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Digital Twin Foundation for Megaprojects

Saudi Aramco

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AVEVA

Presentation Progress
0%

1 | Objective

2 | Digital Twin Overview

3 | Business Case for early deployments of project Digital Twin

4 | Use Case: Safaniyah & Manifa Crude Increments Programs Digital Twin Deployment

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Sulaiman Al Rubaian, Vice President of Facilities Planning in Saudi Aramco:

"Saudi Aramco, in pursuit of its vision for excellence in capital planning and value maximization, always seek to be the first to foster new technologies in the Energy industry. The application of Digital Twin in our front-end planning for capital investments is one of our latest capability frontiers that we look for our partners to adopt and integrate into their processes."

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Outline arguments for early deployments of project digital twin in Megaprojects

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Saudi Aramco categorizes digital twin into two areas:
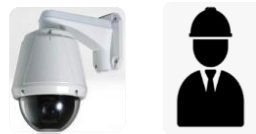
Projects and Construction

- 3D
- Performance Visualization
- Schedule/Cost Update
- Safety

Operate and Maintain

- Production Operations
- Regulatory Compliance
- Quality Operations
- Inventory Operations
- Reliability & Integrity

NFUY Mobility

IOT | Cloud Based

Business Process | Analytics

SOA Integration

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1 | Why do we need to deploy in Pre-Feed and Feed?

2 | What information to be considered in Pre-Feed and Feed?

3 | Which projects we should deploy this requirement to ?

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1 | Why do we need to deploy in Pre-Feed and Feed?

A | Enable EPC first day deployment

B | Enhance Issued For Bid (IFB) package quality

C | Embed data centric approach in project development

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1 | Why do we need to deploy in Pre-Feed and Feed?

A | Enable EPC first day deployment

EPC can hit the ground running with digital twin thanks to early deployment provided enablers:

- Defined contracting strategy guiding EPC to either work with a specific PMC, lead interface digital twin, or independent

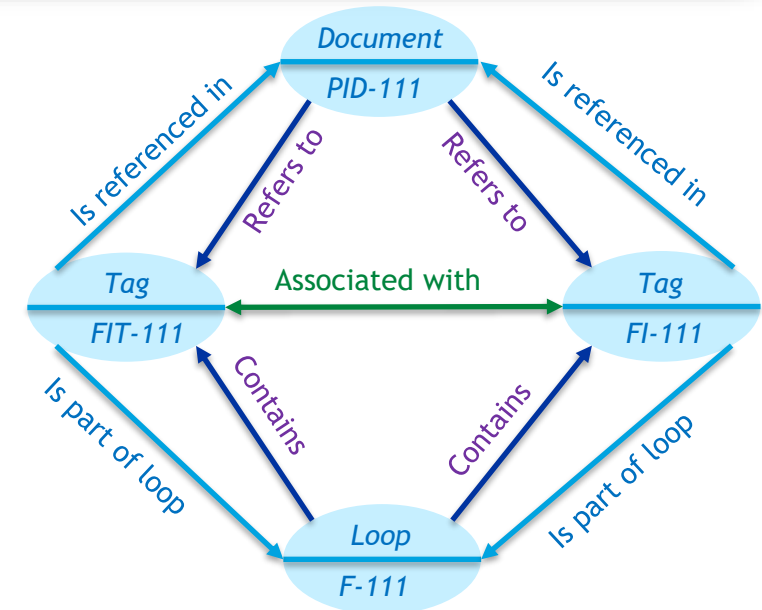- Standardized class library is pre-developed to follow

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1 | **Why do we need to deploy in Pre-Feed and Feed?**

B | **Enhance Issued For Bid (IFB) package quality**

Improve Engineering Deliverables quality through *__Association__* functionality

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1 | Why do we need to deploy in Pre-Feed and Feed?

C | Embed data centric approach in project development

- Data Consistency: ensures uniform representation, and standardized class library

- Data Analysis: enables efficient penetration, and pattern identification

- Scalability: enables expansion with ability to handle large amount of data

- Data Integration: facilitates integration between different packages

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2 | What information to be considered in Pre-Feed and Feed?

Projects and Construction

3D

Schedule/Cost Update

Performance Visualization

Safety

- 3D:
  2D work (and initial 3D) is a Pre-EPC requirement

- Performance Visualization:
  key to track quality and progress

- Schedule, cost and Safety:
  Early to apply. Key is to define EPC scope

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3 | Which projects we should deploy this requirement to ?

This need to be considered in short and long terms :

- Short term:

  o Engineering Service contractors should target early deployment in all megaprojects

- Long term:

  o Engineering service contractors should have it engrained in their day today business to deliver all projects.

  o In addition, consider utilization for offline reviews by developing workflow engines

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Early Digital Twin Deployment in Safaniyah and Manifa Increment Program

Background:

- Safaniyah and Manifa are two Mega programs with several projects across our supply chain

- Early Deployment of Digital Twin was applied in Wood on-prem network for several projects including new crude processing facility, new terminal facility and several expansions in existing facilities

How:

- Utilize existing Wood AVEVA™ Asset Information Management (AIM) license
- Utilize existing pre-configured gateway between WebDMS and AVEVA AIM

WebDMS → Receiver Module

AVEVA AIM

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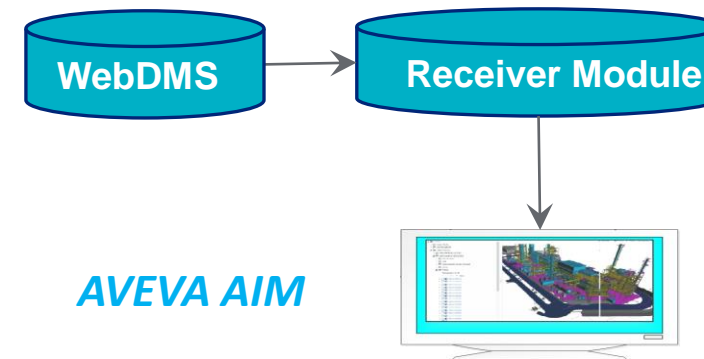
Early Digital Twin Deployment in Safaniyah and Manifa Increment Program

Outcomes:

- Tracking inconsistencies across deliverables

- Tracking progress

- Projected Digital Twin contracted Strategy for each EPC

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1 | Early Digital Twin deployment is key to enable first day application in EPC

2 | Focus on megaproject then transition to all.

3 | Focus on improving IFB quality and defining workable Digital twin EPC scope and contracting strategy

4 | Consider Digital twin to enhance and track offline reviews

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