

Closing the gap between Control System Studio (CSS) and IRMIS

IRMIS and Relational Databases SIG Workshop

Argonne, June 12, 2006

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Agenda

CSS – What is it – and why do we work on it?

CSS Components and – Interfaces

... between IRMIS and CSS

Why working on CSS now?

DESY is building a new machine – the XFEL.

New machine – resources for new developments are available.

The standard EPICS OPI's need an update.

**A good time for a new design for future operator/
machine applications**

New Operator Displays for the XFEL Cryogenic and Utility Control Systems

Motivation for a new application suite

- The existing applications (mainly written in X-Window) run (nearly) only on Unix machines.
- There are only a few programmers (left) that know how to program X-Window/ Motif
- The new EPICS Version will provide new features that must be supported also by the applications
- The existing applications are similar to the first set of Microsoft applications.
They do not share a common look and feel.

What is the Control System Studio (CSS)?

It is an environment / framework which enables you to create your control system applications.

It shall offer a common look and feel for all applications

It shall provide interfaces to:

- Control System Data
- Control System Name Services
- Control System Logging Services
- Application Logging Services
- Application Management Services
- ... more

It shall provide a generic infrastructure to built pluggable, component based applications:

- High level applications (XAL)
- User/ operator applications

The selected Environment

Language:

- Java

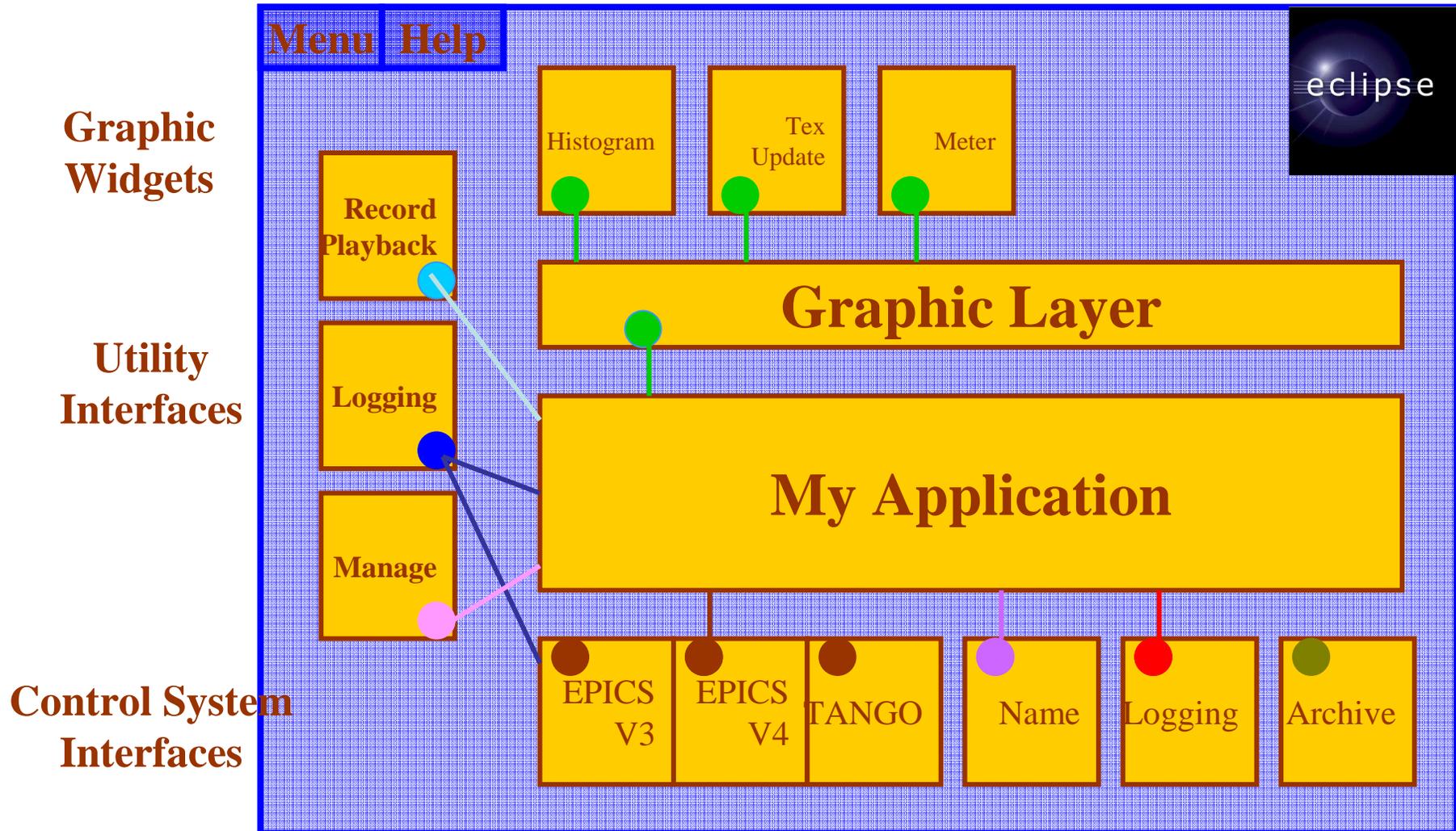
Development environment (IDE):

- Eclipse

Proposed Rich Client Platform (RCP):

- Eclipse

CSS – Framework in Eclipse (as a RCP)



Collaboration/ Contracts with Companies

We do not have the necessary manpower and not the necessary experience to develop such a framework all on our own.

We are working together with competent partners:

Utility Interfaces and overall Design:

- C1 WPS GmbH, Hamburg

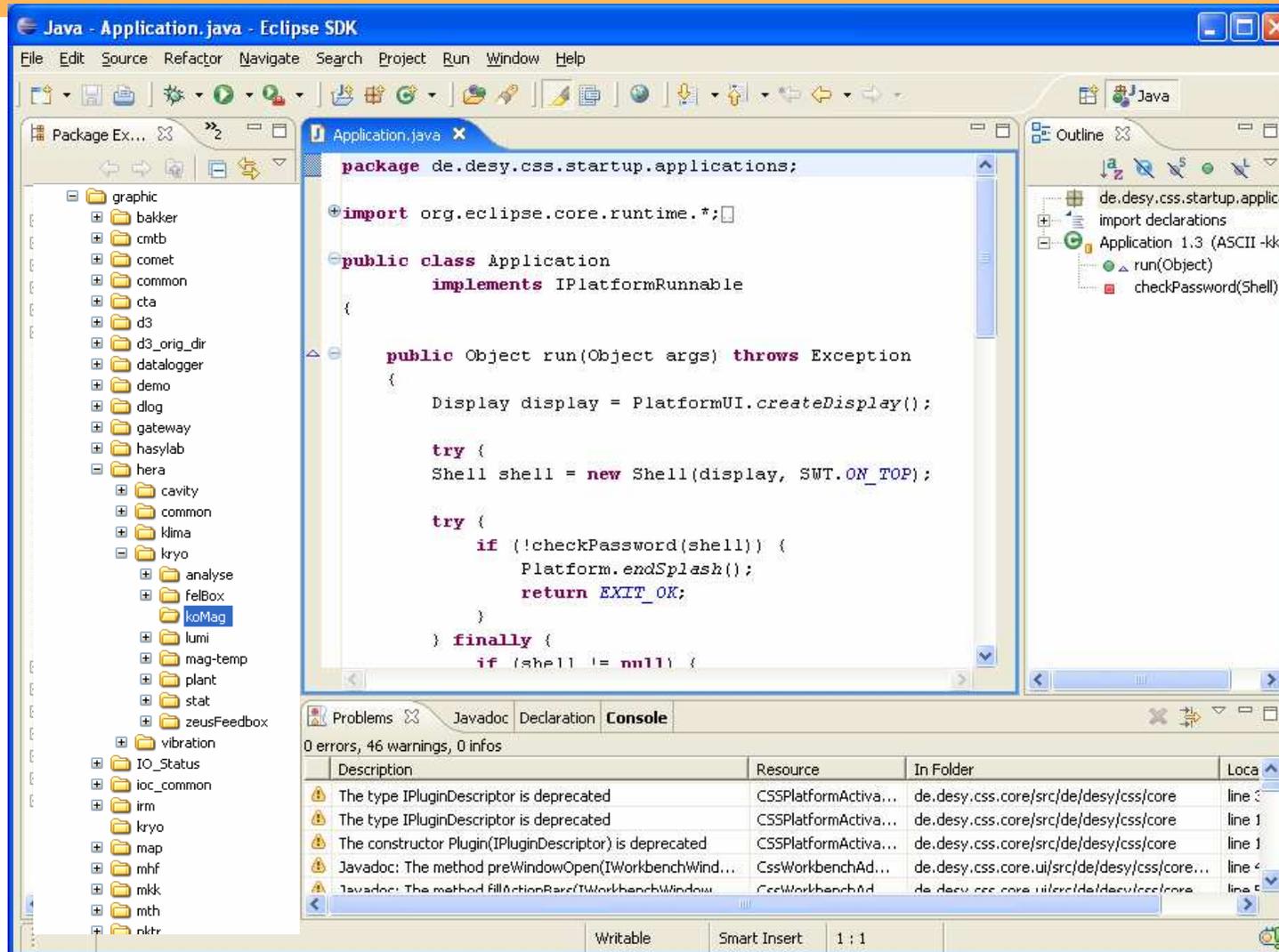


Control System Interfaces:

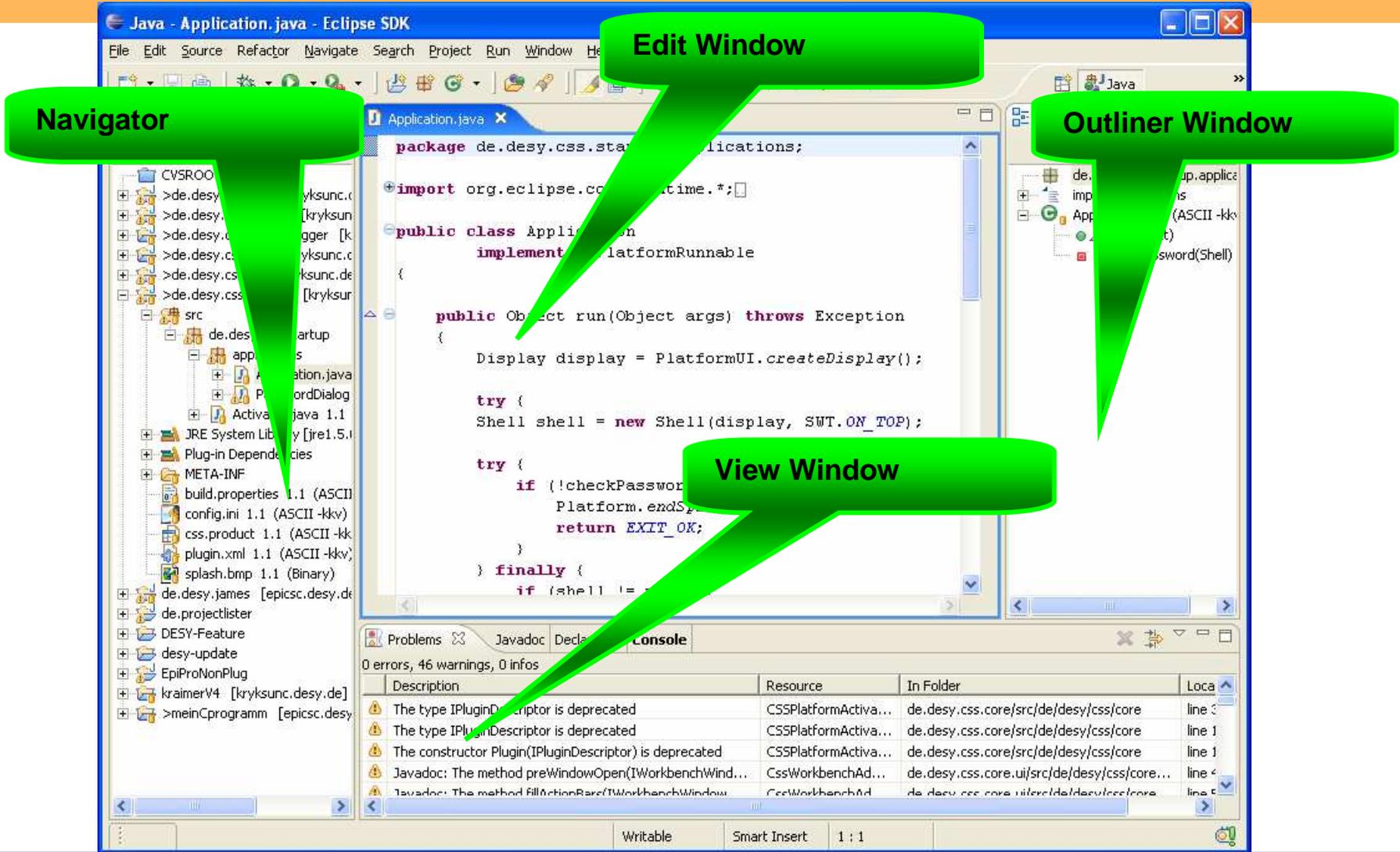
- Cosylab, Ljubljana (Slovenia)



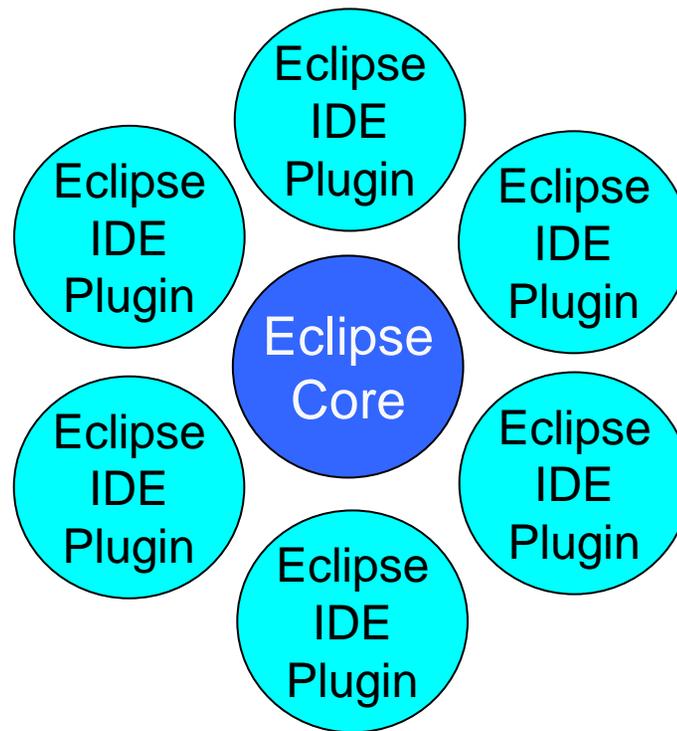
Eclipse IDE - (the original)



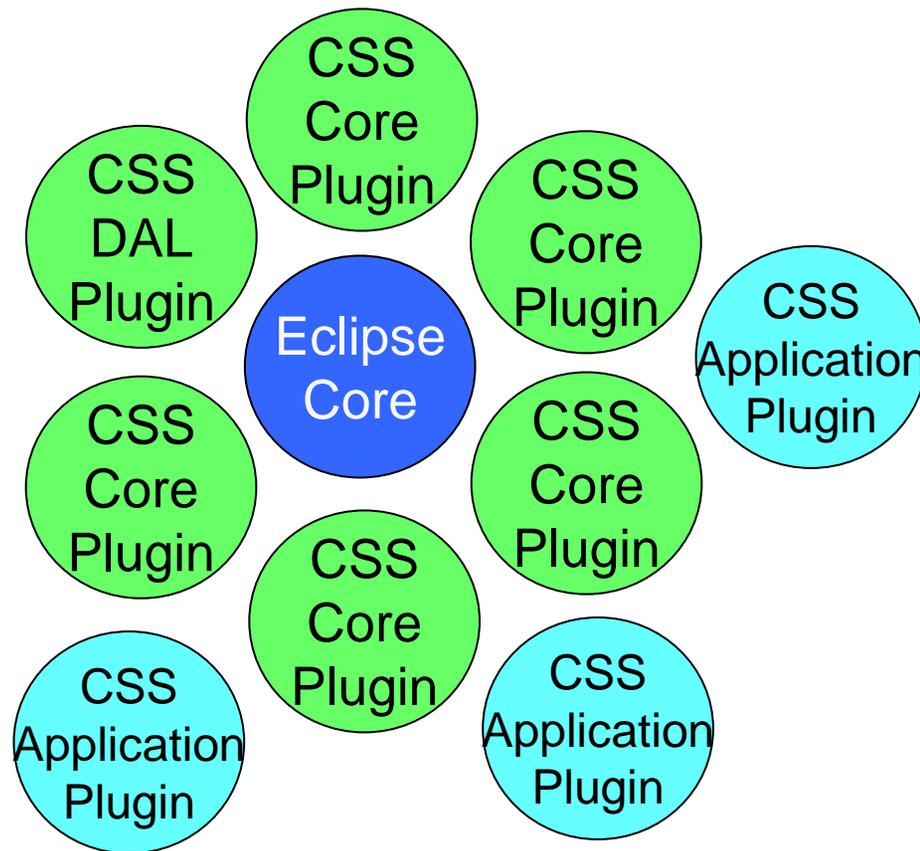
Eclipse IDE - (the original)



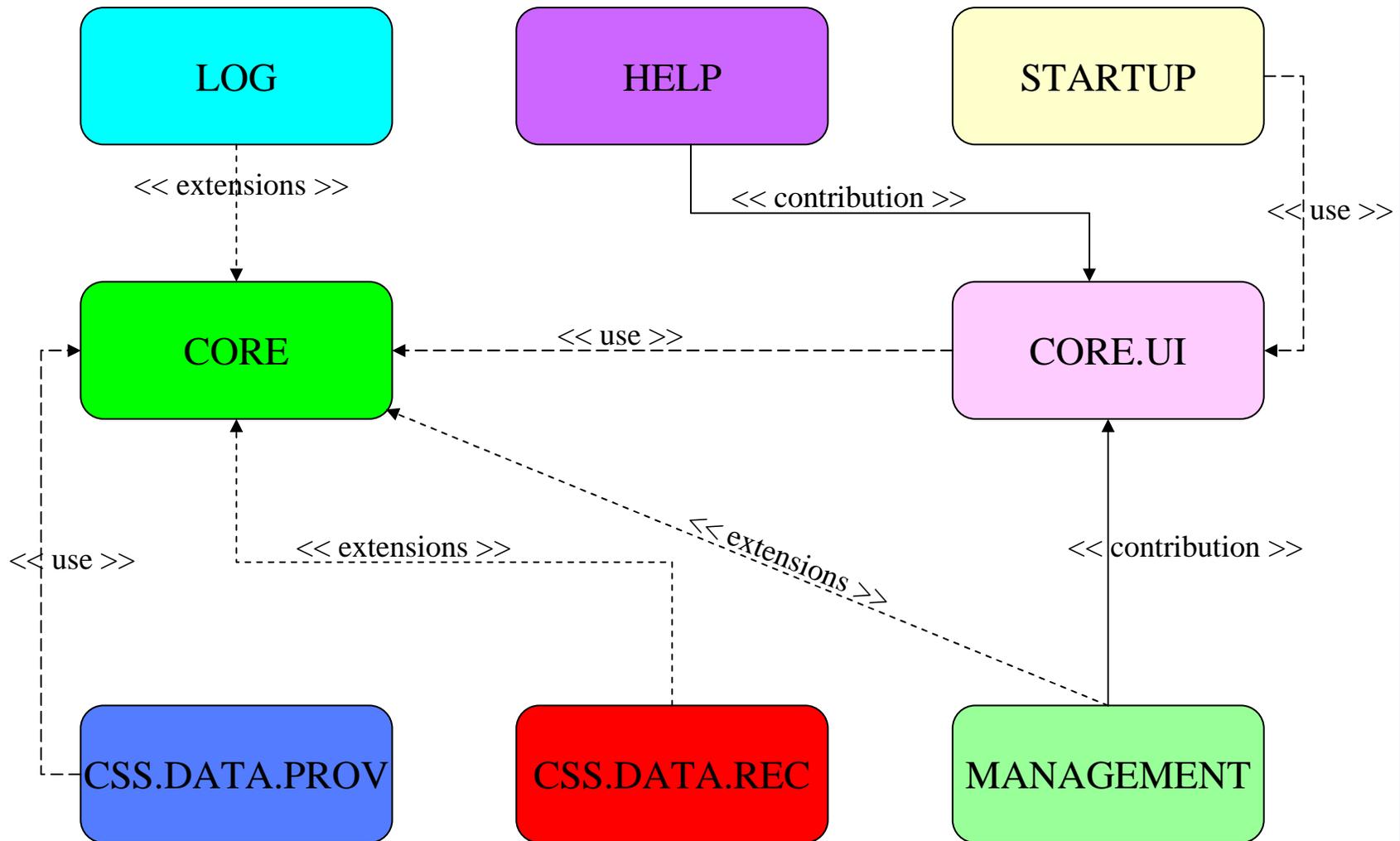
Eclipse to CSS evolution from Eclipse ...



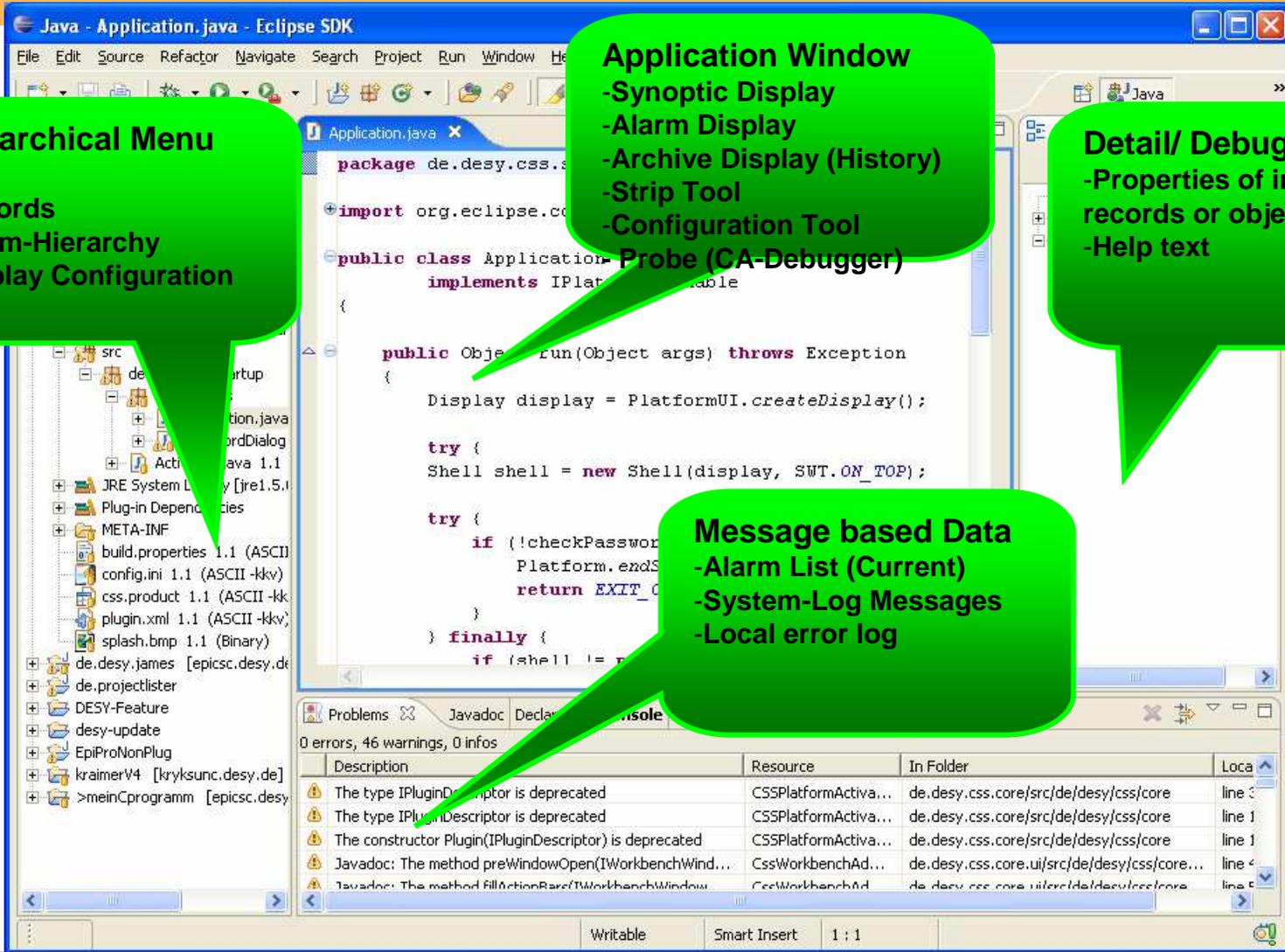
Eclipse to CSS evolution to CSS ...



CSS – in the short pipe



Eclipse IDE / new meaning for CSS



Hierarchical Menu
-IOC
-Records
-Alarm-Hierarchy
-Display Configuration
Files

Application Window
-Synoptic Display
-Alarm Display
-Archive Display (History)
-Strip Tool
-Configuration Tool
-Probe (CA-Debugger)

Detail/ Debug Window
-Properties of individual records or objects
-Help text

Message based Data
-Alarm List (Current)
-System-Log Messages
-Local error log

Control System Studio (CSS) Layout

The screenshot shows the Eclipse IDE with the following components and callouts:

- Hierarchical Menu - Display Configuration Files:** A tree view on the left side of the IDE.
- Application Window - Synoptic Display:** The main central area showing a complex process flow diagram with various sensors, valves, and pumps.
- Message based Data - Alarm List (Current):** A table at the bottom right showing the current status of various alarms.
- Select graphic from list:** A callout pointing to a specific graphic element in the synoptic display.

CSS – selecting Object Aspects with MB3

Application Window -Strip Tool

Right mouse button

Synoptic Display
Alarm Display
Archive Display
Strip Tool
Configuration Tool
Probe

CTA:Trend_DREHZ.stc (Average)

CTA:SIC120_ai
rps
(0, 6000) VAL=2946.99
T2 DREHZAHL
CTA:CV110_ai
%
(0, 100) VAL=58.0065
POSITION CV110
CTA:SIC110_ai
rps
(0, 6000) VAL=4012.7
T1 DREHZAHL
CTA:CV120_ai
%
(0, 100) VAL=0.302133
POSITION CV120
CTA:TT109_ai

0 errors, 46 warnings, 0 infos

Description	Resource	In Folder	Local
Alarm Handler: Current Alarm History			
Close	TIME_STAMP	PROCESS_VARIABLE_NAME	STATUS SEVERITY VALUE
Mon May 22 05:16:37 2006	PIN:BUSERR_calc	HIGH	MINOR 108
Mon May 22 05:16:47 2006	PIN:BUSERR_calc	NO_ALARM	NO_ALARM 12
Mon May 22 09:55:23 2006	PIN:BUSERR_calc	HIGH	MINOR 108
Mon May 22 09:55:34 2006	PIN:BUSERR_calc	NO_ALARM	NO_ALARM 5
Mon May 22 11:12:02 2006	PIN:BUSERR_calc	HIGH	MINOR 114
Mon May 22 11:12:13 2006	PIN:BUSERR_calc	NO_ALARM	NO_ALARM 54
Mon May 22 12:02:14 2006	PIN:BUSERR_calc	HIGH	MINOR 114
Mon May 22 12:02:24 2006	PIN:BUSERR_calc	NO_ALARM	NO_ALARM 18
Mon May 22 12:19:25 2006	PIN:BUSERR_calc	HIGH	MINOR 114
Mon May 22 12:19:35 2006	PIN:BUSERR_calc	NO_ALARM	NO_ALARM 30

CSS – selecting Object Aspects with MB3

**Application Window
-Faceplate / Tuning
Display**

**Right mouse click (MB3
On alarm entry**

**Faceplate Display
Alarm Display
Archive Display
Strip Tool
Configuration Tool
Probe**

Java - Application.java - Eclipse SDK

File Edit Source Refactor Navigate Search Project Run Window Help

Package Ex... Application.java x

Control1_pid.adl

HZF:CV30T16_pid

Druck Eingang Solenoi

ALARM LIMITS

PARAMETERS 1 second

Value 30.42

Setpoint 80.00

300.00

Kelvin

Auto/Man

A

DEV_HIHI 0.00 NO_ALARM PROP Act. ERR SETP Rate 0.00

DEV_HI 0.00 NO_ALARM DEVI Act. ERR SETP Gap 0.00

DEV_LO 0.00 NO_ALARM SETP M->A S=S

DEV_LOLO 0.00 NO_ALARM PROP GAIN 0.20

DEADBAND 0.00 RESET (I) 0.05 OUT LO-Clp 0.00

R/D Reverse RATE (D) 0.00 OUT HI-Clp 100.00

ESU HZF:CV30T16

Value Setpoint Output Int. Setp.

Problems Java Declaration Console

0 errors, 46 warnings, 0 infos

Description

Close	TIME_STAMP	PROCESS	Alarm	SEVERITY	VALUE
	Mon May 22 05:16:37 2006	P1N:BU		MINOR	108
	Mon May 22 05:16:47 2006	P1N:BU		NO_ALARM	12
	Mon May 22 09:55:23 2006	P1N:BU		MINOR	108
	Mon May 22 09:55:34 2006	P1N:BU		NO_ALARM	6
	Mon May 22 11:12:02 2006	P1N:BU		MINOR	114
	Mon May 22 11:12:13 2006	P1N:BU		NO_ALARM	54
	Mon May 22 12:02:14 2006	P1N:BU		MINOR	114
	Mon May 22 12:02:24 2006	P1N:BU		NO_ALARM	18
	Mon May 22 12:19:25 2006	P1N:BU		MINOR	114
	Mon May 22 12:19:35 2006	P1N:BU		NO_ALARM	30

Outline

Java

Writabe Smart Insert 1:1

Demo – the current status

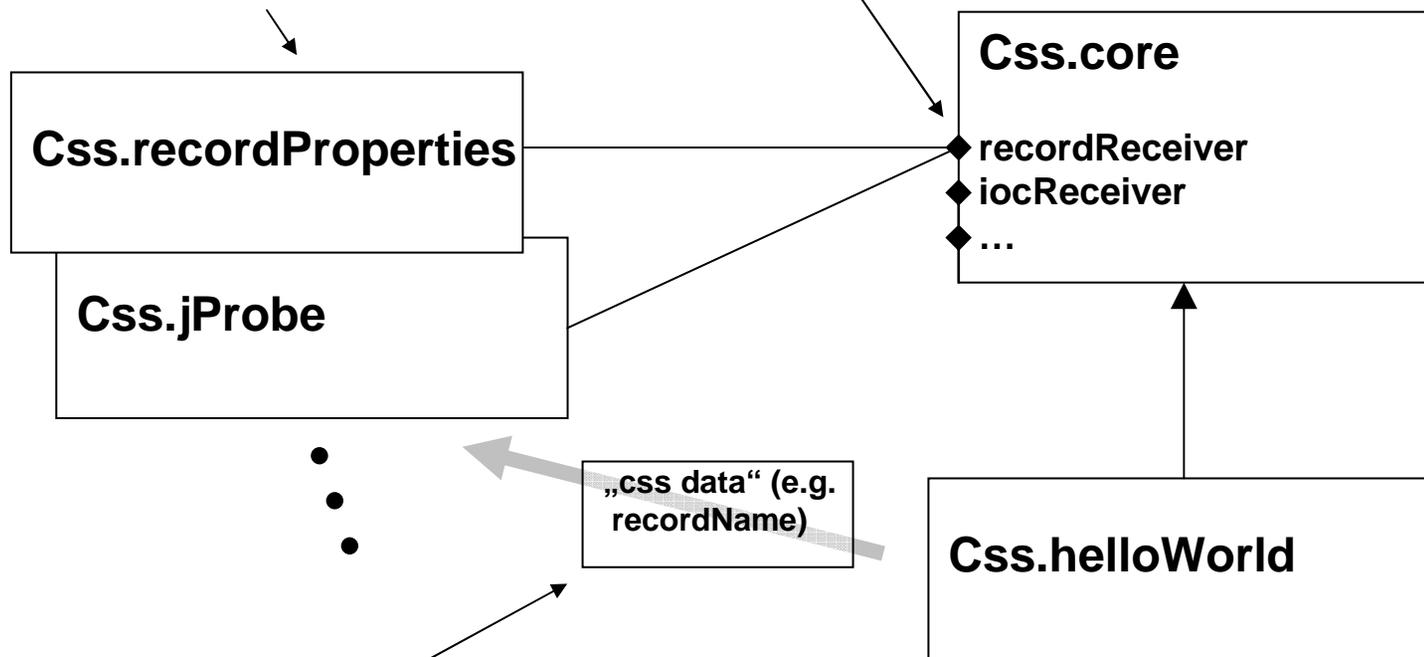
After all this vapor ware...

... let's have a look at the current state.

„MB3“ Architecture

Plugins extends a „css data“ - extension point from css.core plugin. (A new plugin for recordName does not need to change css.helloWorld)

Core plugin defines extension points for every „css data“ - type (e. g. record, ioc)



A data-provider-plugin sends an invoked receiver-plugin the „css data“

A plugin uses a „css data“ - type and gets dynamically a list of proper plugins for this type.

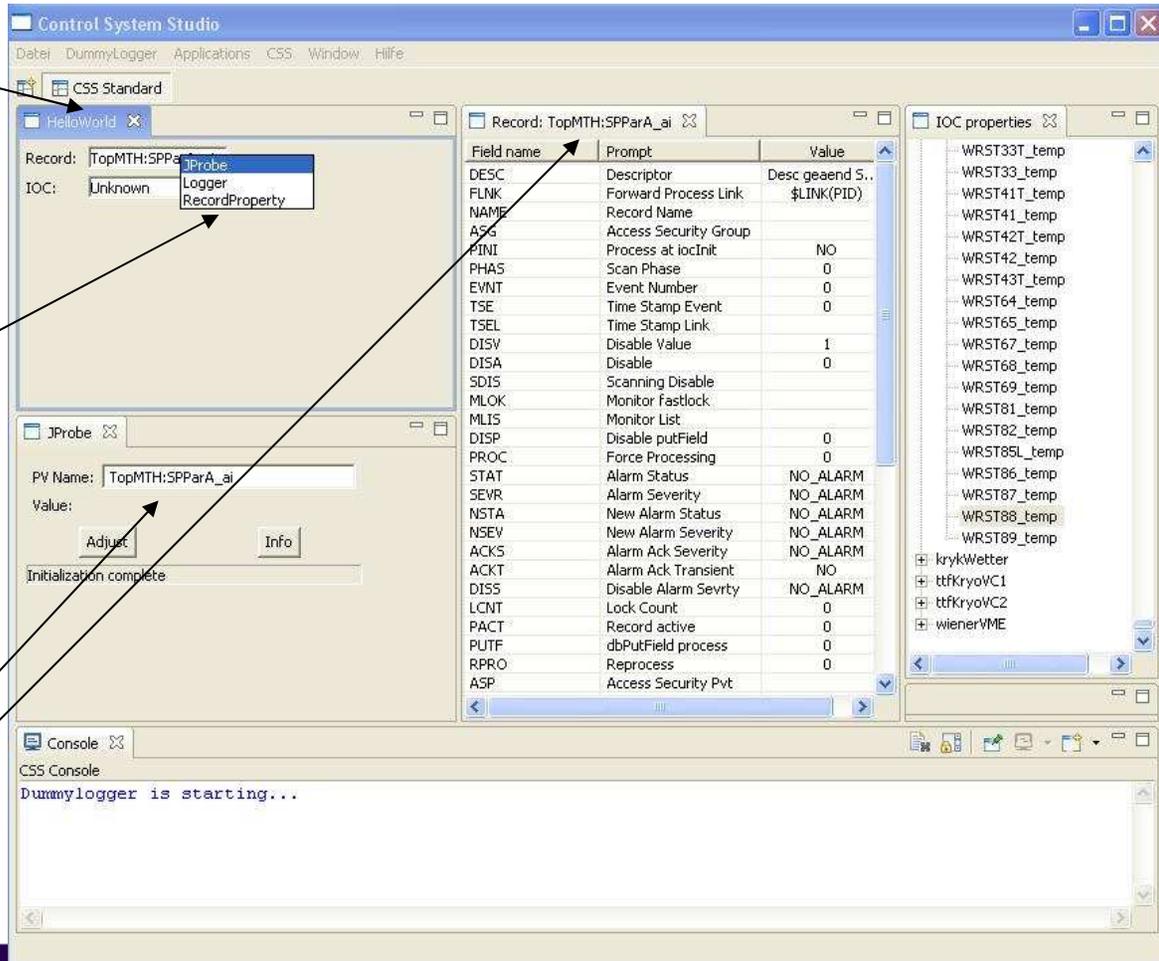
„MB3“ Example (CSS 0.1)

The `Css.recordProperties` plugin and `css.jprobe` plugin extends the extension point `recordReceiver` in `css.core`. The information which plugin has extended an extension point is stored in `extensionRegistry` from the eclipse - Framework.

The `css.helloWorld` plugin uses (not extends) the „css data“- type record defined in plugin `css.core`

A „MB3“- event opens a list of all plugins that offer functionality for Epics records

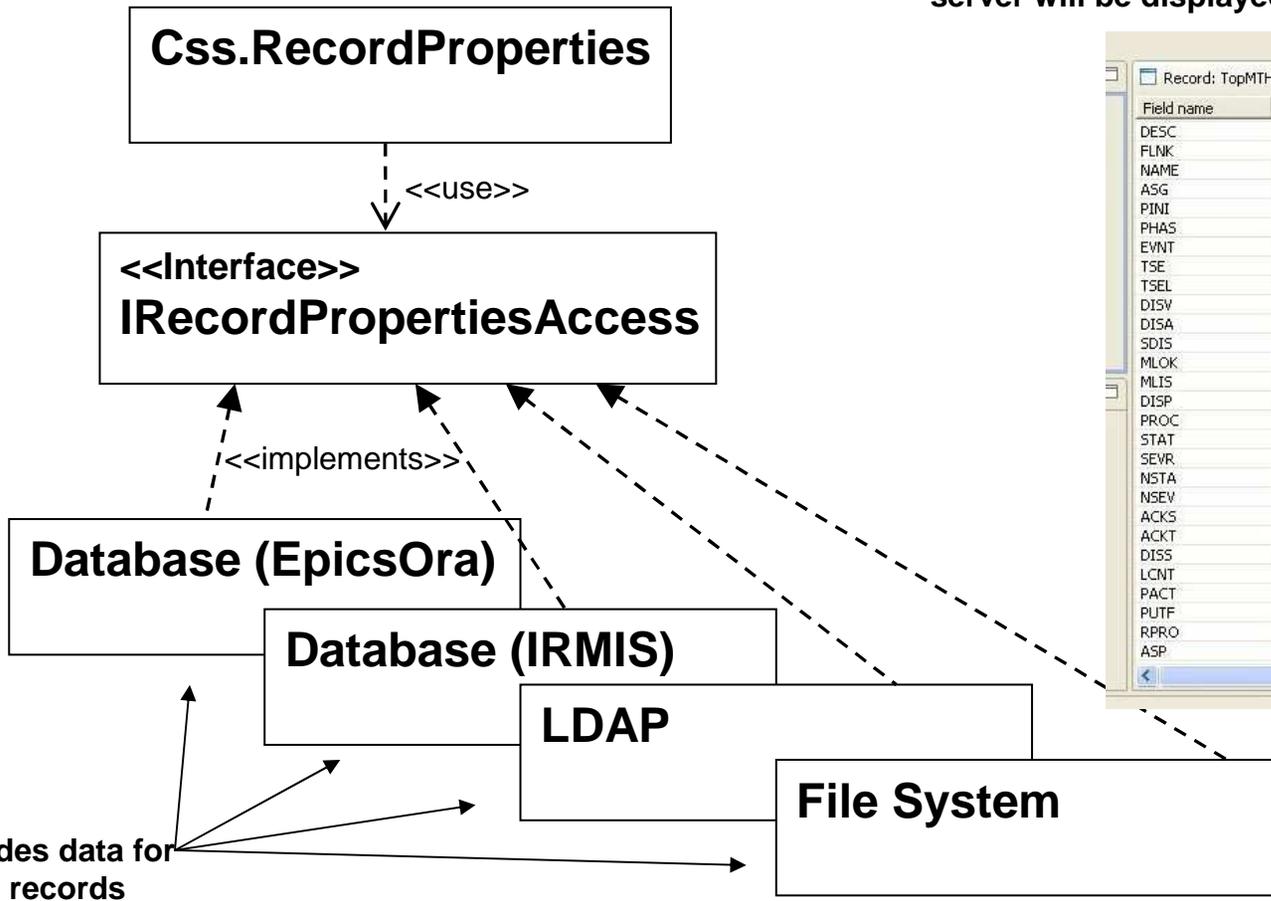
The `css.jProbe` plugin or `css.recordProperty` plugin receives the „css data“- type record from `css.helloWorld`



css.recordProperties

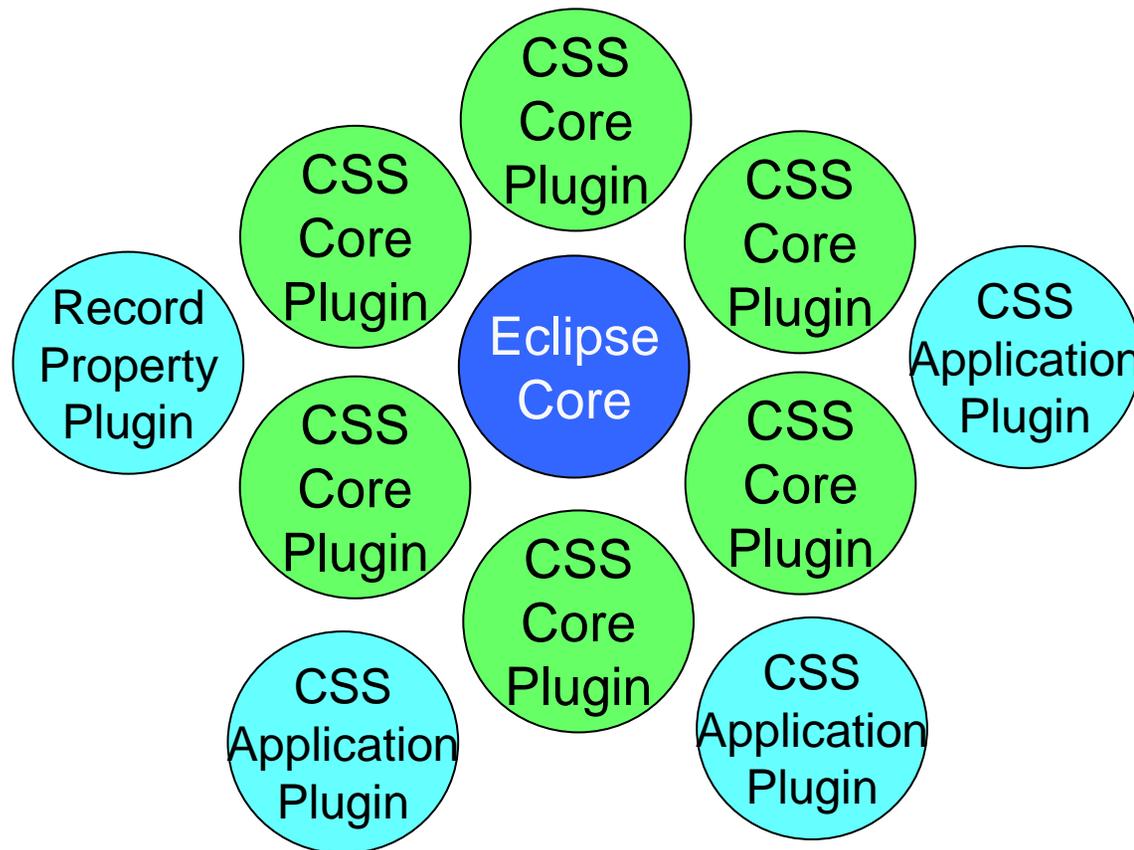
The plugin `css.recordProperties` can use every source that implements the interface `IRecordPropertiesAccess`

First version of `css.recordProperties` plugin with field values from database (`EpicsOra`). In the next version the current value from a LDAP server will be displayed in an other column.



Field name	Prompt	Value
DESC	Descriptor	Desc geaend S..
FLNK	Forward Process Link	\$LINK(PID)
NAME	Record Name	
ASG	Access Security Group	
PINI	Process at iocInit	NO
PHAS	Scan Phase	0
EVNT	Event Number	0
TSE	Time Stamp Event	0
TSEL	Time Stamp Link	
DISV	Disable Value	1
DISA	Disable	0
SDIS	Scanning Disable	
MLOK	Monitor fastlock	
MLIS	Monitor List	
DISP	Disable putField	0
PROC	Force Processing	0
STAT	Alarm Status	NO_ALARM
SEVR	Alarm Severity	NO_ALARM
NSTA	New Alarm Status	NO_ALARM
NSEV	New Alarm Severity	NO_ALARM
ACKS	Alarm Ack Severity	NO_ALARM
ACKT	Alarm Ack Transient	NO
DISS	Disable Alarm Sevrtv	NO_ALARM
LCNT	Lock Count	0
PACT	Record active	0
PUTF	dbPutField process	0
RPRO	Reprocess	0
ASP	Access Security Pvt	

Adding a new CSS Application Plugin

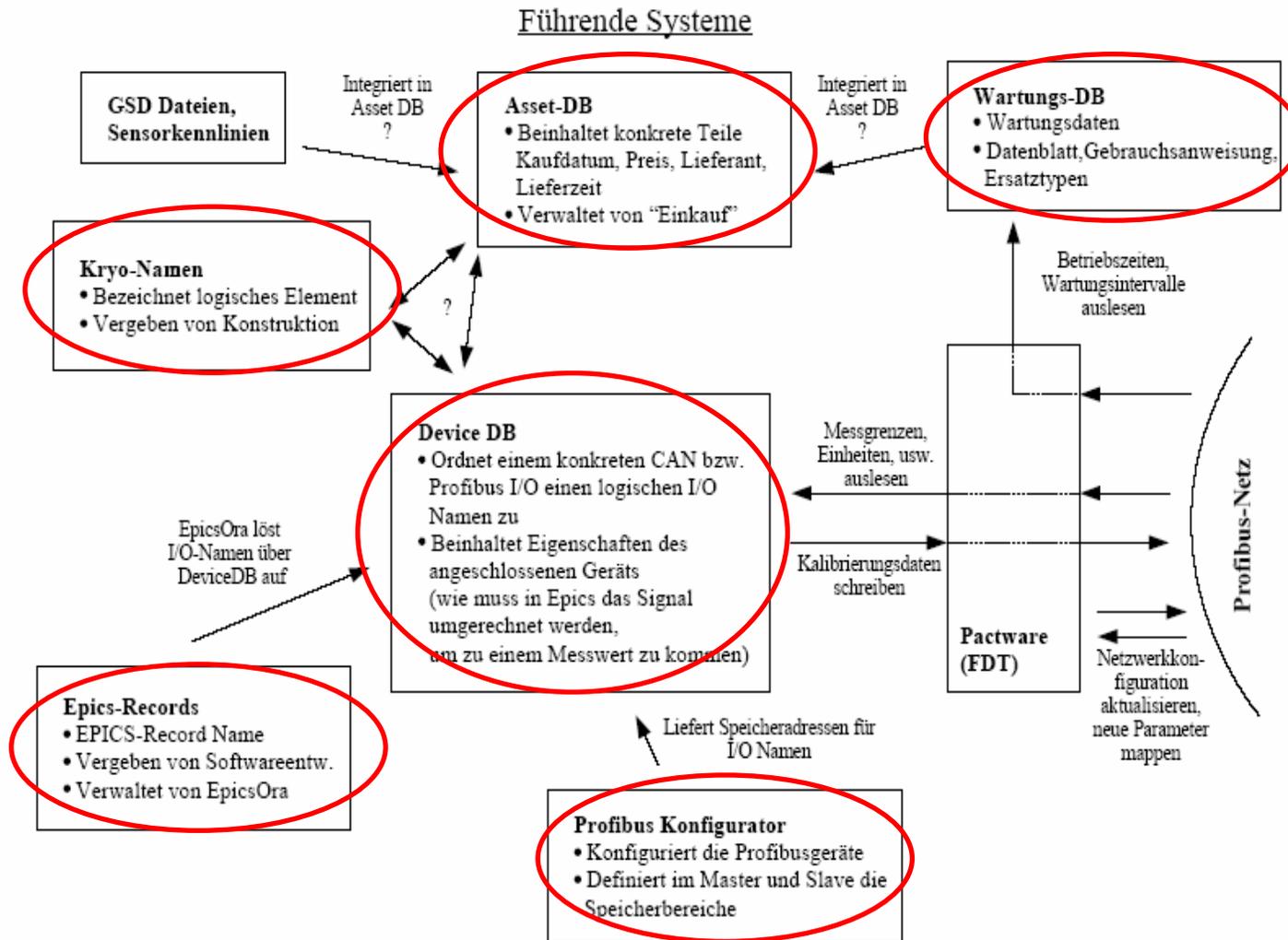


CSS Application Plugin Functionality

- **Implements Interfaces of core plugins (e.g. MB3)**
- **Calls methods of core utility plugins (e.g. logging)**
- **Configure Management Preferences**
 - Update Policy (default: any time)
 - Authorized Actions (default: all)
- **Provides:**
 - Preference pages for configuration data
 - Online Help pages
 - Separate classes for
 - ⇒ **Logic**
 - ⇒ **Display (User Interface)**

=> A wizard will ease creating CSS Application Plugins in the near future

Databases



(DESY) - Databases ...

IOC Databases created completely by EPIS-Ora

- **Missing:**
 - saveRestore
 - caSave
 - Archiving

Device DB

Asset/ Purchase/ Component DB (stock, repair, ...)

Maintenance DB (in progress)

- Condition Monitoring (for Fieldbus Devices)

Connection/ Cable DB

Display configuration DB

(IRMIS candidates)

Key Issues for Common CSS – IRMIS Developments

- **Common Interfaces for CSS and IRMIS applications**
- **Separation of display and data access**
 - The property CSS-plugin can easily be shared if an IRMIS implementation if the RecordPropertiesAccess would be available
 - IRMIS applications could be integrated into CSS (as plugins) if the same separation would be implemented.

Possible Scenarios for CSS <-> IRMIS Application Sharing

Sharing Application Interfaces

Sharing IRMIS-CSS-Plugins

- Integration by MB3 functionality (and other CSS interfaces)

Calling IRMIS Applications from CSS

- Integration by MB3 'container'
(e.g. calling up IRMIS Web pages)

Sharing IRMIS databases

Outlook

There's a lot of common ground

**Let's jointly build the next generation of applications
on top of it**