# Transforming Energy An holistic approach to the industry in the Digitalization era

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Where today meets tomorrow

#### Agenda





# Why are we here?



# Environment

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#### **Disruptive market conditions require industry to adapt**



Cost reductions do **not** compensate for price decline

#### **Dated Brent Price**



#### **Upstream Cost Index**





Lower OPEX

Lower

CAPEX



#### **Pressure to perform despite disruption**





#### **Pressure to perform despite disruption**





F5: WHAT REGIONS OR COUNTRIES WILL PRESENT THE LARGEST GROWTH OPPORTUNITIES OVER THE NEXT 5-10 YEARS?



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# **Capital Projects** By the numbers



**98%** of megaprojects incur cost overruns or delays

Source: McKinsey Construction Productivity Imperative

**80%** is the average cost increase on the original value



Source: McKinsey Construction Productivity Imperative

# **20 months** average slippage behind original schedule



Source: McKinsey Construction Productivity Imperative

# **#21** out of 22 industries\* studied for ranking on the digitization index



Source: McKinsey Imagining Constructions Digital Future

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# **Capital Projects** The productivity gap







Source: McKinsey The construction productivity imperative

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### **Capital Projects** Trends



Increased global competition

Increased project size and complexity

Increased rate of technology innovation

Decreased labor force



### A great capital project requires... ... thousands of great decisions





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# What do you need to make a good project decision?





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# Digitalization changes everything

The next trillion dollars will be earned with data – for our customers and for our industries.

Michael Dell, founder of Dell Inc.

Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000.

Pierre Nanterme, CEO Accenture

# Digitalization

# The widening gap in digital productivity





The top 5% of companies are dominating the economy by exploiting digital competencies.

The Best Versus the Rest: The Global Productivity Slowdown, Divergence Across Firms And The Role of Public Policy, OECD Productivity Working Papers

Data is from 24 OECD countries.

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#### **Como explorar as Competências Digitais?**





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Plantas & Equipamentos – Mundo Físico



Visões de como as empresas estão abordando hoje os desafios de negócios com o modelo digital

**2,268** Executivos de Negócio e Executivos Técnicos

60 Países

#### Diferentes planos para o Digital

Qual das opções a seguir descreve melhor o principal objetivo da sua organização para resultados digitais?



#### Transformar para não desaparecer

A história recente nos mostra a importância desta transformação





"Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000."

Pierre Nanterme CEO Accenture



Restricted © Siemens 2019 Page 21 30-Out-2019 Como as empresas tratam o ativo Informação?

# DATA IS THE NEW OIL

"Faz sentido para o negócio tratar a informação como um ativo, o mercado dá um valor *premium* para empresas "*informationcentric*", essas empresas desfrutam de valor de mercado por ativo tangível que é de 2 a 4 vezes maior que o normal."

Doug Laney, consultor Gartner



Figure 3. The value of information increases with use



Figure 5. Value increases with accuracy



Figure 6. Value increases with integration

#### ERP – Sistema Corporativo de Gestão



#### ERP – Sistema Corporativo de Gestão



Plantas & Equipamentos – Mundo Físico

#### A Jornada na Maturidade Digital





(ACATECH Study-Industrie 4.0 Maturity Index Managing the Digital Transformation of Companies)

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### **The Digital Maturity Journey** Realizing incremental value the entire way



-evels of Digitalization

# **Teamcenter for Capital Asset Lifecycle Management** A digital transformation for capital-intensive industries

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Where today meets tomorrow

Siemens Teamcenter® for Capital Asset Lifecycle Management solution...

#### **Teamcenter for Capital Asset Lifecycle Management** A digital transformation





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### **Teamcenter for Capital Asset Lifecycle Management** A digital transformation





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### Capital Asset Lifecycle Management Realize continuous optimization





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Design, simulate, and verify processes digitally, including mechanics, multiphysics, and electronics

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Plan, simulate, predict, and optimize the plant build digitally including clash detection and construction planning as well as virtual commissioning.

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Predictable construction execution contributes to efficient commissioning and a reduction in project delays and cost overruns

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# Feed back insights to continuously improve capital assets





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# Capital Asset Lifecycle Management Make smarter collaborative decisions





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#### Capital Asset Lifecycle Management Enterprise Insight



# Enterprise Search, Visualization & Analytics

#### **Program performance visualization**

#### Plant data navigation and search

#### Analysis & measurement of key metrics

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#### Capital Asset Lifecycle Management Enterprise Insight





#### **Restricted © Siemens 2019**

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# Capital Asset Lifecycle Management Manage project complexity





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#### Capital Asset Lifecycle Management Program Management



The integration of engineering and construction

Accelerate planning, ensure accuracy and increase compliance & safety

Know when, how and what to build as well as real-time status of project execution

Complement legacy investments such as Primavera and MS Project

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# Capital Asset Lifecycle Management Program Management





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# Capital Asset Lifecycle Management Change & Issue Management





- ✓ Dynamically detect changes to design models
- Enable quick, efficient and traceable change throughout the project and asset lifecycle
- ✓ Digitally review and manage change in real time
- Manage change upstream and downstream so participants know when they need to respond
- Gain a real-time impact analysis of change on project milestones and take steps to mitigate the impact

# Capital Asset Lifecycle Management Requirements Management



Integrate requirements throughout the lifecycle & enable the requirements to influence the design



- ✓ Increase design compliance
- ✓ Reduce design time & redundancy
- ✓ Enable requirements traceability
- ✓ Quickly adapt to customer changes
- Understand change & its impact to the schedule

# Capital Asset Lifecycle Management Configuration Management





In both brownfield & greenfield capital projects, milestone payments are paid at specific intervals i.e. 30%, 60% and100% completion

... for capital asset stakeholders, the challenge lies in determining what is 30% & 60% completion?

- Adopt a continuous design & release (transmittal) process that meets the specified milestone requirements while never losing sight of the overall project
- Gain visibility of the process plant build progress over time i.e. compare at specified dates
- Utilize data-centric measurements of project milestones i.e.
  25% complete vs. 30%

# Capital Asset Lifecycle Management Configuration Management



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# Teamcenter for Capital Asset Lifecycle Management A digital transformation for capital-intensive industries

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Realize innovation.

00:00,00

# Introducing a New Way to Map Your Production Information



User:		1
Password:		
Company:		
	Login	

Remember me

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Forgot your plassword? | Register

Watch our tutorials >

Lifecycle Management



#### **Project: Capital Asset Lifecycle Management**



Customer National Passenger Railroad Company

#### Siemens Scope

- Software:
  - Teamcenter
  - Capital Asset Lifecycle Management

#### **Customer Challenge**

- Establish an enterprise project lifecycle solution to manage data from MicroStation & AutoCAD
- Need to utilise document management, configuration management and change management
- Customer is siloed with regards to their IT systems and Design tools

#### **Siemens Digital Solution**

- Auto-Populate the MicroStation meta-data and files into Teamcenter Objects and Meta-Data coming from CAD designers
- Teamcenter will be the system of record for all In-work / Release data including MicroStation 2D, MicroStation 3D, MicroStation Open Rail, and AutoCAD data
- Use CALM data to leverage Workflows, Configuration Mgmt., Change Mgmt., Revision Controlled as normal CAD Data Sets



Teamcenter as System of Record

Auto-Populate PlantCAD Data



Extend data to leverage Workflow, Configuration, and Change

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Lifecycle Management



**Project: Capital Asset** Lifecycle Management



Customer

Design House & Subsidiary of a Nuclear Power Company

#### Siemens Scope

- Software:
  - Teamcenter
  - Capital Asset Lifecycle Management

#### **Customer Challenge**

- Manage the plant design lifecycle including SmartPlant **3D and AVEVA PDMS**
- Realize digital handover, from project phase to operational phase

#### **Siemens Digital Solution**

- TC will be used as the platform for full plant lifecycle data management
- Extend plant data to the entire organization
- · Leverage CALM solution to manage plant design lifecycle and incremental digital handover

entire



management

Extend data to Single platform for full plant lifecycle data organization



Enable incremental digital handover

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Lifecycle Management



#### Project: Capital Asset Lifecycle Management



Customer

Multinational Energy Corporation

#### Siemens Scope

- Software:
  - Teamcenter
  - Capital Asset Lifecycle Management

#### **Customer Challenge**

- Manage the plant design lifecycle including SmartPlant 3D and AVEVA PDMS
- Gain access to design data earlier in the lifecycle and utilize Siemens software portfolio to design smarter and rely less on their supply chain

#### **Siemens Digital Solution**

- Reduce project costs by bringing front end engineering and planning in-house
- Insight into project execution and oversight of third party EPC firms
- Better collaboration across the supply chain between Owner, EPC, and OEMs
- Leverage CALM data for risk management, change management, requirements management, and project management



Better collaboration with supply chain



Extend data to

risk, change,

requirements,

and project

management

Reduced project costs

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Lifecycle Management



Project: Capital Asset Lifecycle Management



Customer

Green Battery Manufacturer

#### Siemens Scope

- Software:
  - Teamcenter
  - Capital Asset Lifecycle Management

#### **Customer Challenge**

- Consolidate Revit, COMOS, EPLAN into Teamcenter to realize the digital twin of the factory
- Achieve high levels of customer service by locating their factories close to their customer's factories
- Need a cookie cutter approach to new plant design, construction and digital handover

#### **Siemens Digital Solution**

- Conceptualize the plant as a "product" and have a holistic view of the facility and the production equipment within it
- · Teamcenter as the digital backbone of the plant data
- · Integrated requirements management
- Integrated issue and change management
- · Visibility into the plant breakdown structure



Teamcenter as the digital backbone



Integrated

requirements.

issue, and

change

management

Visibility into Plant Breakdown Structure

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# **Summary** The opportunity





#### Accelerate project delivery

**Reduce costs & waste** 

**Ensure safety & quality** 

**Realize higher profitability** 

Achieve best in class success

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#### Agenda





#### **Perguntas & Respostas**





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#### Agenda



