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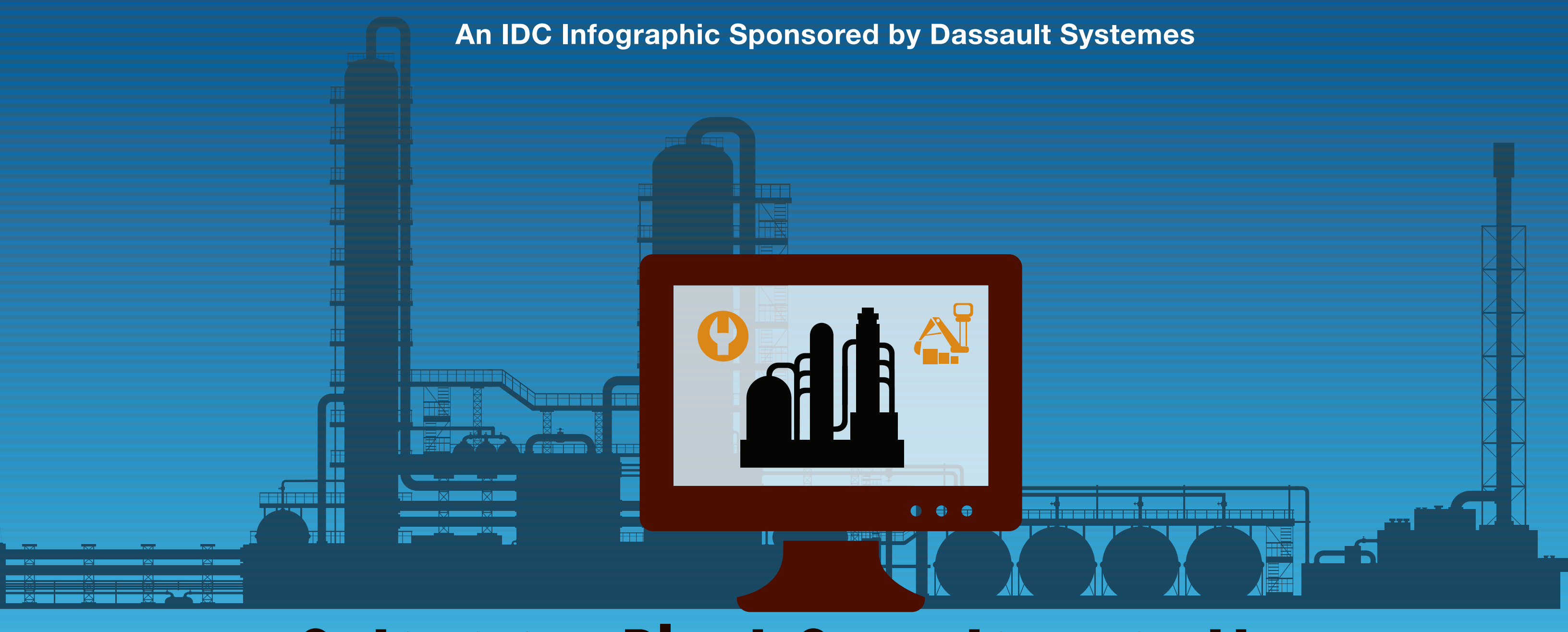


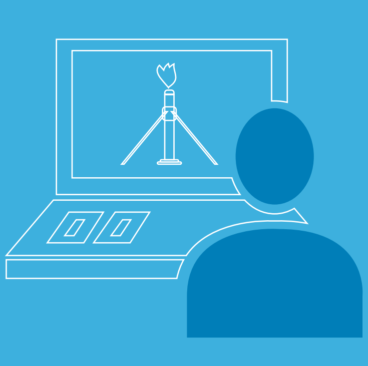
Optimizing Plant Operations in the Oil & Gas Industry

Bringing virtual into reality

Virtual technology leads to better outcomes.

Reduce downtime by validating asset changes offline before executing

Capture critical knowledge from key personnel for risk mitigation with skilled staff departures



Improve safety through hazard analysis in virtual reality

Increase profitability and residual value by increasing Gross Refining Margins

VIRTUAL TWIN

unifies fragmented modeling and simulation siloes into a single and unified model of the plant that validates all changes and activities

REAL–WORLD EXAMPLE

Raw material market changes lead to raw material cost and distilled product price volatility

Manager and planners can use the virtual twin for optimizing distilled fractions to leverage current market trends

A forecast can then be quickly developed to present impact on yield, cost, and profitability

Inefficient operations mean that refining facilities are already taking on the burden of significant risk.

Top challenges for improving operations

Lower commodity prices put pressure on HR budgets.

Safety and compliance issues can cause huge drops in Gross Refining Margins.

Unplanned or prolonged shutdowns result in lower yields.

Engineering and plant managers have their own operational challenges.

Optimizing equipment maintenance and asset utilization

Managing rapid expansion of facilities and processes to capture new markets

Ensuring compliance and security requirements

Optimizing feedstock inputs to meet market demand

Compensating for the lack of experienced staff due to budget constraints and workforce demographics

50%
are increasing spending on automation of business processes[1]

30%
are increasing spend on software and systems[2]

O&G companies are looking to reduce labor budgets by using software and systems to drive performance

An integrated technology environment can encourage multi-disciplinary teams to collaborate.

Digital transformation is needed to automate, modernize, and provide a foundation for intelligence and analytics using KPI-driven dashboards.

Recommended approaches:

Set standards for operational performance, security, and compliance

Deploy process intelligence and modeling to predict the impact of change on business performance

Establish a solid platform to develop a Virtual Twin to model plant systems and processes

DOWNSTREAM: TOP 2015 DRIVERS[3]

INCREASE ORGANIZATION'S PRODUCTIVITY

INCREASE ORGANIZATION'S AGILITY

OPTIMIZE ORGANIZATION'S BUSINESS PROCESS

A Virtual Twin models processes and assets and can be used with knowledge management systems to train new workers to collaborate.

Virtual Twins offer the ability to simulate and model processes in a virtual world before going live in the real world.

REAL–WORLD EXAMPLE

Apply analytics to determine the right balance of feedstock input to optimize the product mix for meeting market demand realizing maximum cash margins

HOW ARE BIG DATA/ANALYTICS USED?

To understand and optimize business processes

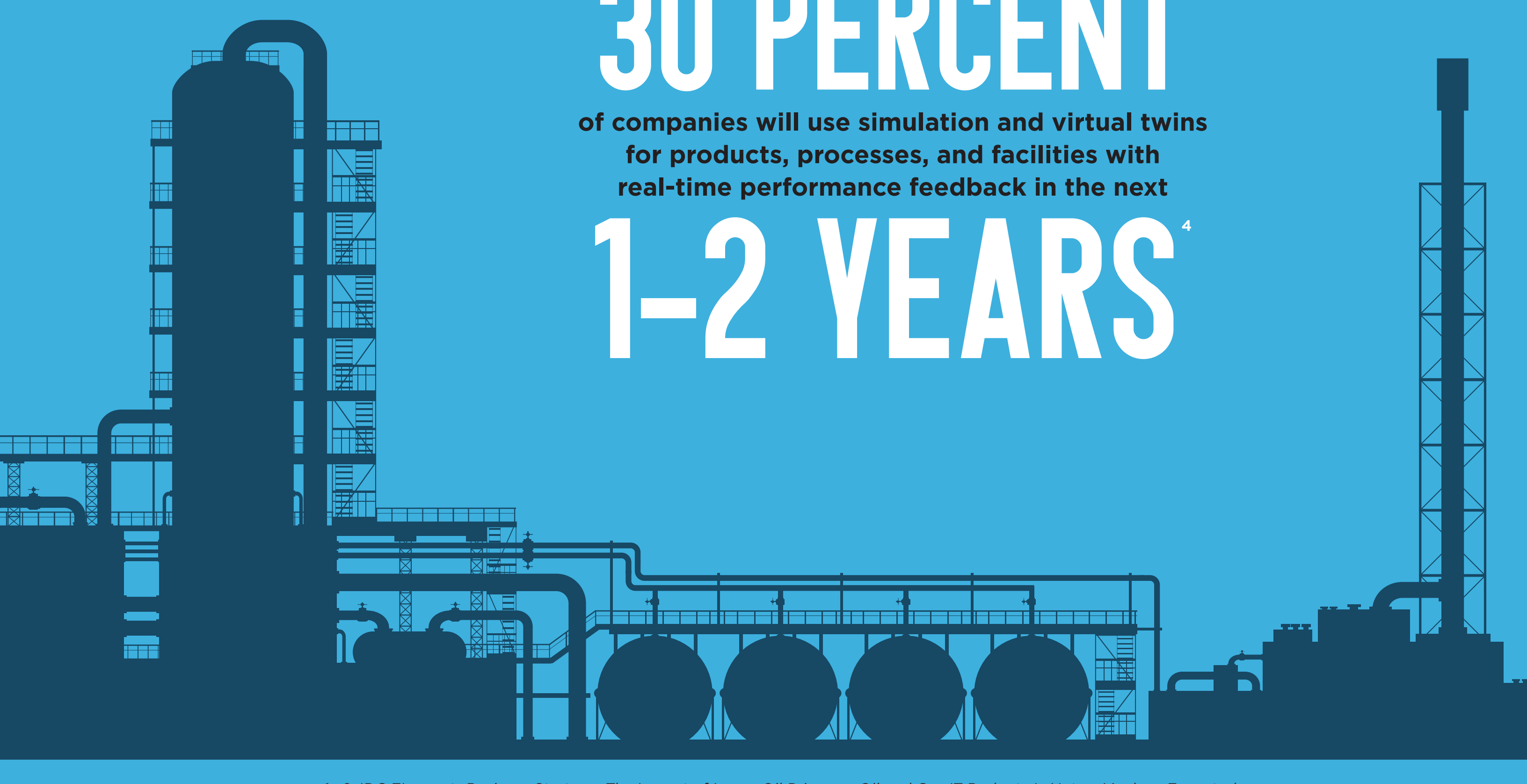
To understand & optimize product performance

To understand patterns in large data sets

With the use of Virtual Twins, decision-making capabilities can improve substantially.

Virtual Twins offer the ability to see what works and what doesn't in an artificial world before going live in the real world.

Data management advances encourage enterprises to build full digital twins of operating assets. The overlay of economic and financial data will usher in a new era of business management based on evidence-based decision-making.



30 PERCENT

of companies will use simulation and virtual twins for products, processes, and facilities with real-time performance feedback in the next

1–2 YEARS[4]

1, 2: IDC EI report: *Business Strategy: The Impact of Lower Oil Prices on Oil and Gas IT Budgets Is Not as Much as Expected.*
3, 4: IDC EI report: *IDC FutureScape: Worldwide Oil and Gas 2016 Predictions.*

IDC
Analyze the Future