NOVEMBER 16, 2022

Operations Technology Management

Creating a Corporate Operating Model for Deploying and Sustaining a Contemporary Historian Platform from a mosaic of companies.

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AVEVA

About The Mosaic Company

(NYSE: MOS)

Our Mission

- We help the world grow the food it needs.

Our Work

We are the world's leading integrated producer and marketer of concentrated phosphate and potash.

Who We Are

Fortune 500 company incorporated March 2004.

Combination of IMC Global Inc. & Cargill fertilizer businesses.

100 YEAR HISTORY
phosphate mining in U.S.

50 YEAR HISTORY
potash mining in Canada

25.0 MILLION TONNES
of operational capacity

$8.7B
FY2020 sales

customers in approximately **40 COUNTRIES**

>12,000 EMPLOYEES in operations and joint ventures (JVs) in:
United States, Canada, Brazil, Paraguay, China, India, Australia, Peru (JV), Saudi Arabia (JV)

Global Offices & Operations

Mergers & Acquisitions

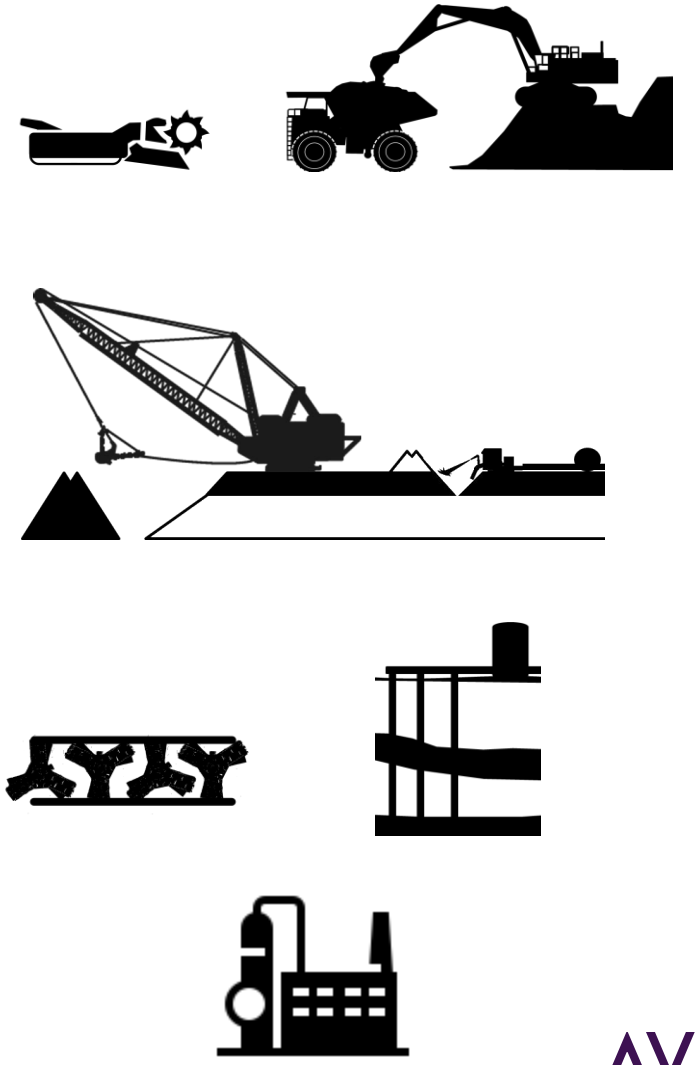
IMC Global + Cargill Crop nutrition

+

VALE FERTILIZANTES

Mosaic®

Methods



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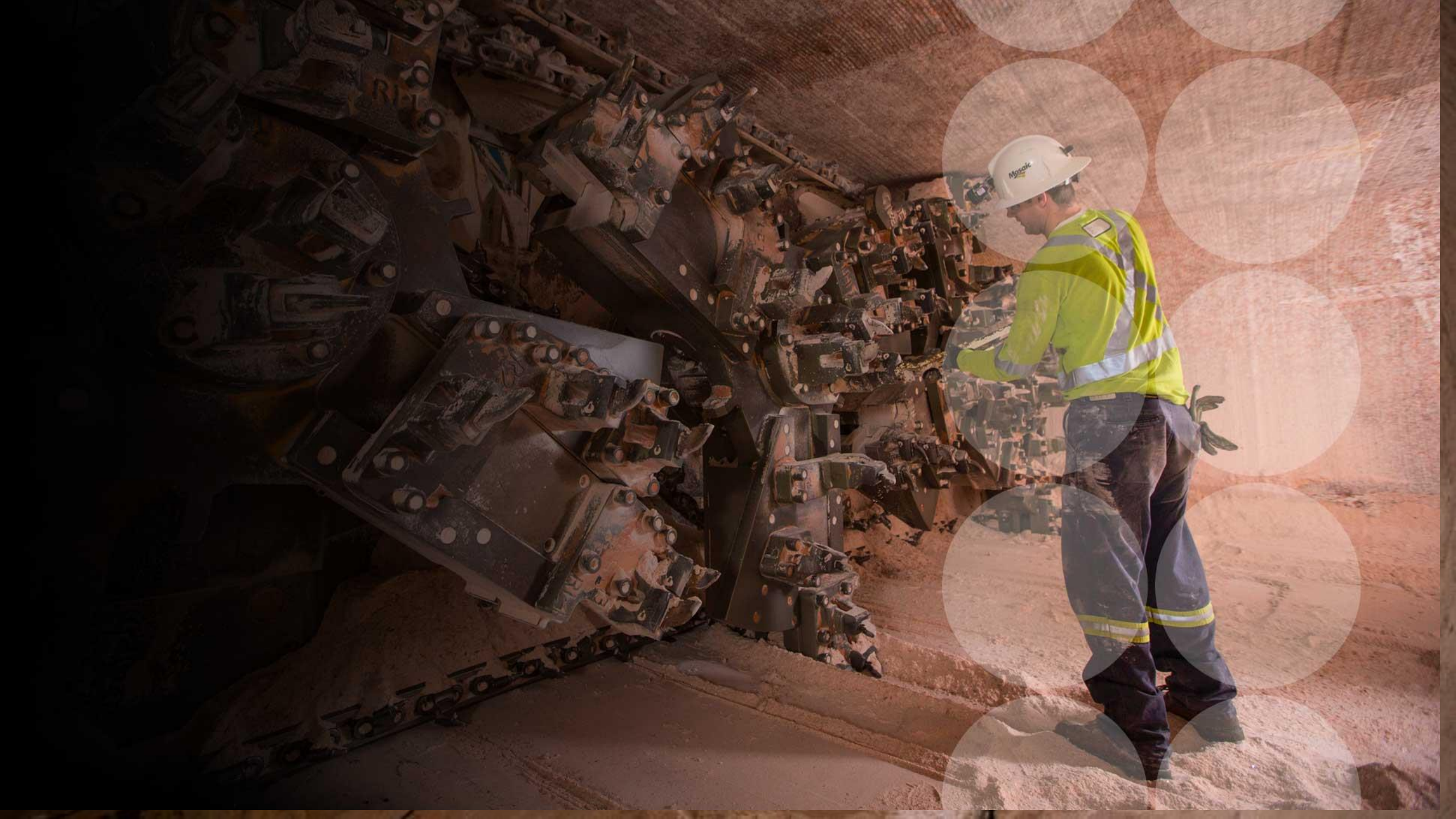


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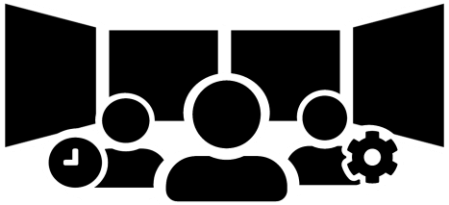
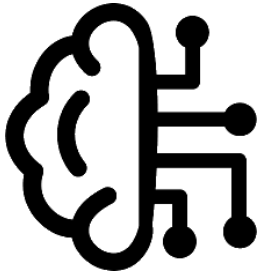
guns: 99%
sump: 100%
Standard daytime

Regional differences in culture, buying, and legacy technologies

Objective: Use the Popular Technologies



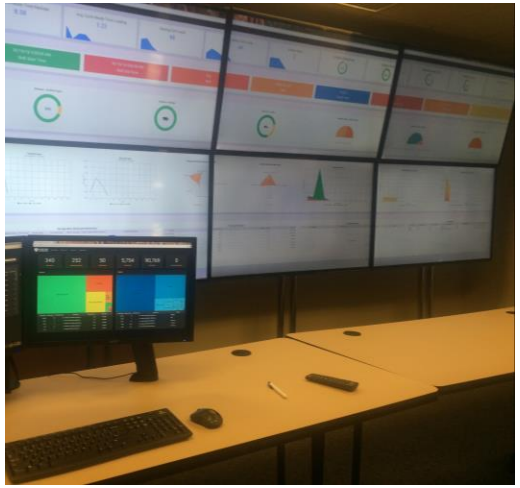
Integrated Remote Operations Centers

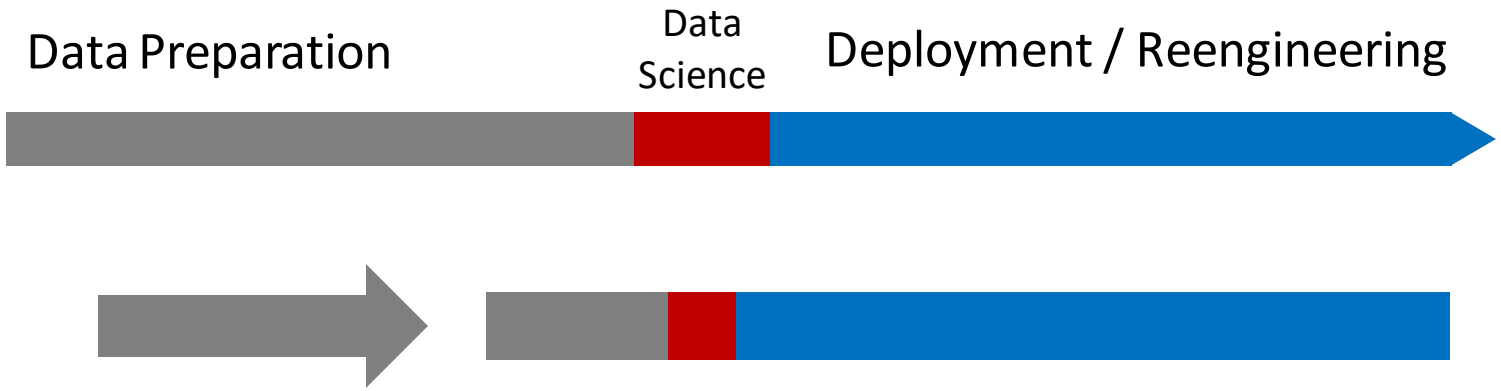


Machine Learning / data science / AI

Effective esthetic manageable reporting

Entrepreneurial & R&D Experience





What is the correct operating model for OT?

Core challenges in developing an OT plan

Organizational

- How much should be done by a centralized group?
- What is corporate IT's role?
- How to consider regional differences in support?
- Interconnectedness of legacy systems
- Where does the expertise exist?

Cultural

- Balancing need for flexibility within operations with advantages from standardization.
- Spreading innovation & creativity in a sustainable way
- Regional differences in willingness to follow standard

Industry-wide

- Dearth of AF / Pi personnel
- Limited number of consultants with real expertise

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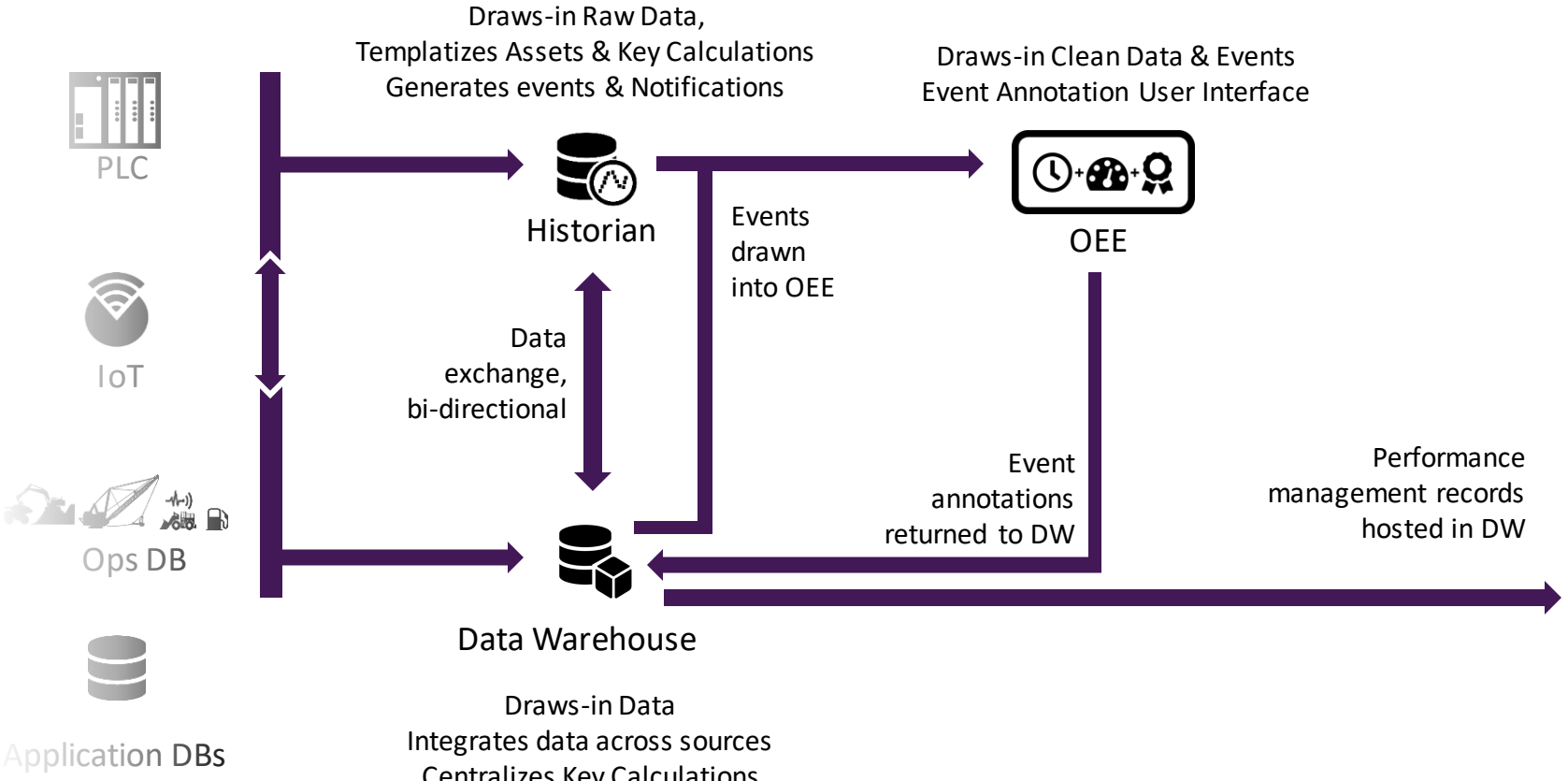
Operations Technology – where to draw the corporate line?



Operations Performance Management (OPM) Platform, Gamification

- Defines Measures: KPIs, LSIs, goals… Sets Accountable teams/individuals
- Makes Performance Measures easily available for motivational BI
- Design & coaching of meetings where motivational BI is used.

OT plays an advisory role, operations central

AVEVA products

AVEVA™ Historian

(formerly Wonderware)

AVEVA PI System™

(formerly OSIsoft)

Challenges of Centralizing OT infrastructure

Information Technology versus Operations Technology

Information Technology Department

- Security
- User access
- Infrastructure (server & network)
- Source control (AF code), DTAP
- Code to draw data into DW

Operations Technology Group

- Design & maintenance of the AF templates
- Building & supporting the AF hierarchy for each site
- Conceiving & communicating event frames
- Pi Vision esthetics, set of standard screens
- Hands-on training

Challenges of Centralizing OT infrastructure

Cultural & Technological Inertia	Experience, how to overcome…
Unacknowledged benefits of Standardization	• Benefit of AF Templates across an organization?
Personal Spreadsheets & ProcessBooks	• Selling Pi Vision (takes months) & application of asset frameworks
Fit-to-purpose custom regional software with legacy integrations into other systems	• Communicating long-term vision of gentle, gradual replacement
Quantification of common OT infrastructure	• Used projects already underway; facilitating / accelerating
Reporting & cultural response	• Who would be most responsive?

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Models Studied

Operations Technology Models seen in the Industry

Centralized

- Characteristics
  - Technology controlled centrally
  - Large internal development groups, at times creating bespoke software
- Challenges
  - Expensive / economies of scale
  - Unresponsive / slow
  - Local attempts at innovation thwarted
  - Local 'work arounds'
  - Only sustainable in certain cultural conditions
  - Creates massive number of reports to manage

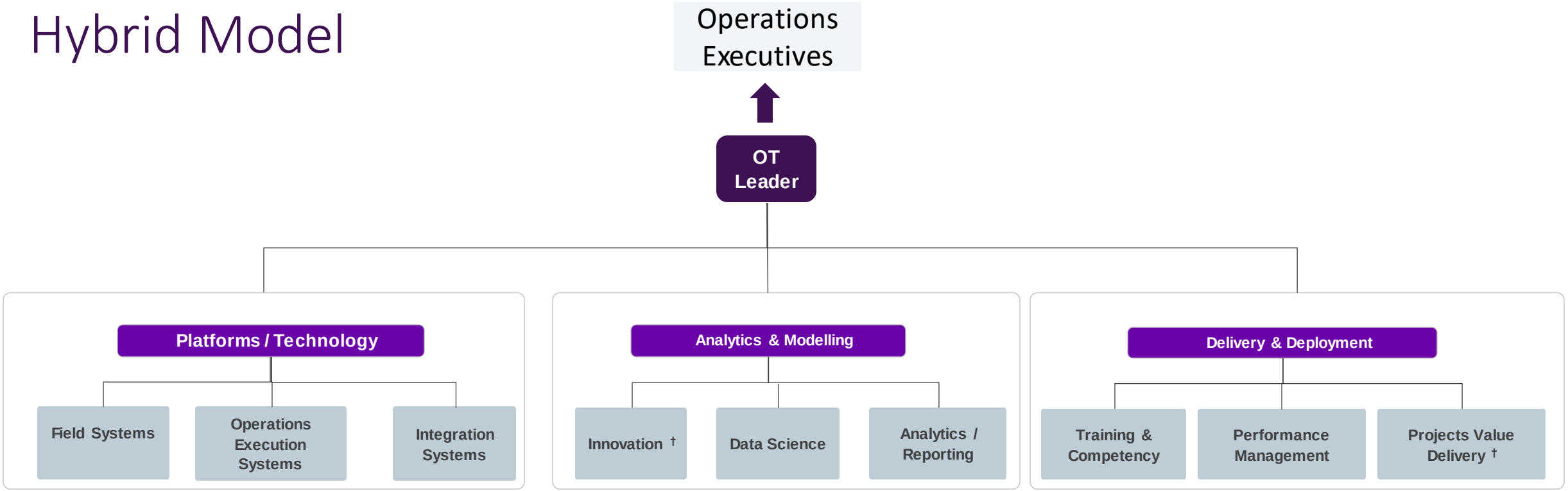
Decentralized (site-driven)

- Characteristics
  - Rapid adoption
  - Entrepreneurial
- Challenges
  - Low ability to extend innovation between sites
  - Turn-over has significant impact (no bench of experts)
  - Significant overlap in both innovation & support

Hybrid

- Characteristics
  - Core integrated systems centrally controlled
  - Education/training efforts centralized
  - Standards / templates defined centrally
  - Innovation encouraged, but also shared
- Challenges
  - Organizationally challenging to 'sell'
  - Cooperation among sites culturally difficult to sustain without strong leadership & clear mandate
  - Frequent 1st victim during 'restructuring'

Hybrid Model



- Supports best practice for COTS e.g. FMS, DMS
- Supports common IoT platforms

- Historian, OEE, etc.
- Manages standards for deployment, AF templates, Time-Usage-Models, etc.
- Sharing best practice

- Joint with IT
- Intakes requirements for data warehouse & integration
- Supports existing pipelines

- Advanced complex modeling
- Manages development projects, e.g. Potash optimized dispatching

- Manage data science lab
- Execute & support data science projects
- Heuristic specializations

- Develops analytical templates
- Creates official 'standard' reports
- Support UI/UX esthetic standards

- Curates & manages training content
- Sets internal certification process & expectations

- Administers formal performance management
- Common KPIs & leading indicators
- Coaching standard

- Managing deployments
- Setting accountability & utilization standards (post-deployment)

† Future role, unnecessary until minimum platforms are completed

“What will it look like in 3 years?”

Short-term Mine & Maint. planners, field geologist

80%

Reduction in manually updated spreadsheets, freeing 30% of their time.

Operators

6X

Additional engagement from gamified daily feedback

IOC: Prod. Optimization, Rt Process & Machine Health

90%

Reduction in time to scale improvements to other sites.

Data Scientist

70%

Reduction in time to develop & scale ML models

Dispatch

All mines, concentrators, and supply chain holistic dispatch

Engaging Feedback

GMs to Operators have daily scorecards, with LSIs & KPIs balanced between Safety, productivity, and process / machine health

Executives

KPIs

Benchmarked
Tons (Rt & trends)
% Utilization
% Availability

LSIs

% MDPR achieved
# Process Health events
Ratio of Planned vs Unpl.

ESG

Energy consumption & mix
Gal. fuel burnt at idle
kWHrs Drawn from Grid

EHS

Safety Audits
Gal. fuel burnt at idle
Gal. fresh water used

Technical career path / step exists

Technical Training programs & micro-certifications

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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!

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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.

Learn more at www.aveva.com