The journey started in 1997 in Norway with support of a standards initiative – the POSC/Caesar project.
The World’s First Operational
POSC/Caesar Data Warehouse

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- Engineering Database
  - EPC – Project Design & Handover
  - O/O – Operations & Maintenance
- Flexible, Dynamic Configuration
- Collaboration
- Document Management
- Rigorous Configuration Mgmt
- As-Built / Project Environment
- Revision/Version control
- Powerful Import / Export
‘the eEngineering Integration Hub’

- The **Hub** for engineering handover (down and upload)
  - Data integration
- The **Hub** between integrated applications – complex negotiable transactions
  - Application integration
- The **Hub** or portal for collaborative applications
- The **Hub** as an ‘engineering companion’ to plant ERP
- The **Hub** as a supplier gateway for technical information
- The **Hub** for plant centric engineering applications
- The **Hub** for continuous improvement of the ‘information asset’
- As a JV Collaboration **Hub**
- The **Hub** as a Client and Regulatory Review Portal
- The **Hub** for ‘overarching’ Management of Change
- The **Hub** for program management
- The **Hub** for document management & control applications … and more
eEngineering Integration Hub

Collaboration & Data Consumption

Data & Document Management

Remote Gateway & Supply/Value Chain

ERP
- Maintenance
- Purchasing
- Materials
- HR
- Project Mgt

Authoring & Project Execution

Optimization & Asset Care
Hub for Engineering Handover

EPC repository, readying for handover;- depositing documents, drawings, models and data
Hub for Engineering Handover

OO repository, receiving from handover uploading documents, drawings, models and data
Hub between integrated applications Process, Power & Marine
Rich, negotiable, iterative transactions
Plant information management throughout the entire plant life cycle.
SmartPlant Foundation 2008

- 10 Years young
- 200+ customers strong
- An evolution from data warehouse, to document management, to become the hub of the SmartPlant Enterprise
SPE – SPF Release cycles

- Staggered release cycles between SPF and the rest of the SmartPlant Enterprise tools
- Forward and backward compatibility of integration commenced at SPE2007 SP4
Why Version 4?

- Need to isolate working data from released.
  - Authoring domains
- Need to support consistency reporting.
  - Publish domains
- Need support for concurrent engineering.
  - Major upgrade to configuration management.
- Need a document model that better represents the real world.
  - Major upgrade to the SPF document model
SmartPlant Foundation 2008

- Schema Object Model - only
  - Supports upgraded 2007 SO and BO models and data
  - Customisation requires services review
- Concurrent engineering enhancements
- Progress module
- New more powerful security model
- Web Portal for interoperability
- Administration clients consolidated
  - Single persistence model for schema, admin and data - reporting
  - Single client for administration and operation
- General usability enhancements
- Improved document handling
- Client localization and Server internationalization
Domains

- Domains provide data segregation
  - SPF stand alone document / tag management
  - Separate the data published by the tools
    - Correlated via the shared domain
  - Separate the working and published data in SPF
- Configurations run across domains
  - Providing Project As Built support for SPF stand alone systems
  - Providing Project As Built support for integrated systems in the future
- Roles
  - Control domain visibility
  - Role assignments control access within Plants and Projects
Managed Inconsistencies
- The data warehouse displays last in wins by default
- Inconsistencies are highlighted
Most organizations have traditionally focused on information creation.

Time now to target consistency and collaboration…
SmartPlant Enterprise tools publish to SmartPlant Foundation domains
Ensures tool specific data segregation within publish domains…
SmartPlant Enterprise tools retrieve from SmartPlant Foundation domains
Write once read many fundamental to discipline collaboration…
Applications written in SPF publish data

Consolidation of previously standalone apps written in access databases and excel spreadsheets…
Domain Consistency

Consistency can be achieved at a domain level, across different sources, not only between revisions of documents…
Managed consistency across SPF domains

The equivalent of the yellow lining squad check…
Managed consistency across SPF domains

The equivalent of the yellow lining squad check…

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</table>
Remote access via SPF Web Portal

Included & integrated application neutral role/kiosk based access…

Remote access via Role-based / Kiosk-based SPF Web Portal
Remote access via SPF Web Portal

Included & integrated application neutral role/kiosk based access
Remote access via SPF Web Portal

Included & integrated application neutral role/kiosk based access…
Web Portal

- Based on Web Parts Technology
  - ASP.NET 2.0
  - Supports WSS/IIS implementation, Microsoft SharePoint Portal Server, Microsoft Office SharePoint Server
  - Fulfills thin client, portal and toolkit requirements.

- Initial release focuses on View, Query, Print with Markup in SP1
Once the plant is operating it does NOT stand still – change is a fact of life

Multiple changes are planned to be executed either at planned shutdown/turnaround, or during maintenance outages

Projects can range from small field executed changes, small capital projects involving local field engineering support or major capital execution

All involve some variant of the same information which if not maintained requires costly walkdown and recreation steps

The operating basis, license/regulatory basis, engineering basis, safety basis… must converge or be consistent to ensure continued risk free operation
Managing change (the ever evolving ‘configuration’ of the plant)
- Isolating change from a design basis until execution
  - Multiple level (plant-projects, project-workpacks etc)
- Managing concurrent change
  - Shared design basis
  - View effects of change and parallel changes
  - Conflict resolution
- Supporting design alternatives
  - Put options on hold
  - History retention and archiving
- Controlled update of design basis on execution

This requires the ability to process long term transactions that may span days, weeks or months, as opposed to short term transactions typically supported by a database, while maintaining control of the records.
SPF 2008 - Concurrent Engineering
‘Simple’ Concurrent Engineering Example

The ‘as-built’ record

Local engineering plans to install bypass

Local maintenance plans to install drain
The ‘as-built’ record

**PlantA (=design basis)**

Local engineering plans to install bypass

**Project1**

**Claim**

**Revise**

**Re-Design**
SPF 2008 - Concurrent Engineering

Process Overview

The ‘as-built’ record

PlantA (=design basis)

Local engineering plans to install bypass

Max flow = 45 kg/s

Local maintenance plans to install drain

Max flow = 30 kg/s

Add drain

Email notification of design basis change

Process Engineer

Maintenance Engineer

Claim / Revise

Merge
SPF 2008 - Concurrent Engineering

Process Overview

The ‘as-built’ record

PlantA (=design basis)

Local engineering plans to install bypass

Process Engineer

Project1

View conflicts
- Run down data or accept project values
- Manually update drawing

Max flow = 30 kg/s

Max flow = 45 kg/s
Ability to plan and report the development of time critical activities related to documentation.

Ability to track the development of deliverables and groups of deliverables against a project plan/set of milestones.

- Design Progress for individual deliverables
- Activity Progress for groups of deliverables

Ability to set and track planned, actual and forecast dates.

Ability to report on man-hour budgets, & remaining man-hours to completion.

Ability to view progress at varying levels within a Project hierarchy.
Configurable hierarchy

Configurable workpacks with production steps & milestones

Progress documents (or any object)

Rollup of progress at every level in hierarchy

Reporting planned, actual and forecast progress

Re-planning mode allows viewing of changes before acceptance

SPF2008 – Progress Management
SPF2008 – Progress Management
Design Progress

Design progress is the tracking of individual deliverables. A workpack groups deliverables that share a common lifecycle. The workpack contains plan details.

- Man hour budgets
- Plan start and end dates

The lifecycle is defined as a set of production steps. Steps have planned, actual and forecast dates. Steps have a weighting = the % of the workpack progress accrued.

Progress is accrued as steps are completed. Deliverables such as documents and drawings are registered for progress tracking which associates them to a workpack.
SPF2008 – Progress Management
Activity Progress

- Tracks Progress of a group of deliverables via a related Activity
- Typically these would be documents that are received from Suppliers that need reviewing, returning, updating etc.
- Activity deliverables have a set of properties to track them
- The Activity's steps are progressed using return status and review periods.

![Image of step progress calculation]

\[
\text{Total progress} = 5\% + 7.5\% + 8\% + 4\% = 24.5\%
\]

(First production step so 100% complete if at least 1 deliverable has been received)
Client Consolidation

- Desktop Client
  - Administrative functions
    - Common GUI configuration and reporting
  - Security

- Data loading
  - Excel loader with compare
Enhanced Document Functionality

- Document reservation and activation
  - Different Lifecycle state for Reserved documents
- Configurable Revision Schemes
  - By Plant/Project, Configuration Level, Document Class, and/or Classification
- Configurable Vaults
  - By Owning Group, Configuration, Document Class, with conditions
- Archive & Purge
  - Rule-based (i.e., If Condition = True Then…)
  - Scheduled or on demand
  - Archive based on the transmittal export (Data as XML & files)
  - Archive & purge not linked so can be used independently.

ENS Enhancements
- Configured on the Class not the forms
- Supports alternative definitions by Class & Classification

FTR Enhancements
- Configurable by Class and Property
Usability Enhancements

- Enhanced Subscriptions
  - Event driven
  - Conditional
  - Class based as well as object based
  - Alternative actions
    - Notify
    - Log Messages
    - Procedure Call (DLL)
Internationalization

- Support localizations of
  - Client GUI Text
  - Schema and object “display-as”
    - Schema items including Enums
    - Tree views such as classification trees

- Will not support
  - Multiple values for data