



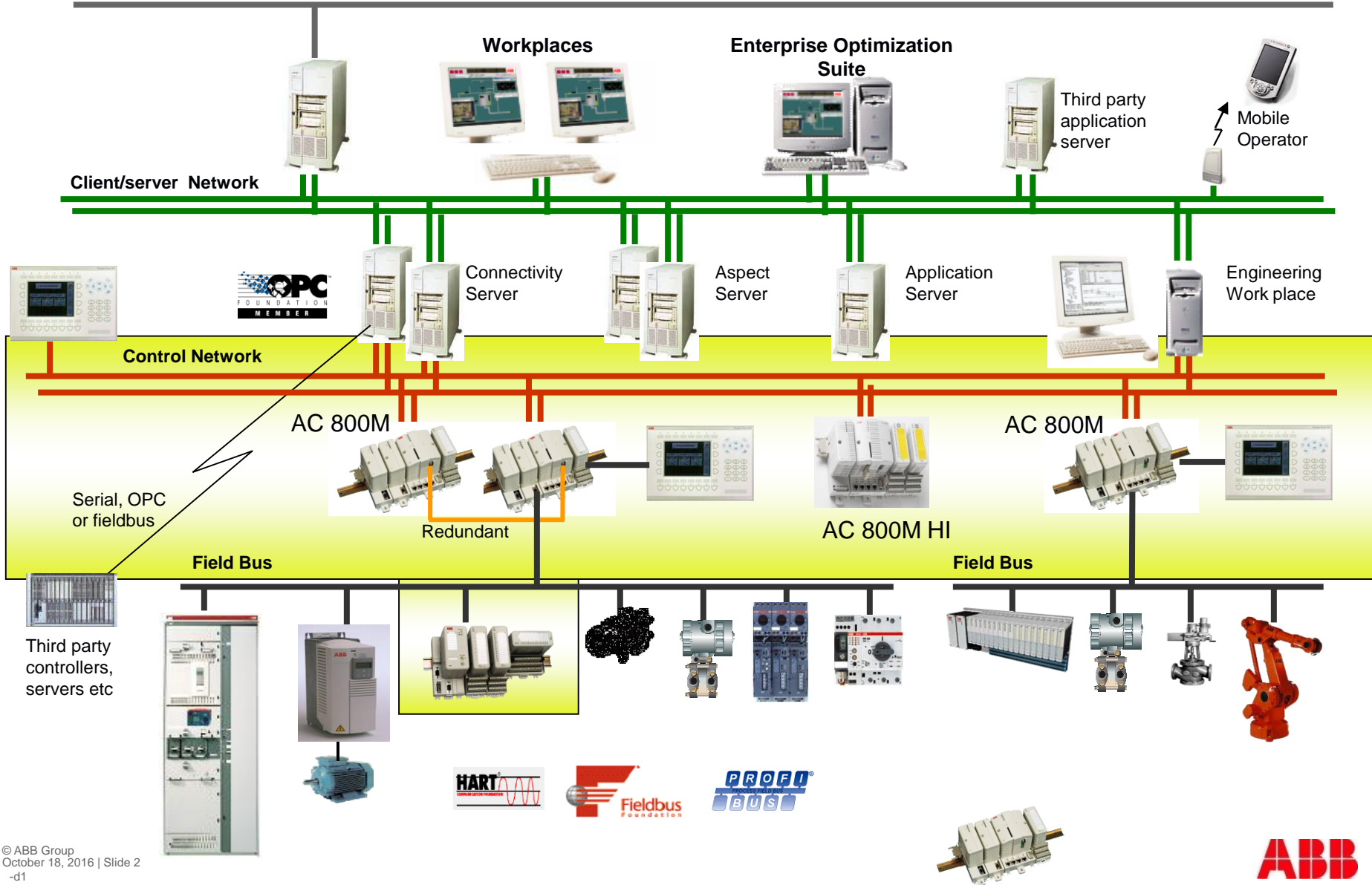
Ulf Hagberg PA/XAACS 2016-10-03

Fifteen years of collaboration on domain-specific languages

Products

800xA Control IT

Plant Network / Intranet



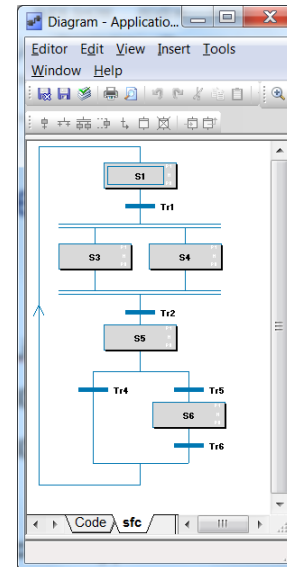
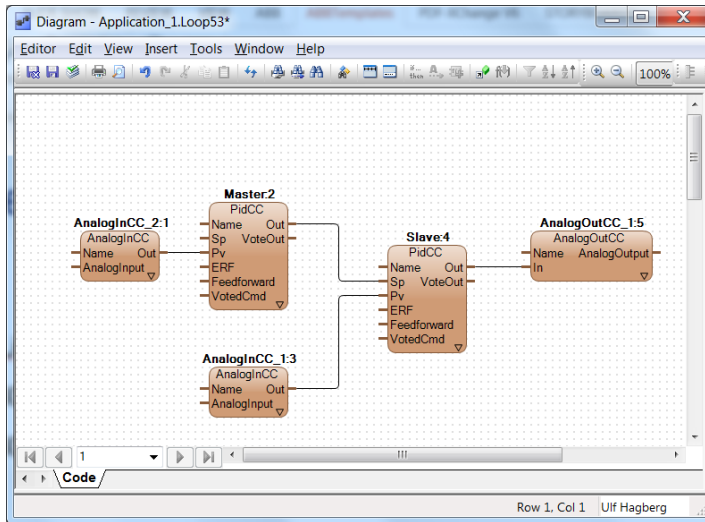
Products derived from LTH

- **PID Autotuner** (Tore Hägglund, Karl Johan Åström)
 - Algorithm still used as the main autotuner.
- **Sattline** (Hilding Elmqvist)
 - 1989 market introduction
 - Reason for ABB to buy the automation part
 - 800xA – AC800M (derived from SattLine 1999)
ABB main DCS and still continuously developed.



Distributed Control System – Language

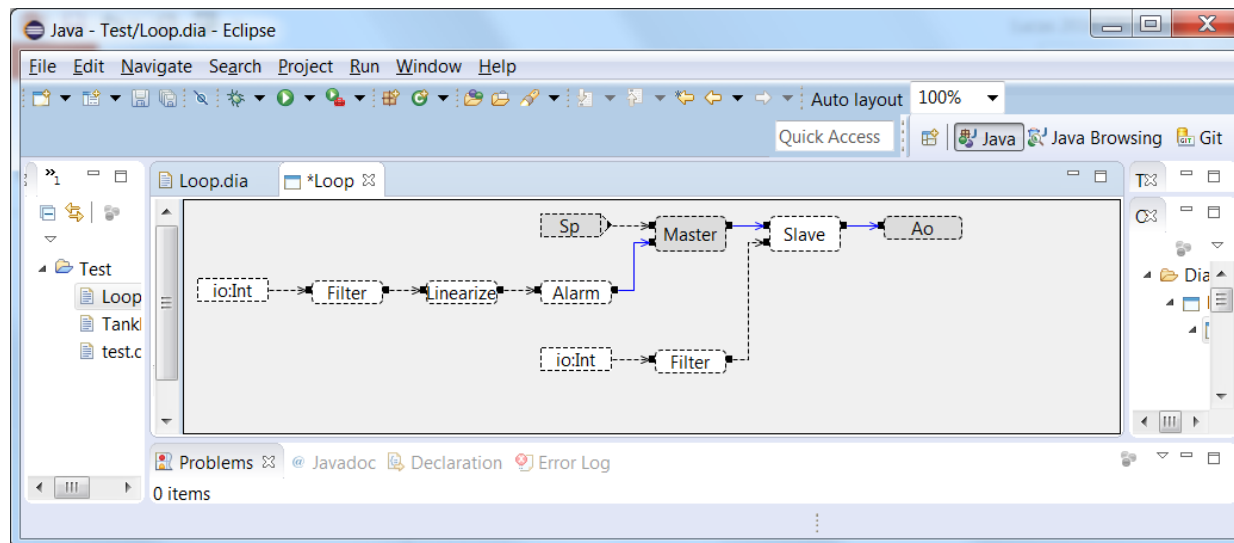
- SattLine – graphical representation, automatic execution order sorting (1989)
- AC 800M + IEC 61131-3 : IL, ST, FBD, SFC (1999)
- AC 800M + Diagrams, graphical language with visible data flow (2012)



Hierarchical type instance based – but still is inheritance missing!

Language Cooperation ABB – LTH

- Vinnova / Lucas (2000-2009)
 - Design and implementation of object-oriented extensions to the Control Module Language, Torbjörn Ekman
- Vinnova / EASE 2010
 - ABB failed to sign the agreement – focus on mobile industry
- PhD 2010 - 2014
 - A Sequential Control Language for Industrial Automation, Alfred Theorin
- ABB – CT / LTH 2013 - 2016
 - The Design and Implementation of Bloqqi – A Feature-Based Diagram Programming Language, Niklas Fors

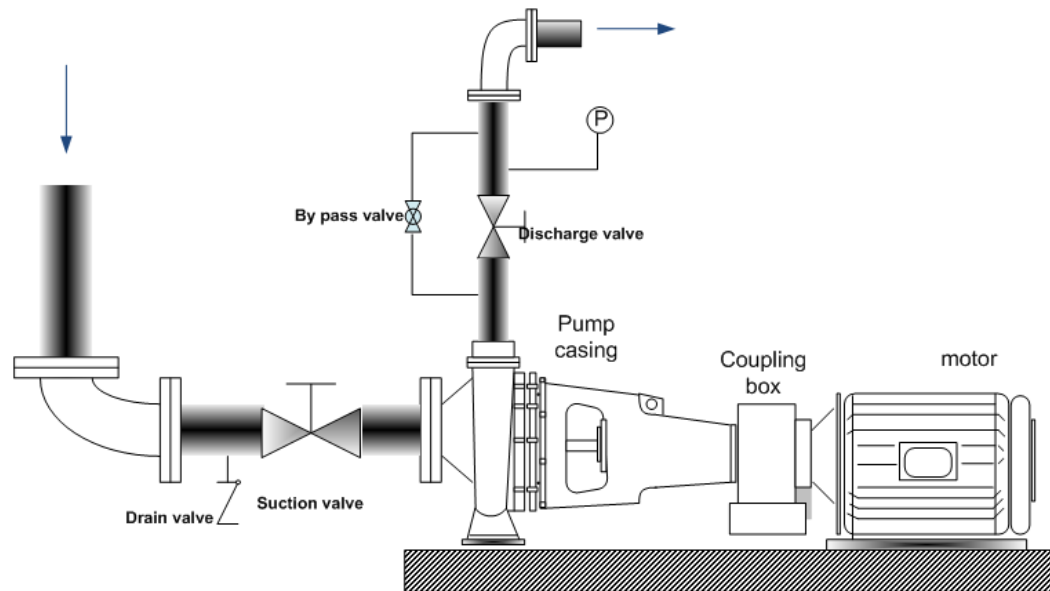


Language cooperation ABB – LTH, next step

- Vinnova / LTH / ABB , 2016 - 2017

Feasibility study: Feature-oriented automation programming

- Sequence Programming / JGrafchart
- FMI / Modelica
- Unit tests
- Provide examples



Centrifugal pump system

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