Digital Transformation in Oil & Gas
Unified Supply Chain Management

Roberto Conti
Business Development Manager EURA – Unified Supply Chain Management
CONFIDENTIAL

This material is for presentation only and not for distribution outside Schneider Electric

Disclaimer: “The Schneider Electric industrial software business and AVEVA have merged to trade as AVEVA Group plc, a UK listed company. The Schneider Electric and Life is On trademarks are owned by Schneider Electric and are being licensed to AVEVA by Schneider Electric.”
We address both lifecycles in the markets we address through the key elements of our platform.
Spiral Suite

Background & Overview

Spiral Software founded in 1998

Became part of Schneider Electric/Invensys in November 2012

On 1st March 2018, The Schneider Electric industrial software business and AVEVA have merged to trade as AVEVA Group plc, a UK listed company.

Based in Cambridge, UK

Global client base

• Successfully adopted by more than 100 companies
• In use at more than 350 sites
• Customers spanning crude trading, refining, petrochemicals, engineering services & laboratories

Services including technical and business consulting

Products and Solutions

• Spiral Suite
  – The only unified, enterprise supply chain software for the petroleum industry
• Crude assay management
  – Market leader
• Enterprise Crude Knowledge Management
  – Unique offering with global standardization by oil majors
• Trader Tools
• Unified Planning & Scheduling
• Enterprise Supply Chain Management
• Cloud and SaaS hosted solutions
Spiral Suite
Global Footprint

**Oil Majors**
- BP
- Chevron
- ExxonMobil
- Shell
- Total France

**Refining & Petrochem**
- Ecopetrol
- Essar
- Gunvor
- HollyFrontier
- Idemitsu
- INEOS
- JXTG
- MOL
- Neste
- Petrobras
- Reliance
- Rosneft
- Showa Shell
- Sinopec
- SK Energy
- Statoil
- Thai Oil
- TonenGeneral

**Chemicals**
- BASF
- SABIC

**E&C**
- Bechtel
- KBR
- Muse Stancil
- Samsung
- Technip

**Trading**
- Bloomberg
- KPI
- Litasco
- Mercuria
- North Atlantic
- Trafigura
- GALP

**Laboratories**
- Core Labs
- Inspectorate
- Intertek
- ITS
- SGS
Supply Chain Management – Challenges

Legacy of Point Solutions for Supply Chain Management

Trading  Planning  Scheduling  Refinery Operations  Primary Distribution

Gaps and Lost Opportunities

- Different Assays
- Different Topologies
- Different Unit Models
- Different Constraints
- Different Pricing
- Different Optimisation
- Opaque, Point Answers
- Needs Toolset Expertise
- Discourages Collaboration
- Slow Process Improvement
- Slow Decision Making
- High Maintenance Effort

- Lack of alignment between tools, data and processes create gaps and lost synergies resulting in *Margin Leakage* of $10 - $100 MM/yr.
Spiral Suite – Unified Supply Chain Vision

Spiral Suite vision

- Single, unified, Enterprise application across all supply chain activities
- Enable new workflows that cross traditional tool boundaries
- Integrated analytics enabling robust business decision support & risk analysis
- Built-in collaboration providing broad user accessibility to a unified decision-making tool
- We aim to be the leading supply chain management software for the process industries

Hydrocarbon Value Chain

- Crude Trading
- Refining & Petrochemicals
- Product Trading
- Distribution
- Retail
Digitalization of Supply Chain with Unified Supply Chain Management

**Feedstock Management & Trading**
- Management & sharing of rich and complete crude assay data

**Distribution**
- Supply/demand balance and inventory management across global networks

**Enterprise Knowledge Management**
- Common supply chain data and communicate decisions and experience across the enterprise

**3rd Party Integration**
- Modern, scalable, secure mechanisms for transferring data between ERPs etc.

**Planning**
- Robust decision making for planning with rich solution insight

**Scheduling**
- Definition of schedules based on plans and latest business knowledge

**Operations Execution**
- Transform intentions into effective operational instructions

Confidential Property of AVEVA Group plc.
Spiral Suite – Key Differentiators

**Unified**
- Eliminates costly business gaps arising from legacy point solutions
- Single application: unified by design, not “integrated”

**Enterprise**
- Collaboration enables better business decisions
- Lowers cost of ownership for IT and Support

**Modern**
- SaaS and Cloud enabled
- Easy to use and learn

**Unique**
- The only software for enterprise crude oil knowledge management
- Only unified, enterprise supply chain management software
Planning Horizon and Business Processes  ...how it is done today

-1 to 30 days  1 to 15 days  1 to 3 months  1 year  2 to 10 years

Current Time

Model Update

Supply and Distribution Planning

Crude and Inventory Plan

3 Month Rolling Plan

Budget Planning

Corporate Business Plans

Investment Planning

Strategic Plan

Yield Balance Monitoring

Back casting (Plan vs. Schedule vs. Actual)

Operations Scheduling

Operations Targets

Operations

Results

Actual

1 to 30 days

1 to 15 days

1 to 3 months

1 year

2 to 10 years

Different teams (different tools/ models)
Unified Supply Chain

Unified Refinery Modelling

Models without tanks

Models with tanks

Time-averaged solutions

Activity-based solutions

Focus on economically optimised solutions

Focus on feasible solutions

Feasibility and economic optimality both considered

Planner decides target

Scheduler required to implement target

Targets and metrics are evolved collaboratively as information changes

Confidential Property of AVEVA Group plc.
Spiral Suite Modules

*Spiral Suite is a unified solution for supply chain management*

Provides common core data management across modules and workflows

License Spiral Suite and select modules

**Spiral Assay**
- Crude & feedstock modelling and knowledge management

**Spiral Plan**
- Plant optimization with integrated Analytics and flexible multi-period

**Spiral Network**
- Supply & distribution network optimization with integrated Analytics and flexible multi-period
  - Includes full plant models when combined with Spiral Plan

**Spiral Schedule**
- End-to-end plant scheduling including feed and blend optimization
Spiral Suite – Multiple Interfaces

**Desktop tools**
- Local installation
- Fast, interactive, portable, secure

**Programmatic interface**
- Support for automation
- Direct integration with other software

**Web access**
- No installation needed
- Flexible, secure

CrudeSync / Spiral Suite Data Services

**Servers**
- Powerful computing

**Database**
- Assay data
- Reference data
- User data

**Cloud**
- Access to unlimited storage and computing power
ECKM Implementations

"Spiral tools help us manage our extensive database of crude characteristics and share the information across the group. Spiral's statistical tools support a rapid commercial evaluation of new and existing crudes."

"Shell chose the suite of products from Spiral Software because it fitted into our vision of a standardized dynamic supply chain process delivered to our global Manufacturing, Supply and Distribution business."

"Chevron has chosen Spiral Software's product suite as its oil information delivery tool of choice. We chose Spiral tools because we think their ability to fit a model across all the crudes in our assay database will allow us to make more accurate predictions where we have limited data."
Press Release

Schneider Electric announces Global Software Agreement with Shell for SimSci Spiral Suite

SimSci Spiral Suite, Schneider Electric's enterprise solution for unified supply chain optimization licensed by Shell

LAKE FOREST, CA – 31 August, 2015. Schneider Electric Software, a global leader in industrial software for the process industries, announced today that Shell has signed a global agreement for Spiral Suite that includes planning, scheduling and supply and distribution optimization modules.

Spiral Suite is the industry’s only unified planning and scheduling environment designed from the ground up. It fully supports all supply chain work processes across large and small refineries, bringing together enterprise crude knowledge management, planning, scheduling and envelope optimization activities in a single software application. The result is a solution that better explores opportunities, reduces operational risk and shrinks the gap between planned and actual results. All activities are supported within a single application, with a single user interface and a single source of data with version and data management control. Spiral Suite enables information to be shared easily between users, improving understanding and collaboration between traders, planners and schedulers and replacing potentially disjointed point solutions.

“We are pleased to collaborate with Shell on this project. Spiral Suite promises to enhance the refinery business environment where diverse business groups can collaborate to understand how their decisions impact others and then cooperate to collectively unlock the maximum value of their economic forecasts,” said Ravi Gopinath, Ph.D., Executive Vice President, Schneider Electric Software. “It increases transparency and collaboration across different business groups, enabling our customers to make the best overall decisions for safety and profitability while taking better advantage of new opportunities presented by the market.”

For more information about Spiral Suite, please visit www.spiralsuite.com. SimSci Spiral is the trading, planning and scheduling offering within the Schneider Electric Software industrial software portfolio for the process industries. For more information about Schneider Electric Software to go software.schneider-electric.com.

Press Release

Schneider Electric announces Global Software Agreement with BP for SimSci Spiral Suite

BP licenses SimSci Spiral Suite, Schneider Electric's enterprise solution for supply chain optimization

LAKE FOREST, CA, Jan 21, 2016 – BP and Schneider Electric Software, a global leader in industrial software and part of Schneider Electric, the global specialist in energy management and automation, have signed a global agreement for Spiral Suite that includes planning and supply & distribution optimization modules. Spiral's expert development and support teams will work with BP to deploy the software across its global refinery portfolio. Deployment of this enhanced hydrocarbon supply chain optimization solution is a key milestone for BP’s fuels business in improving delivery of commercial performance.

Spiral Suite is a modern enterprise supply chain management solution for the hydrocarbon processing industry that eliminates inefficiencies experienced with existing point solutions. In-cloud Analytics enable better decisions with cloud-based distributed calculation enabling rapid analysis of many more scenarios. Its modern, scalable architecture enables collaboration across the enterprise.

Spiral Suite is built using the latest technologies which provides an efficient, flexible and familiar user experience. The Spiral Plan and Spiral Network modules support all planning and product distribution work processes across large and small refineries. All activities are supported within a single application, with a single user interface and a single source of data with version and data management control. Spiral Suite enables information to be shared easily between users, improving understanding and collaboration between traders, planners and analysts.
Recent Success Stories:

Press Release

Schneider Electric Implements SimSci Spiral Suite at SK Innovation

South Korea’s largest refining and petrochemicals company deploys Schneider Electric software solution for unified supply chain optimization

May 25, 2016 – Schneider Electric Software, a global leader in industrial software and part of Schneider Electric, the global specialist in energy management and automation, today announced that SK Innovation, South Korea’s largest refining and petrochemicals company, has successfully implemented SimSci Spiral Suite for planning and crude knowledge management. SimSci Spiral Suite’s unified enterprise supply chain solution has successfully been implemented to replace SK’s legacy system. Now SK Innovation’s assay specialists, process engineers and planners from multiple sites can collaborate to optimize plans, manage business and ultimately increase performance across their enterprise.

“By implementing SimSci Spiral Suite, we could build new streamlined work processes, enabled by an integrated enterprise-level supply chain solution,” stated Kwanggyo Hong, Vice President of Optimization Office at SK Innovation. “All activities are supported within a single application with version and data management control. SimSci Spiral Suite enables a single source of information to be shared easily between users, improving understanding and collaboration between traders, planners and schedulers and replacing potentially disjointed point solutions.”

Press Release

Schneider Electric announces Software Agreement for SimSci Spiral Suite with Gunvor

Gunvor licenses SimSci Spiral Suite, Schneider Electric’s enterprise solution for unified supply chain optimization and crude knowledge management, for their Ingolstadt, Antwerp & Rotterdam refineries and Geneva headquarters

LAKE FOREST, Calif. – June 8, 2016 – Schneider Electric Software, a global leader in industrial software solutions for the process industries, announced today that Gunvor, one of the world’s leading independent commodities trading houses, has signed a license agreement for Spiral Suite. Gunvor’s Ingolstadt and Antwerp refineries and Geneva Headquarters already benefit from using Spiral Suite. This agreement now extends their license to cover the newly acquired Rotterdam site.

“Spiral Suite provides an integrated solution for a broad spectrum of users”, said Marcel Marenauer, Technical Director, Gunvor International B.V. “By having a unified application, we can improve how we share data across the organization to better interact and respond faster to opportunities as they arise. Its powerful predictive modelling capabilities improves our responsiveness to changes in assay quality and allows faster, better operational and commercial decisions. In the end, Spiral Suite lets us make better quality predictions that are consistent across the business. Easy to use and implement, it was a natural choice to extend to our Rotterdam refinery. The enterprise offering seamlessly scales to readily support our growing organization.”
BP Public Cloud Strategy Helps reduce IT cost by 40%

BP Downstream CIO recently presented keynote at the AWS Summit

Spiral was specifically mentioned as one of first business specific application to move to cloud

**Improve speed of Crude/ feedstock selection**

.....By placing [Spiral Plan] in the cloud, the time taken to complete a job was reduced from around seven hours to three minutes, while using the same data set ... *I didn’t think we would get that out of cloud and that has been revolutionary for us....*
BP Commercial Optimization supports 70 cents/bbl improvement in cash margin

“.And third is commercial optimisation. This programme aims to maximize value from our assets by capturing opportunities in every step of the value chain from crude selection through to yield optimisation as well as utilisation improvements.

Feedstock flexibility also enables us to further optimise our crude slate depending on the relative crude differentials - an important capability given today’s volatile energy markets…”

“Our commercial optimisation program supports an improvement of around 70 cents per barrel in our net cash margin from 2016 to 2021.”

Page 26/27
ADNOC Panorama Unified Production Planning

The Company

• Abu Dhabi National Oil Company is one of the world’s leading energy producers based in Abu Dhabi, UAE

• ADNOC produces 3.1 million barrels of oil per day and 9.6 billion cubic feet of raw gas per day

Processing and Refining

• Oil Refineries (Takreer): Abu Dhabi Oil Refinery and Ruwais
  – Total oil refining capacity of 922,000 barrels per day

• Petrochemical company: Borouge
  – Annual capacity to 4.5 million tonnes of polyethylene and polypropylene

• ADNOC Gas processing
  – Total capacity of 8 billion standard cubic feet per day

Spiral Suite deployment: Spiral Plan & Network

Source: www.thenational.ae, Nov ‘17
“Panorama enables the real-time monitoring and analysis across the group’s areas of operation using a 50-metre floor-to-ceiling LED screen which takes up an entire floor in Adnoc’s headquarters building”.

رائحة: مساحة تجارية وضوح للعملاء
ADNOC
“The most significant new entrant, not even covered in the last report, but already achieving a market share of over 3 percent in a fragmented market, is Schneider Electric. Schneider Electric is focused on providing solutions for oil refineries”
Unified 2018
Unifying the Asset & Operations Value Chains

• Our global event for professionals in Oil & Gas
  • Unified Supply Chain
  • Engineering
  • Operations & Asset Performance Management

• Training: Monday 1st to Tuesday 2nd October 2018
• Meeting: Tuesday 2nd to Friday 5th October 2018

• To register your interest or submit a presentation abstract, email emea.software@schneider-electric.com
Questions?
Change 2018 USER Conference
15 – 18 April | Champagne Sports Resort