



EXTERNAL

Satt Evolution

Evolution of SattLine DCS and of SattCon PLC

February 2021

3BSE093848 rev C



Operating and maintaining the control system

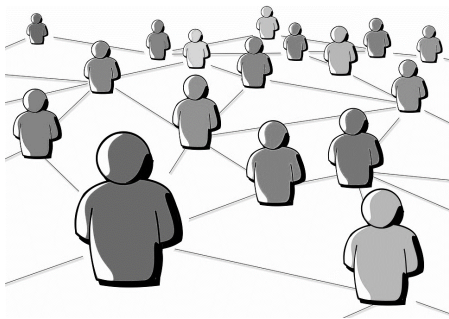
What are the challenges today? Which ones are relevant to our customer?

Plant Availability and Asset Health



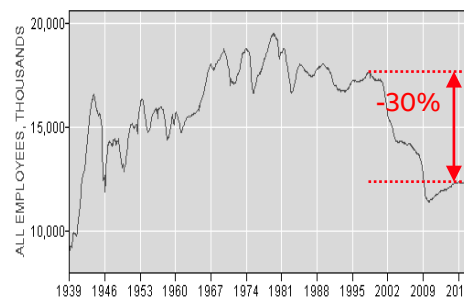
Minimize un-planned shutdowns and minimize the duration of the shutdown caused by equipment failures in the control system

Collaboration



Improve collaboration with vendors, channel partners, and within the company

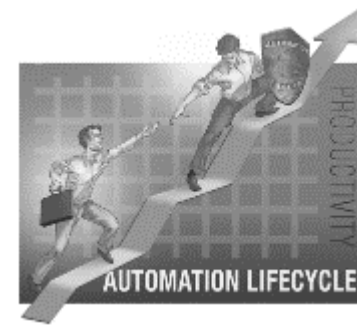
Aging work force and Skill gaps



Enhance the control system to be able to run the plant with less people for operation and maintenance

Source: US Bureau of Labor Statistics

Life cycle management



How to upgrade or evolve the system as efficient as possible while keeping the investments in application and assets.

What do you actually have installed? What is the life cycle today and in the future?

Cyber Security and Digitalization



How to make the control system secure and how to keep it secure?

How to increase digitalization while maintaining cyber security? How to enter the digital world? How to increase the level of digitalization?

Operating and maintaining the control system

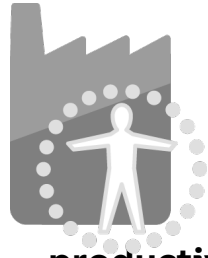
It's all about control



...security



...costs



... productivity



“ It’s all about Control”

Everyone has the same picture of what’s going on in the plant



“ It’s all about Control”

Fully utilize plant assets



Alarm Analysis

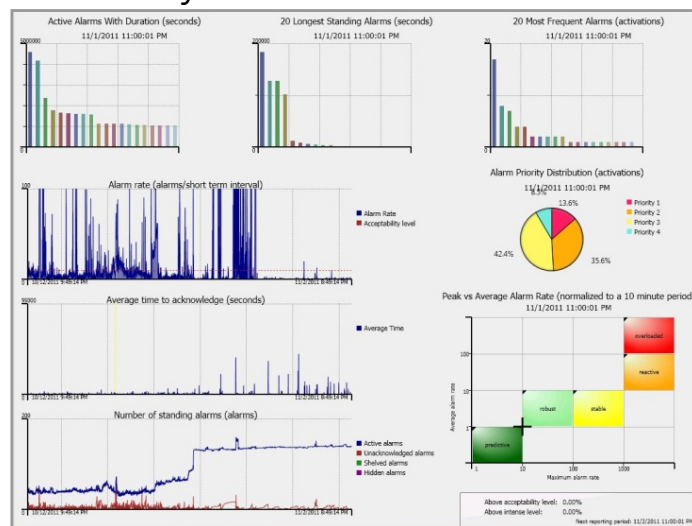


ABB Collaboration Table



Satt Evolution

Content

SattLine DCS Evolution

Sattline DCS Evolution

- SattLine SW Evolution
- SattLine 200 Series Evolution
 - medium/large DCS
 - small DCS

SattGraph & SattCon PLC Evolution

Satt PLC Evolution

- SattGraph 5000 Evolution

Satt PLC Evolution

- SattCon 200 Evolution
 - medium/large PLC
- SattCon 15, 31, 35, 60 Evolution
 - small /medium/large PLC
- SattCon 05 / OP45 Evolution
 - small PLC

Satt Evolution

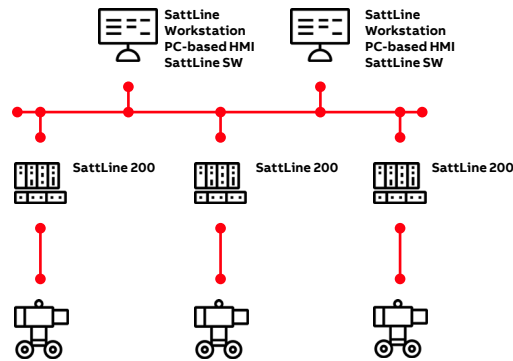
Additional resources

Satt Evolution Overview

Evolve from SattLine DCS to System 800xA or from stand-alone SattCon PLC to Compact, Freelance & AC500

SattLine DCS

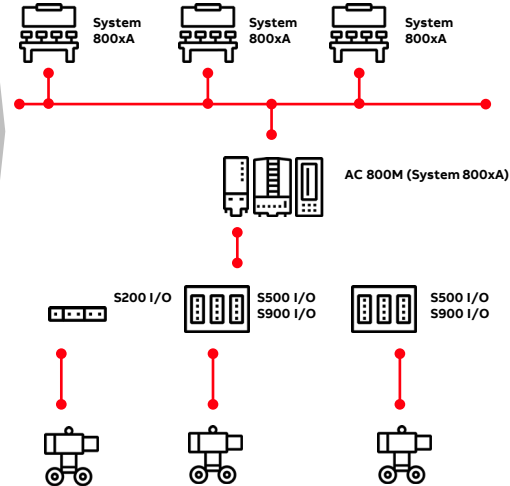
Heritage DCS



The New SattLine 3.1 and CPU80
Upgrade to the latest HMI and Control version.

ABB Ability™ System 800xA

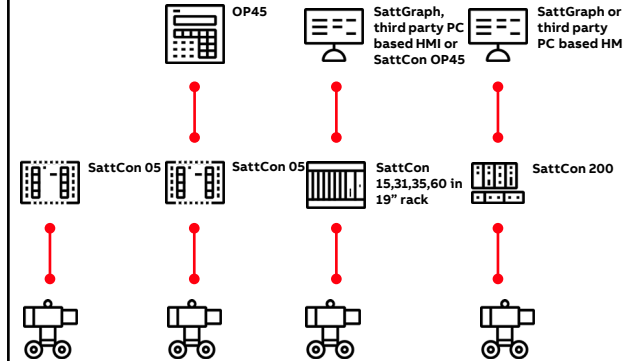
Market Leader DCS



For small SattLine systems
Compact or Freelance are other alternatives

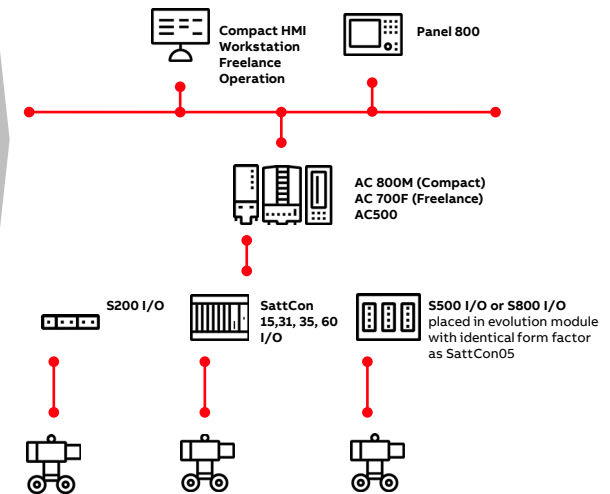
SattCon PLC

Heritage Stand alone PLC



Compact – Freelance – AC500

Market leader PAC/PLC





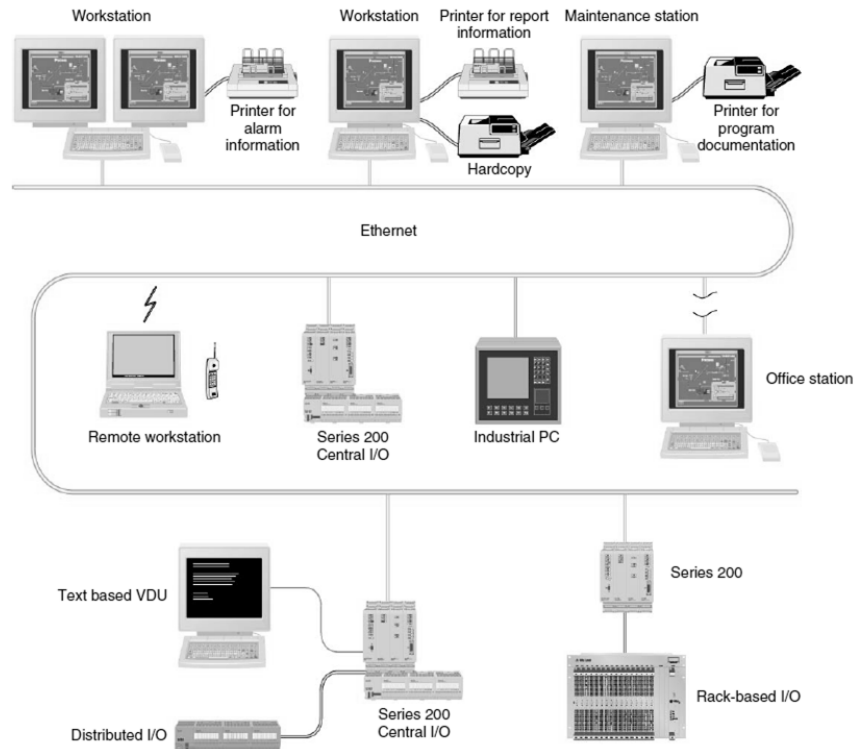
SattLine DCS Evolution

SattLine

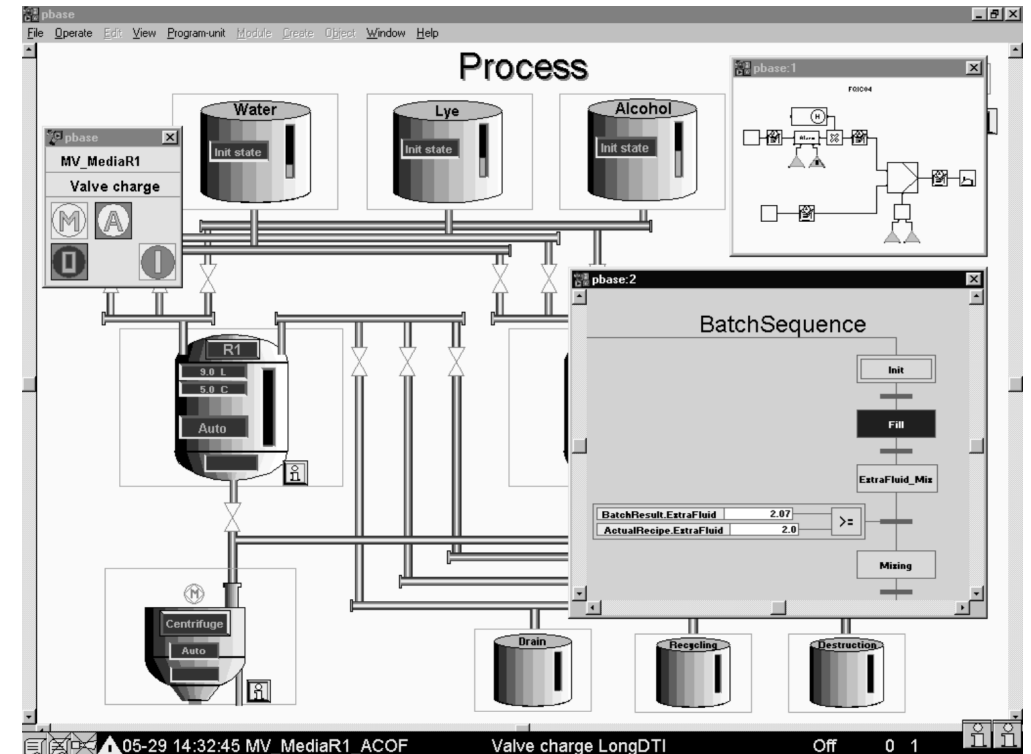
SattLine

Overview

System Configuration



Process Window



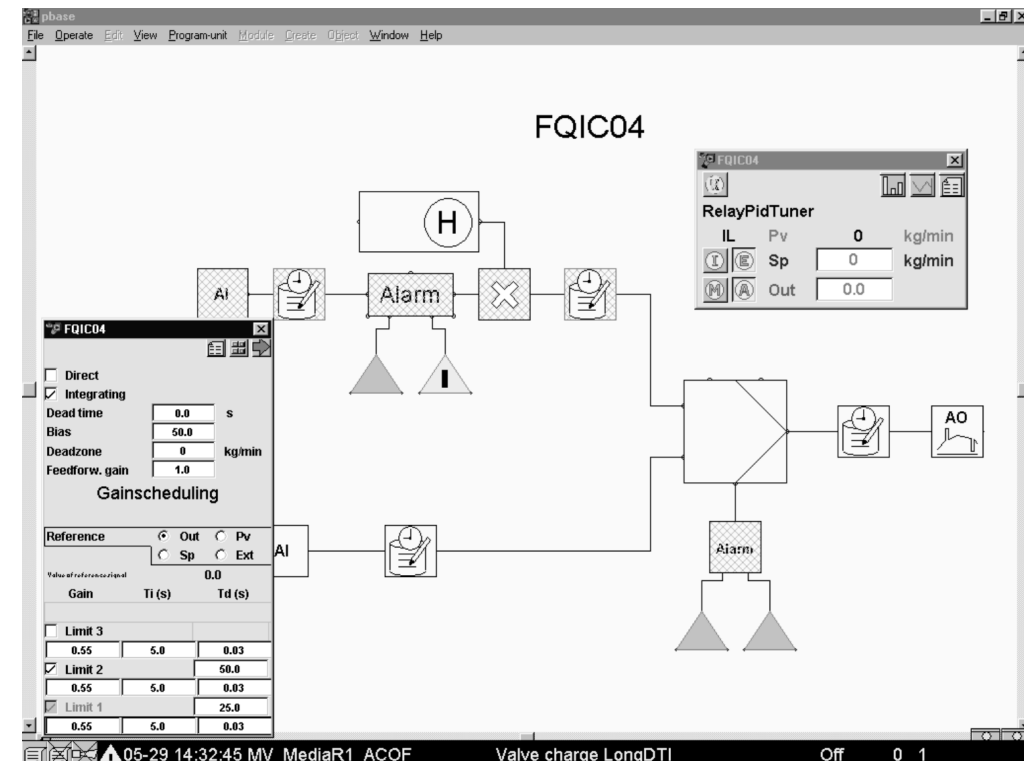
Object-based architectures

How much information do you have for each Thing?

SattLine - Object-oriented Process Automation

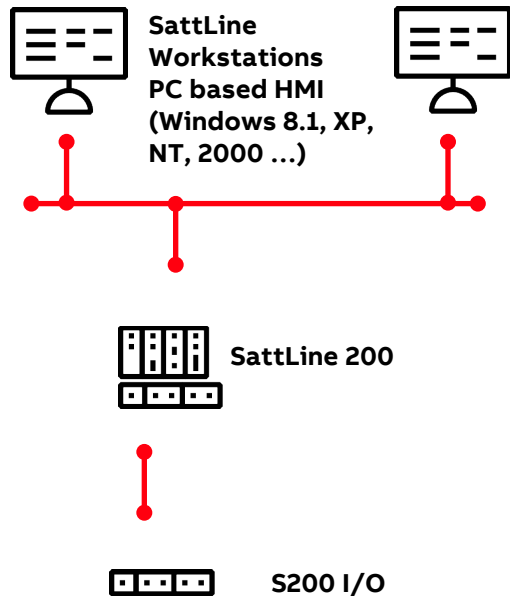
- A common control language is used throughout all components of the system to cover the various needs of a control application.
- SattLine includes the process graphics, operator interaction and program code for calculations and control in one and the same object.
- The objects, called Module types, may be saved in libraries.
- Programs consist of a hierarchy of such objects which are able to correspond to physical objects in the plant or process functions.

Control Loops



SattLine Evolution

Current life cycle and support situation



- Life Cycle Status:
 - SattLine 200 Series CPU is in Classic life cycle phase
- Aging components
- The CPU is in Classic life cycle phase with limited support
- HMI operating system may be in non supported life cycle

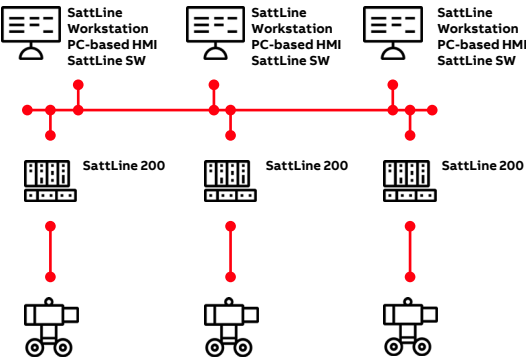
Expensive system to support

SattLine Evolution Overview

Scalable Evolve Options for SattLine DCS

SattLine DCS

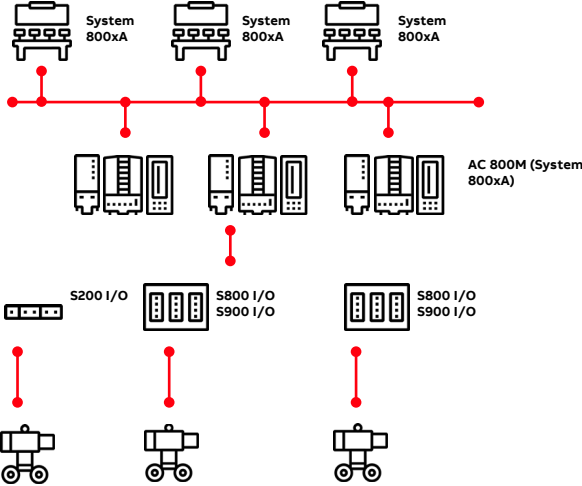
Medium to Large DCS



The New SattLine 3.1 and CPU80
Upgrade to the latest HMI and Control version.

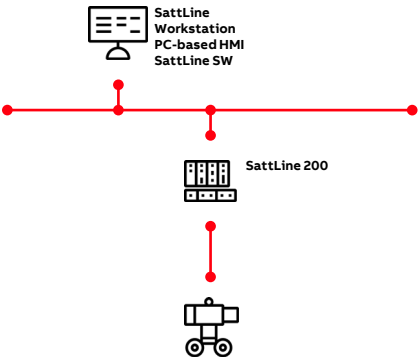
ABB Ability™ System 800xA

Market Leader DCS



SattLine DCS

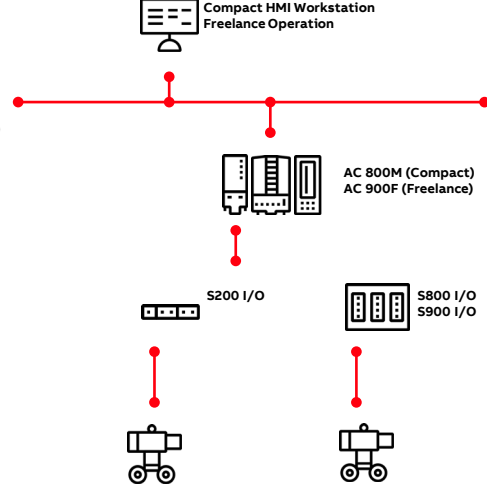
Small DCS



The New SattLine 3.1 and CPU80
Upgrade to the latest HMI and Control version.

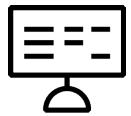
Compact or Freelance

PAC solution or small DCS



SattLine SW Upgrade

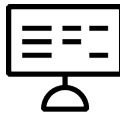
Upgrade recommendation: Continue with SattLine 3.1 Upgrade and PC virtualization



SattLine Workstations
PC based HMI
(Windows 8.1, XP, NT,
2000 ...)



SattLine 200



SattLine 3.1
Workstations
PC based HMI
(Windows 10
Enterprise)



SattLine 200

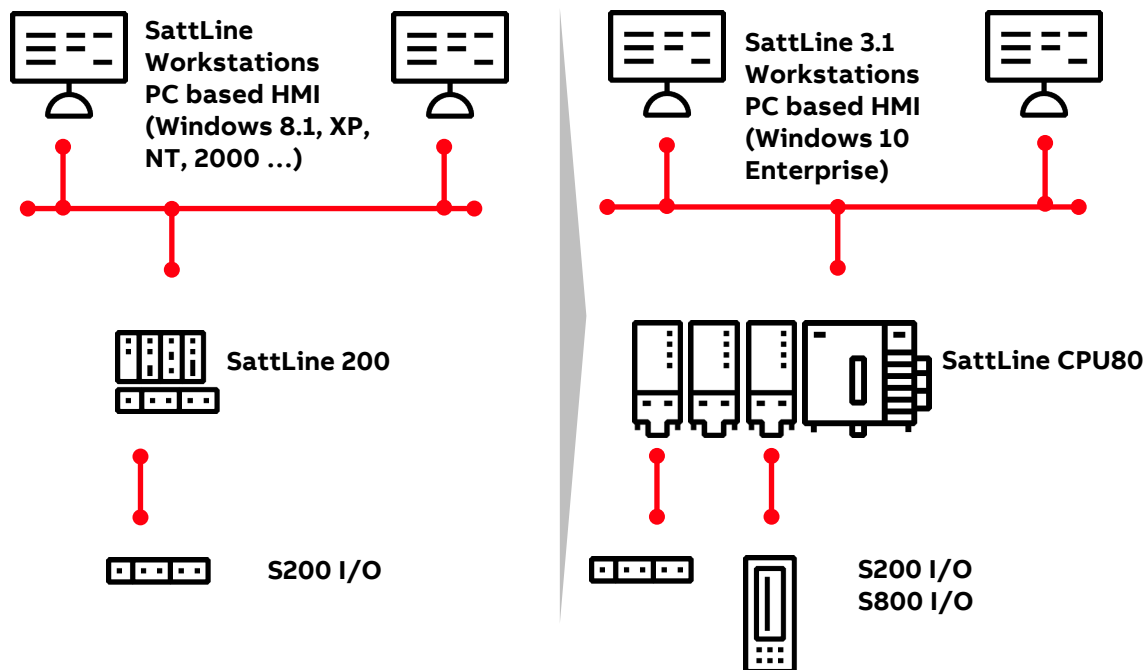
- Upgrade to SattLine ver. 3.1-1 for Windows 10 Enterprise 2019 LTSC, option to run Workstation PC virtualized verified in VMware ESXi 6.0
- Evolution path supported by Automation Sentinel
- Support of the classic SattLine 200 Series controller platform, stepwise evolve to the new SattLine CPU80
- SattLine 200 Series platform remains in current supported life cycle phase, Classic

Expensive system to support

Easily and cost effective to support

SattLine 3.1 with CPU80 Upgrade

Upgrade recommendation: Continue with SattLine 3.1 – Stepwise Controller evolution to CPU80



- Upgrade to SattLine ver. 3.1-1 for Windows 10 Enterprise 2019 LTSC, option to run Workstation PC virtualized verified in VMware ESXi 6.0
- Evolution path supported by Automation Sentinel
- Support of the classic SattLine 200 Series controller platform
- Stepwise evolve to the new SattLine CPU80
 - Support of COMLI master/slave and User defined protocols
 - Support of Satt I/O via ControlNet
 - Stepwise evolve to the S800I/O via PROFIBUS

Expensive system to support

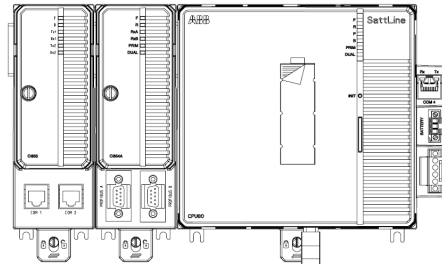
Easily and cost effective to support

SattLine 3.1 New version

Based on Windows 10 Enterprise, Supports CPU30/40 and 50 from Series 200 and CPU80

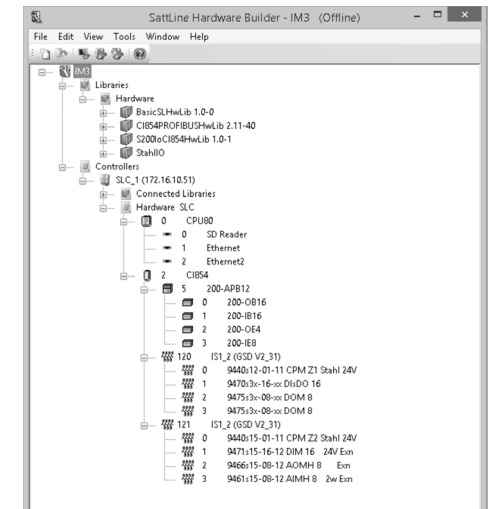
SattLine CPU80

- New SattLine CPU hardware based on the AC 800 Hardware platform
- Larger memory
- Faster scan time
 - Foreseen 20-40 % increased capacity compared to CPU 50 depending on application.
 - Ethernet and power supply onboard (no external unit like PSMG or 200-CIE needed)
- SattLine CPU80 supports
 - CI853 Serial232
 - CI854B PROFIBUS
 - CI865 ControlNet



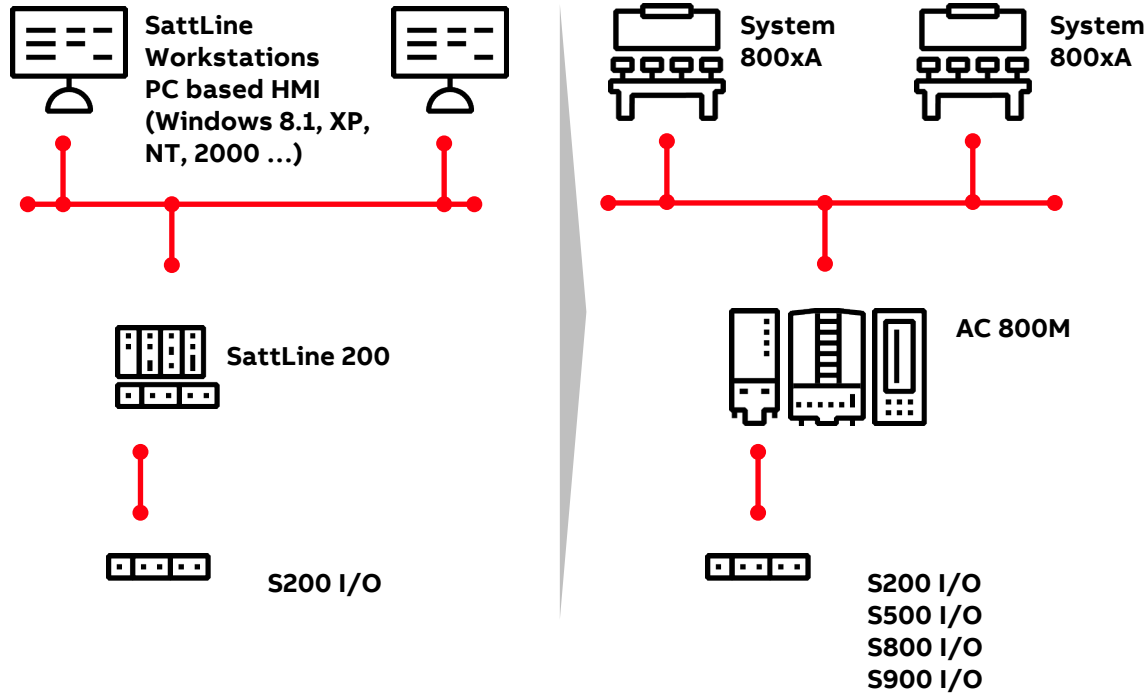
SattLine Hardware builder

- New tool for PROFIBUS I/O configuration time
 - Reuse and Import your existing Sycon .PB files
 - Recommended to make a hardware lib for the used modules.
 - From SattLine version 3.1-1 the Hardware Builder can be used to manually address Profibus addresses on the DPM



SattLine Evolution – medium to large systems

Evolution recommendation – System 800xA with AC 800M controller



- HMI replacement: Replace existing SattLine Workstations with System 800xA
- Process graphics conversion available, usually remade to benefit from new HMI.
- Controller replacement
 - SattLine 200 Series CPU to AC 800M.
 - Remove CPU and Power Supply
 - Replace local communications module with ACN communications module,
 - Retain fieldbus, Rack I/O, S200 I/O and wiring
 - Add AC 800M processor module - PM860 or greater.
- Application software: Automatic conversion for System 800xA

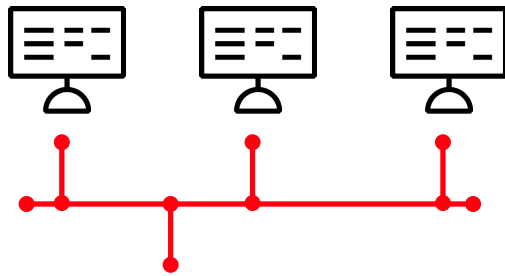
Expensive system to support

Easily and cost effective to support

Evolve SattLine systems to ABB Ability™ System 800xA

Allow the system to evolve with growing business needs

Medium to large SattLine System



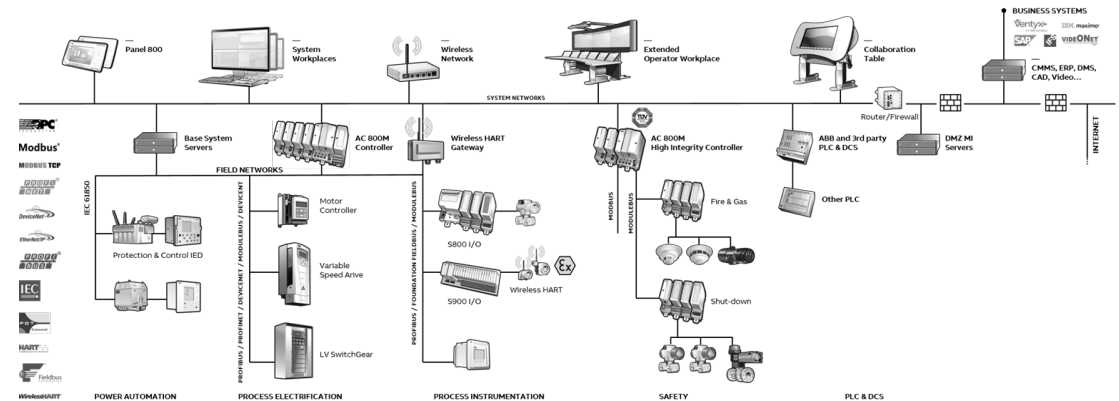
SattLine Workstations
PC based HMI
(Windows 8.1, XP, NT, 2000 ...)

SattLine 200

S200 I/O

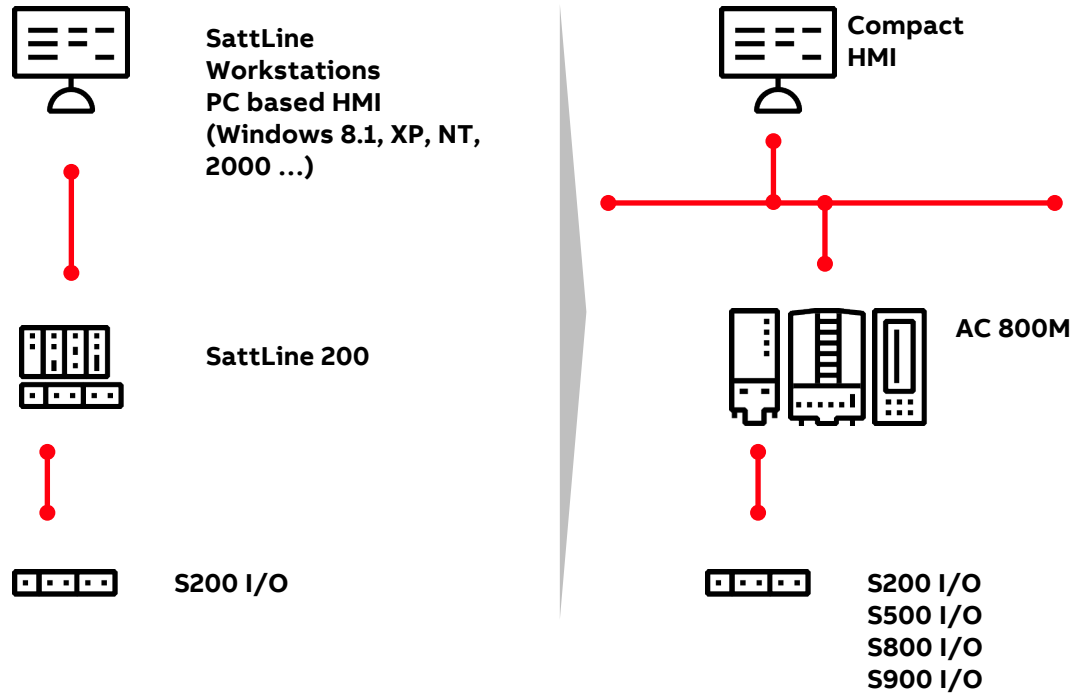
ABB Ability™ System 800xA

- Up to 120,000 tags
- Deep integration with AC 800M
- Embedded electrical control
- Integrated safety



SattLine Evolution – Small Systems

Evolution recommendation – Compact HMI with AC 800M controller



- HMI replacement: Replace existing SattLine Workstations with Compact HMI
- Process graphics conversion available, usually remade to benefit from new HMI.
- Controller replacement
 - SattLine 200 Series CPU to AC 800M.
 - Remove CPU and Power Supply
 - Replace local communications module with ACN communications module,
 - Retain fieldbus, Rack I/O, S200 I/O and wiring
 - Add AC 800M processor module - PM860 or greater.
- Application software: Automatic conversion for System 800xA

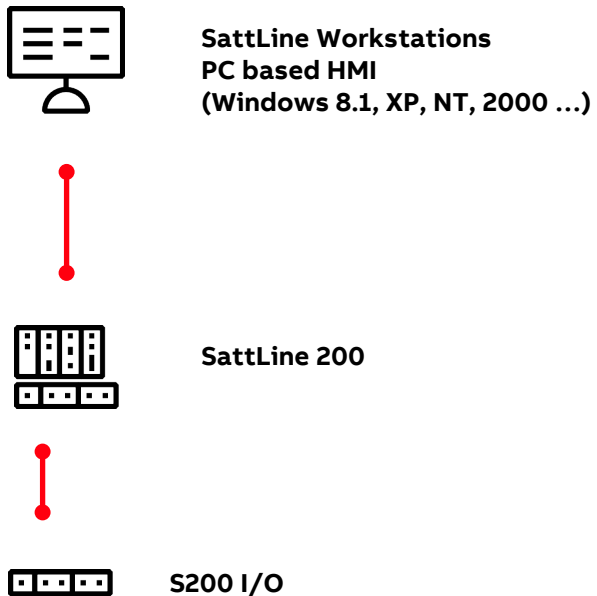
Expensive system to support

Easily and cost effective to support

Evolve small SattLine systems to Compact HMI with AC 800M Controller

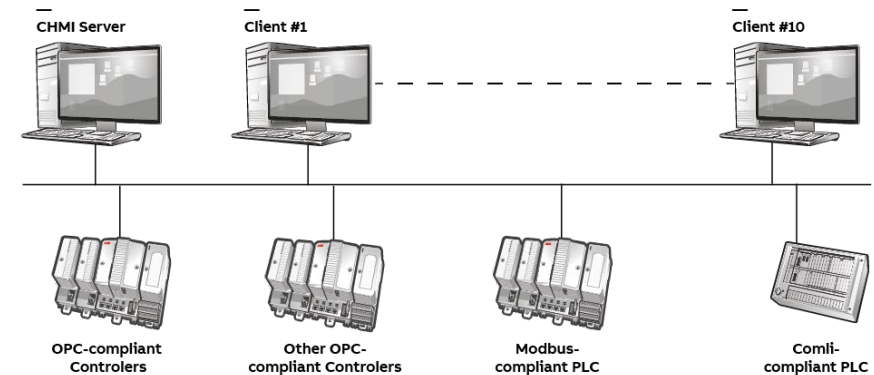
Allow the system to evolve with growing business needs

Small SattLine System



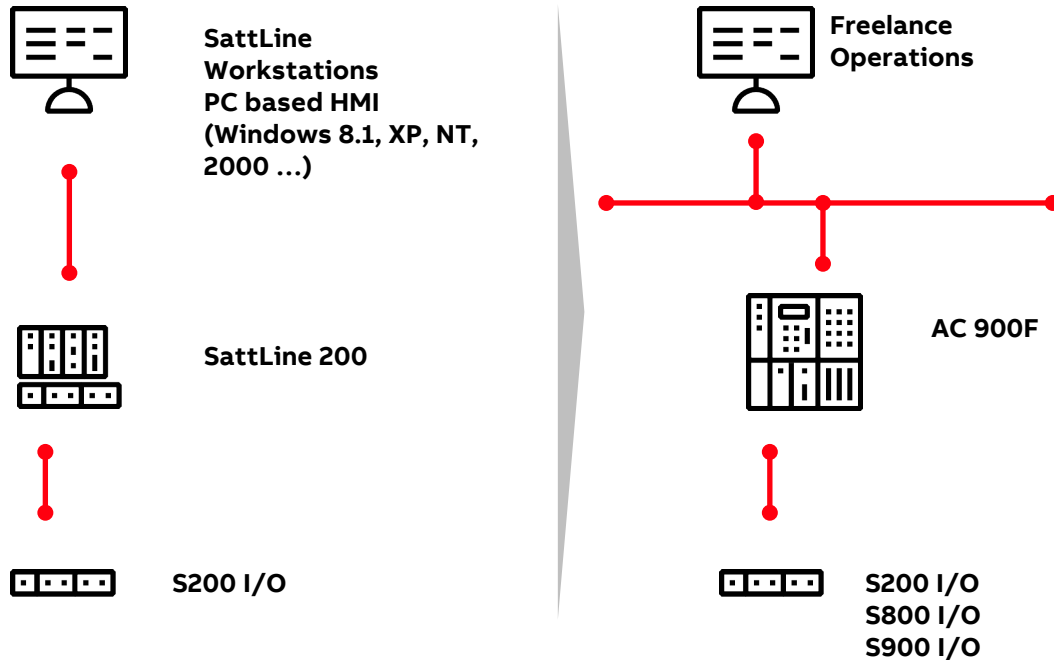
Compact HMI with AC 800M Controller

- 1 Server Workplace (Operations and Engineering)
- Up to 9 additional client workplaces
- 50 - 10,000 signals (20 - 4,000 tags)



SattLine Evolution – Small Systems

Evolution recommendation – Freelance with AC 900F controller



- HMI replacement: Replace existing SattLine Workstations with Freelance Operations
- Controller replacement
 - SattLine 200 Series CPU to AC 900F.
 - Remove CPU and Power Supply
 - Replace local communications module Profibus communications module,
 - Retain fieldbus, S200 I/O and wiring
 - Add AC 900F processor module

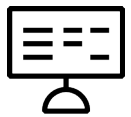
Expensive system to support

Easily and cost effective to support

Evolve small SattLine systems to Freelance with AC 900F Controller

Allow the system to evolve with growing business needs

Small SattLine System



SattLine Workstations
PC based HMI
(Windows 8.1, XP, NT, 2000 ...)



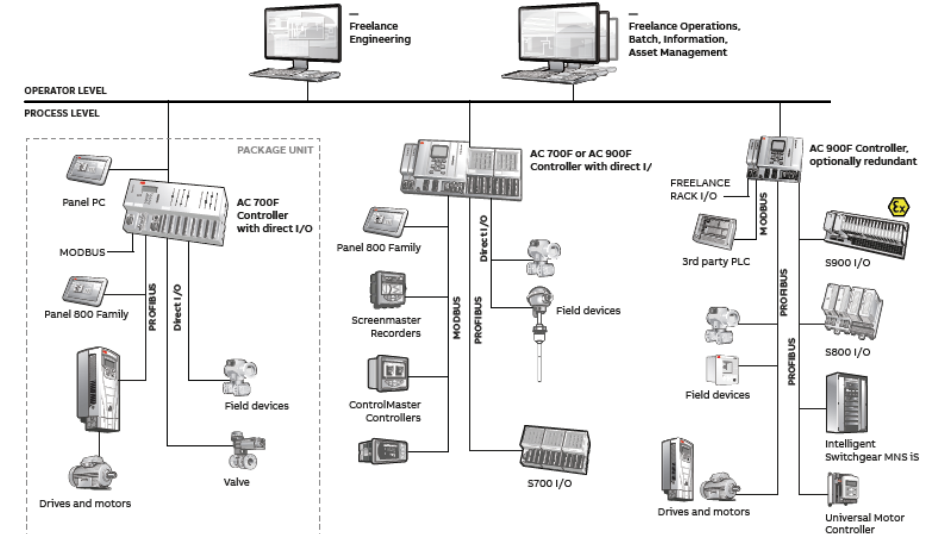
SattLine 200



S200 I/O

Freelance

- Server less architecture
- Up to 10 HMIs connected to one controller, up to 100 HMIs in total
- 16 – 10000 I/O

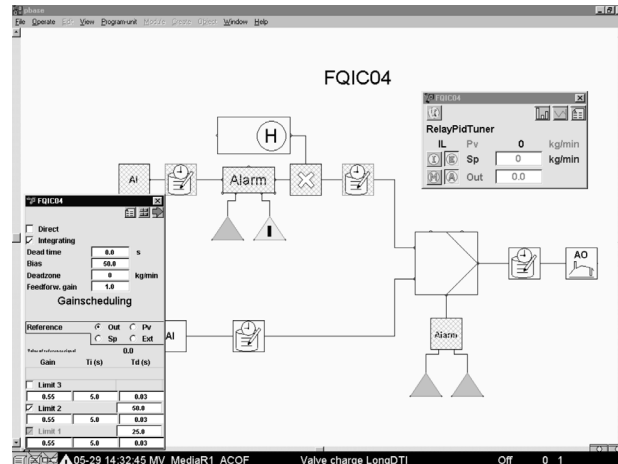


Object-based oriented architectures in both SattLine and 800xA

The SattLine module type concept is included in the 800xA Controller.

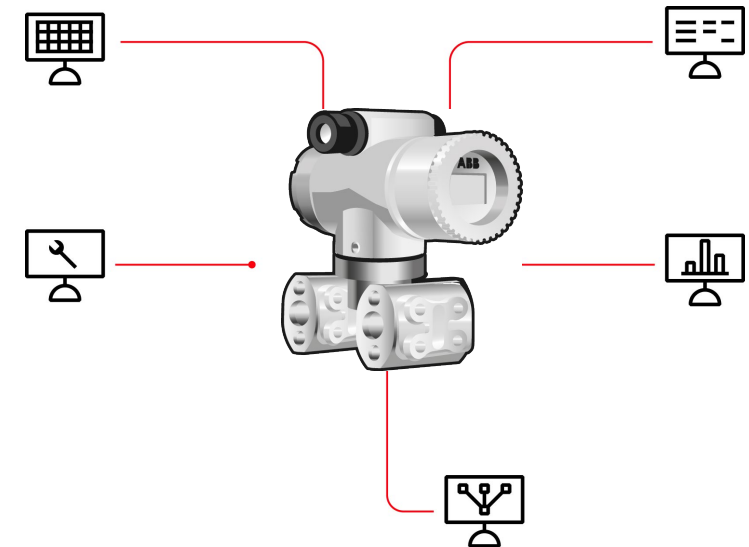
SattLine - Object-oriented Process Automation

- A common control language is used throughout all components of the system to cover the various needs of a control application.
- SattLine includes the process graphics, operator interaction and program code for calculations and control in one and the same object.
- The objects, called Module types, may be saved in libraries.
- Programs consist of a hierarchy of such objects which are able to correspond to physical objects in the plant or process functions.



System 800xA or Compact

- Faceplates, Graphic Symbols
- Alarm management
- Trend, History
- Drawings
- Instructions
- ...



System 800xA - Object-based architecture

The Solution – A system representation of the real world.

ABB's Aspect Object technology organizes information, not into files and folders, but into aspects of plant and business entities.

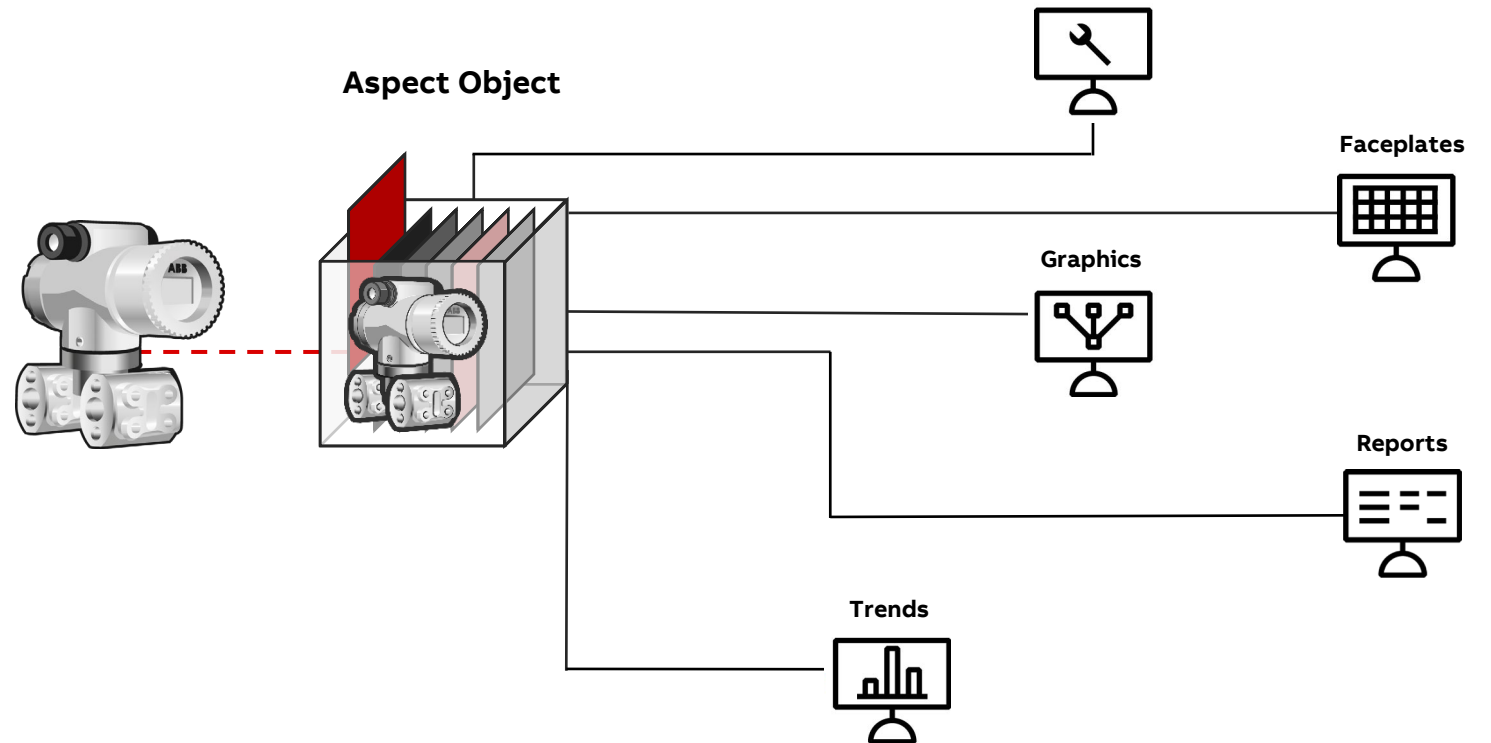
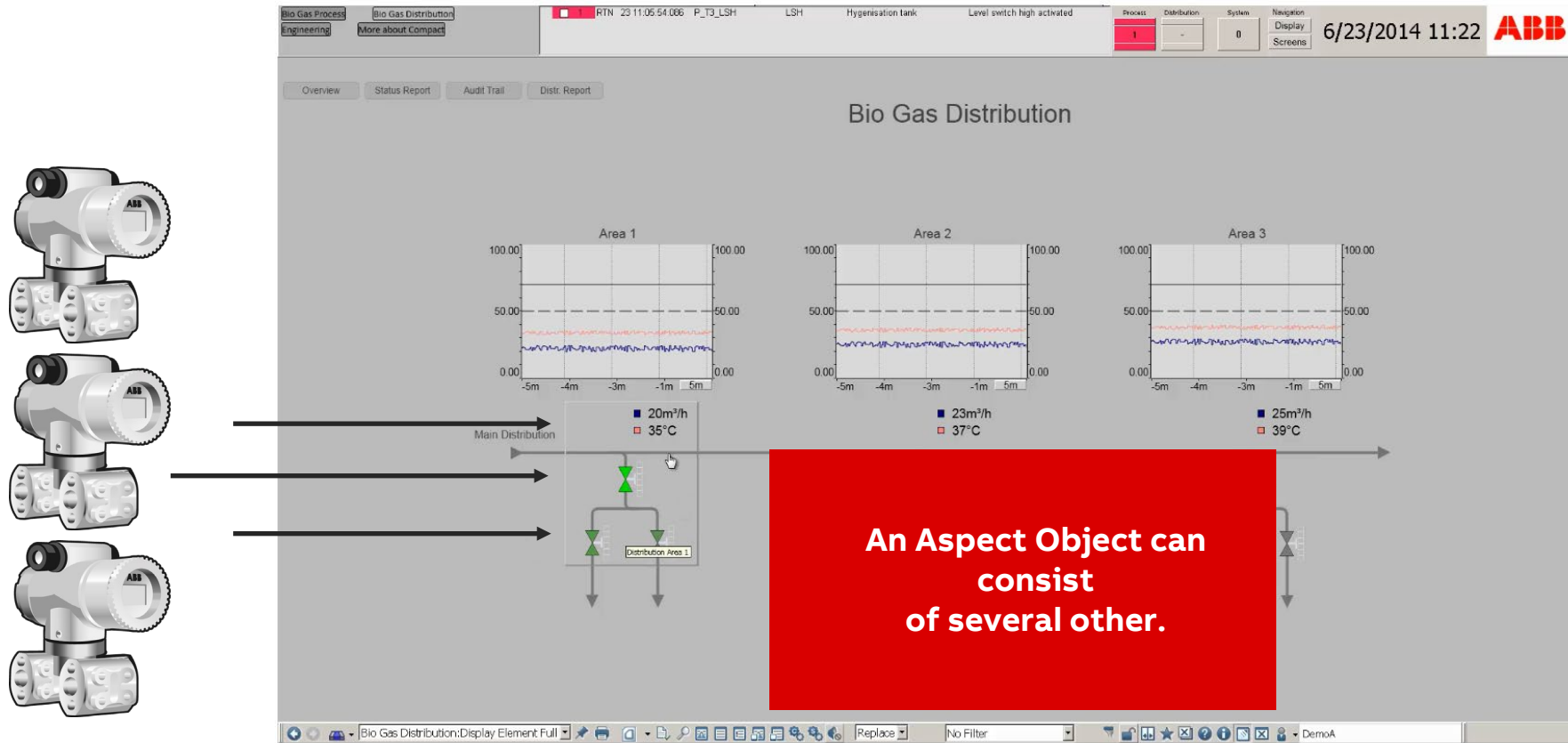


ABB Ability™ System 800xA - Object-based architecture

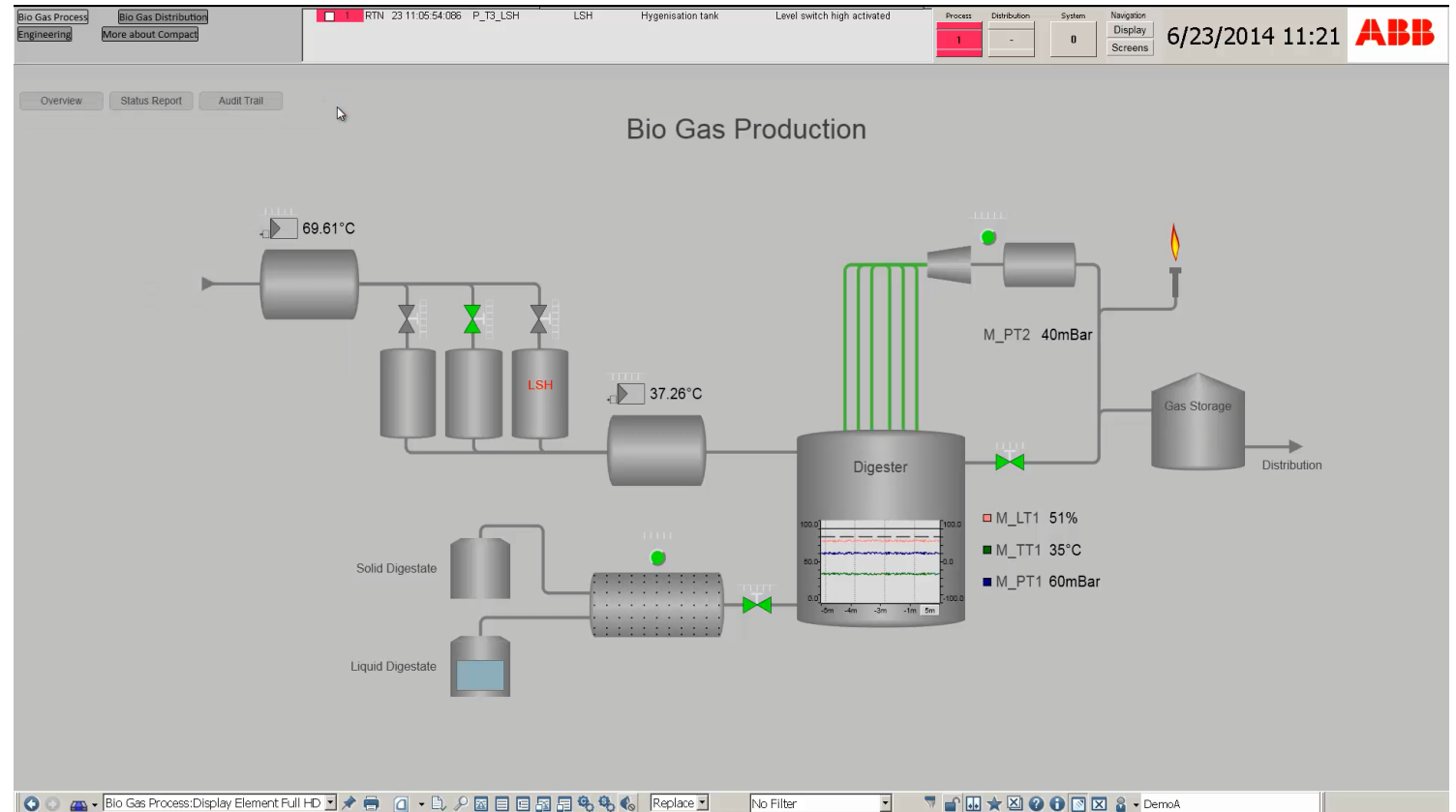
The Solution – Things on many levels



System 800xA – Superior DCS functionality in an HMI

High Performance Graphics

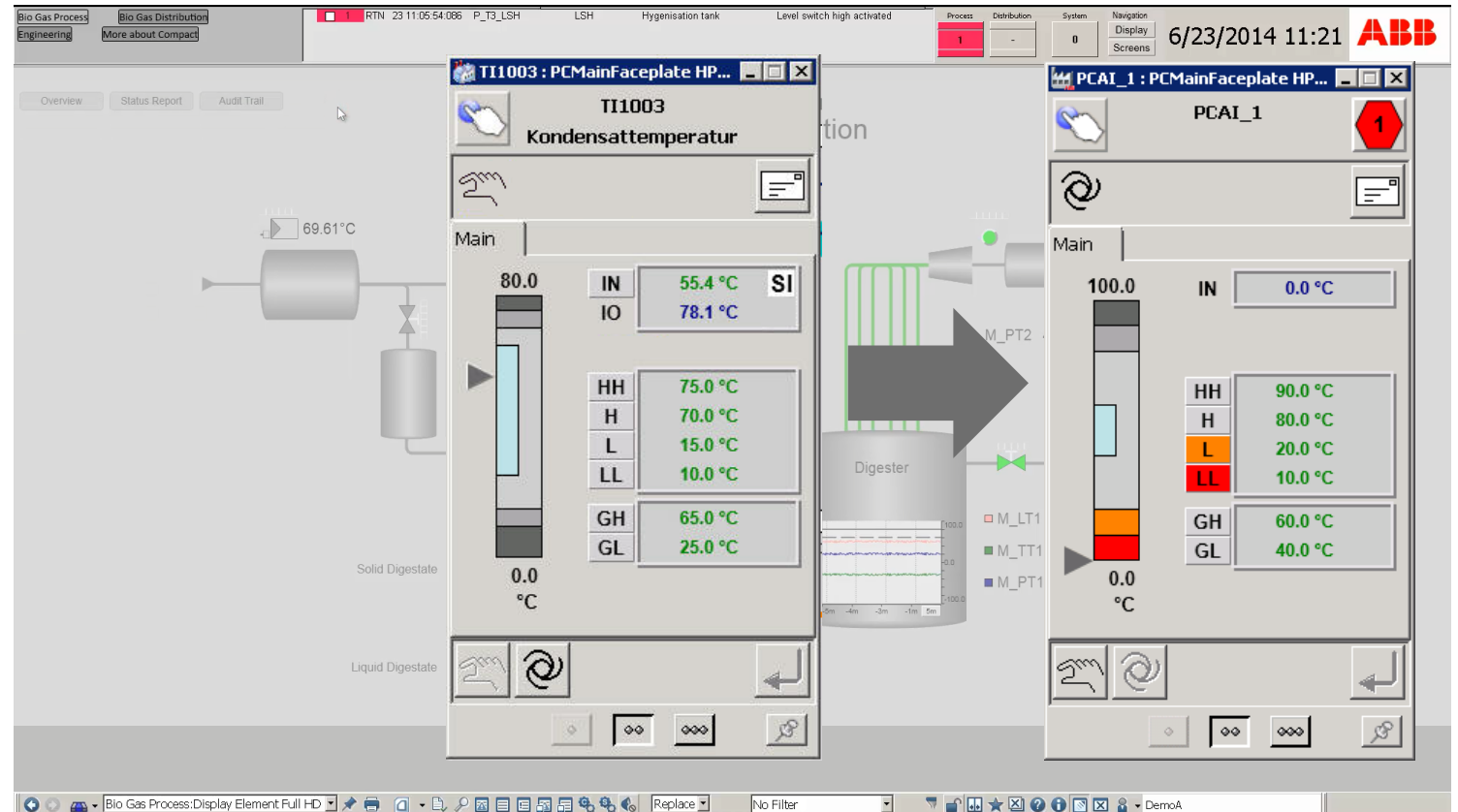
- Predefined workplaces including navigation, alarming, trending, view handling, favorites, etc.
- Modern engineering tool with wide range of ready to use graphical elements.
- Advanced trending functionality including auto scaling, zooming, alarm indication, etc.



System 800xA – Superior DCS functionality in an HMI

High Performance Graphics – A faceplate example

- Example: Analog input
- Color concept:
 - Normal: Gray
 - Process values: Dark blue
 - Setpoints and changeable values: Green
 - Alarms: Red, Orange, Yellow (depending on priority)
 - 4 Limits (HH, H, L, LL) and “Good-Range” (GH, GL)



System 800xA –DCS functionality in an HMI

Features available

High Performance Process Graphics & efficient engineering

- Ready to use workplaces
- Tab navigation with alarm indication
- History & advanced trending
- CAD Viewer included
- Bulk data handling
- Calculations and Soft points

Industrial cyber security

- Audit Trail
- Advanced access control
- Digital signing of aspects
- User management
- User log-over
- Scheduled System Backup

Alarm management

- Alarms & events
- Alarm shelving
- Alarm analysis

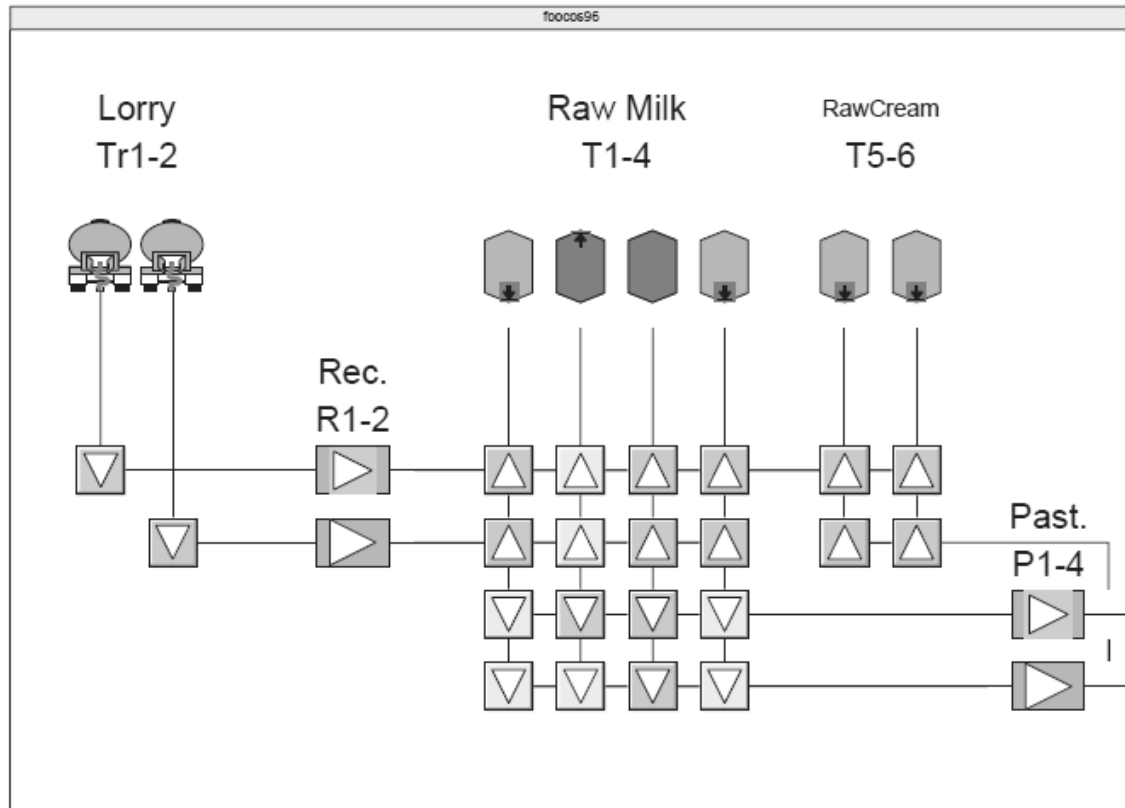
Reporting and documentation

- Snapshot reports
- Document handling
- Connectivity
- Office access using Smart Client
- Multisystem Integration provider
- OPC connectivity
- Dial-up connectivity
- SMS and e-mail messaging

A wide range of functionalities

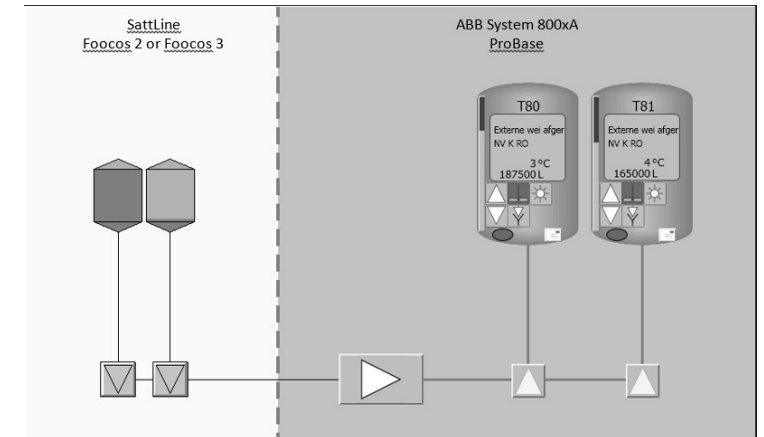
SattLine Evolution - MES

Evolution of Foocos 2 and 3 evolution to 800xA Probase library or Liquid Routing Library for 800xA



Picture of a plant overview

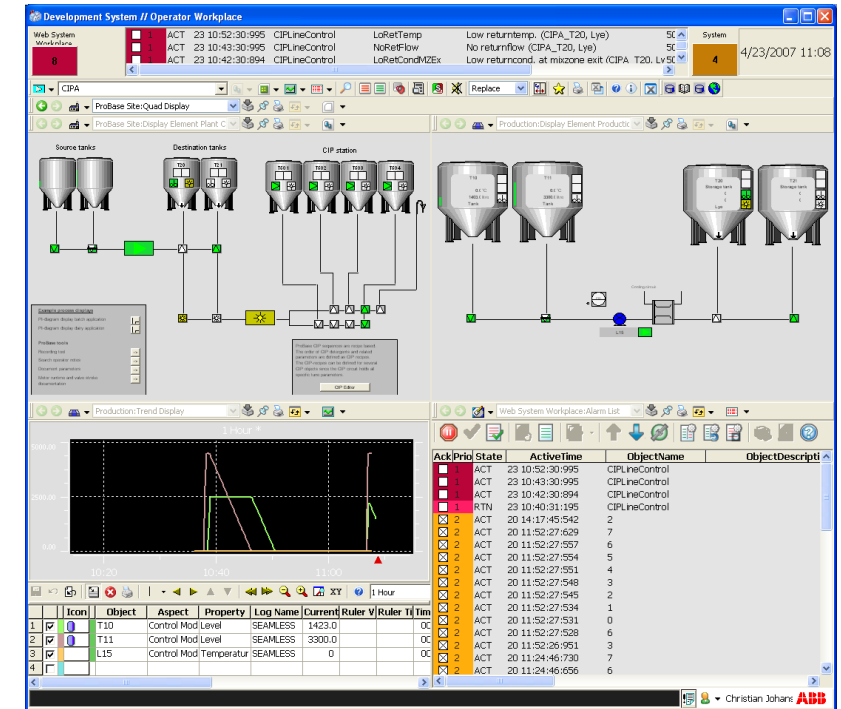
- ProBase has taken over the modular architecture including
 - Faceplates and screens
 - Object oriented way of doing applications using control modules
- Furthermore, ProBase supports
 - High performance graphics
 - Cleaning in place



Liquid Routing Library

Introduction

- Automation solution for industries like dairies, breweries, tank farms, chemical and pharmaceutical plants, mill, fodder, powder manufacturing plants etc. where products are transported and/or stored or processed in tanks and lines
- Includes functionality for advanced product transfer called routing & Comprehensive Cleaning in Place (CIP) support. All required functionality for alarm handling, alarm propagation between different units, queue handling for online production changes, control & supervision of process objects, interlocks & transfer of product and equipment settings like product codes, unit names and unit states.
- A complete library for product routing
 - Ready-made objects & templates
 - Queue handling, diagnostics and asset
- Comprehensive Cleaning in Place (CIP) support
 - Readymade templates for CIP components
 - Recipe editor tool for optimal cleaning process execution



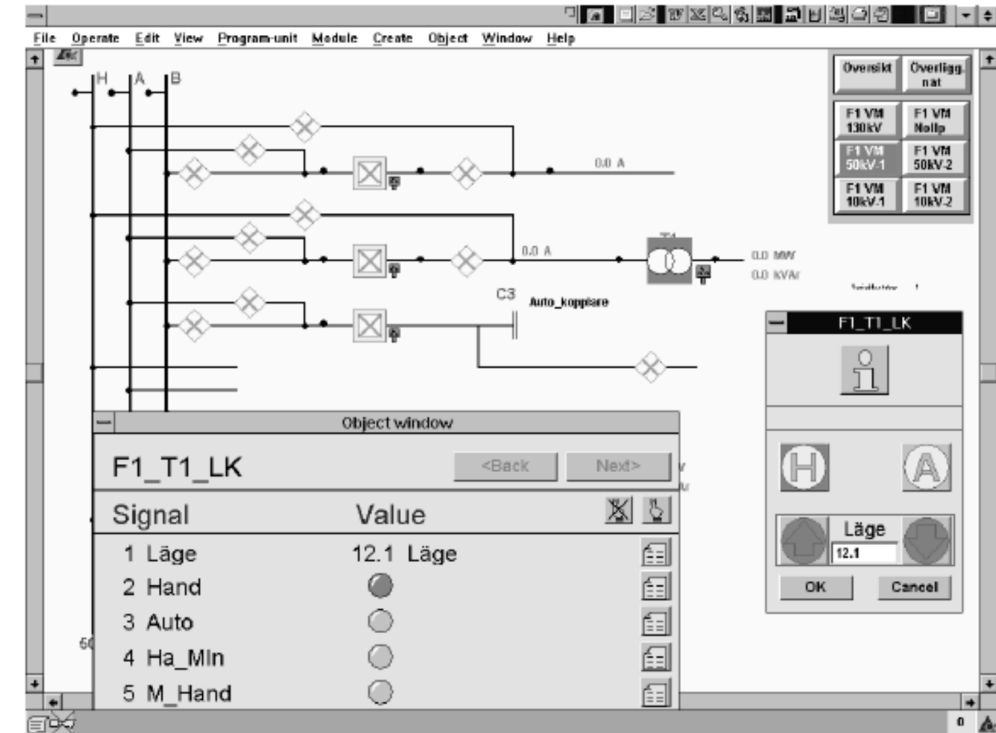


SattGraph Evolution

SattGraph 5000

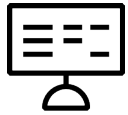
Overview

Process Window



SattGraph Evolution

Current life cycle and support situation



SattGraph 5000
PC based HMI
(Windows 8.1, XP, NT, 2000 ...)



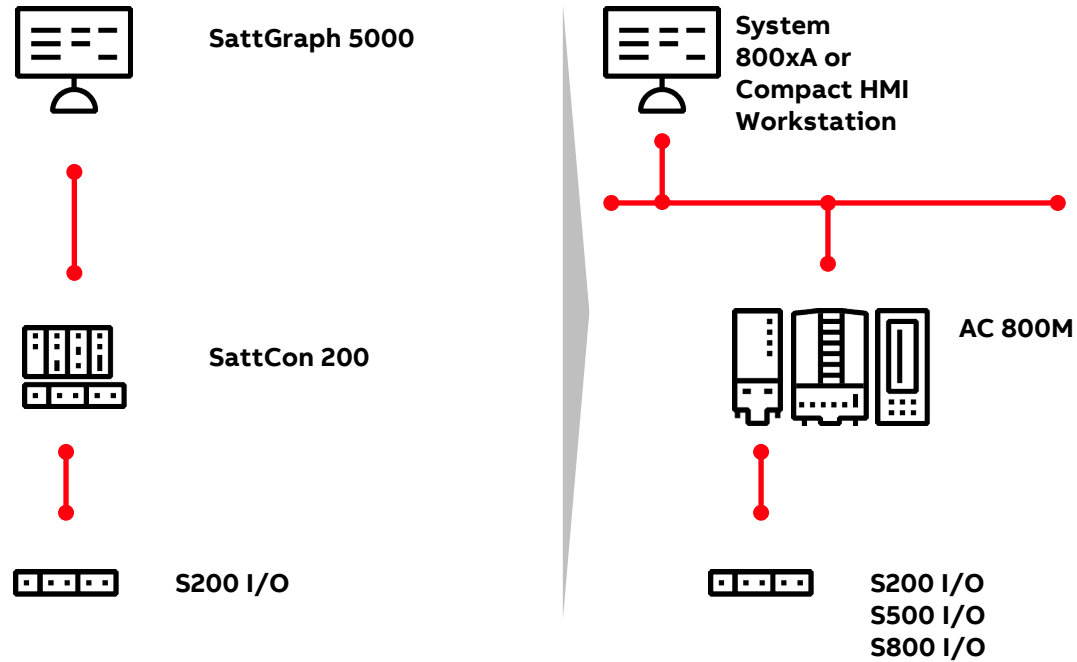
SattCon 200

- HMI: SattGraph is in Obsolete life cycle phase and PC operating system may be in non supported life cycle.

Expensive system to support

SattGraph 5000 Evolution

Evolution recommendation – System 800xA or Compact HMI



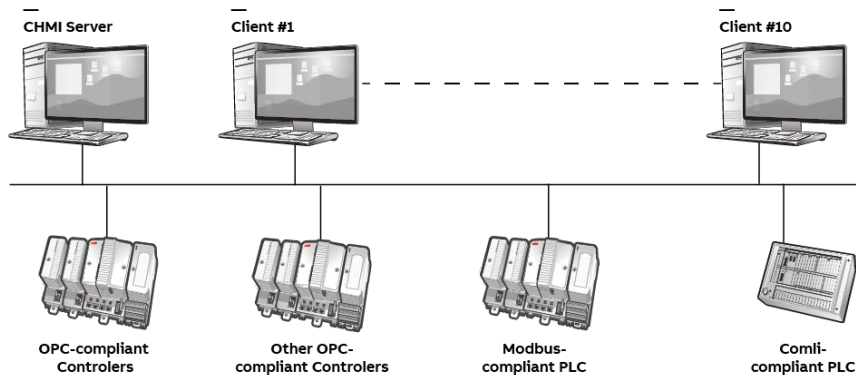
- HMI replacement
- Replace SattGraph HMI with System 800xA or Compact HMI

Expensive system to support

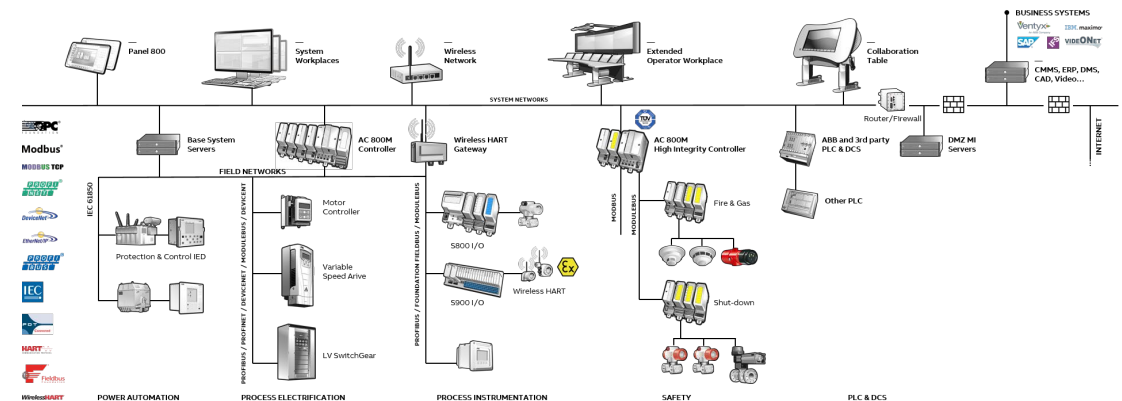
Easily and cost effective to support

Allow the system to evolve with growing business needs

- 1 Server Workplace (Operations and Engineering)
- 1 to 9 additional client workplaces
- 50 - 10,000 signals (20 - 4,000 tags)



- Up to 120,000 tags
- Deep integration with AC 800M
- Embedded electrical control
- Integrated safety

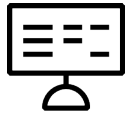


SattCon PLC Evolution

SattCon 200, SattCon 15, 31, 35, 60, SattCon 05/OP45

SattCon 200 Evolution

Current life cycle and support situation



SattGraph or third party
PC based HMI
(Windows 8.1, XP, NT, 2000 ...)



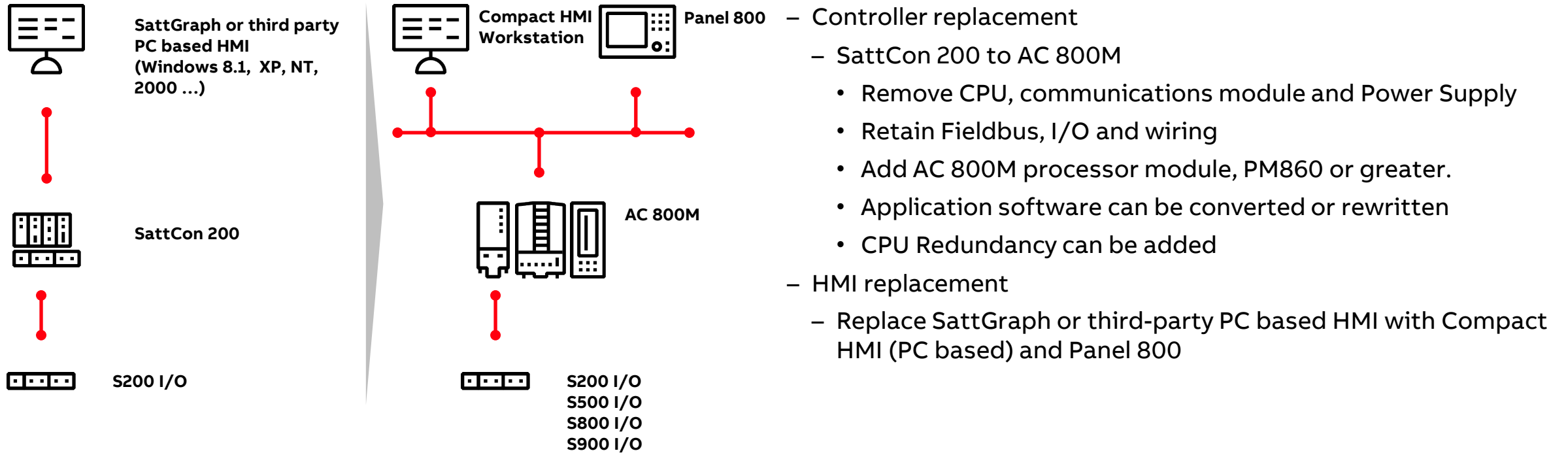
SattCon 200

- Life Cycle Status:
 - SattCon 200 CPU is in Classic life cycle phase
- Aging components
- The CPU is in Classic life cycle phase with limited support
- HMI: SattGraph is in Obsolete life cycle phase and PC operating system may be in non supported life cycle.

Expensive system to support

SattCon 200 Evolution

Evolution recommendation - AC 800M controller with 800xA / Compact HMI or Panel 800

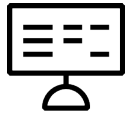


Expensive system to support

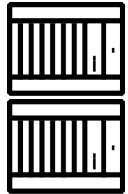
Easily and cost effective to support

SattCon 15, 31, 35, 60 Evolution

Current life cycle and support situation



SattCon OP45 or
PC based HMI
(Windows 8.1, XP, NT, 2000 ...)



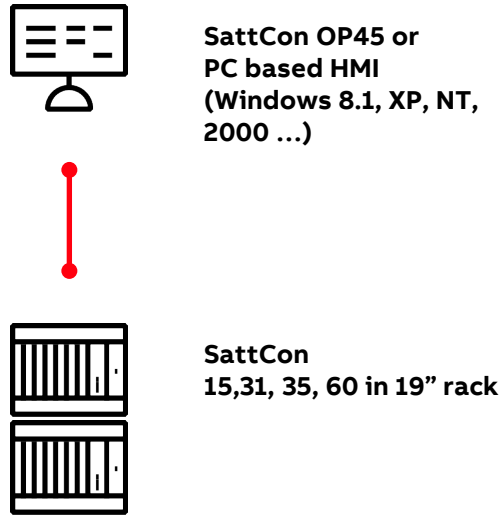
SattCon
15,31, 35, 60 in 19" rack

- Life Cycle Status:
 - SattCon 15,31,35 and 60 are in Obsolete life cycle phase
 - Support on 'Best effort'
 - SattCon 35 is in Limited life cycle phase
 - Rack I/O boards are in Limited/Obsolete life cycle phase
 - Parts Services availability: Parts Repair available, Parts Exchange available on 'best effort'
- Aging components
- Risk of conductivity problems due to corrosion in rack backplane
- The CPU is in the Obsolete life cycle phase and has limited support
- HMI: PC based HMI operating system may be in non supported life cycle

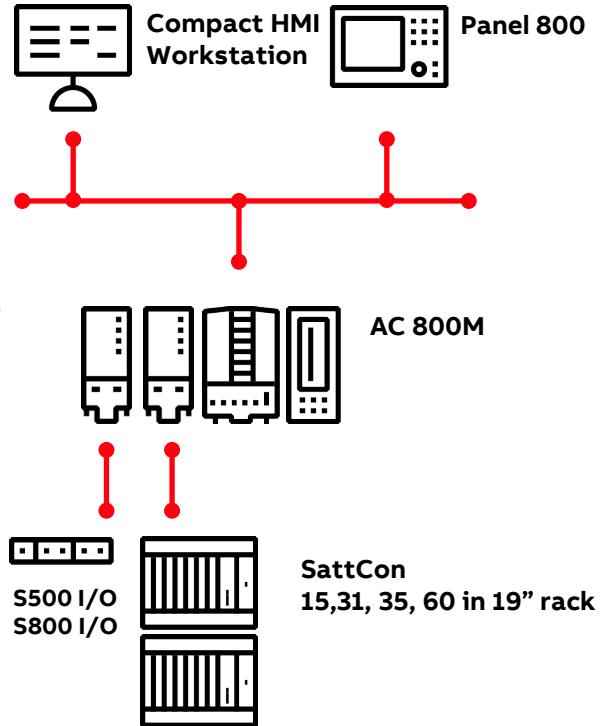
Expensive system to support

SattCon 15, 31, 35, 60 Evolution

Evolution recommendation - AC 800M controller using RACN-board, Compact HMI or Panel 800



Expensive system to support



Easily and cost effective to support

- Controller replacement:
 - Evolve to AC 800M with S800 I/O:
 - CPU in SattCon 19" rack replaced by a RACN communication board in each rack.
 - *SattCon retained as local I/O, wiring retained, reducing the total evolution cost.*
- Application software can be manually converted but is usually rewritten to benefit from controller features.
- HMI replacement
 - Replace several OP45 with one Compact HMI (PC based)
 - Replace single OP45 with Panel 800

SattCon 05 / OP45 Evolution

Current life cycle and support situation



SattCon OP45
Panel-type PLC



SattCon 05
PLC

- Life Cycle Status:
 - SattCon OP45 and SattCon 05 Slimline: Limited
- Aging components
- System is no longer in production and replacement depends on availability of parts on stock.
- SattCon 05 and SattCon OP45 are in later life cycle phases and has limited support

Expensive system to support

SattCon 05 / OP45 Evolution

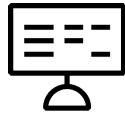
Evolution recommendation - AC 800M controller with Panel 800 or Compact HMI



SattCon OP45
Panel-type PLC



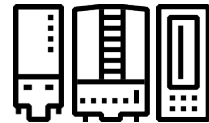
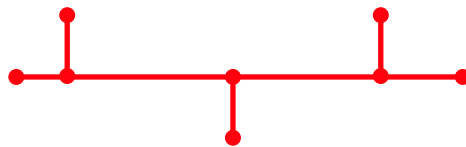
SattCon 05
PLC



Compact HMI
Workstation



Panel 800



AC 800M



S500 I/O or S800 I/O
placed in evolution
module with identical
form factor as
SattCon05

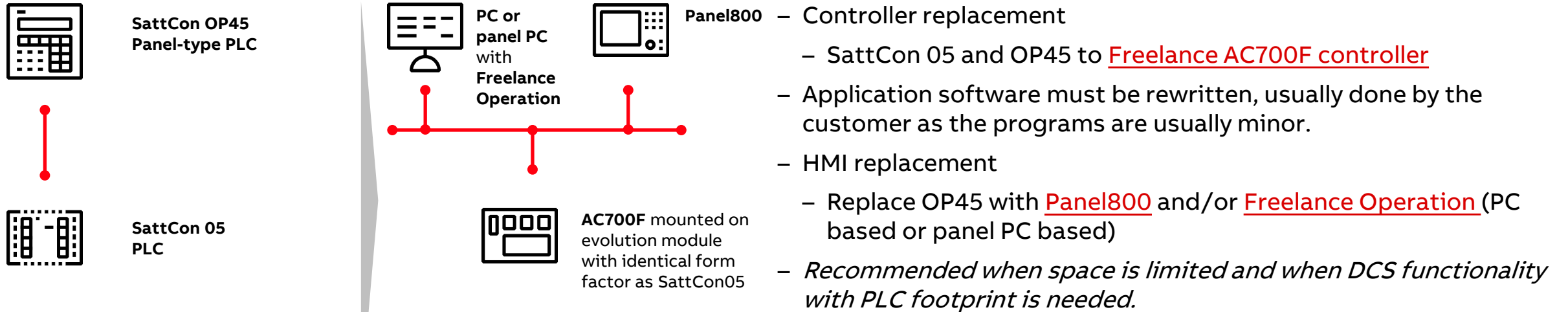
- Controller replacement
 - SattCon 05 and SattCon 05/OP45 to AC 800M with S800 I/O
 - S500 I/O or S800 I/O can be placed in evolution module
- HMI replacement
 - Replace several OP45 with one Compact HMI (PC based)
 - Replace single OP45 with Panel 800
- Application software must be rewritten, usually done by the customer as the programs are usually minor.
- *Recommended when space is not limited and when expansions are needed.*

Expensive system to support

Easily and cost effective to support

SattCon 05 / OP45 Evolution

Evolution recommendation - Freelance AC700F controller with Freelance Operation or Panel800



Expensive system to support

Easily and cost effective to support

SattCon 05 / OP45 Evolution

Evolution recommendation - AC 500 using evolution kit, add panel for local HMI



SattCon OP45
Panel-type PLC



SattCon 05
PLC



CP600,
CP600-eCo Panel



AC500 mounted on
evolution module with
identical form factor as
SattCon05

- Controller replacement
 - SattCon 05 and OP45 to AC500 using evolution module
- Application software must be rewritten, usually done by the customer as the programs are usually minor.
- HMI replacement
 - Replace OP45 with CP600 or CP600-eCo panels
- *Recommended when space is limited and when low cost PLC technology with low footprint is needed.*

Expensive system to support

Easily and cost effective to support



Satt Evolution

Additional Resources and Contacts

Satt Evolution

Contacts and additional resources

Additional resources

[ABB Satt web pages](#) (external)

[ABB Library – Satt downloads](#) (external)

Contact us

Satt Evolution Center: satt.evolution@se.abb.com

ABB Control Systems : [Contact form](#)

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