRATEGIC SUPPLY CHAIN PLATFORM








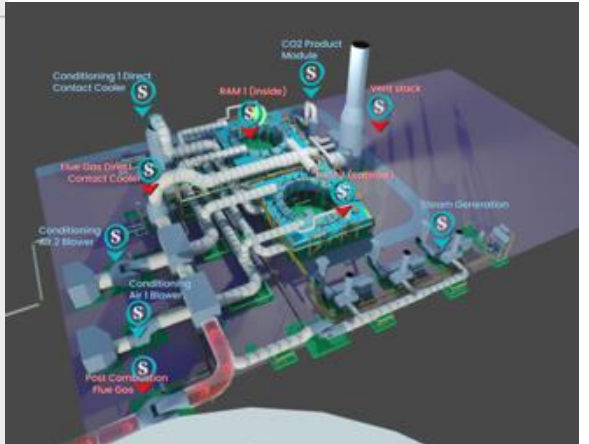
CHANNEL TO MARKET PLATFORM



STRATEGIC ACCOUNT MANAGEMENT





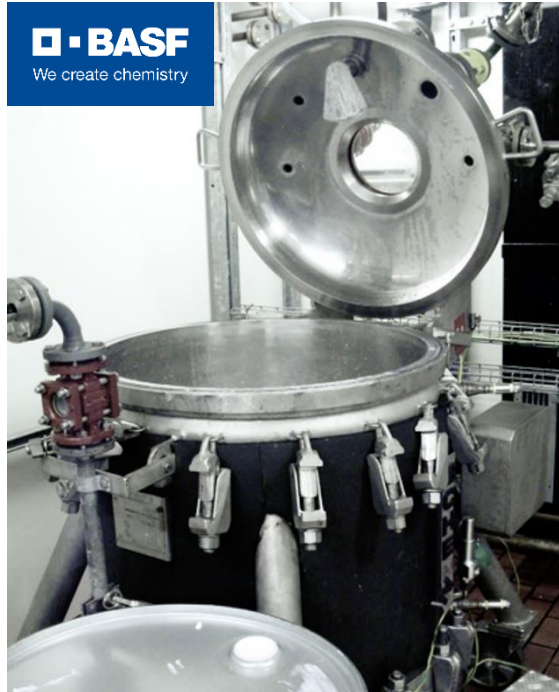

Product Development & Commercial Scale-Up

Phase	Process Demonstration Unit 100 Series	Pilot Plant Cement Kiln Flue Gas 200 Series	FOAK Plant 400 Series	SOAK Plant 400 Series	Full Scale Machine Design Validation 1000 Series	1 st Commercial Capture Plant 2000 Series
Plant Scale						
Location	Svante BC, Canada	Lafarge BC, Canada	Cenovus SK, Canada	Chevron CA, USA	Svante, Kiewit AB, Canada	Svante US Location
Years	2017	2018 – 2015	2019 – 2024	2023 – 2025	2023 – 2024	2025 – 2026
CO ₂ Capacity	0.1 TPD	1 TPD	30 TPD	25 TPD	~500 TPD	~4000 TPD (2 x 2000 TPD RAMs on site)

Minimum Viable Product Phase

Product-Market Fit

MOF Sorbent Development & Commercial Scale-Up

Phase	Laboratory	Bench Scale	Pilot Plant	Commercial Scale
Plant Scale				
Location	Svante BC, Canada	Svante BC, Canada	BASF Ludwigshafen, Germany	BASF NC, USA
Years	2016 - 2019	2019 - 2020	2021 - 2022	2023 +
Batch Size	10 g	5 kg	Up to 500 kg	2500 kg
Annual Capacity	5 kg	250 kg	10 tonnes	500 up to 3000 tonnes

Minimum Viable Product Phase

Product-Market Fit

Filter Bed Development & Commercial Scale-Up

Phase	Laboratory Development	Pilot Manufacturing	Commercial Manufacturing	Gigatonne Factory
Filter (Structured Adsorbent Bed) Size				
Location	BC, Canada	BC, Canada	BC, Canada	U.S. (Location TBA)
Years	2009 - 2019	2019 - 2023	2024 - 2030	2028+
CO ₂ Capacity	40 TPA	30,000 TPA	10 MM TPA	100 MM TPA



MVP Phase

Product-Market Fit

Plan for Rapid Commercial Deployment in 2024/25

01 Manufacturing Capacity

Adsorbent Manufacturing Scale Up:



SAB Manufacturing Facility: 10 - 1MMt/yr plants per year ~\$100MM




02 Rotary Adsorption Machine

"Buck" In-house build of 14m RAM by 1st Quarter 2023

Design Two RAM Sizes: 14m | 500 TPD
24m | 2000 TPD

Seal Material Testing: Testing on Buck and test stations




03 Capture Plant Engineering

Scoping Studies: Expand pipeline of Class 4&5 projects

FEED To FID: Projects to FID 2024 SMR, Pulp & Paper, FCC, Cement

Gov't Funding: Jointly apply to US DOE & Canadian Gov't

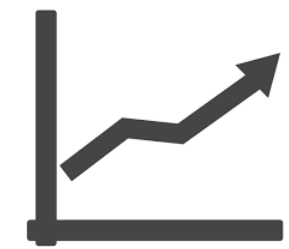


04 Demonstrate KPI's

In house 3 Single bed test stations
Dev: 3 Process demonstration units

External Dev Pilots: Lafarge 1 TPD
Total Energies 0.1 TPD

External Large Pilots: Cenovus 30 TPD
Chevron 25 TPD



Svante - Business Lines

R&D Center of Excellence



Technology Push

Material & Process Focus,
Limited Planning

- Idea & IP generation
- Proofs of concept
- Materials development
- Modeling & simulation
- Test stations
- Wet & analytical labs
- Lab information management

SAB Filter Manufacturing

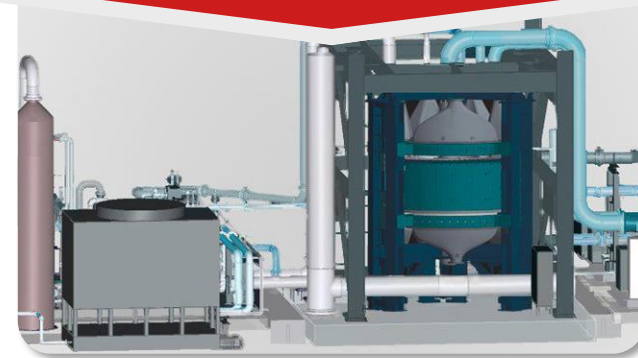


Manufacturing Driven

Lean and Kanban Focus

- Raw materials conversion into SAB modules
- Materials planning
- Routings and BOMs
- Process standardization
- Output & reproducibility
- Continuous improvement

RAM Machine OEM

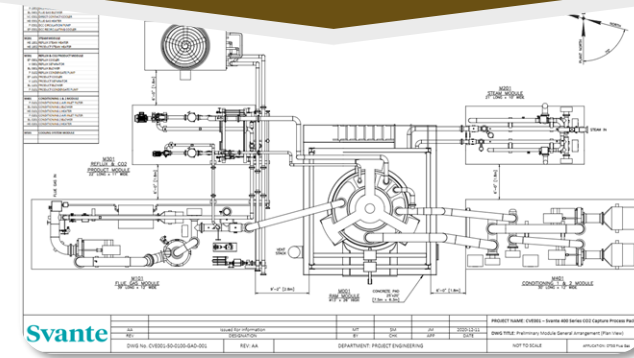


Product Driven

Quality, Target Cost, and Scalability Focus

- Rotary Adsorption Machine Product Development
- Product Lifecycle Mgmt.
- OEM via sub-contracted fabrication
- Product data and BOM

Plant Engineering & Project Delivery

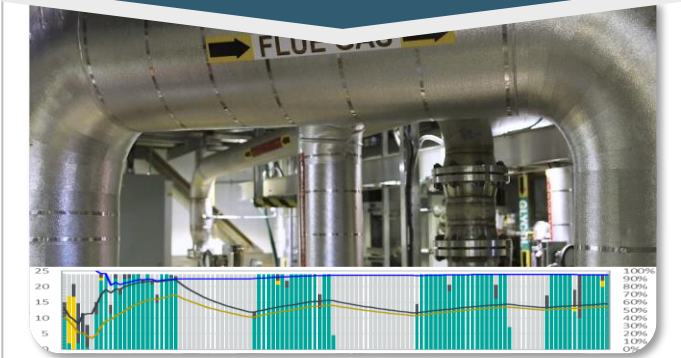


Project Driven

Strong Client Focus,
Site-Specific Planning

- Execution strategy
- Work packages
- Subcontract management
- Cost and schedule
- Earned value
- Project controls

Plant O&M and Field Services



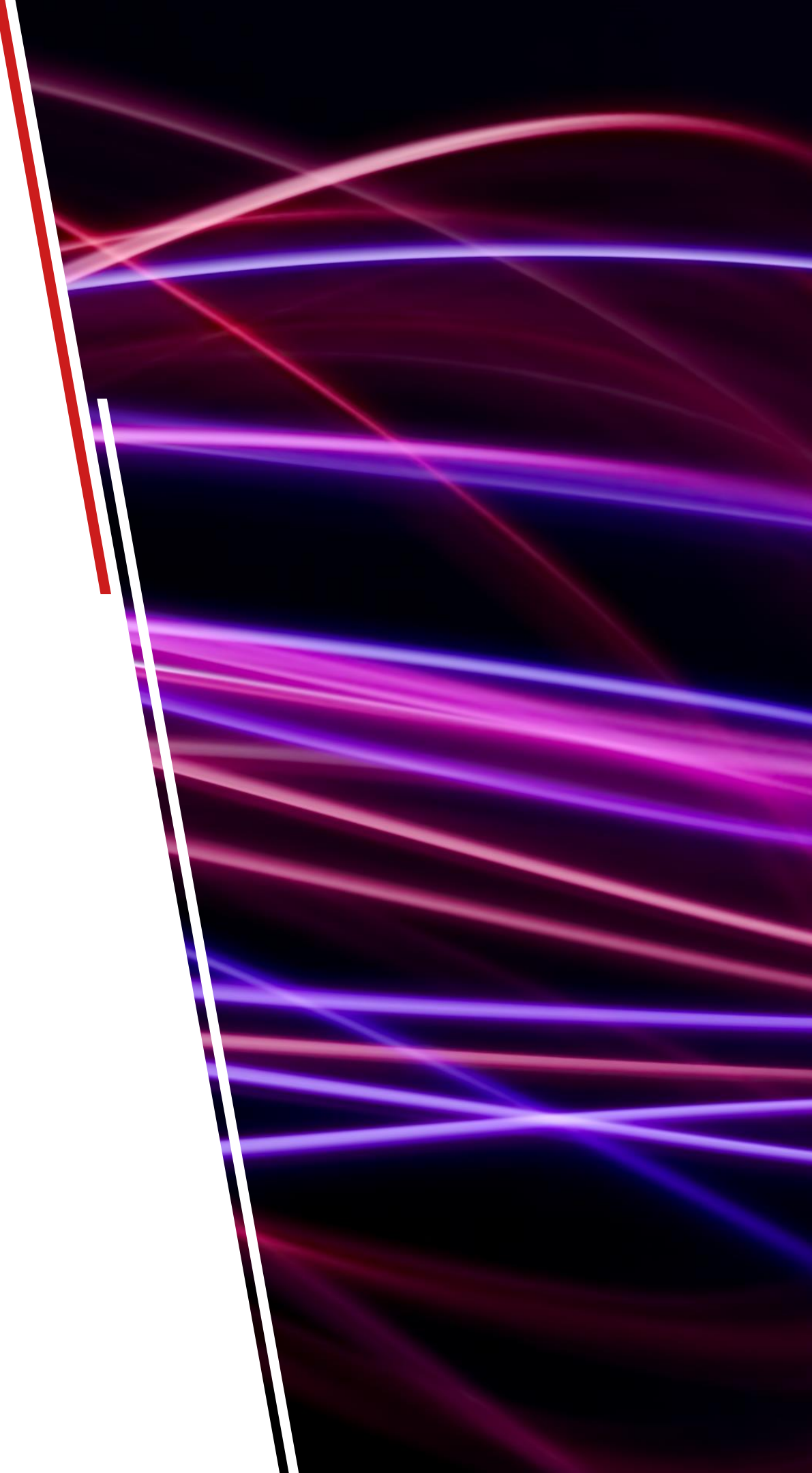
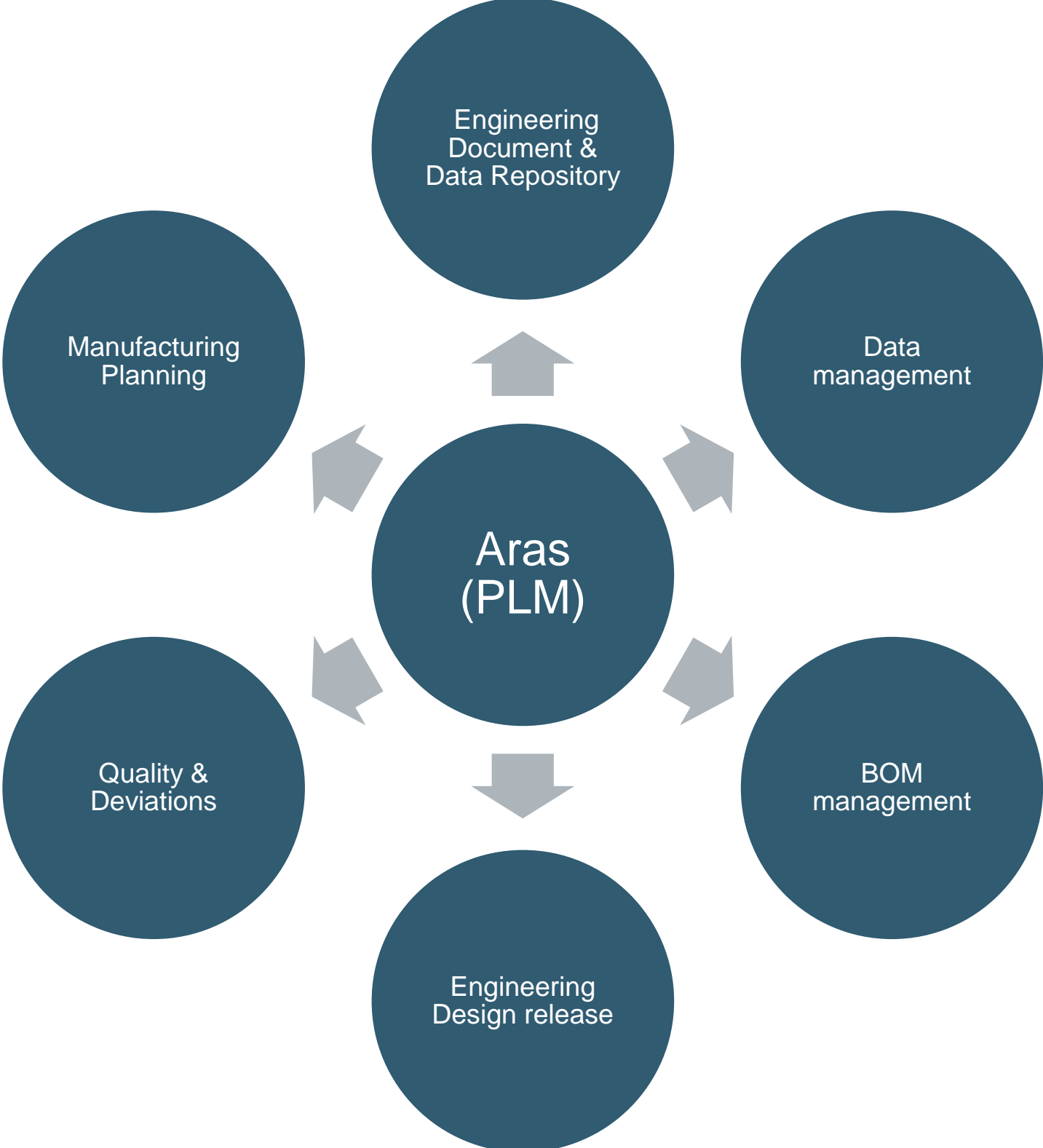
Plant Reliability & Safety

Focus on Operability,
Reliability and Availability

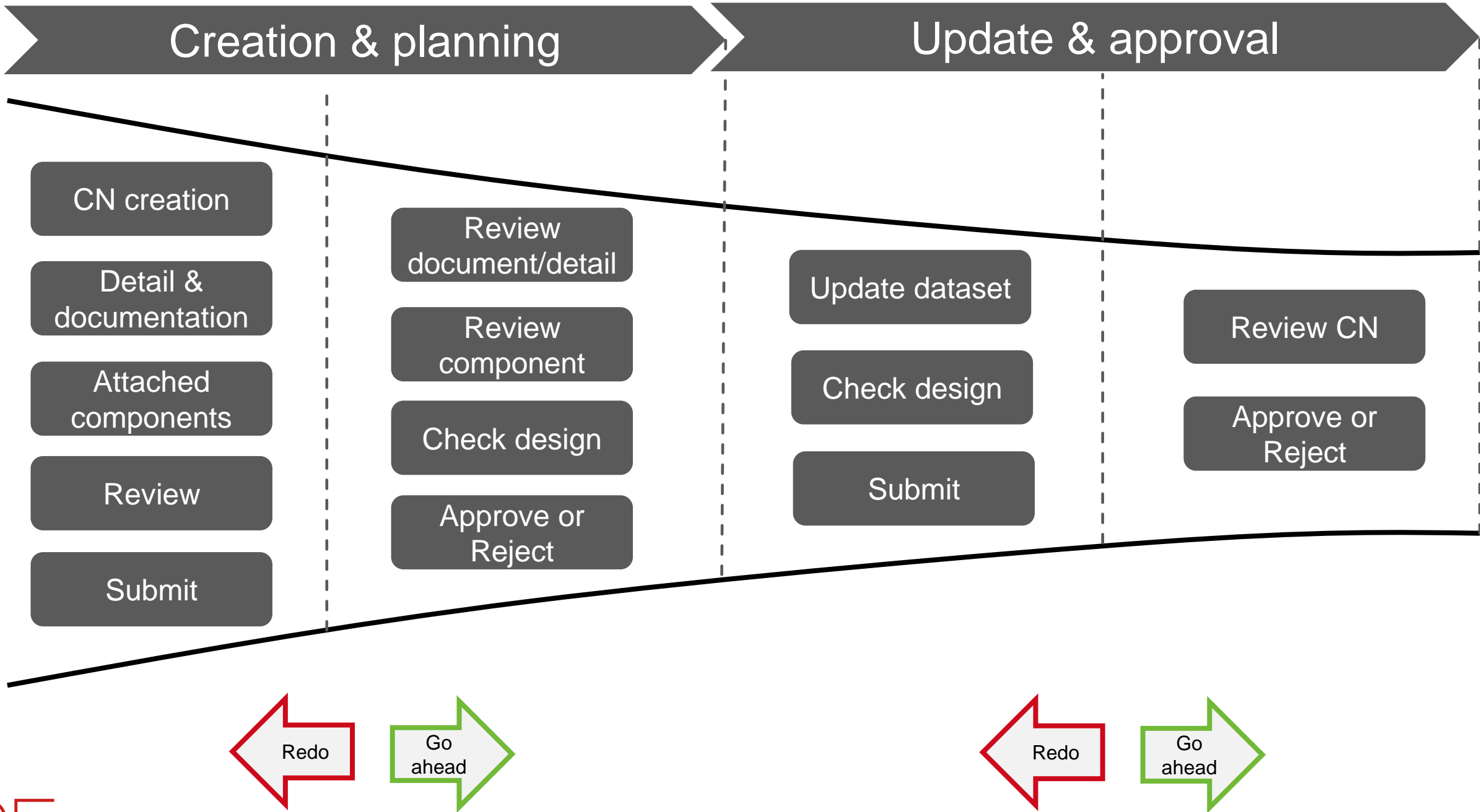
- Plant data & analytics
- Filter replacements
- Preventative maintenance
- Predictive maintenance
- Online optimization, OPEX and gross margin
- HSSE and safety performance

PLM (In-scope)

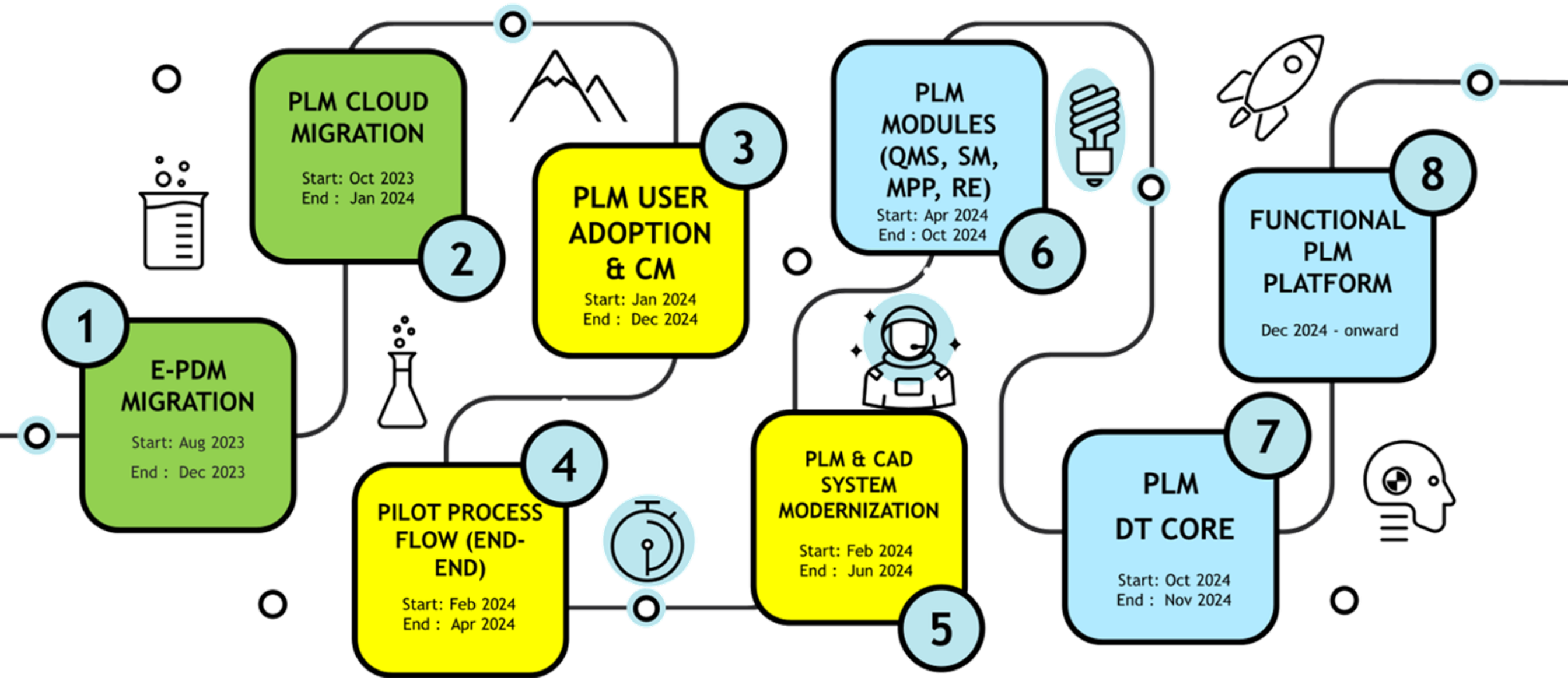
Svante – PLM (Aras) System



Svante – High-level Workflow



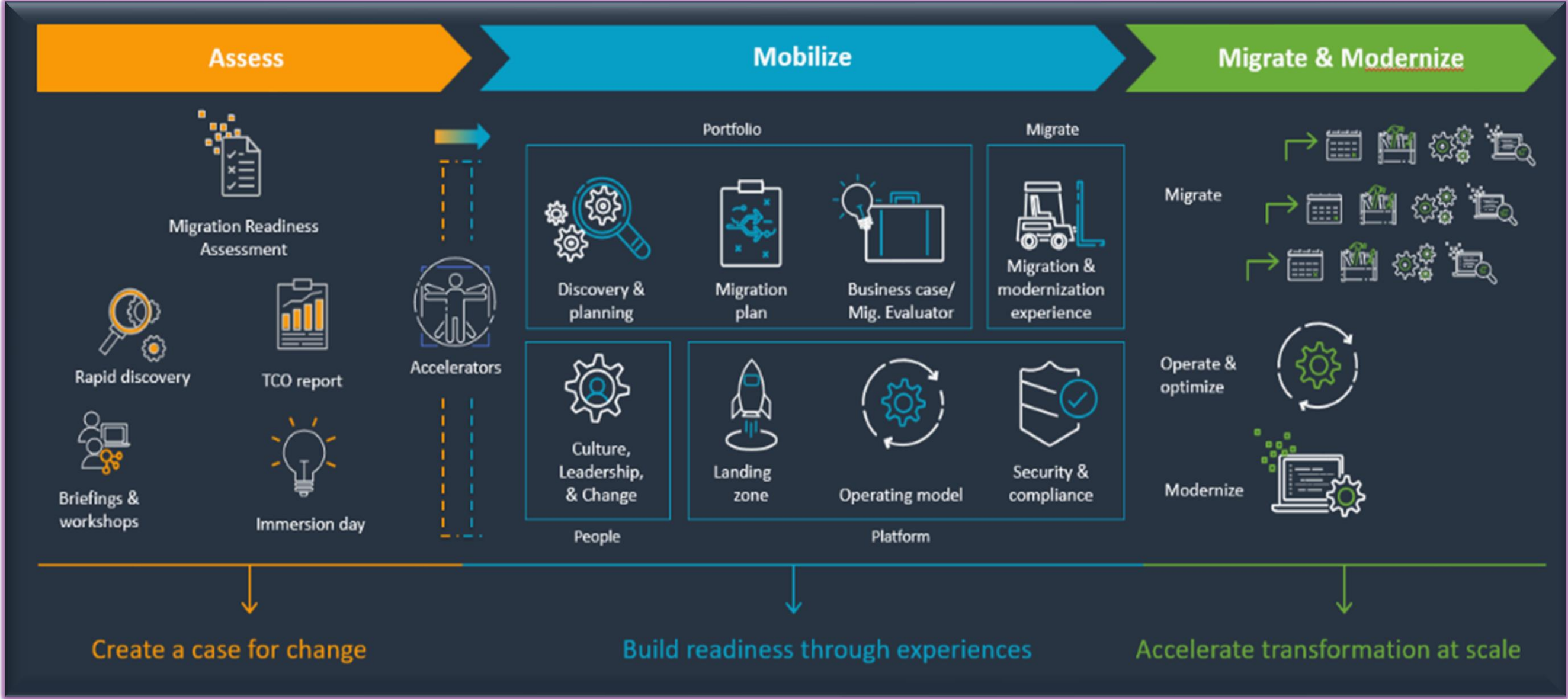
Svante – PLM Product Roadmap



PLM Cloud migration

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Cloud Migration & Modernization Journey



PLM Cloud Migration and Modernization – Business Case

Based on the four key areas, we had to prioritize the cloud migration & modernization

Improved Security & Operational Resilience

- ❖ Overcome Cyber security Threads - Compliance
- ❖ Resolve on-prem IT Infrastructure challenges
 - ❖ Conversion server, PDM Vault issues
- ❖ Fool-proof Disaster Recovery Plan
 - ❖ Backup, recovery, and failover

Resolve End-user Challenges

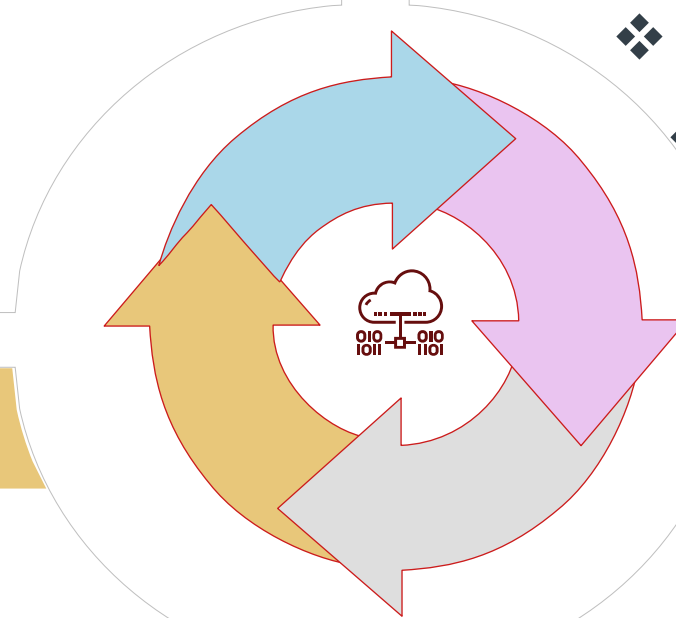
- ❖ Large # of IRs will be resolved directly
 - ❖ Bulk items, effectivity date, watermarks etc.
 - ❖ Intelligent CAD, Connectors & PLM
- ❖ Latest Aras, SW, Creo, XPLM, Essig versions
- ❖ Rapid & Relevant Digital Innovation

Agility & Staff Productivity

- ❖ Managed services by Aras/Azure SaaS
- ❖ Effective Low-Code & DevOps
- ❖ Efficient File Management & Specialized Engineering software
- ❖ Low-no dependency on Svante IT

Enterprise Agility & Business Performance

- ❖ Faster IR Resolution & Automate PLM development
 - ❖ Efficient Business Processes & Incorporate PLM Modules (QMS, MPP, Digital Twin etc).
- ❖ Effective Governance Structures



Migration – Collaboration & Partnership

Communication Channels

- Direct Communication Channels: Emails, Phone Calls, Instant Messaging
- Scheduled Meetings: Daily meetings, Weekly status meetings

Roles and Responsibilities

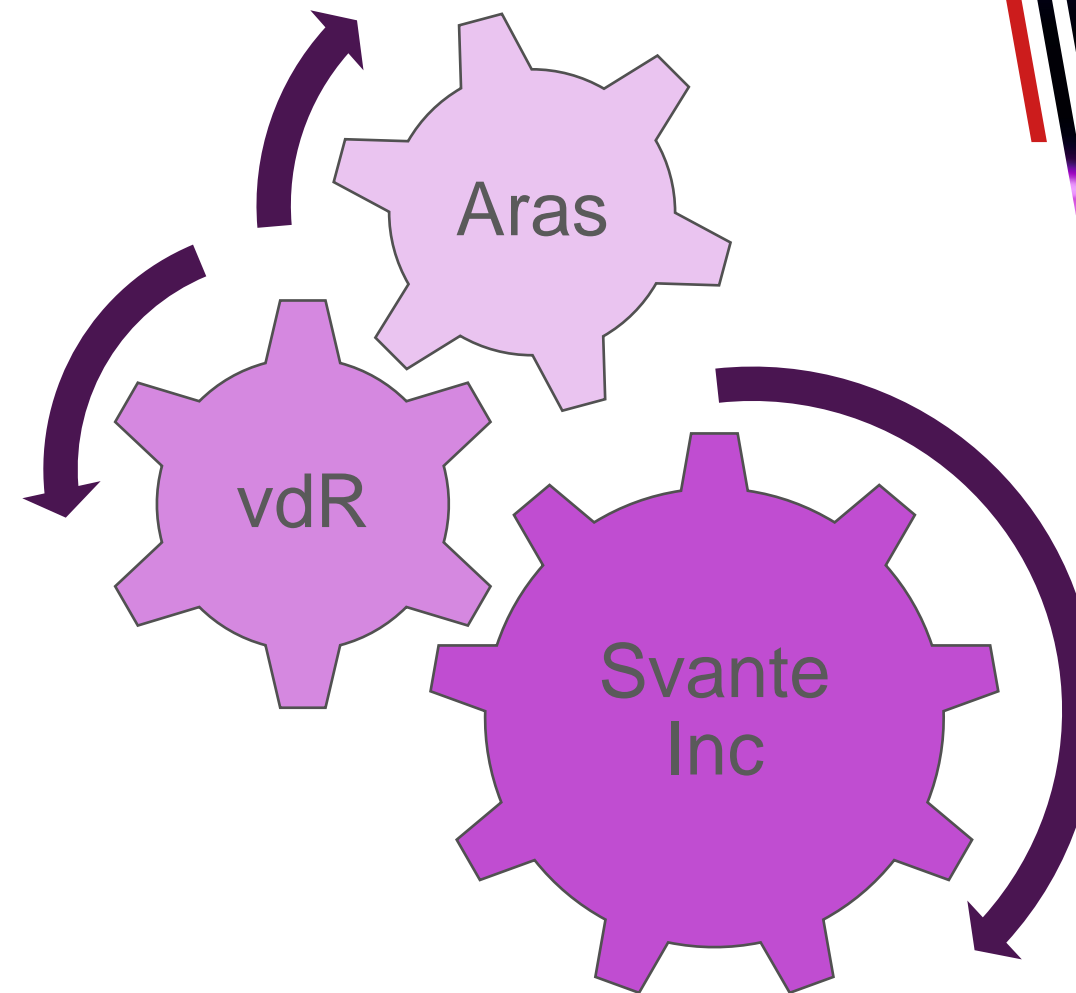
- Clearly defined roles for each party
- Responsibilities outlined and agreed upon
- Cross-functional collaboration encouraged

Software Testing

- Collaborative approach to software testing
- Testing procedures agreed upon collectively
- Feedback loop for testing results and improvements

Decision-making:

- Transparent decision-making process
- Consensus-driven decision-making when applicable
- Escalation process for unresolved issues



Migration on a page

Requirements

- Prerequisite for cloud migration
- Impact on current system
- Readiness of team

Planning and Collaboration

- Identify the stakeholders
- Define scope & timelines
- Roles and responsibilities

Training & Enhancement

- Enhancement in PLM system
- Security and functionality improvements
- Knowledge upgradation with DevOps and code tree

Environment Setup

- SIT, UAT, Production

QA/QC testing

- Review 140 test cases
- Approval via core committee

Deployment

- Production deployment to cloud
- Smoke testing
- Minimum impact on user

Post Deployment Activities

- Daily stand up for Prod monitoring
- Conduct performance testing



Migration – SIT environment

Evaluation of SIT environment

Basic functionality

Challenges

9 test cases
44 steps

100% success

System
Boundary testing

Network &
Config Issues

Migration – UAT environment

Evaluation of UAT environment

Extended functionality
checks

Challenges

140 test cases
44 steps

80% success

System
functionality
testing

Watermark
function not
working

Migration – Production environment

Production Qualification Testing

All functionality

Challenges

140 test cases
2533 steps

100% success

Slow
performance

Feature freeze

MPP Pilot

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MPP module - Introduction

Bill of material (BOM)

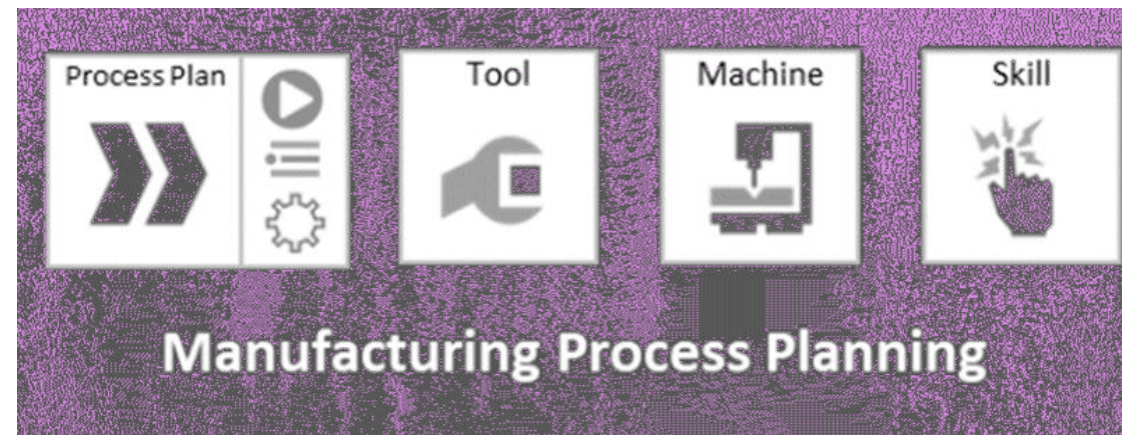
- Manufacturing BOM management
- Conversion of EBOM to MBOM
- Plant specific BOM

Variant management

- Variant control as per requirement
- Variant BOM management
- Align with the production plan

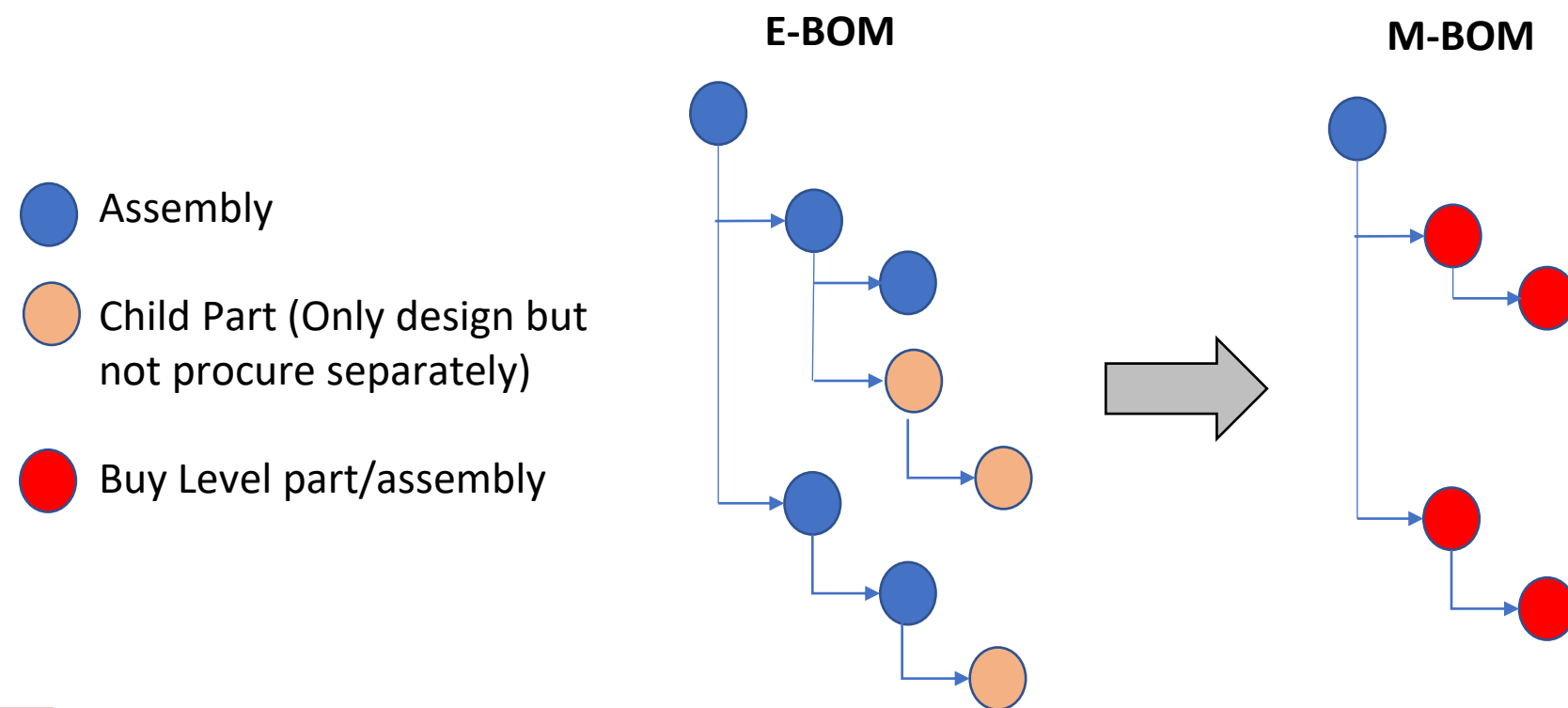
Process control

- Authorizing process plan and work instruction
- Inventory management
- Production management
 - Operation detailing
 - Resource management
 - Process planning

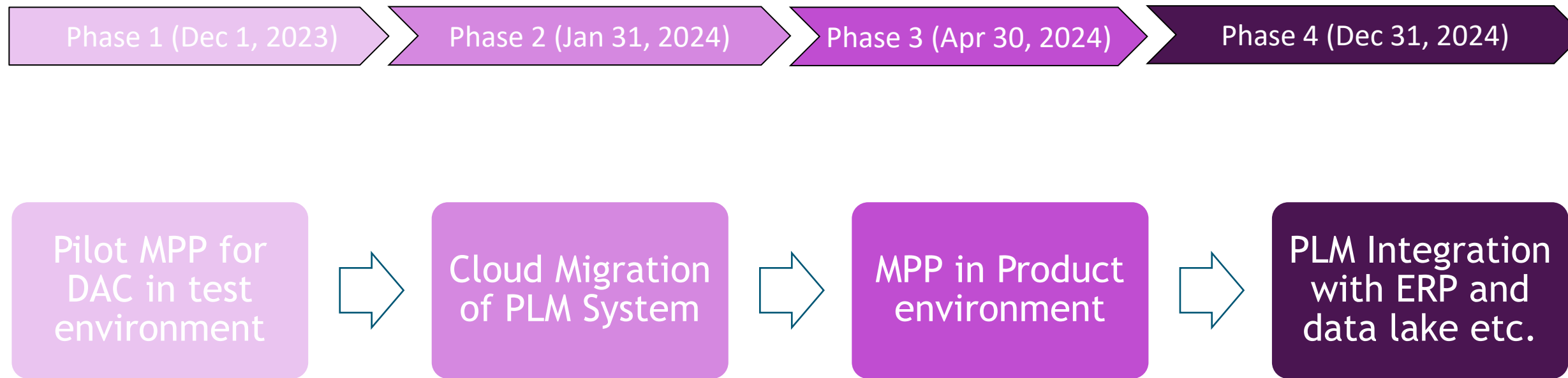


MPP module – Bill of material

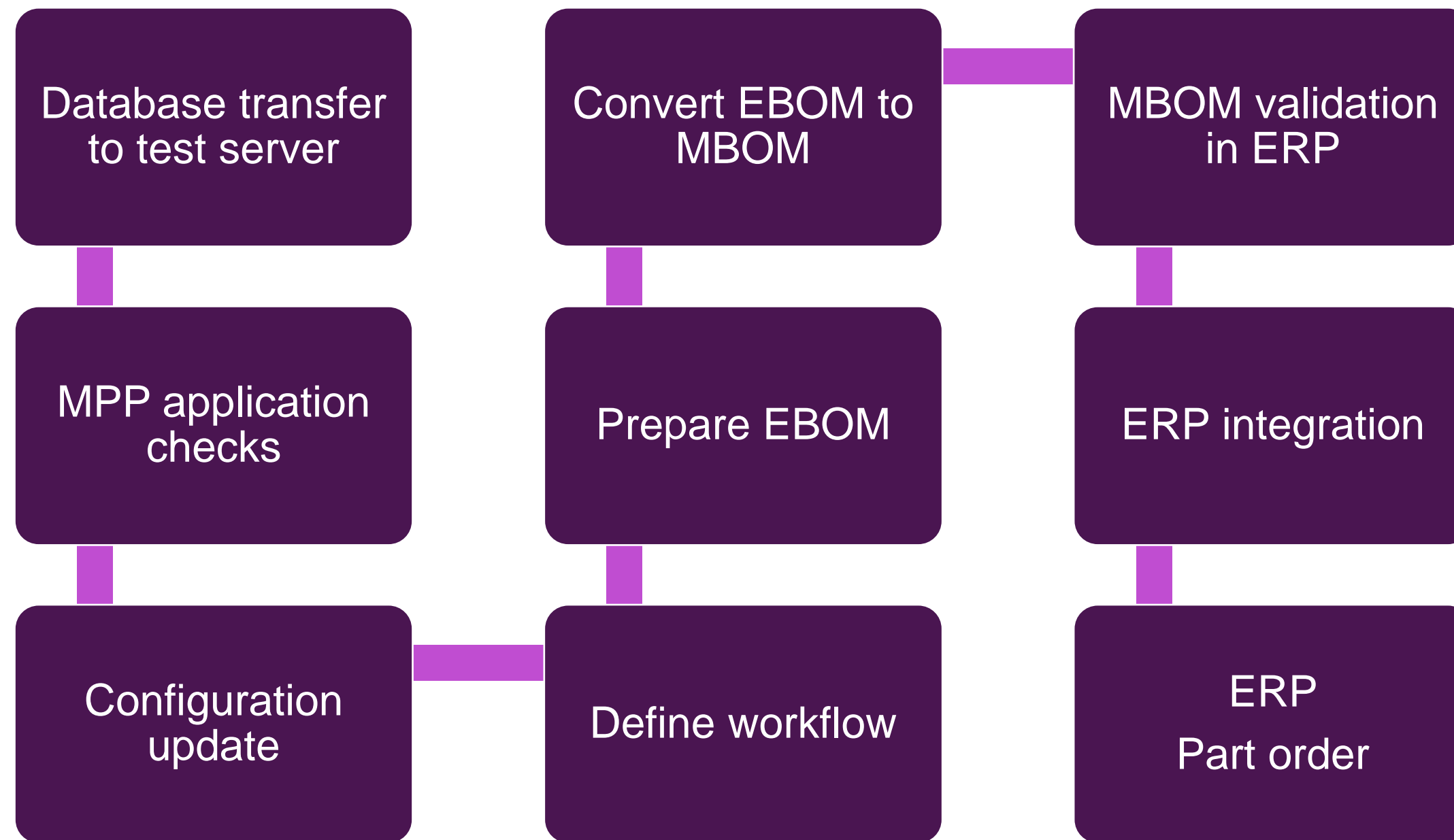
- M-BOM derived from E-BOM
- Manufacturing engineers lack E-BOM write privileges
- Assembly requires distinct structure
- Make or Buy attribute assignment
- Manufacturing-specific parts addition



MPP module – Implementation plan



MPP module – Pilot process flow



Questions & Feedback

Thank you

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