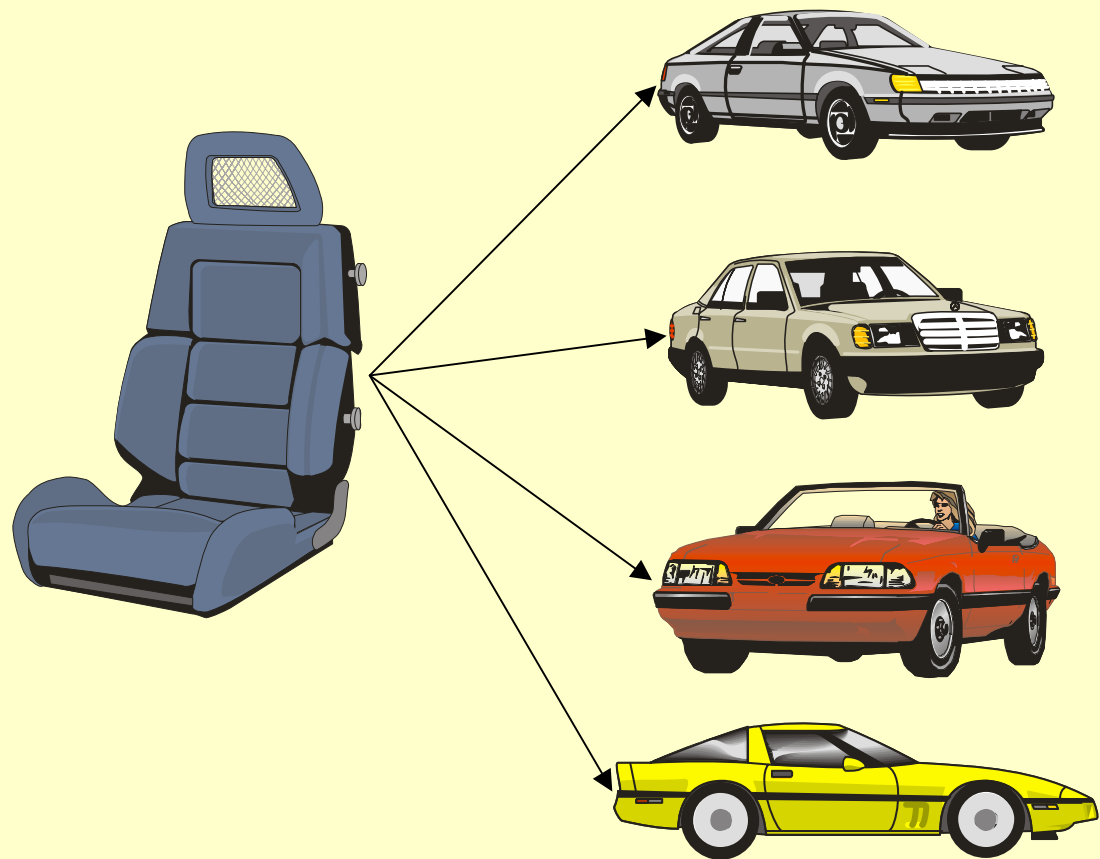
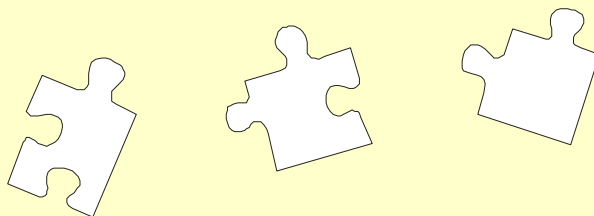
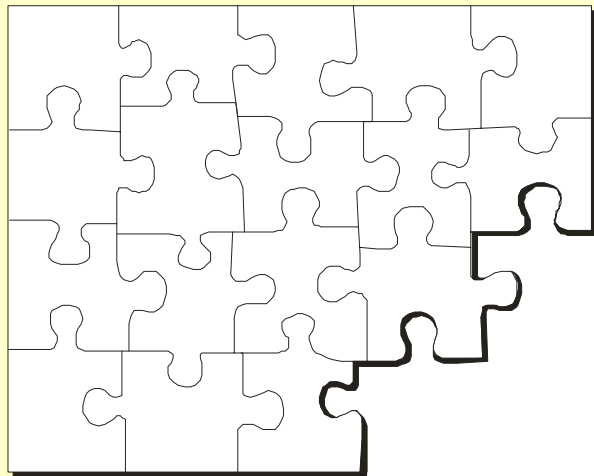




The LHC Experiments' Joint Controls Project Framework

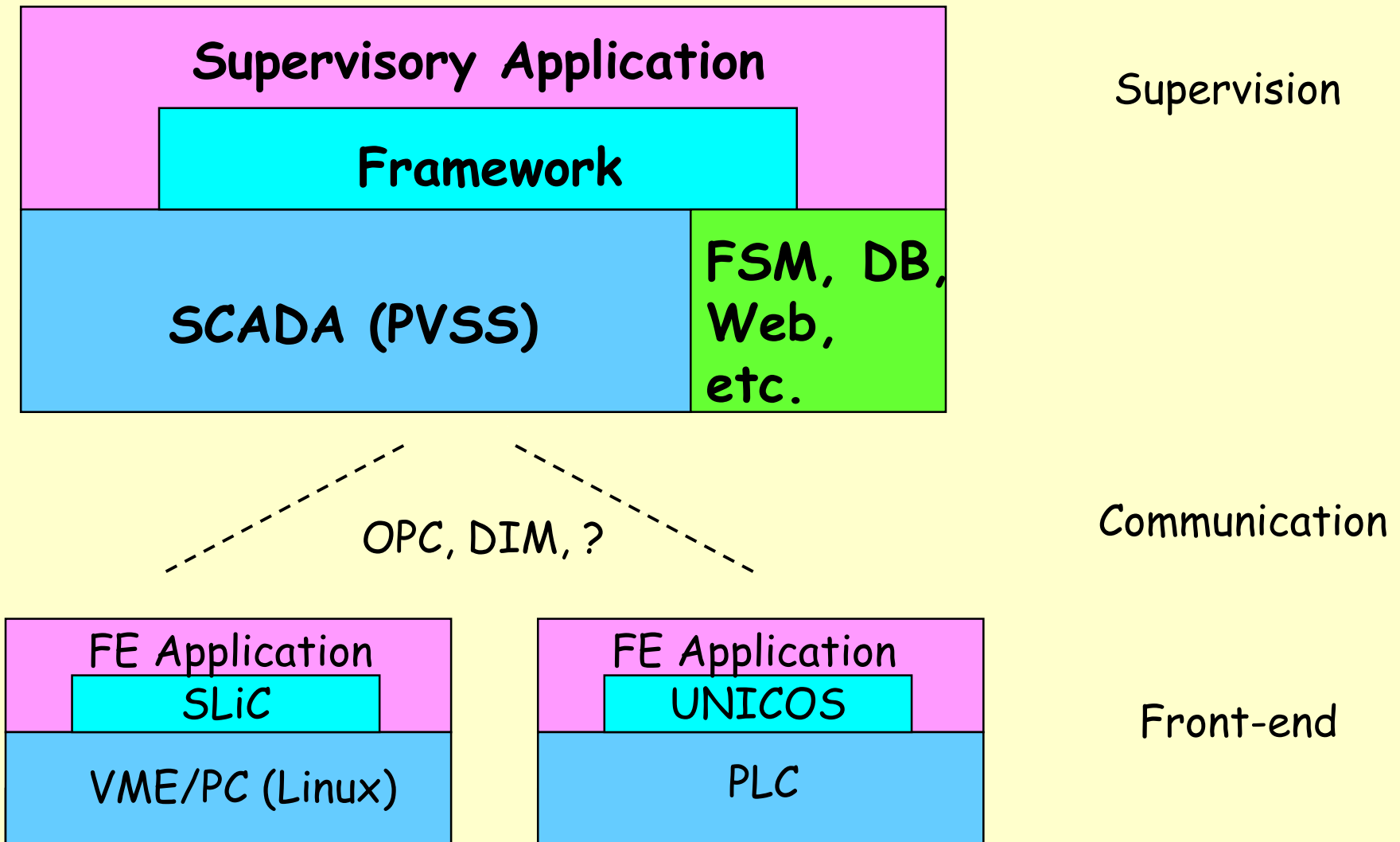
ATLAS DCS Workshop
10th-12th October 2001

Control System Framework





Control System Framework





Components of the Framework

◆ PVSS Development Guidelines Document

◆ Devices

☞ A Framework device is a representation of a real-world device or a logical entity

☞ Device consists of

- ☐ PVSS Data Point Type
- ☐ Library
- ☐ Panels

◆ Utilities

☞ Act on the Devices

- ☐ Configure
- ☐ Browse
- ☐ Operate
- ☐ Etc.



Supported Devices

◆ Analog-Digital devices

- ☞ Analog Input/Output
- ☞ Digital Input/Output
- ☞ Process Monitor

◆ CAEN devices

- ☞ Crate SY127
- ☞ Crate SY403
- ☞ Crate SY527
- ☞ CAEN board
- ☞ CAEN channel



Supported Devices (II)

- ◆ Wiener Fan Tray

- ◆ ELMB

- ◆ Node

 - ☞ Means to build hierarchies of devices

 - ☞ Composite device



Utilities

- ◆ Editor/Navigator
- ◆ External Alarm Handler
- ◆ Device Support Extension
- ◆ Generic External Handler
- ◆ Import of Front-End Configuration
- ◆ Controls Hierarchy + FSM



Future Work

- ◆ Co-ordination via Framework Working Group
- ◆ CAEN crate 1527 (underway)
- ◆ SPS data (implementation exists)
- ◆ Conditions database (implementations exist)
- ◆ CASTOR (implementation underway)
- ◆ Mass configuration tool
- ◆ Historical data handling utility
- ◆ Integration of UNICOS framework (being investigated)
- ◆



Controls Technologies

Layer Structure

Technologies

Commercial

Custom

FSM

SCADA

OPC

DIM

Communication Protocols

PLC/UNICOS

VME/SLiC

Field buses & Nodes

Sensors/devices

Supervision

Process
Management

Field
Management

Configuration DB,
Archives,
Log files, etc.

Storage

WAN

LAN

LAN

VME

Controller/
PLC

Field Bus

Node

Node

Experimental equipment

Other systems
(LHC, Safety, ...)

Based on an original idea from LHCb



Control System Components 1

Standards defined by Controls Board, JCOP, IT/CO

- ◆ **Supervision: PVSS SCADA Toolkit**

- ◆ **Programmable Logic Controllers (PLCs):**

Siemens and Schneider (with UNICOS PLC library)

- ◆ **Field Buses**

CAN Bus, ProfiBus, WorldFIP, (and possibly Ethernet)

- ◆ **OLE for Process Control (OPC)**

Interface for Commercial H/W available on Windows

- ◆ **Distributed Information Manager (DIM)**

Interim solution for non-commercial H/W

Information/Support for a variety of equipment:

Wago, Wiener, Applicom, SoftPLCs, N.I., Beckhoff, etc.

IT/CO Home Page: <http://itcowww.cern.ch/welcome.html>



Control System Components 2

JCOP "Framework": customisation for HEP

[//itcowww.cern.ch/jcop/subprojects/Framework/welcome.html](http://itcowww.cern.ch/jcop/subprojects/Framework/welcome.html)

- ◆ Provides standard utilities and pre-defined components

Drivers & Panels for HV, ADCs, Fan Trays, ...

- ◆ PVSS implementation Guidelines

- ◆ Finite State Machine (SMI) integrated with PVSS

- ◆ Custom Front-End "SLiC"

C++ Class library + Communications & Error Handling...

For VME and PC H/W (LINUX + possibly NT)

Details: [//itcofe.web.cern.ch/itcofe/Projects/SLiC/welcome.html](http://itcofe.web.cern.ch/itcofe/Projects/SLiC/welcome.html)

- ◆ Lab. Systems: National Instruments LabView



Other Related Activities

- ◆ Rack Control Project
- ◆ CERN Safety Alarm Monitoring System (CSAM)
- ◆ Detector Safety System (DSS)
- ◆ CERN SCADA Application Support Group (SASG)
- ◆ Industrial SCADA Application Group (ISAG)
- ◆ LHC Data Interchange Working Group (LDIWG)
- ◆ Joint Cooling and Ventilation Project (JCOV)
- ◆ Subrack Project
- ◆ Gas Working Group