OCTOBER 25, 2023

Best Practices in Engineering, Construction Planning & Management

Presentations & Panel Q&A

Steve Furze, AVEVA

Dr. Ted Blackmon, Construct-X

Ray Paulk, Project AI

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INTRODUCTIONS & SESSION FRAMING

Stephen *(Steve)* Furze

Global Director of Project Execution Sales for AVEVA

AVEVA

Steve participates in the development of solutions strategies and is responsible for the sales enablement of the portfolio of Project Execution solutions.

Over 20 years of experience, developing and leading sales, services and “Go To Market” (GTM) teams focused on engineering, fabrication, construction and O&M solutions in the Process, Power, Marine, Mining and AEC industries.

Steve is a member of CII Board of Advisors.

Stephen.Furze@AVEVA.com

Ted Blackmon, PhD

Founder and CEO

CONSTRUCT-X

Dr. Ted Blackmon, PhD, helped to pioneer the entire market for Advanced Work Packaging (AWP); with the invention of the ConstructSim™ and OpSim™ platforms that drew upon his success with the Mars Pathfinder Mission at NASA.

His software platforms were so highly recognized in the marketplace, their acquisition became the industry’s cornerstone for many years.

Ted.Blackmon@Construct-X.com

Ray Paulk

Senior Business and Project Advisor

PROJECT AI

Ray specializes in enterprise transformation and the structuring and governance of capital investment programs.

With over 20 years experience in the Oil & Gas, Resources and Engineering & Construction industries; he has advised project teams of all sizes (minor, major and mega-projects) on six continents, and led global business transformation, technology implementation and functional standardization initiatives for some of the world’s largest companies.

Ray.Paulk@ProjectAi.com

AVEVA

Agenda / Session Framing

Industry Response & AVEVA Alignment

Real World Application of Best Practices

Ted Blackmon

Ray Paulk

Panel Discussion / Q&A

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INDUSTRY CHALLENGES

According to a study by EY , 64% of complex projects face cost project overruns and 73% report delays. Completion costs were, on average, 59% higher than initial cost estimates – an increase in total of US$500bn. Cost overruns of 50% are common and overruns of 100% are not uncommon

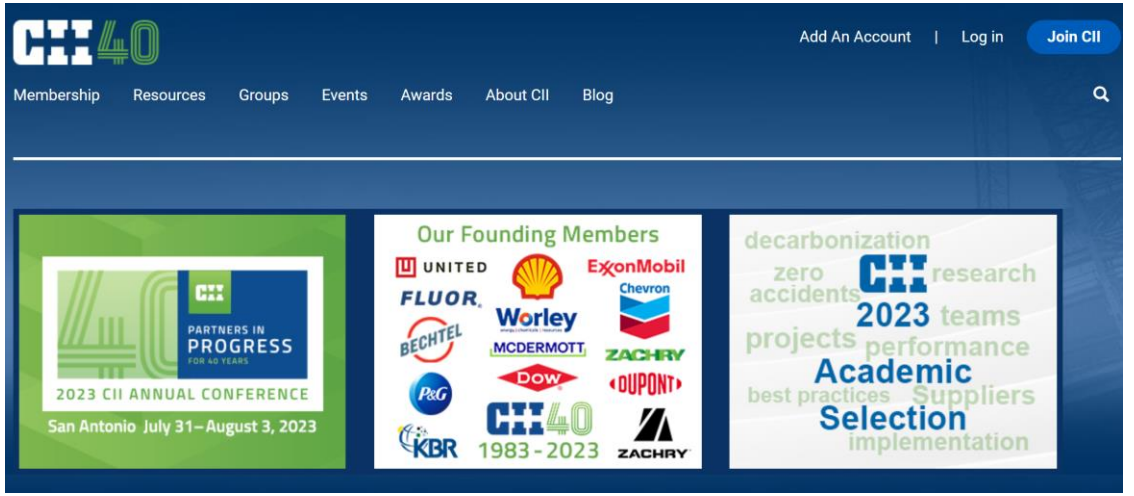
INDUSTRY RESPONSE

About the Construction Industry Institute (CII)

CII, based at The University of Texas at Austin, is a consortium of more than 130 leading owner, engineering-contractor, and supplier firms from both the public and private arenas.

These organizations have joined together to enhance the business effectiveness and sustainability of the capital facility life cycle through CII research, related initiatives, and industry alliances.

CII - Home (construction-institute.org)



16%
MATERIALS MANAGEMENT

The benefits of a materials management program results in 16% schedule improvement.

20%
CONSTRUCTION READINESS

Construction-ready projects benefit from a 20% cost savings compared to non-ready projects.

25%
ADVANCED WORK PACKAGING

Projects that apply AWP have proven results of a 25% increase in productivity and a 10% reduction in total installed cost, compared to traditional projects.

$3-$10 PAYBACK
FRONT END PLANNING

Front End Planning has $3-$10 payback on every dollar spent.

30-45%
CONSTRUCTION TECHNOLOGY

Adoption of proven technology can improve construction industry productivity by 30-45%, as well as improve material predictability and reliability.

$25
PROJECT PLANNING

Each 1$ spent on the PDRI process can save $25 in return.

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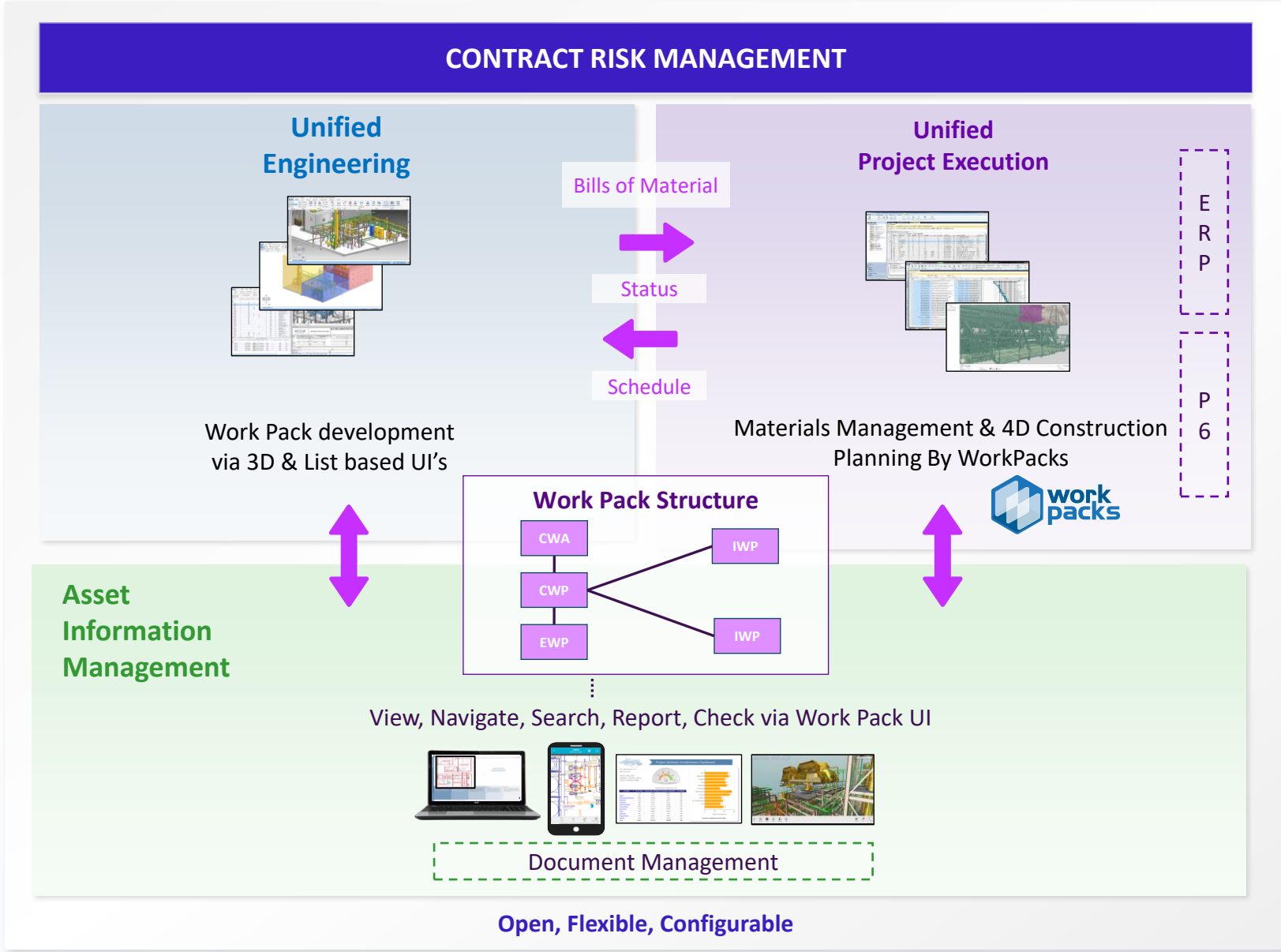
WORK
PACKAGING

Work Packaging Threaded Throughout AVEVA Applications



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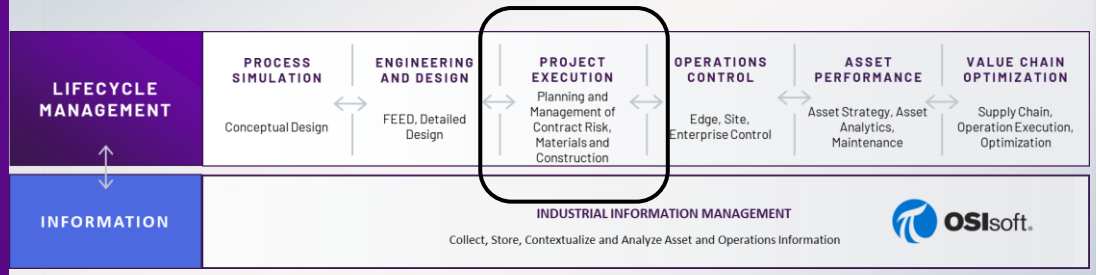
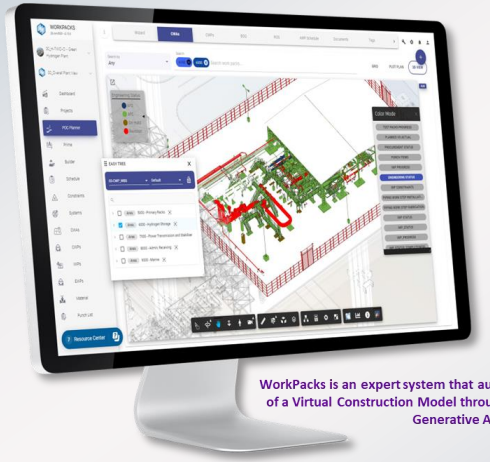
AVEVA CONSTRUCTION PARTNERSHIPS

AVEVA



workpacks



WorkPacks is an expert system that automates the creation of a Virtual Construction Model through the application of Generative AI & other techniques.

AI-Powered AWP with WorkPacks

- Digital Threads
- Automating the Path of Construction
- Connecting Project Controls to the VCM

CONSTRUCT-X

Driving BUSINESS TRANSFORMATION LEVERAGING ADVANCED WORK PACKAGING (AWP) , LEAN CONSTRUCTION, AND DESIGN FOR MANUFACTURING AND ASSEMBLY (DFMA) **through strategic consulting and implementation services.**

projectai
CREATE CLARITY

We fuse the right processes, people and technology to transform how your business and projects work.

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BEST PRACTICES IN ENGINEERING, CONSTRUCTION PLANNING & MANAGEMENT

That Yield Proven Results

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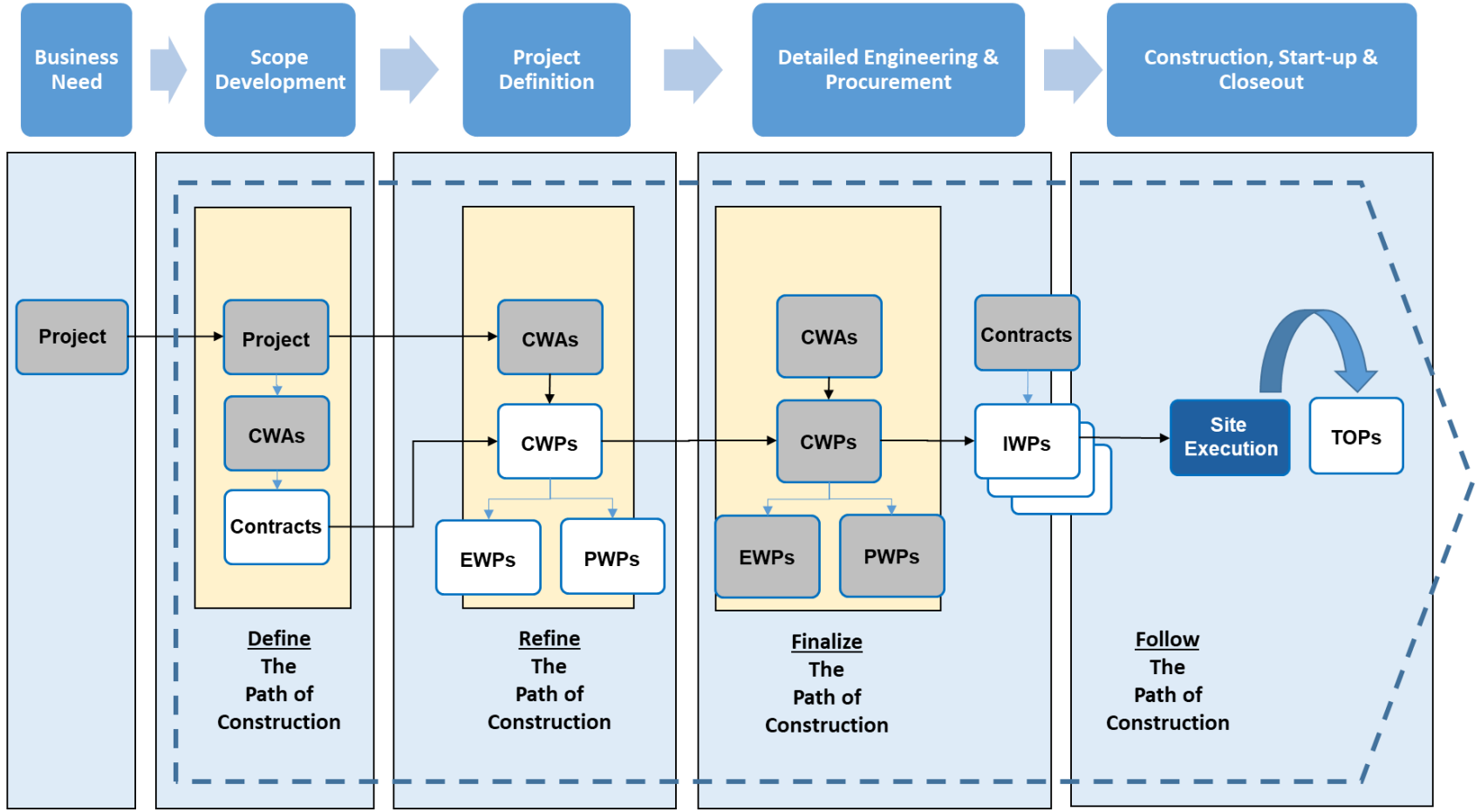
AWP COMMERCIAL WITH REFERENCES

- THE PROCESS @ 250K FEET
- WHAT DOES GOOD LOOK LIKE
- CLIENT ADOPTION

THE PROCESS @ 250K FEET

THE AWP JOURNEY STARTED ABOUT 20 YEARS AGO



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Advanced Work Packaging (AWP) with constraint management is a construction project management approach that combines the principles of breaking down projects into manageable work packages with the systematic identification and management of constraints

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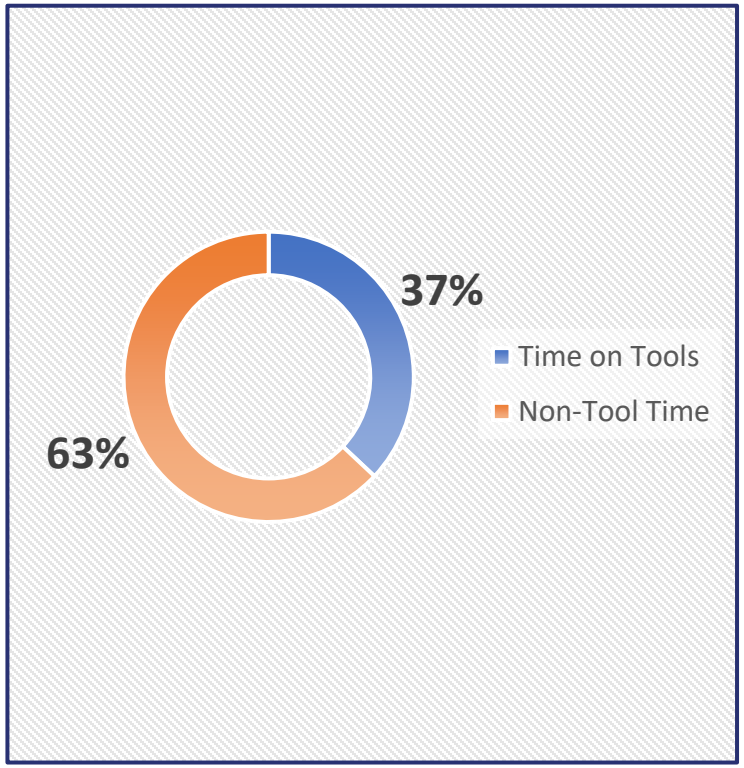
THE PROCESS @ 250K FEET

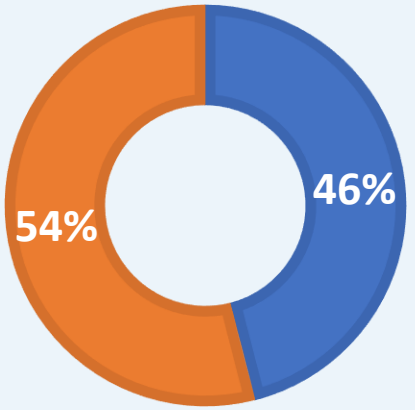
BRING TOGETHER A BLEND OF SOLUTIONS



AWP Benefits

25% Increase in Productivity

10% Reduction in Cost



Improved Safety

Cost and Schedule Predictability

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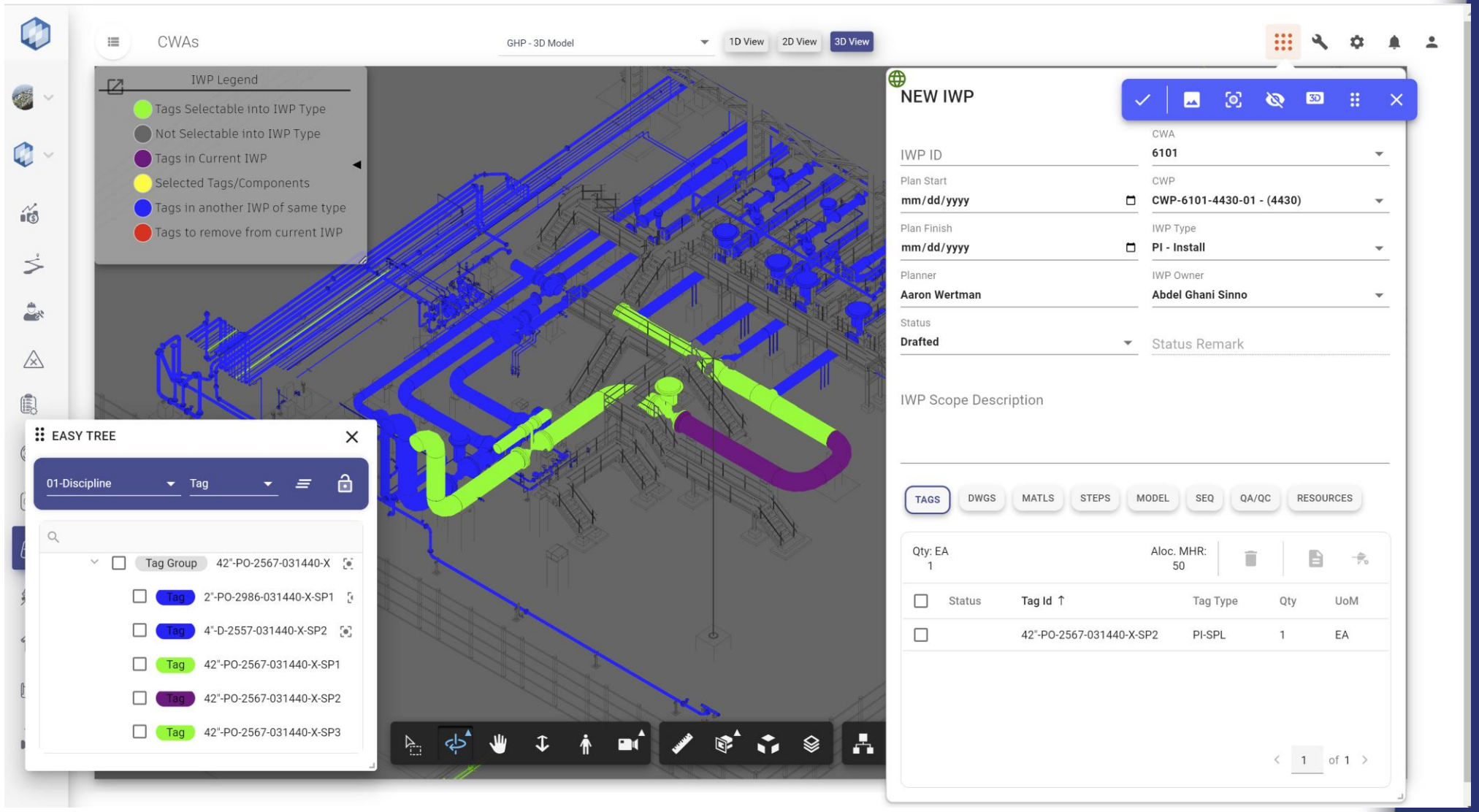
THE PROCESS @ 250K FEET

BRING TOGETHER A BLEND OF SOLUTIONS



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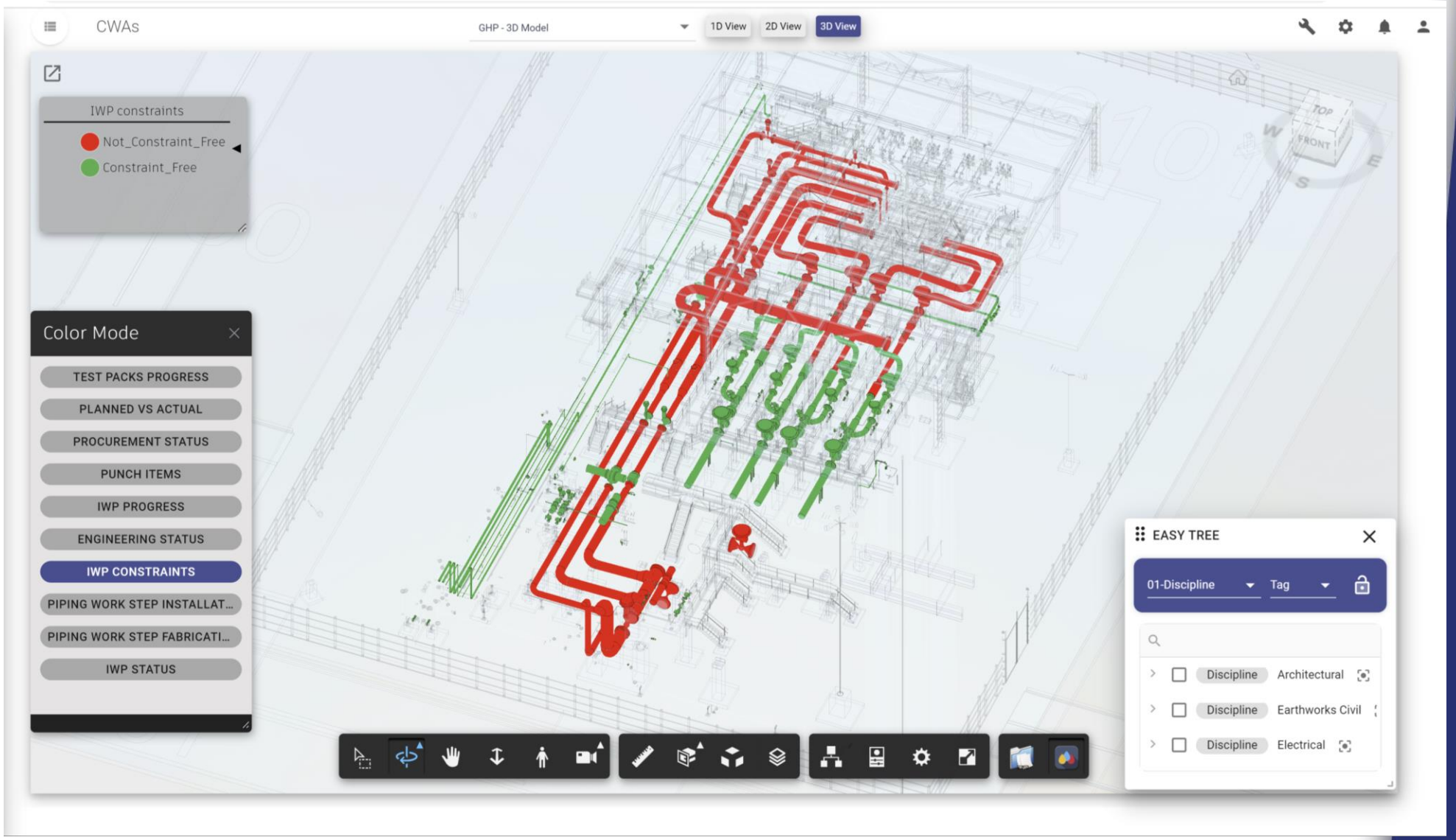
BRING TOGETHER A BLEND OF SOLUTIONS



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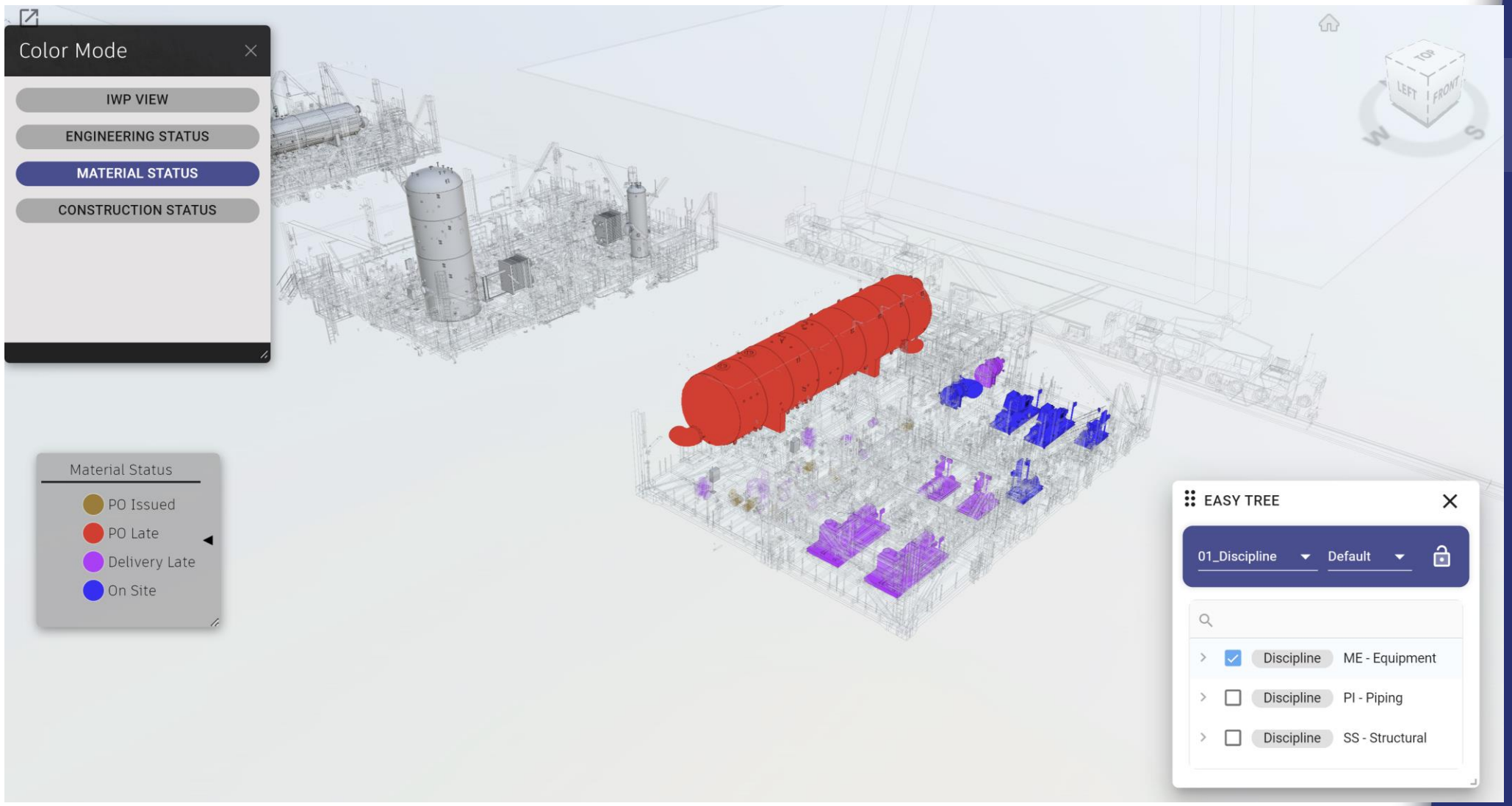

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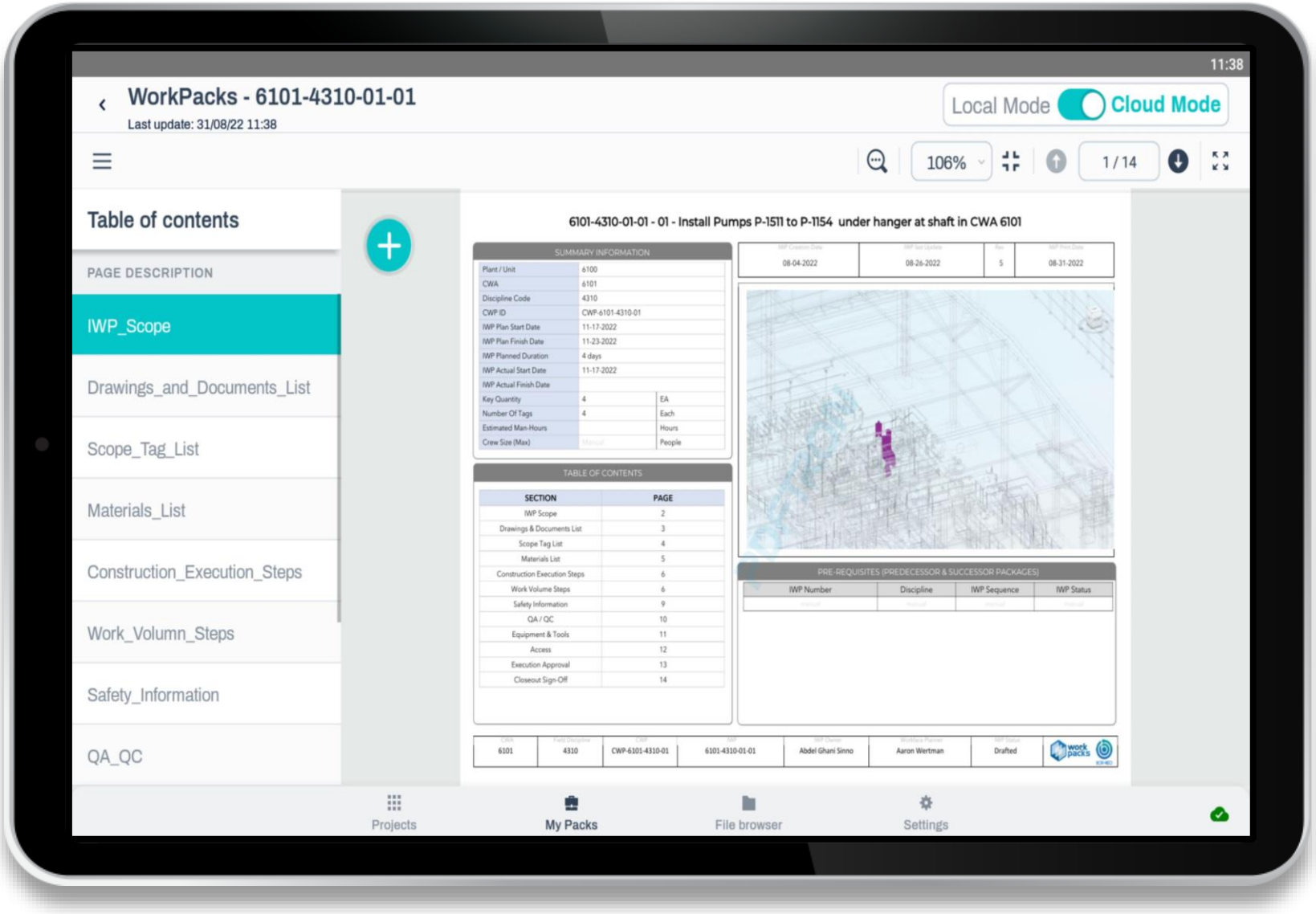

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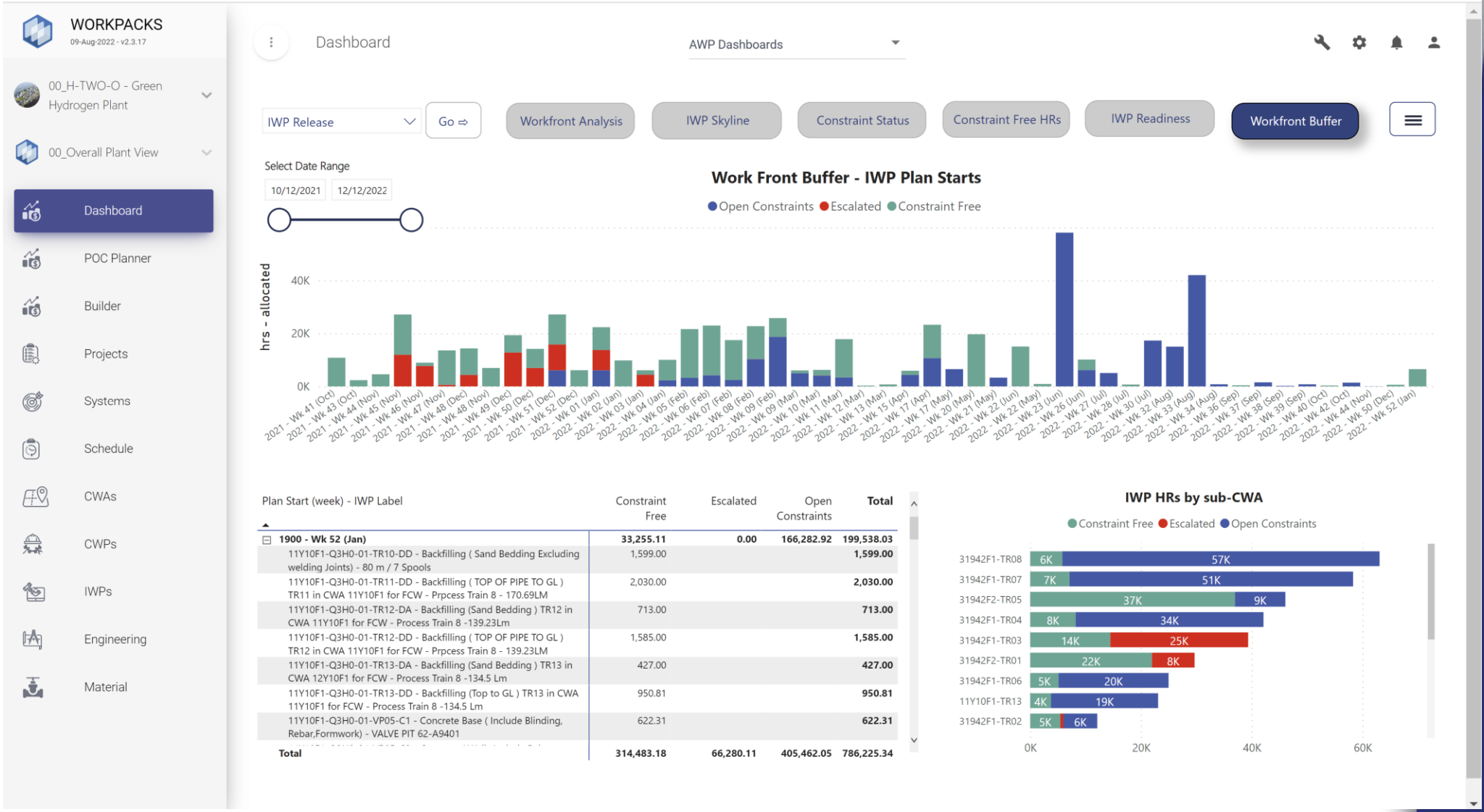

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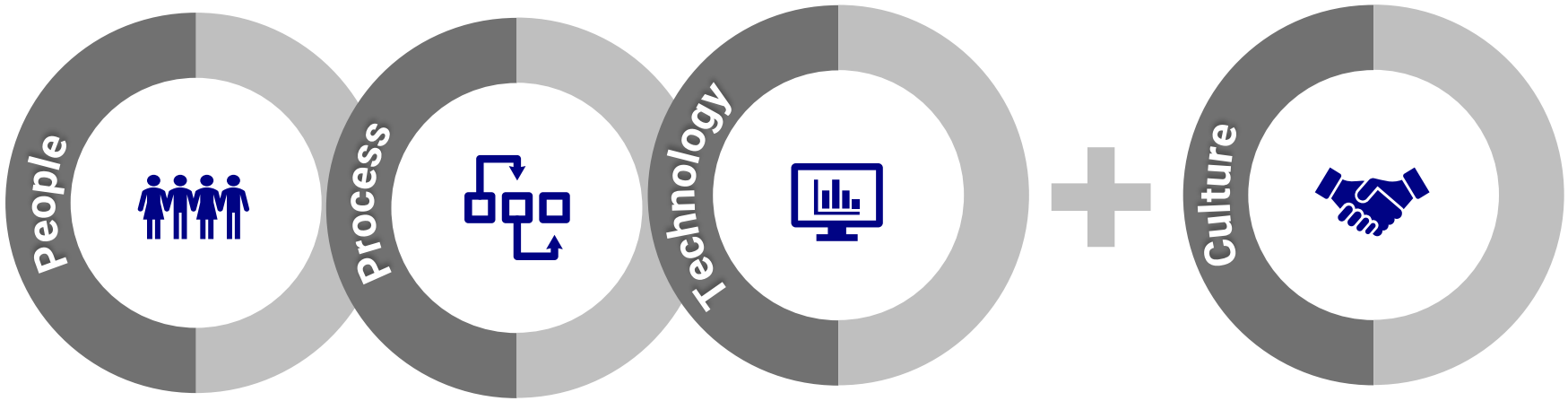
CRITICAL FACTORS

The Science Behind Optimizing the Project Delivery Experience



RELIABILITY **REPEATABILITY** **SCALABILITY** **SUSTAINABILITY**

Achieving optimal benefits requires …

ALIGNMENT
ALIGNMENT
ALIGNMENT

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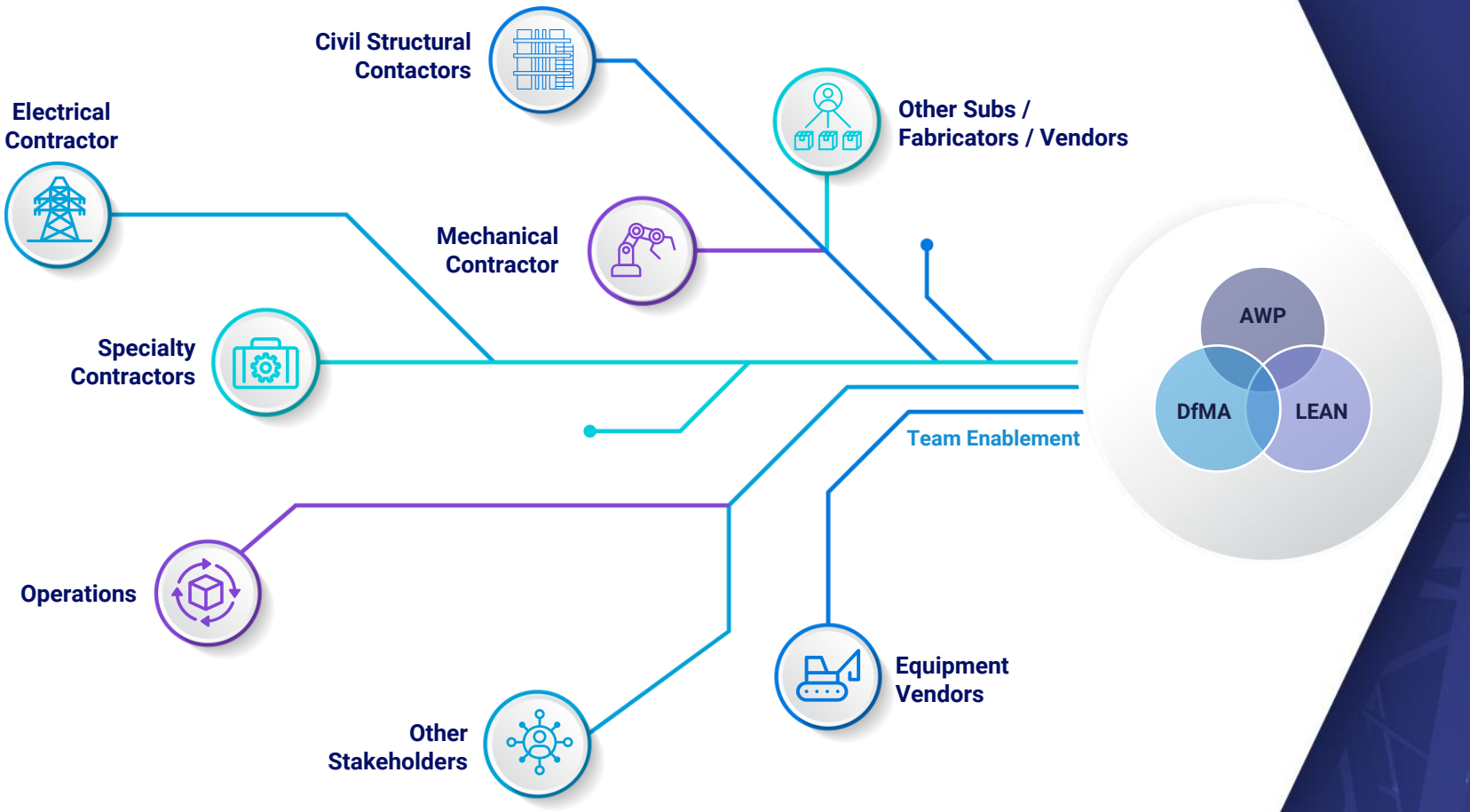
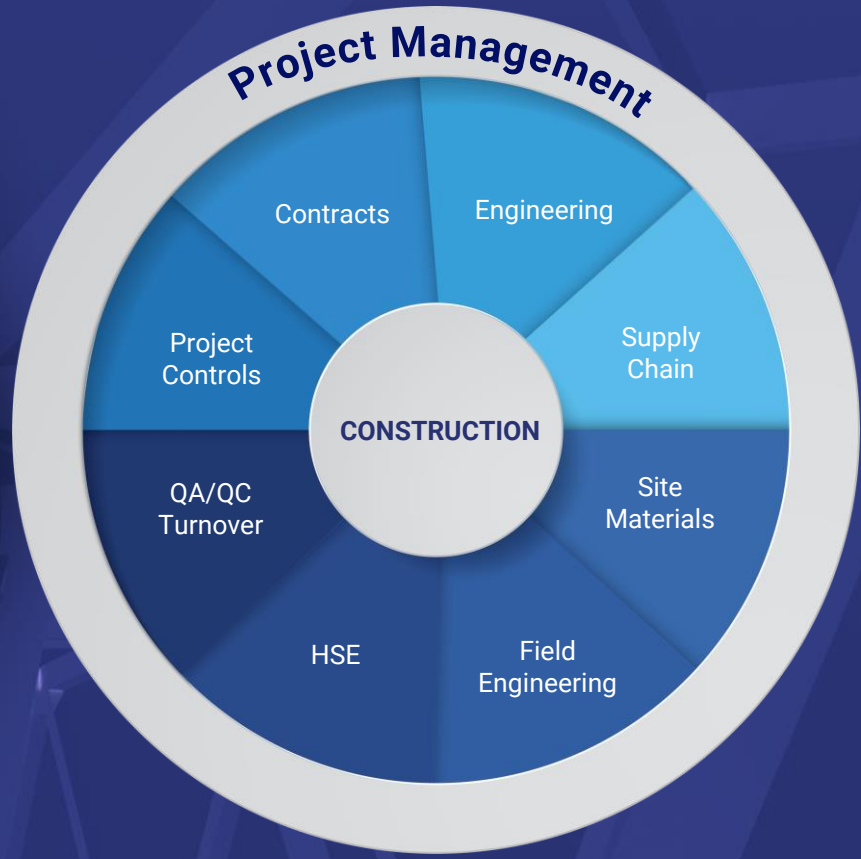
WHAT DOES GOOD LOOK LIKE
FUNCTIONAL & INTEGRATED TEAM





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WHAT DOES GOOD LOOK LIKE

USER QUOTES – THE METRICS

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"The vision of leveraging the 3D design model as a project management tool has now been realized."

- Hiroyuki Mogami, Chiyoda Section Lead, IT Digital Business Intelligence

"Good things happen to those who work package early."

- User at major EPC Organization

"This is next-level capability in AWP."

- User at major Owner Operator

2-for-10

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BACKGROUND

- **Strategic Initiative -** NFE Project is a significant endeavor by Qatar Petroleum with a $28.75 billion investment in the LNG sector.
- **Global Standing -** The project enhances Qatar's position as a leading LNG exporter, leveraging the third-largest gas field globally.
- **CCC's Role -** Focused on onshore LNG Mega trains, integrating advanced AWP solutions with digital EPC tools to achieve project objectives efficiently, involving significant quantities of various construction materials and commodities.

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Working together …

CCC Wins 2 AWP Project Awards at 2023 Annual Conference

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RESULTS

- **Safety Improvements** - The 90-day lookahead feature provided transformative visibility, enabling proactive safety measures and optimized resource allocation for a safer project environment.

- **Quality Enhancement** - With a significant focus on quality, WorkPacks facilitated transparent tracking, dual-role tagging, and integration of quality measures into construction processes, resulting in remarkable improvements in quality benchmarks.

- **Efficiency in Time Management** - WorkPacks provided crucial features for time management, including 90-day visibility, proactive constraint management, and efficiency trend analysis, supporting the project's ambitious efficiency improvement goals.

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Working together …

CCC Wins 2 AWP Project Awards at 2023 Annual Conference

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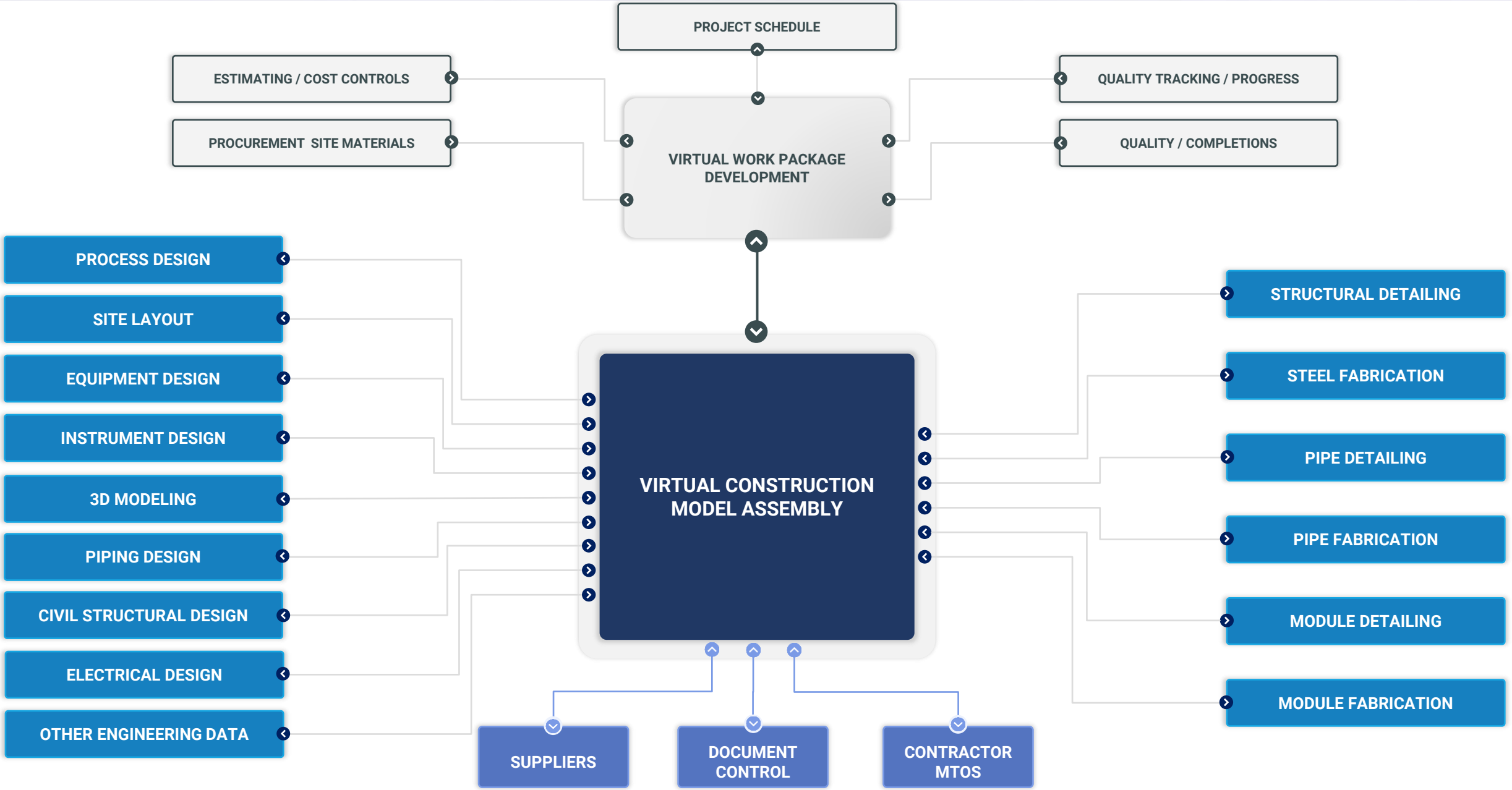
3. AWP ROLL OUT CHALLENGES

- MANAGING DATA & CHANGES - DIGITAL THREADS
- CONTINUOUS DESIGN MODEL UPDATES –VCM
- GETTING THE ORGANIZATION TO DO CONSTRAINTS – CLOUD CONSTRAINTS
- BRINGING IT ALL TOGETHER

MANAGING DATA & CHANGES - DIGITAL THREADS



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AWP ROLL OUT CHALLENGES

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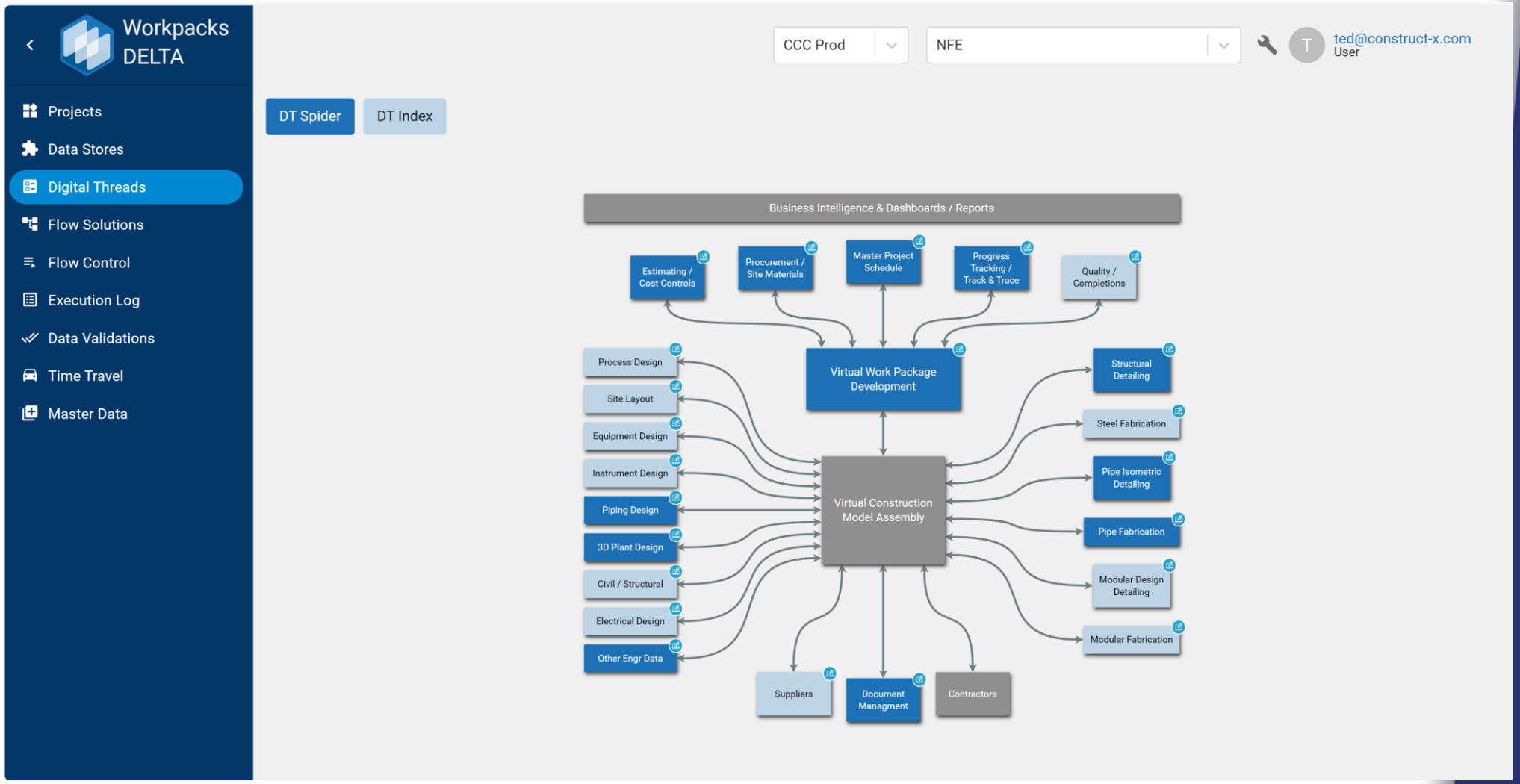

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AWP
DEMANDS

NEW ROLES & DIGITAL USERS

ON PROJECTS NOT TYPICAL PROJECT BUDGETS

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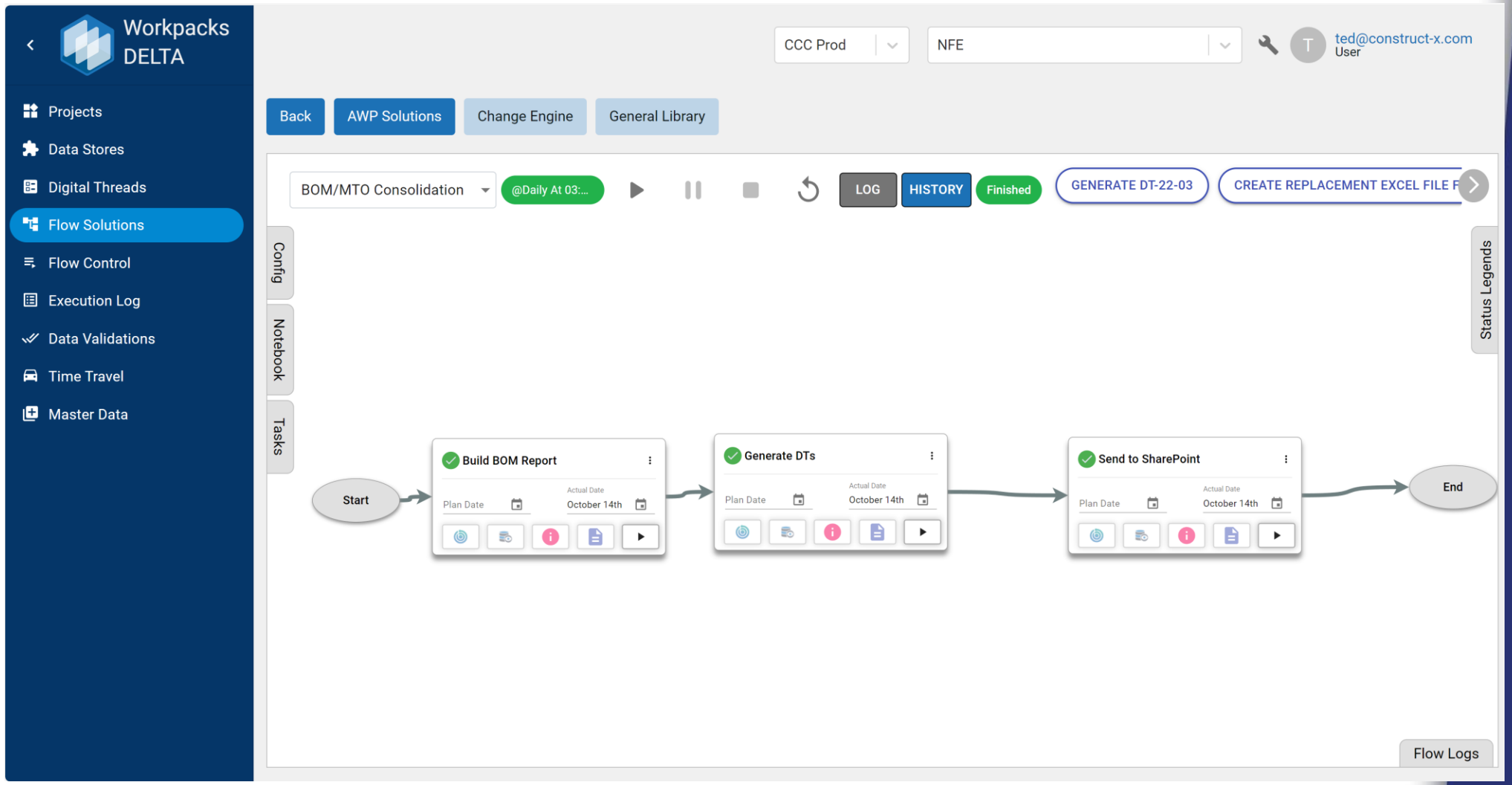
AWP ROLL OUT CHALLENGES

MANAGING DATA & CHANGES - DIGITAL THREADS



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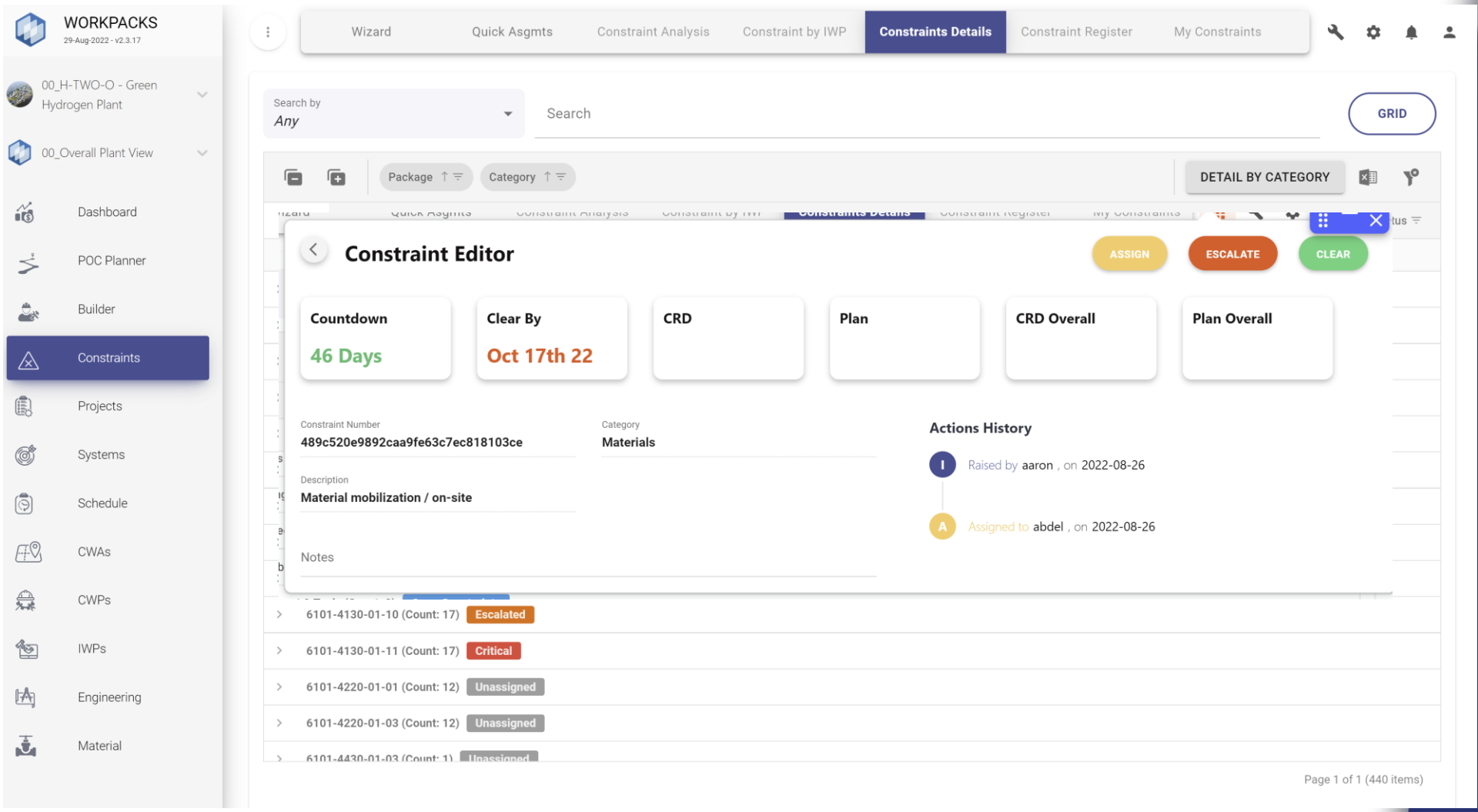
AWP ROLL OUT CHALLENGES

GETTING THE ORGANIZATION TO DO CONSTRAINTS



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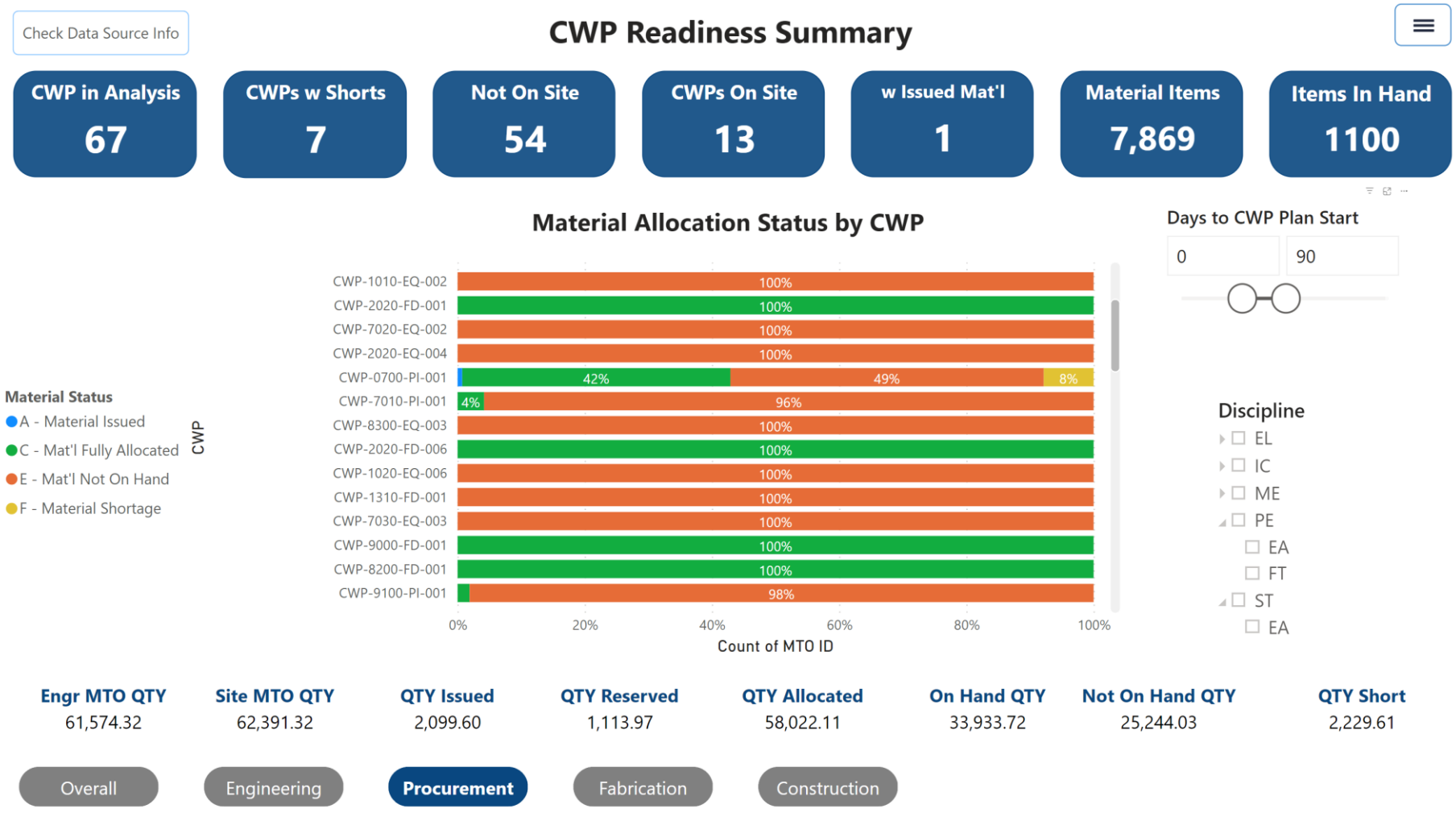
AWP ROLL OUT CHALLENGES

CONTINUOUS DESIGN MODEL UPDATES –VCM



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NEW ROLES & DIGITAL USERS

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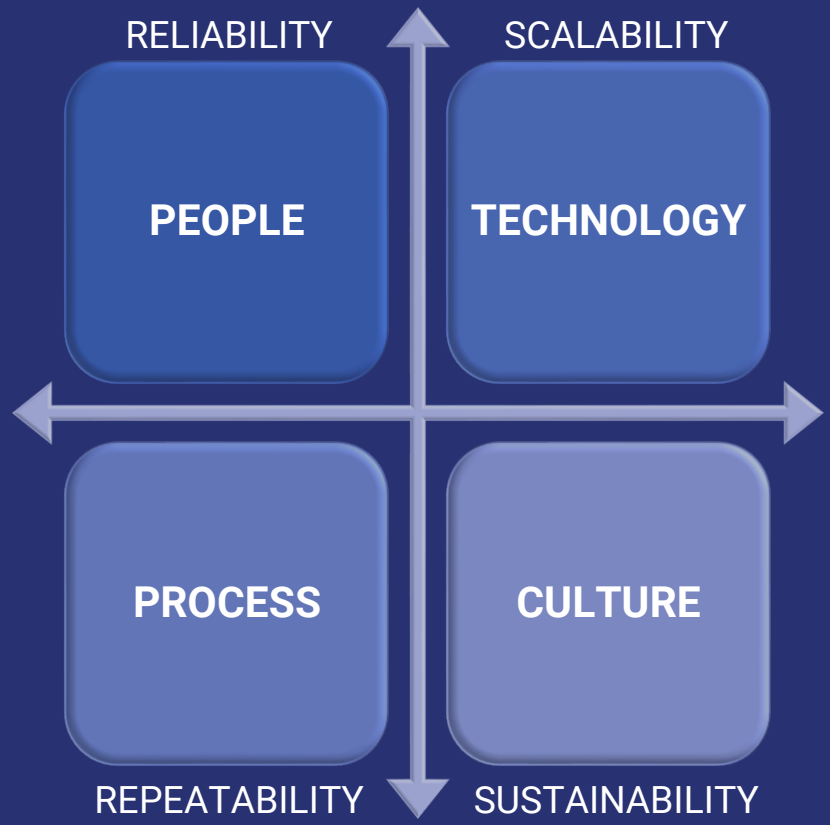
AWP ROLL OUT CHALLENGES
BRINGING IT ALL TOGETHER

- **Fit-For-Purpose AWP/LPD Program**
- **Implementation Strategy**
- **Education, Training & Coaching**
- **Implementation Support & Staffing**
- **Continuous Improvement**



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projectai
CREATE CLARITY

The Intelligent Project:
Digital Execution & AWP in Capital Portfolios

Ray Paulk
Founder / CEO, ProjectAI
AVEVA World 2023 - San Francisco

projectai.com

Today’s Speaker

Ray Paulk
Founder / CEO, ProjectAI

- Senior business and portfolio advisor specialising in capital investment/ venture structuring, project strategy, technology strategy, portfolio optimisation, growth & international expansion.
- Over 20 years experience in major- and mega-projects and portfolios for the Oil & Gas, Natural Resources and EPC industries.
- Expert in major project governance to inform capital investment decisions, execution phase reviews, and forensic reviews.
- Led large multi-disciplinary teams, overseeing project controls for projects and programs ranging from $4m to $15bn, and portfolios ranging from $60 to $100bn. Advised numerous project and portfolio teams on six continents.
- Recognized innovator and thought leader in Project & Portfolio Management, specializing in advanced analytics, automation, systems integration, reporting and artificial intelligence for projects.

Why do Owners and EPCs still struggle with digital transformation in capital projects?

Problem 1:

Projects are human.

Problem 2:

Projects are temporary.

Problem 3:

Projects are unique.

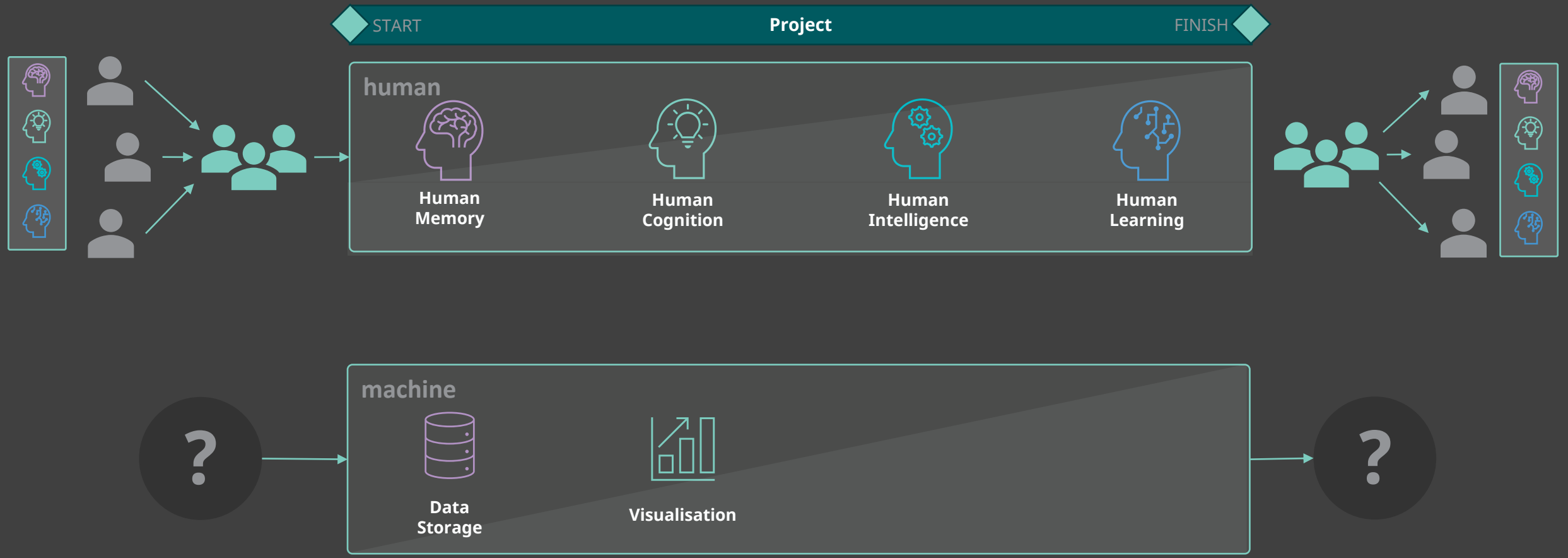
A new team comes together...

They learn a lot of things...

They create a lot of data...

The project ends...

Everyone leaves.

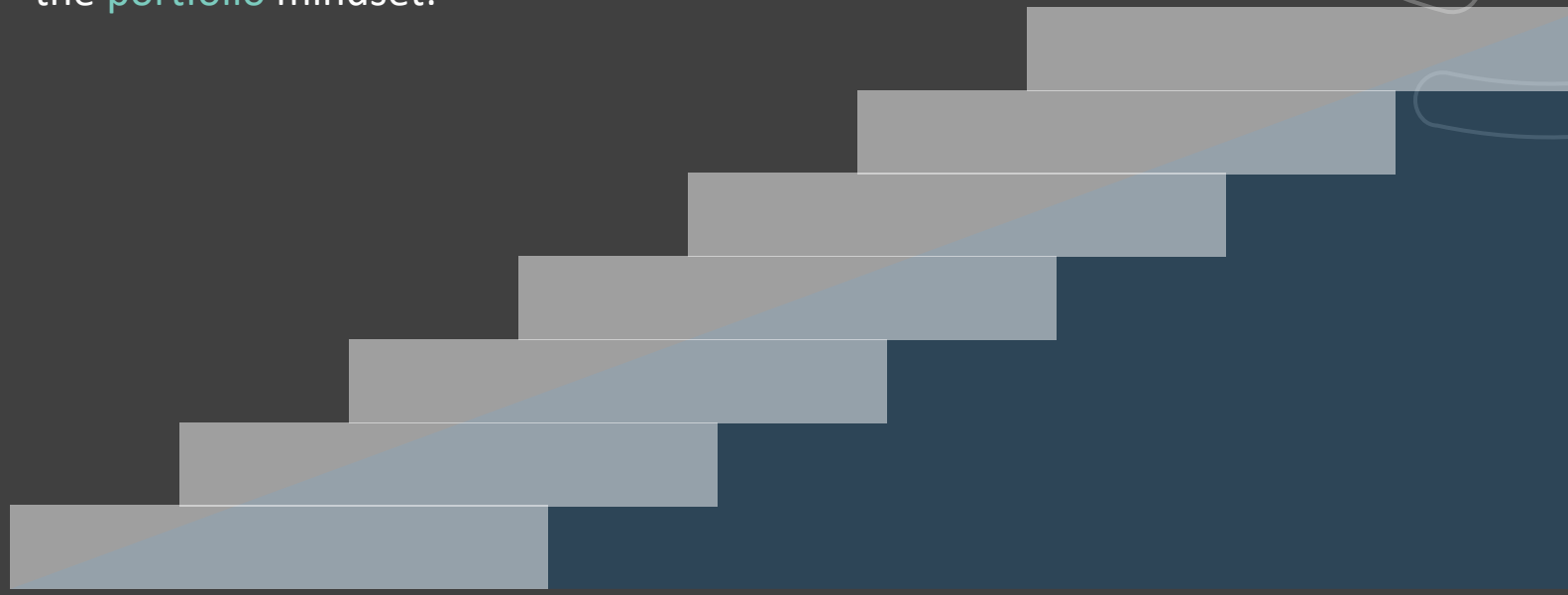


the single project mindset

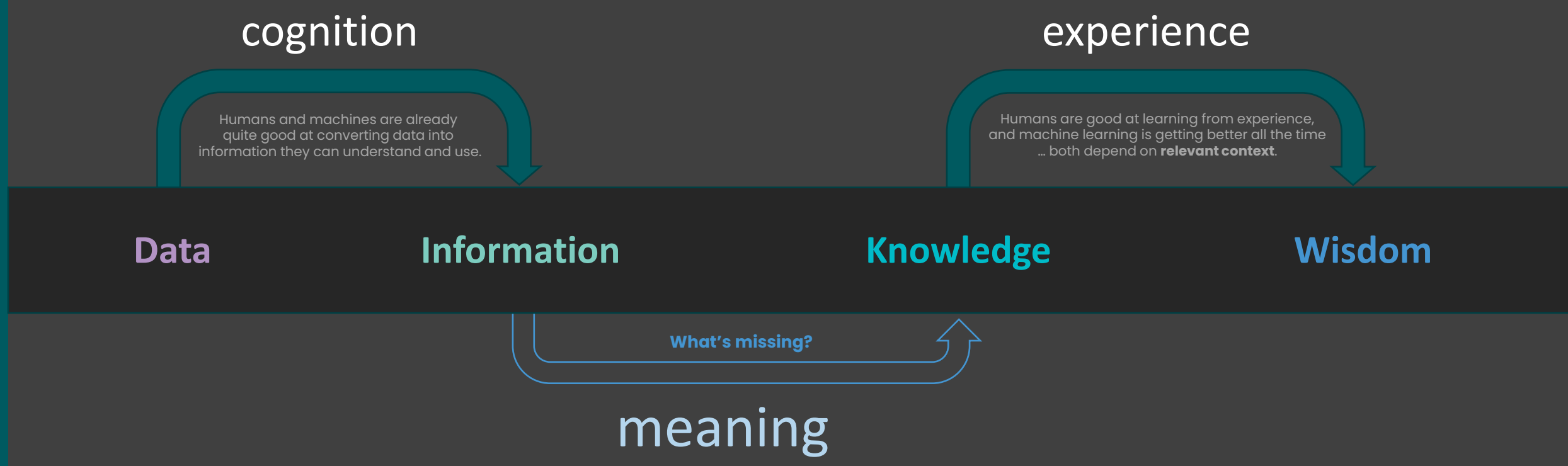
Every project is **temporary** …
but the knowledge we gain from them **does not have to be.**

the single project mindset:

the portfolio mindset:



Projects are temporary… but we keep doing them.
Projects are unique… but not special.


cognition
Humans and machines are already quite good at converting data into information they can understand and use.
experience
Humans are good at learning from experience, and machine learning is getting better all the time … both depend on **relevant context**.
Data
Information
Knowledge
Wisdom
What's missing?
meaning

Intelligent project execution is not achieved with a new dashboard

...but through the combination of human and artificial intelligence to **meaningfully predict future outcomes** and **optimize actions and decisions in the face of emerging conditions.**

Reporting	Analysis	Monitoring	Predictive	Prescriptive
What happened?	Why did it happen?	What's happening now?	What will happen?	What should happen?

SCADA
IIOT

AWP

AI

Governance
Understand | Manage Risk | Diagnose | Decide

pulse

Listen | Learn | Engage

Crowdsourced Team Sentiment & Stakeholder Management

Visualise | Analyse | Predict | Optimise

Project & Portfolio Dashboards, Predictive Analytics & Knowledge Discovery using Natural Language

Connect | Condition | Contextualize

Semantic Knowledge Platform for the Industrial Enterprise

People
Roles | Accountability
Ingenuity | Emotion

Process
Value Chain | Workflows
Best Practices

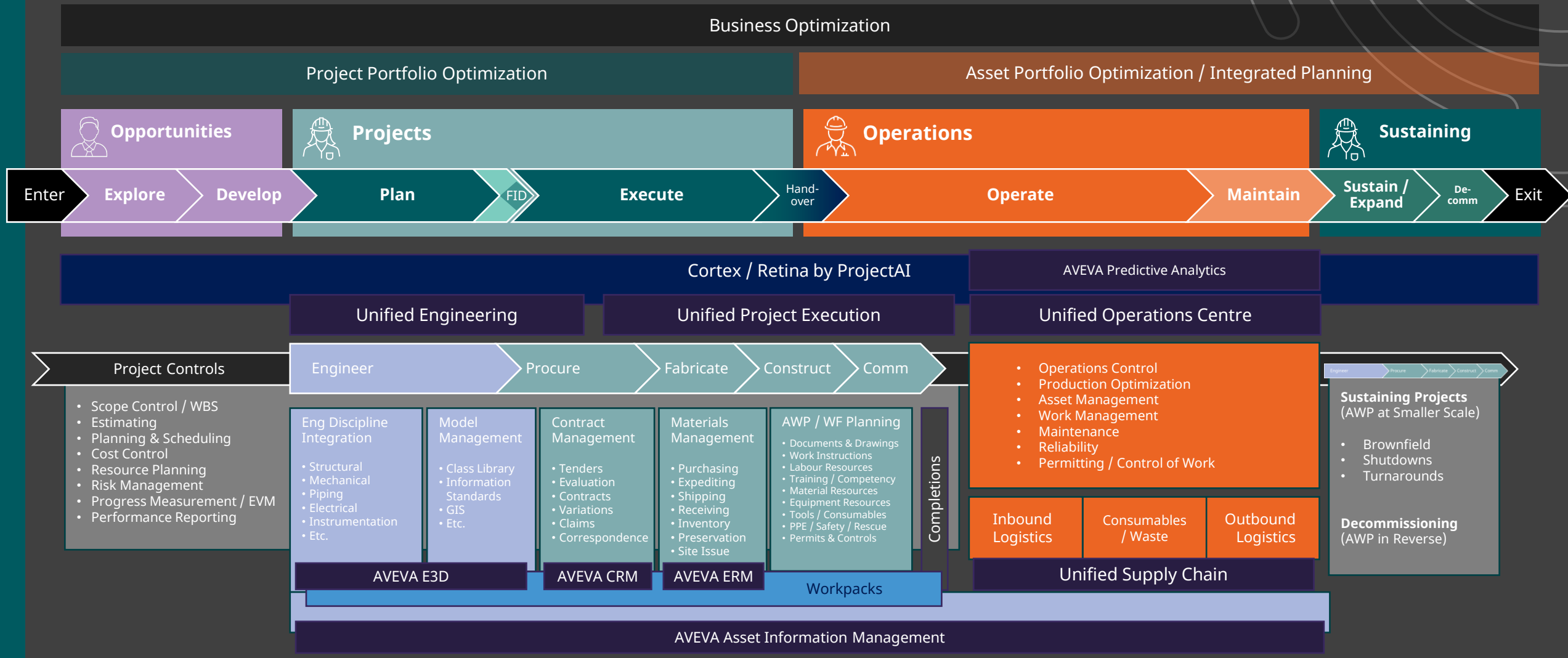
Technology
Project & Portfolio Mgmt Apps | Engineering & BIM Platforms
IIOT | Documents & Collaboration | ERP Platforms
Operations & Asset Management Platforms

Culture
Innovation | Transparency | Collaboration | Performance

Why ProjectAI?

- We use AI to convert unique project data into universal concepts – unlocking faster reporting, portfolio optimisation, predictive analysis and decision making across any application landscape or execution strategy.
- We capture human expertise in a form that AI can access, interpret, re-use and improve upon.
- We use explicit enterprise knowledge, inferred model-driven knowledge and large language models (e.g. GPT).
- **We use AI to bring people in to the project… not to push them out.**

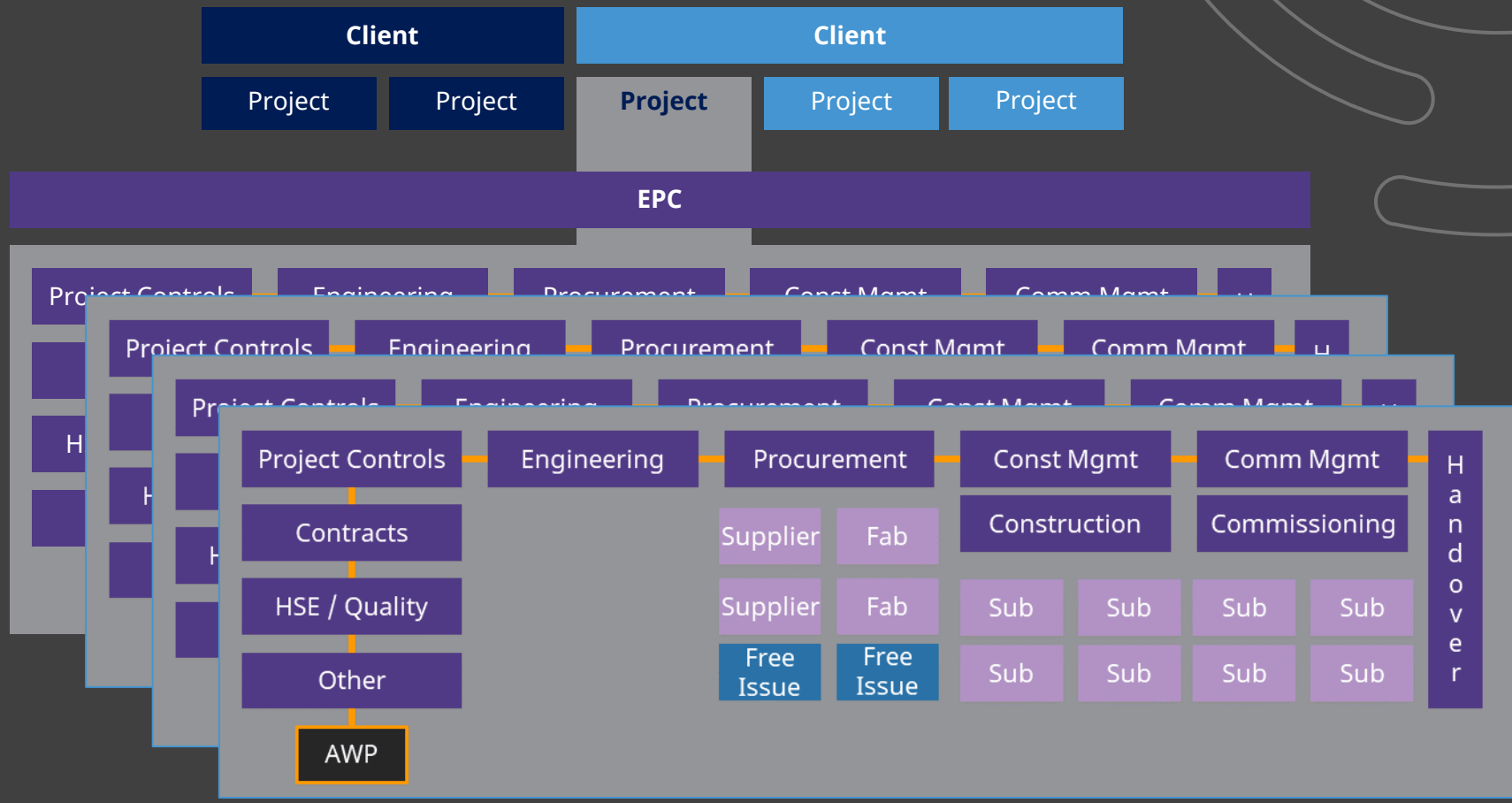
The value benefits from AWP are an excellent catalyst for cross-functional project & asset lifecycle data integration.



AWP in the **EPC**

EPCs / EPCMs use AWP to tie a digital thread through a project.

But the value of AWP is amplified for the EPC by connecting the data across their portfolio… using common systems to facilitate the needs of multiple clients simultaneously.



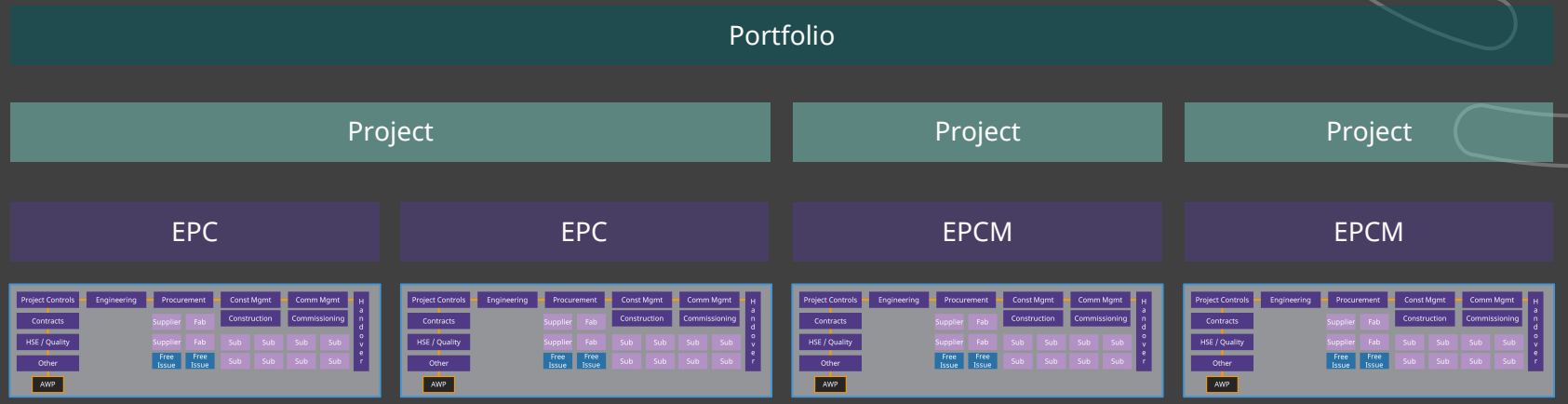
Why is AWP important for the EPC?

Safety	• **Planning for Safety** – Assuring HSE risks have been controlled, and HSE constraints eliminated • **Control of Work** – Assuring permitting regime is applied. • **Competency Verification** – Assuring resources are deployed with appropriate qualifications and training.
Win Rate	• **Competitive Tenders** – Stronger basis for lower estimates / faster schedules. • **Demonstrate Reputation for Successful Delivery** – backed up by data. • **Competitive Advantage / Differentiation** – clients expecting maximum leverage of project data for win/win outcomes. • **Provide Transparency to the Client** – clients expecting transparent performance management and proactive intervention
Margin & Cash Flow	• **Lump Sum Margin** – via productivity, delivery assurance and minimal rework. • **Incentive Attainment** – via predictable cost, schedule, quality, and other delivery KPIs • **Protect Margin via Scope Control** – strong control of data provides clear support for variations and claims defense • **Reduce Overhead / Indirects** – via data driven approach / eliminating spreadsheets and data handover points
Learning	• Enabling **Knowledge Retention** across disparate customer sectors • Mitigating for **Resource Attrition / Departure** • **Lessons Learned / Risk Reduction** • **Data Normalisation** for meaningful benchmarking / future estimates

AWP in the **Owner**

In the same way EPCs / EPCMs need to aggregate data across a variety of stakeholders… and for a variety of clients.

Owners need to do the same across a variety of EPCs… across different project types and contracting strategies.



Why is AWP important for **the Owner**?

Safety	• **Planning for Safety** – Assuring HSE risks have been controlled, and HSE constraints eliminated. • **Control of Work** – Assuring permitting regime is applied. • **Competency Verification** – Assuring resources are deployed with appropriate qualifications and training.
Competitiveness	• **Optimised Design –** Assuring resultant facility concept is not over-/under-designed for its use, while remaining operable, maintainable, reliable, etc. • **Optimised Investment Alternative & Business Case** – reflecting outstanding risk and uncertainty profile. • **Capital Intensity via Benchmarking** – cost / schedule / productivity Estimates in line with industry / regional benchmarks. • **Optimized Resource Utilization** – optimal deployment of capital / human resources.
Predictability	• **Scope Definition / Change Prevention** – and associated optimised execution / contracting strategy. • **Constraint Elimination & Resource Staging for Productive Execution** • **Assuring Productivity / Course Correction** for Root Causes of Delay / Non-Productive Time • **Project Performance** and Value-Focused Leading Indicators
Learning	• Enabling **Knowledge Retention for both Projects & Operations** • Mitigating for **Resource Attrition / Departure** • **Lessons Learned / Risk Reduction** • **Data Normalisation** for meaningful benchmarking / future estimates

AWP & Digital Execution capability is **already a key differentiator / qualifier** of EPC capability

"The Role of the Owner" argument continues…

- **EPCs bringing their own systems and processes?**
  - EPC capability not always as advertised.
  - Too dependent on capability of individuals?
  - Owners should trust but verify… i.e. prequalify
  - How do Owners get the transparency they want, the predictability they need, and retain the knowledge they paid for?

- **Owners mandating their own systems and processes?**
  - Mitigates for variable EPC capability, but costs more / takes longer for EPC to learn new way of working.
  - Fundamentally erodes the value of EPC people / process / systems
  - Limits leverage of EPC experience from other projects

The best of both worlds:

- **EPCs acquire / build / sustain strong capability in digital delivery around:**
  - Capable People
  - Streamlined Processes
  - Enabling Technology
  - Strong Governance / Performance Management
  - Culture of Transparency and Win-Win

- **Owners:**
  - Prequalify EPC Capability in AWP & Digital Delivery
  - Include Detailed Data Requirements in Invitations to Tender / Head Contracts
  - Establish pipelines to EPC(M) data sources
  - Normalise incoming data to ensure it is retained as sustainable knowledge.

RioTinto

Rio Tinto is one of the world's largest metals and mining companies, investing in a large portfolio of complex capital projects around the world.

ProjectAI is supporting the Rio Tinto Projects team to deliver the phased implementation of AWP … unlocking value for individual projects, and the portfolio as a whole.

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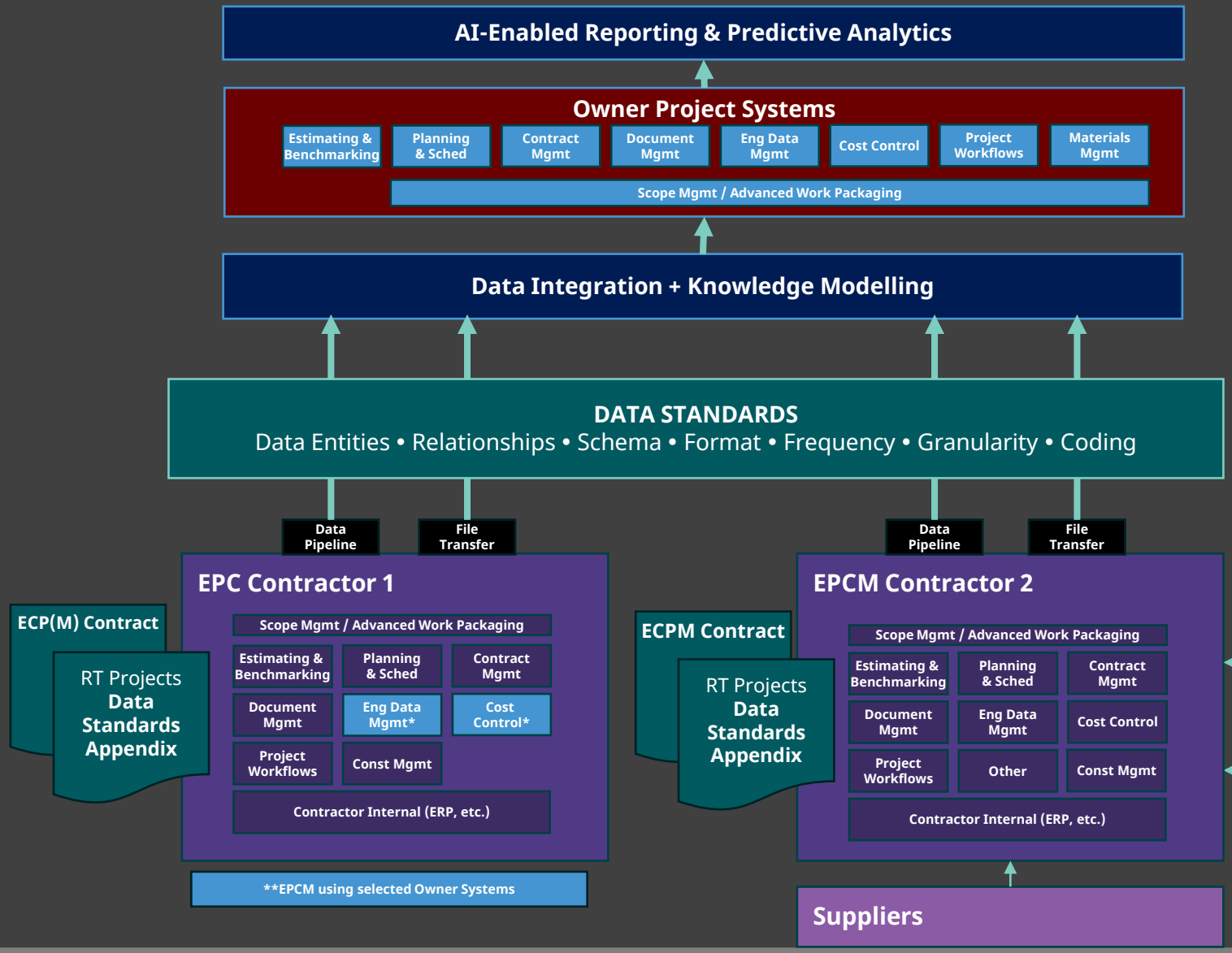
Implementing AWP across a Global Portfolio



- design and implement **data standards** underpinned by a **preferred internal systems architecture.**
- applies to **data requirements throughout the project lifecycle**, as well as the ultimate handover data & deliverables.
- **data standards are mandated** in related contracts, with controls to ensure quality / completeness.
- use of **data pipelines** (e.g. endpoints / APIs) is preferred over manual file transfer.
- contractor capability to meet these standards using **their own systems architecture** should be validated, and gaps filled where necessary.

Amplifying AWP

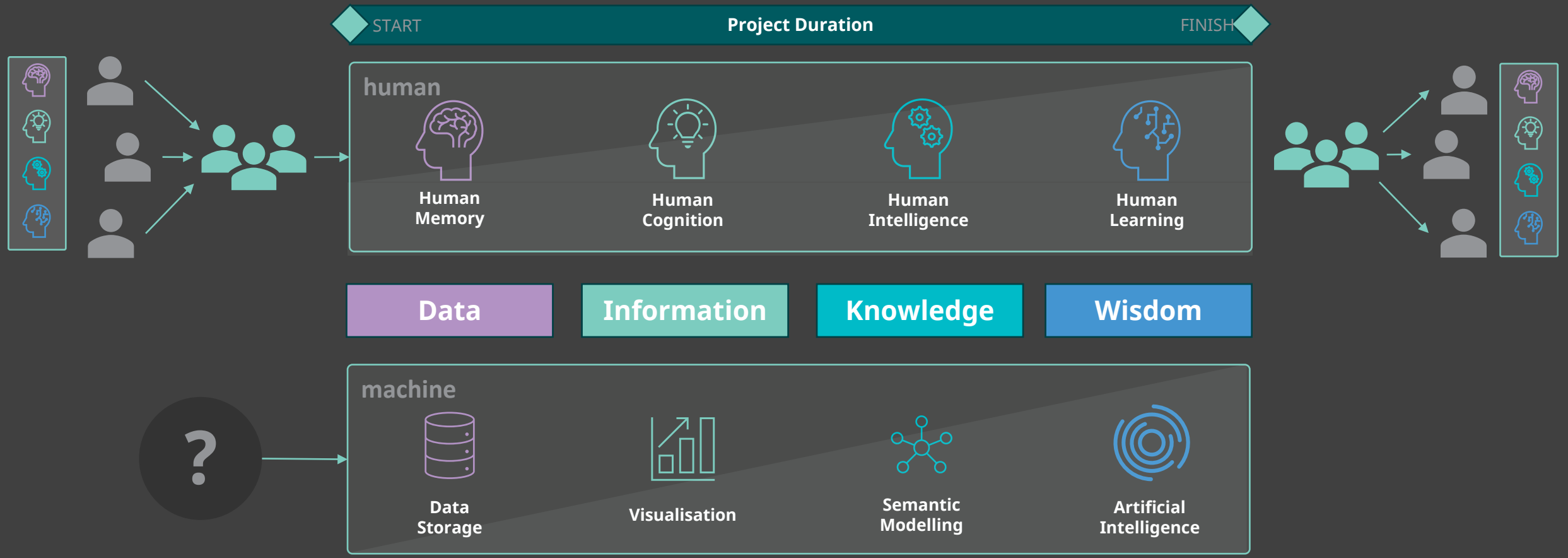
A new team comes together...

They learn a lot of things...

They create a lot of data...

The project ends...

Everyone leaves.



cortex

by projectai

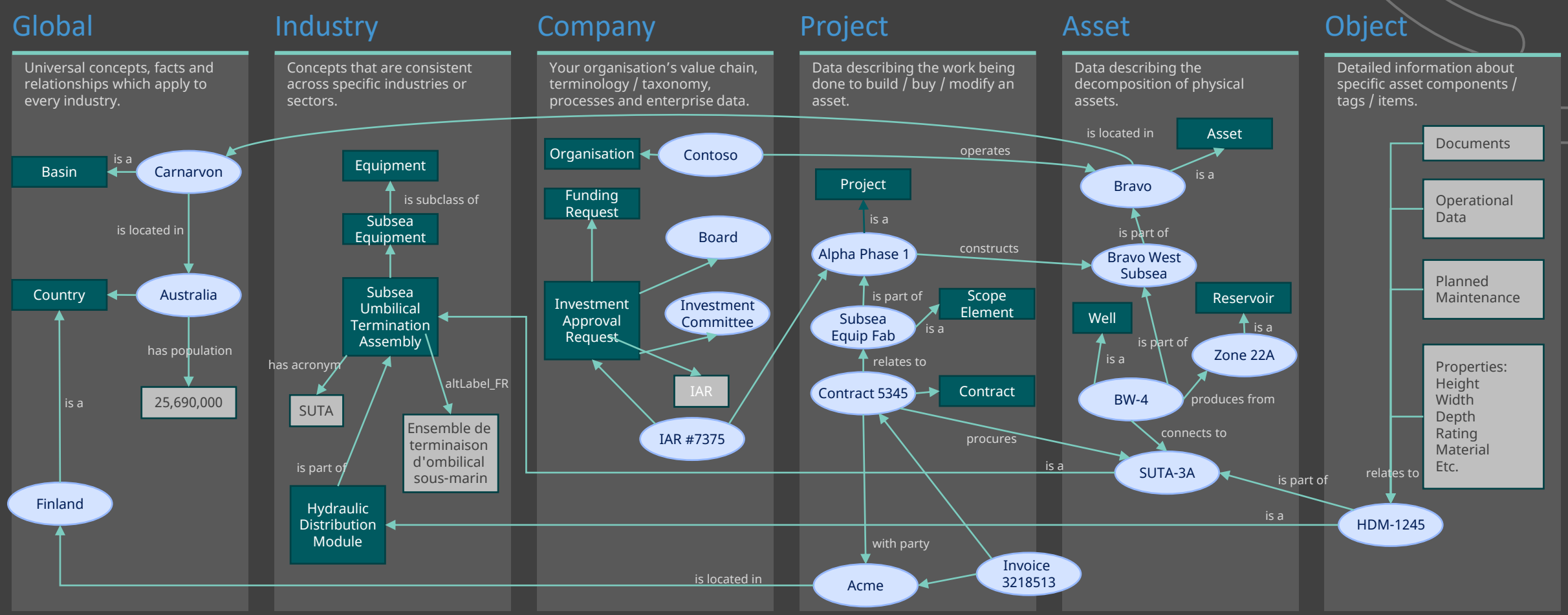
Cortex is a revolutionary **semantic knowledge platform** for the asset-intensive enterprise.

- By adding **meaning** to technical and commercial data, Cortex enables disparate data across a diverse portfolio to be integrated, normalised, optimised and personalised for the people who need it.

- This allows **data** to be converted into sustainable **knowledge**, making analysis more rapid, relevant and re-usable to optimise business performance in context.

Cortex Knowledge Domains & Linked Data

Don’t reinvent the wheel. Grow and re-use organisational knowledge with Cortex.



projectai

CREATE CLARITY

Asia-Pacific
+61 8 6280 2040

Americas
+1 646 934 6400

Europe, Middle East & Africa
+44 20 3769 8005

info@projectai.com

projectai.com

Panel / Q&A

Please wait for the microphone.

State your name and company.

For More Information

Visit Ted & Ray at the WorkPacks Booth in the Exhibit Hall

Ted Blackmon ted@construct-x.com

Ray Paulk ray.paulk@projectai.com

Steve Furze Stephen.Furze@AVEVA.com

Please remember to…

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

Thank you!

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