

CSS – Control System Studio

Synoptic Display Studio (SDS) and Archive Display (Data Browser)

CSS – Control System Studio

Summary Presentation @ GSI February 11th 2009

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Presented by: Matthias Clausen

Overview

Synoptic Display Studio (SDS)

- Overview
- Converter

Data Browser

- Basic Functionality
- Post Analyzer
- Waveform Support
- Integrating data from Scopes

Synoptic Display Studio

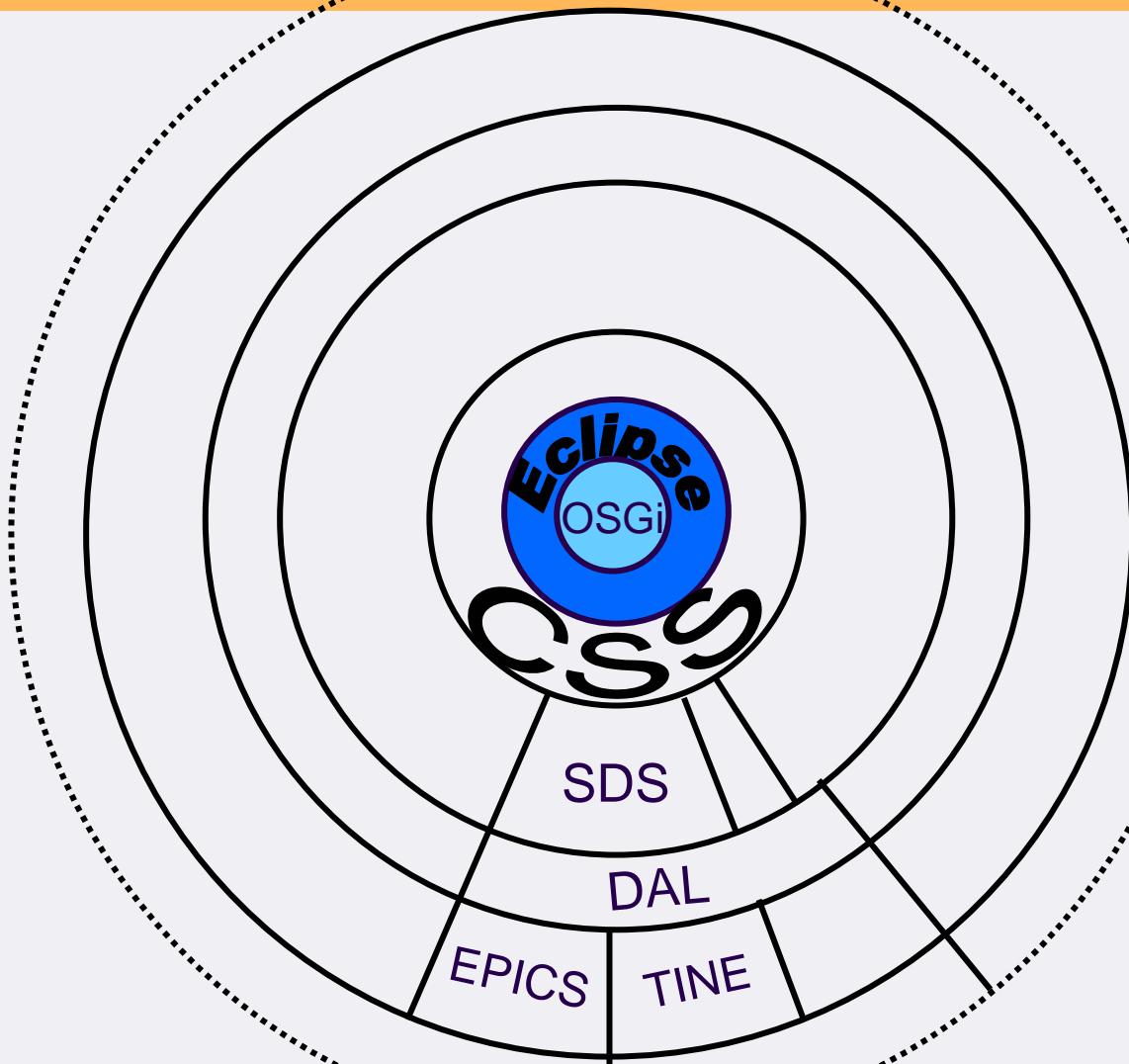
Synoptic Displays are the key (killer) application for process control systems

The current implementation provides a rich functionality

- Any property of any widget can be dynamic
- Any value from the control system may be converted by an individual (Java) script
- Any widget or graphic may change dynamically
- A local namespace can be configured dynamically (on the fly) and provides in addition a fixed set of parameters

Let's see how it works...

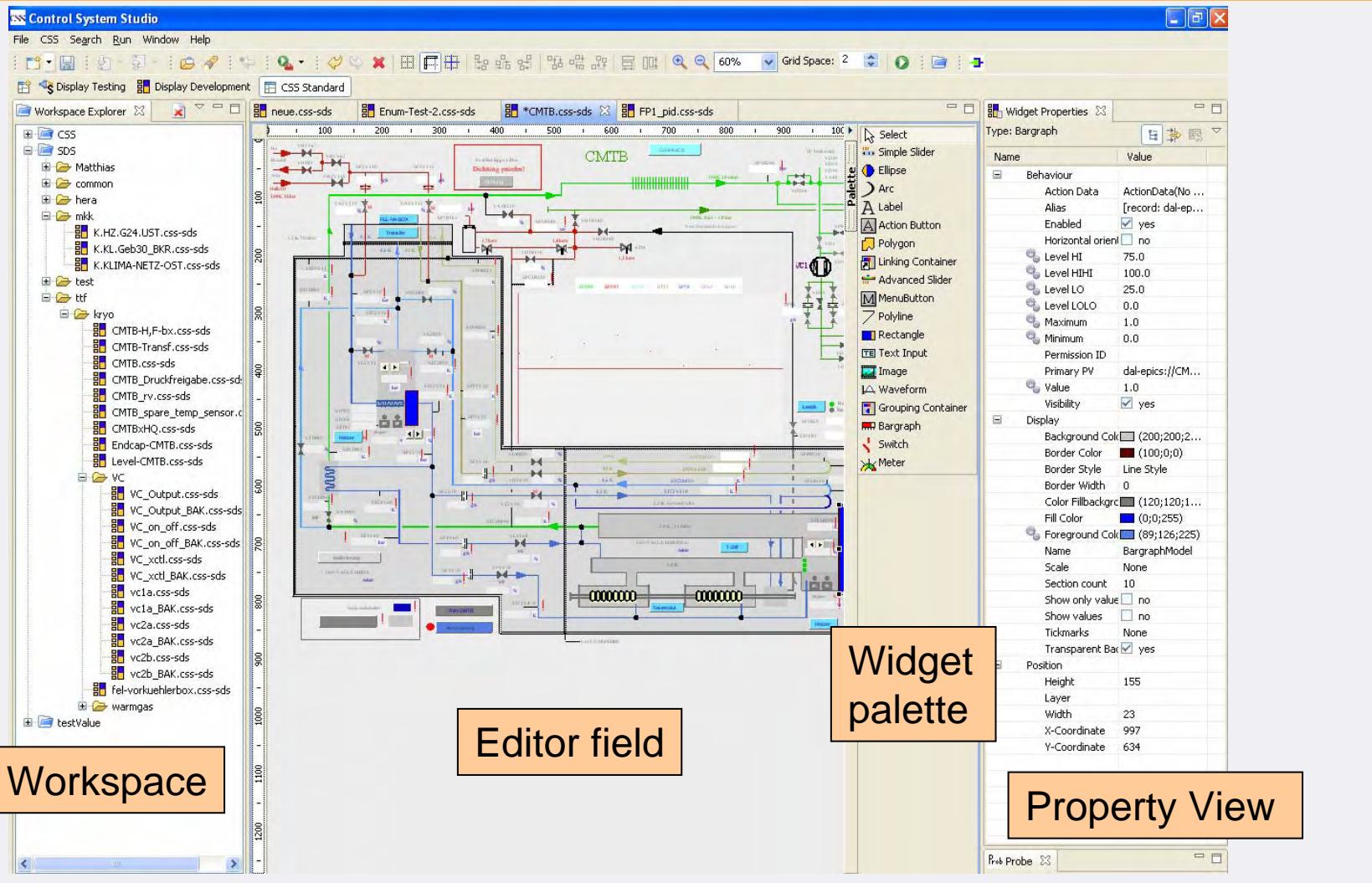
The CSS Onion Synoptic Display Studio (SDS)



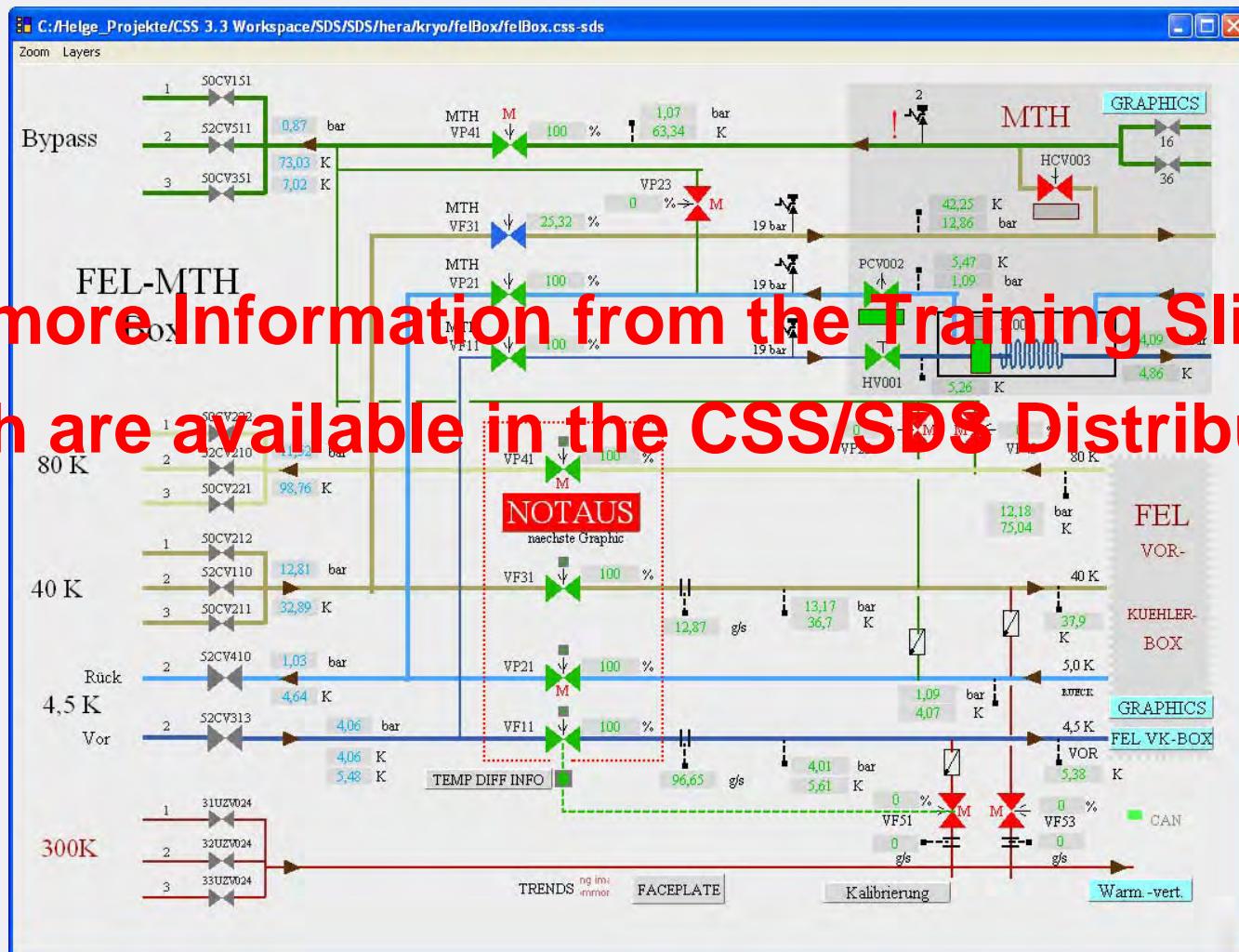
Synoptic Display Studio

- Synoptic Display Studio (SDS) is a set of CSS plugins
- SDS is based on GEF
- Connection to control system via DAL
 - Support for EPICS and TINE (more to come)
 - Full asynchronous support for data updates
- Initializer for widgets (depending on local settings)
- CVS support for the management of displays (Eclipse feature)
- ADL converter to reuse dm2k Displays
- Easy to add new widgets (one week for a Cosylab student)
http://css.desy.de/content/e1576/index_eng.html
- Everything can be dynamic
 - Properties
 - Display call-up (name substitution using alias names)
 - Displays in Displays (depending on the actual value of a channel)

Synoptic Display Studio UI



SDS Example

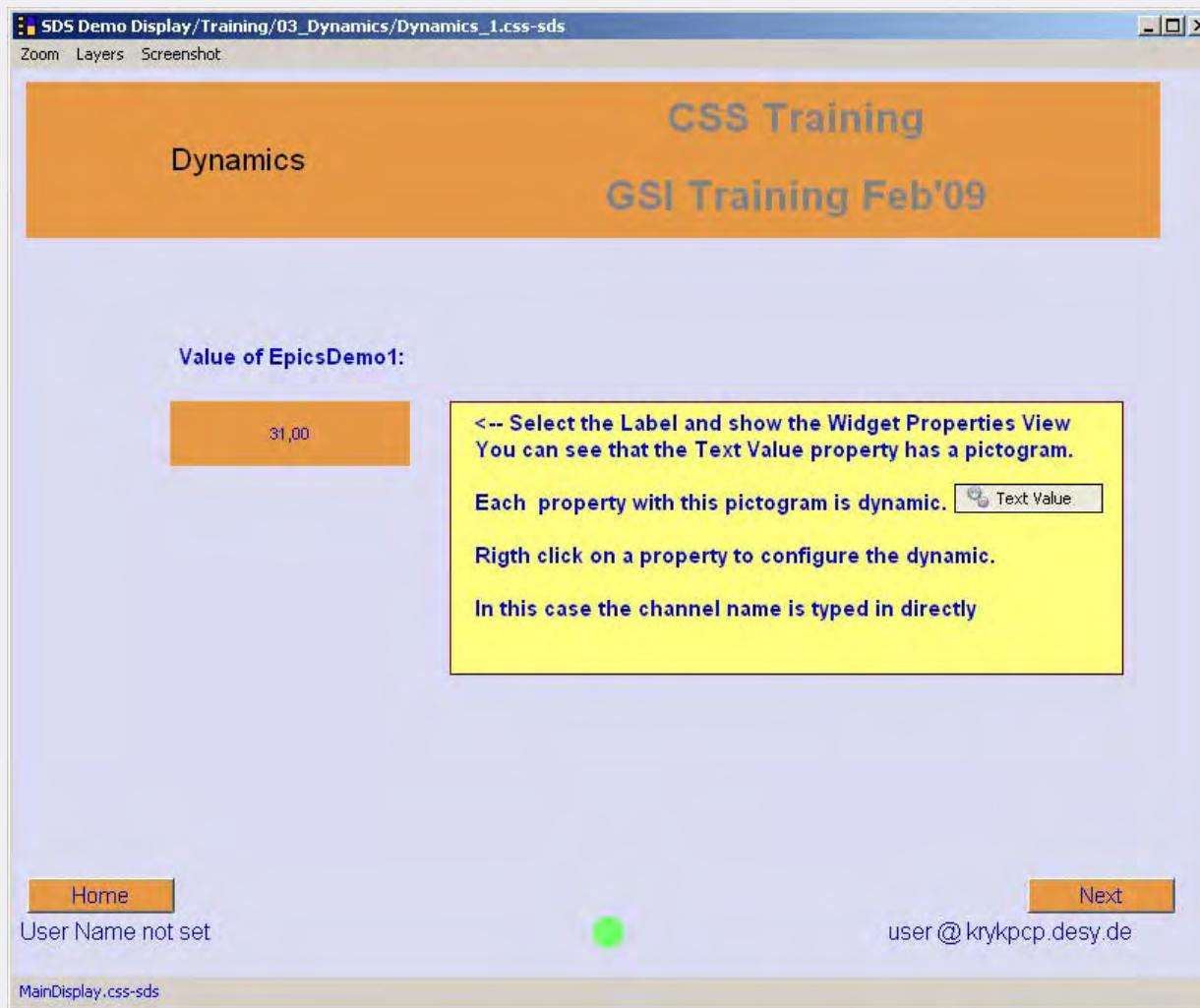


Overview

The screenshot shows a window titled "SDS Demo Display/Training/00_Main/MainDisplay.css-sds". The window has a menu bar with "Zoom", "Layers", and "Screenshot". The main content area has a yellow header with "CSS Training" and "GSI Training Feb'09". Below the header is a table with two columns: "Chapter" and "Description". The left column contains chapters 00 through 09, and the right column contains chapters 10 through 40. The "Preferences" chapter (09) is highlighted with a light green background. At the bottom left, it says "User Name not set" with a red dot next to it. At the bottom right, it says "jhatje @ krykpcp.desy.de".

Chapter	Description	Chapter	Description
00	Initialization	10	Widget Overview
01	Overview	20	Utilities
02	Layer Management	30	Examples
03	Dynamics	40	PID Seminar
04	Alias		
05	Connection-States		
06	Rules		
07	Action Data		
08	Cursor		
09	Preferences		

Dynamics



Characteristics

SDS Demo Display/Training/03_Dynamics/Characteristic_2.css-sds

Zoom Layers Screenshot

CSS Training
GSI Training Feb'09

Characteristic	Value	Unit	Value	Unit
graphMax	125.00		HOPR	125.00
graphMin	0.00		LOPR	0.00
maximum	125.00		EGUF	0.00
minimum	0.00		EGUL	0.00
position	0.00			
propertyType	0.00			
resolution	65.535.00			
scaleType	0.00		LINR	NO CONVERSION
sequenceLength	1.00			
severity	WARNING		SEVR	MINOR
status	HIGH_ALARM		STAT	HIGH
timestamp	2009-02-09T13:48:02.444519295			

Back Next

User Name not set

MainDisplay.css-sds > Dynamics_1.css-sds > Dynamics_2.css-sds > Local_Variables.css-sds > Characteristic_1.css-sds

user @ krykpcp.desy.de
(channel=)
1 Actions: Open Disp
Performed Action: -10

Alias

The screenshot shows a window titled "SDS Demo Display/Training/04_Alias/Alias_2.css-sds". The window title bar includes "Zoom", "Layers", and "Screenshot" buttons. The main content area has a yellow header with "CSS Training" and "GSI Training Feb'09" text. Below the header, there are three sections, each with a blue label on the left and a yellow text box on the right.

- Value of EpicsDemo1:** 4,00
A dynamic Value with a simple Alias
\$channel\$ (default Alias)
- Value of EpicsDemo4:** 40,00
A dynamic Value with a parent Alias
\$channelDisp\$ (Display Alias)
- Value of EpicsDemo1:** 4,00
A dynamic Value with an overwritten parent Alias
\$channelDisp\$

At the bottom, there are "Back" and "Next" buttons, and a status bar at the bottom left reads "MainDisplay.css-sds > Alias_1.css-sds".

Connection States



Rules



Action Data

The screenshot shows a window titled "SDS Demo Display/Training/07_Action_Data/ActionData1.css-sds". The window title bar includes "Zoom", "Layers", and "Screenshot" buttons. The main content area has a yellow header with "CSS Training" and "GSI Training Feb'09". Below this, there's a section titled "Action Data" and a list of three items: "Action Button (Send)", "MenuButton", and "Label". To the right of these items is a list of four bullet points:

- There are two kinds of Action Data
 - Send a Value
 - Open a Display
- Each Widget can have an arbitrary number of action data
- You can execute the action from the contribution menu

At the bottom left, there are "Home" and "User Name not set" buttons. On the right, there's an email address "jhatje @ krykpcp.desy.de". The footer bar at the bottom contains the text "MainDisplay.css-sds".

Bargraph and Meter

SDS Demo Display/Training/10_Widget/16_Bargraph-Meter.css-sds

Zoom Layers Screenshot

Bargraph Meter

CSS Training
GSI Training Feb'09

Trainloc:Alarm:RAMPB_calc

Important Properties:
 - Value
 Special Properties:
 - Level HIHI
 - Level HIGH
 - Level LOW
 - Level LOLO
 - Minimum (LOPR)
 - Maximum (HOPR)
 - Scale
 - Section Count
 - Show only value
 - Tickmarks

Important Properties:
 - Value
 Special Properties:
 - Boundary / Color HIHI
 - Boundary / Color HIGH
 - Boundary / Color LOW
 - Boundary / Color LOLO
 - Minimum (LOPR)
 - Maximum (HOPR)
 - Minor Scale Step
 - Major Scale Step
 - Display Angel
 - Inner Angel
 - Needle Color
 - Scale Radius
 - Scale Text Radius
 - Scale With
 - Visible Radius

Back Next

User Name not set

jhatje @ krykpcp.desy.de

MainDisplay.css-sds > WidgetOverview.css-sds

The Initializer is setting the properties according to your needs.

(Or your control system)

Grouping- and Linking Container

The screenshot shows a window titled "SDS Demo Display/Training/10_Widget/17_Grouping-Linking_Container.css-sds". The window has tabs for "Zoom", "Layers", and "Screenshot". The main content area displays two examples:

- Grouping Container:** A container with a red border containing a large empty white area, a smaller red-bordered box with the text "72,11", a blue button labeled "Button", and a small icon labeled "\$channel\$".
- Linking Container:** A yellow box containing text about grouping and linking.

CSS Training
GSI Training Feb'09

Grouping Container

Linking Container

**It is possible that a group is empty.
So it will remember its properties.**

**All Widgets can be grouped.
A Group can have an Action.
A Group can be dynamic.**

A Linking Container contains a Display defined by a rule.

Special Properties:

- Resource (can be dynamic)
- Automatic Zoom

Choose Faceplate

Label

Back

User Name not set

Next

jhatje @ krykpcp.desy.de

MainDisplay.css-sds > WidgetOverview.css-sds

Sixteen Binary Bar and Thumb Wheel

SDS Demo Display/Training/10_Widget/18_Sixteen_Binary_Bar-Thumb_Wheel.css-sds

Zoom Layers Screenshot

CSS Training

GSI Training Feb'09

Sixteen Binary Bar
Thumb Wheel

Important Properties:
- Value

Special Properties:
- Bit Range (from)
- Bit Range (to)
- Off Color
- On Color
- Show labels

Important Properties:
- Value

Special Properties:
- Decimal digits
- Integer digits
- Min
- Max
- Internal frame thickness

0 0 3 6 . 0 0 0 0

Back Next

User Name not set

jhatje @ krykpc.desy.de

MainDisplay.css-sds > WidgetOverview.css-sds

Strip Chart and Waveform

SDS Demo Display/Training/10_Widget/19_Strip_Chart-Waveform.css-sds

Zoom Layers Screenshot

Strip Chart Waveform CSS Training GSI Training Feb'09

Important Properties:

- Automatic scaling
- Minimum
- Maximum

Special Properties:

- Data point drawing style
- Graph line width
- Graph line color
- Labeled ticks
- Show axes
- X-achse label
- Y-achse label
- Y-achse scaling

Strip Chart

Special Properties:

- Update interval (sec)
- X-axis timespan (sec)
- Value #1 to #8
- Enable plot #1 to #8
- Plot color #1 to #8

Waveform

Special Properties:

- Line chart
- Data #1 to #4
- Plot color #1 to #4

Back Next

User Name not set

jhatje @ krykpcp.desy.de

MainDisplay.css-sds > WidgetOverview.css-sds

And there's more ...

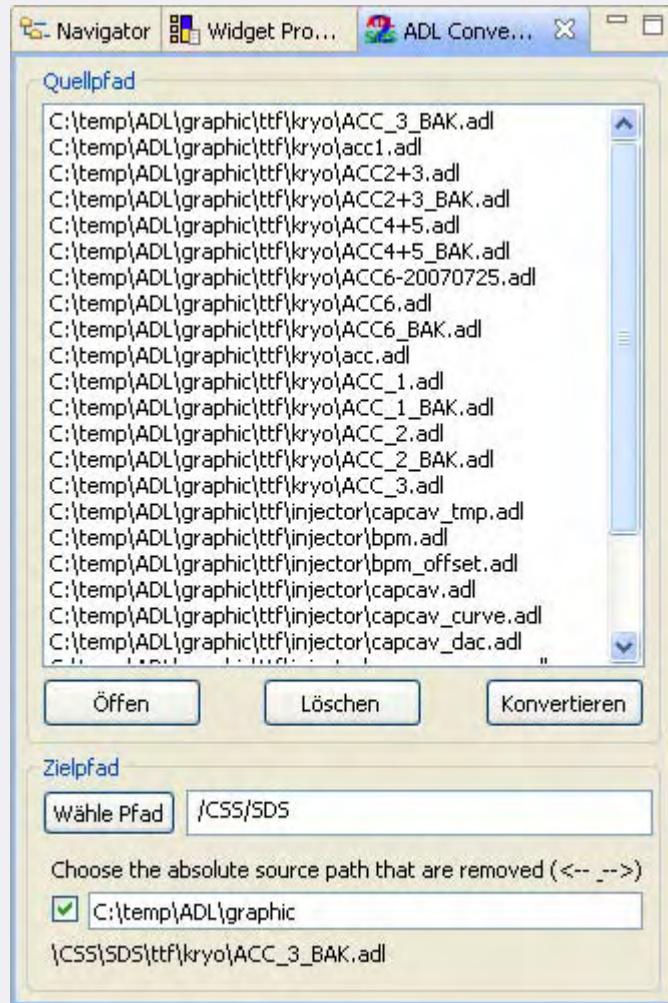
Widgets:

- Timer
- Plyline/ Polygon
- Rectangle/ Ellipse/ Arc
- Slider
- Switch ('programmed' symbols)
- Image (picture)

Layer management

...

ADL Converter

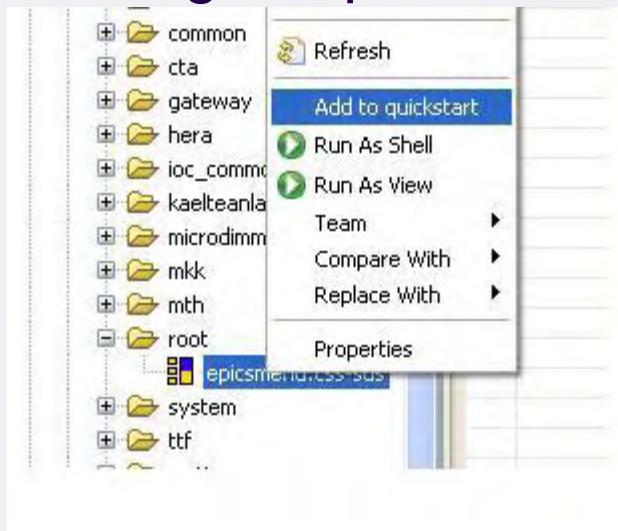


MEDM → SDS



SDS Quickstart Menu

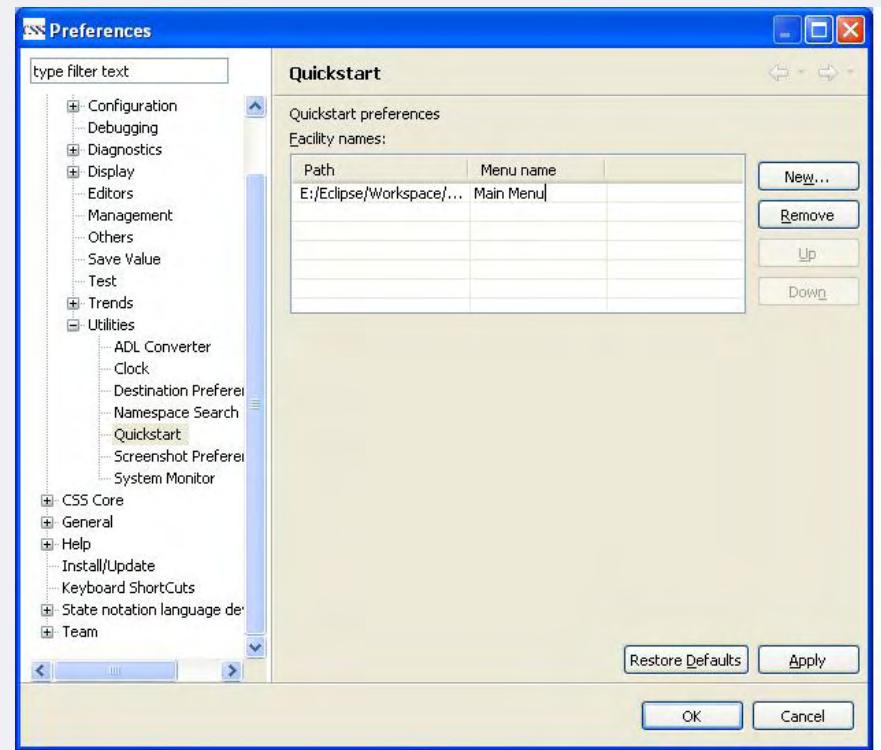
Adding Graphic to Menu



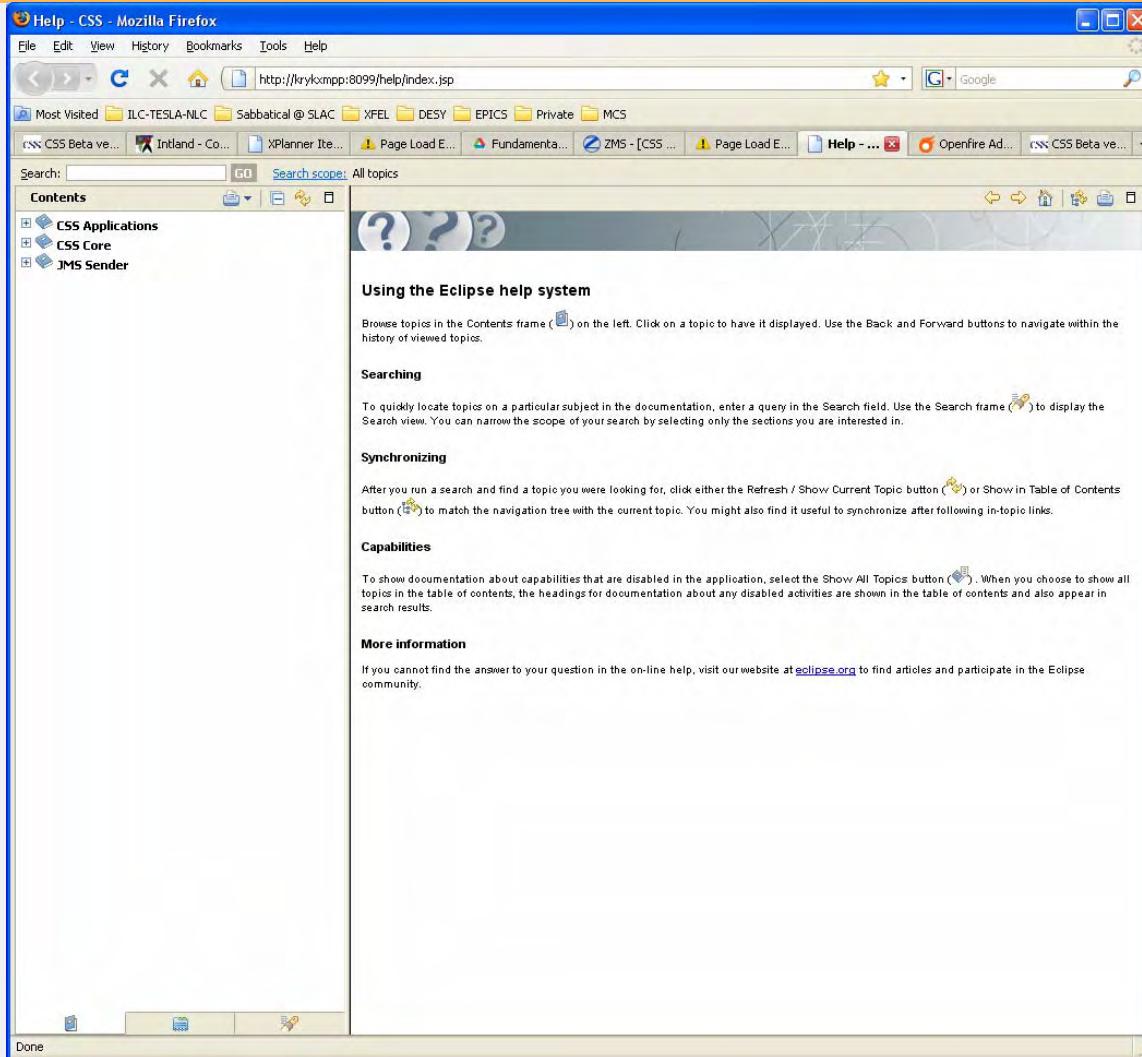
New Menu Entry



Changing Menu Entry String



Online Help @ <http://krykxmpp.desy.de:8099/help/index.jsp>



Synoptic Display Studio

Who is involved?

- Core functionalities specified by DESY
- Initial implementation and design: C1-WPS/
University of Hamburg
- DAL/ simpleDal adapter: C1-WPS
- New widgets and extensions: DESY, students
- Initializer: DESY
- Adl2Sds converter for dm2k(medm) graphics:
DESY

Synoptic Display Studio

Relevance for GSI Users:

- Most of the existing medm graphics can be converted into SDS graphics ‘out of the box’
- The existing DAL implementation for GSI (DAL-plug) could be converted into a CSS/DAL plugin
 - This would open the door to use CSS and its applications (SDS) also for other GSI applications

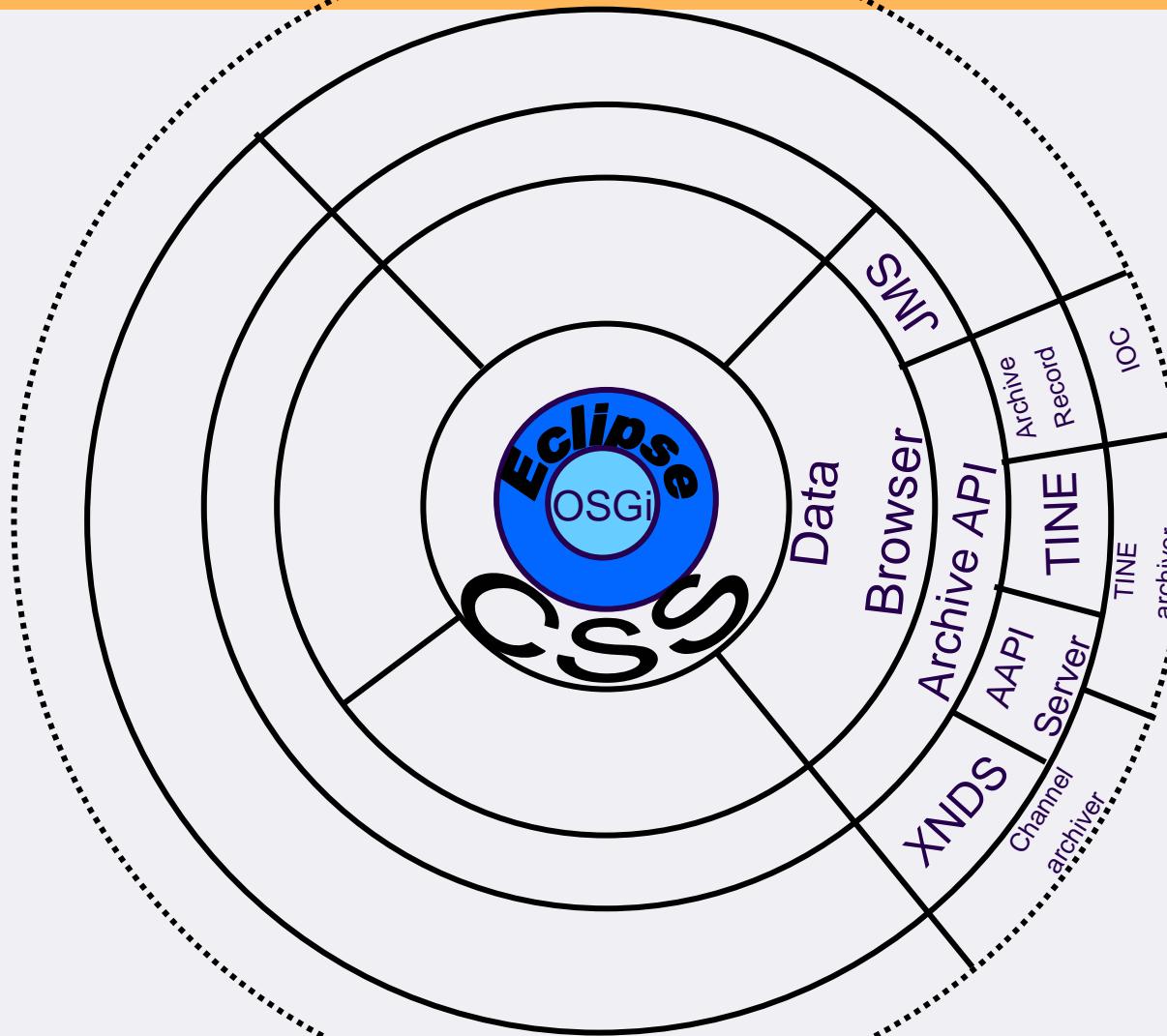
Synoptic Display Studio

Future Plans:

- Continue to develop new widgets
 - The meter widget needs attention
 - A (3D) image widget is necessary for beam line controls
- Improve SDS by taking the feedback from the DESY operators into account
 - Ease of use
- New project with C1-WPS and HHLA with the focus on using the CSS-SDS tools as a basis for the operator applications in the container terminals (JMS DAL-plug)
- The collaboration with ITER might add new development resources to CSS/SDS

The CSS Onion

DataBrowser

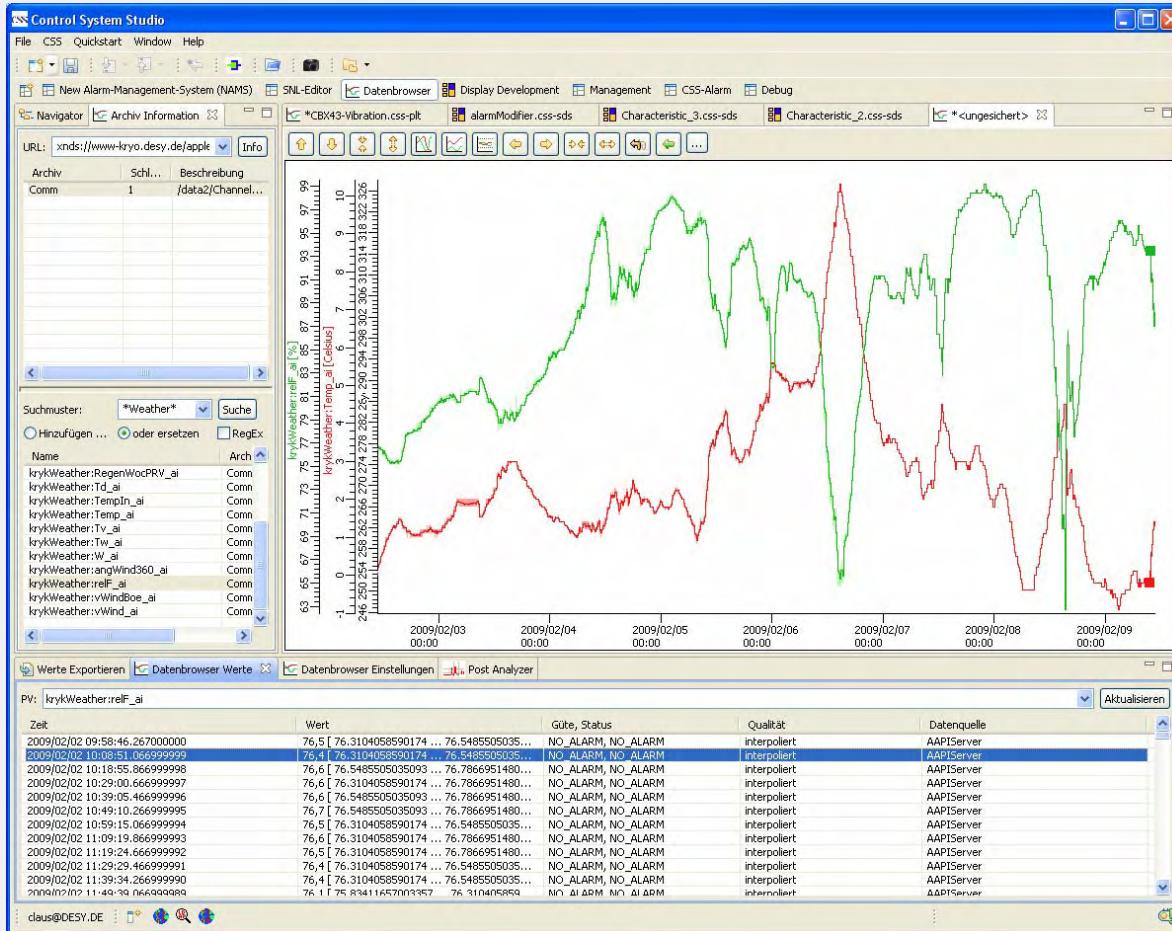


Data Browser

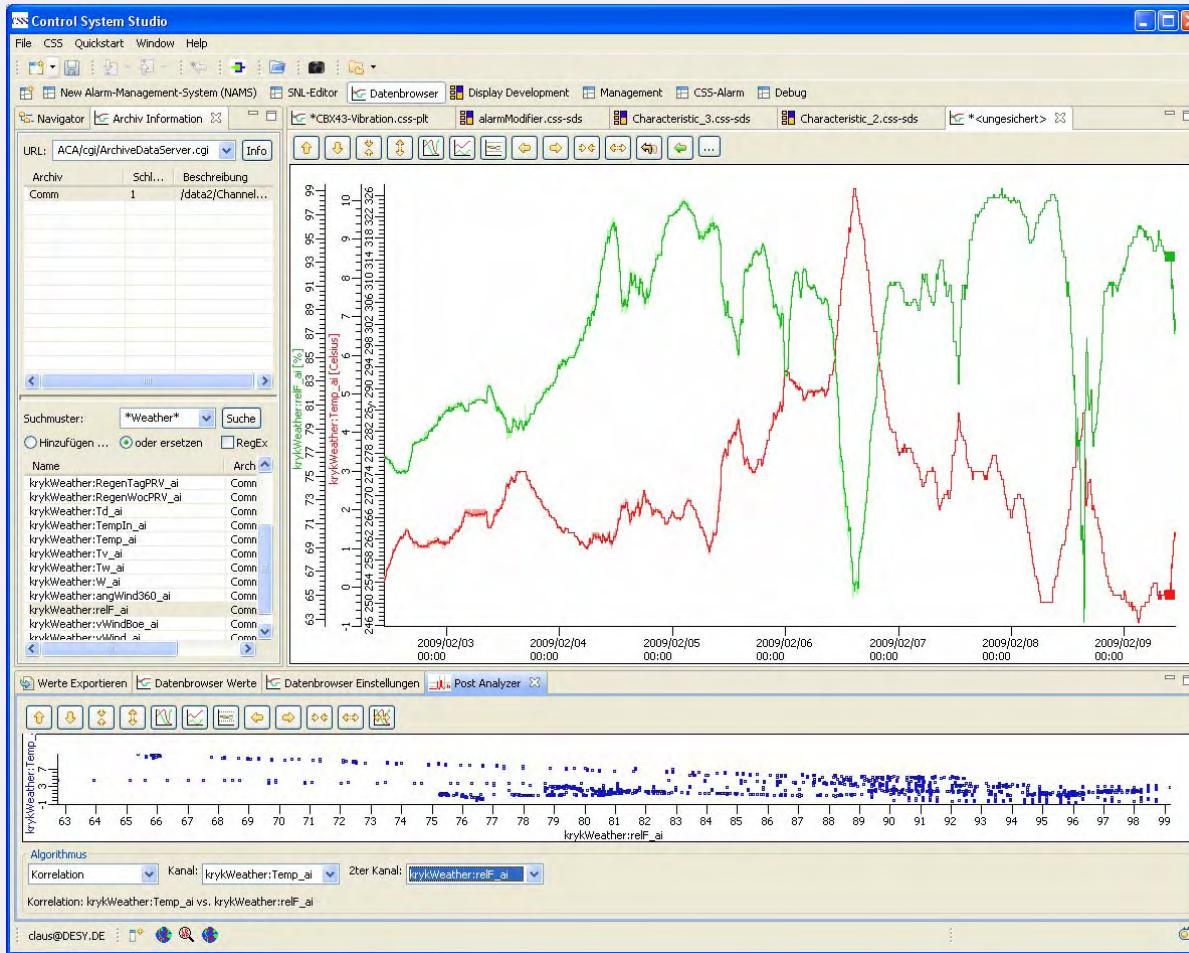
Besides synoptic displays and alarm displays the data browser is the third –important- application for process control.

- The Archive API is the glue code to ‘any’ archive data source
- The dataBrowser was designed and implemented by Kay Kasemir (ORNL)
- ORNL and DESY are constantly working on improvements and extensions

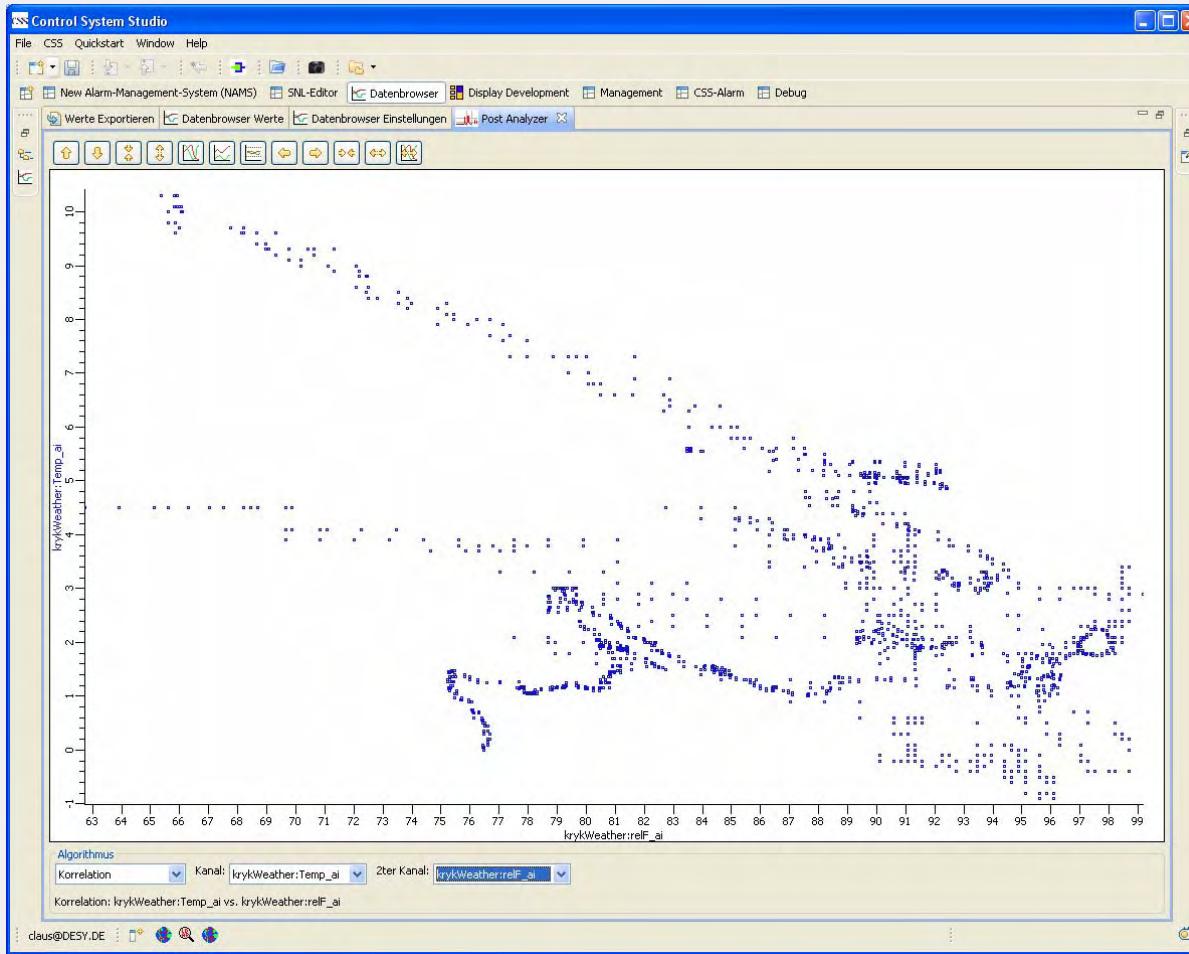
Data Browser in CSS



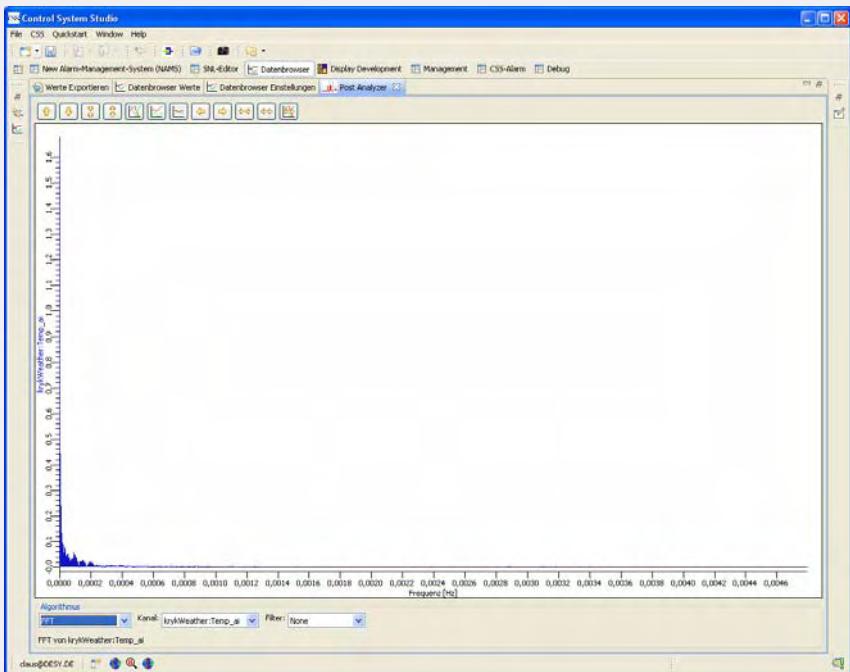
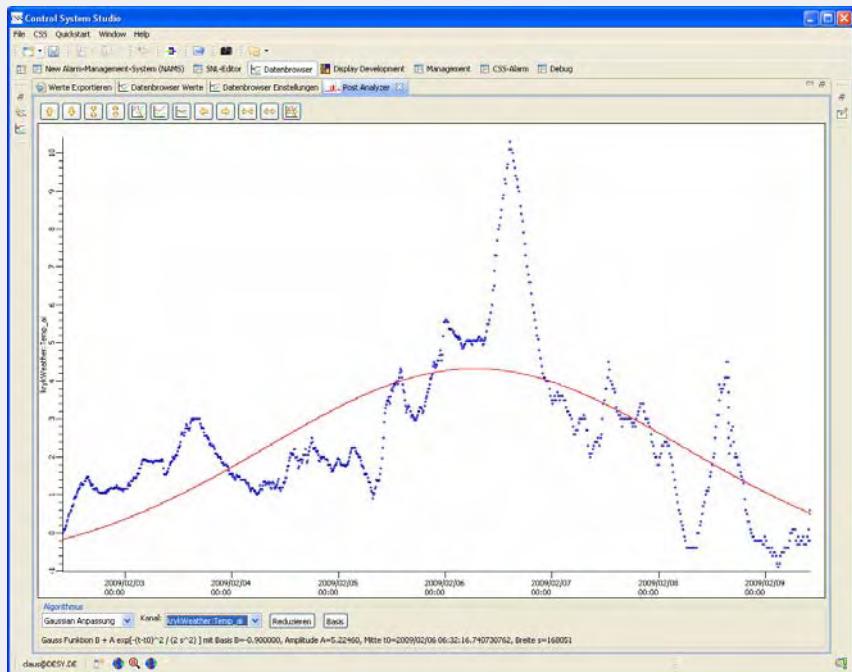
Data Browser and Correlation Plot



Correlation Plot



Gaussian Plot and FFT



Scope Data - Settings

Record Chooser

Choose the records to display							
Name	Date from	Date to	Sample used	Sample total	Unit	Formula	
<input checked="" type="checkbox"/> SP1V76A(Z1)	2008-04-18 14:09:30.450	2008-04-18 14:10:20.500	5005	5005	bar	Variable must be x	<input style="width: 20px; height: 20px;" type="button" value="..."/>
<input type="checkbox"/> SP1V76M(Z1)	2008-04-18 14:09:30.450	2008-04-18 14:10:20.500	5005	5005	bar	Variable must be x	<input style="width: 20px; height: 20px;" type="button" value="..."/>
<input type="checkbox"/> TRIGGER(Z1)	2008-04-18 14:09:30.450	2008-04-18 14:10:20.500	5005	5005	v	Variable must be x	<input style="width: 20px; height: 20px;" type="button" value="..."/>
<input checked="" type="checkbox"/> SP7V100(Z1)	2008-04-18 14:09:30.450	2008-04-18 14:10:20.500	5005	5005	bar	Variable must be x	<input style="width: 20px; height: 20px;" type="button" value="..."/>
<input type="checkbox"/> SP7V101(Z1)	2008-04-18 14:09:30.450	2008-04-18 14:10:20.500	5005	5005	bar	Variable must be x	<input style="width: 20px; height: 20px;" type="button" value="..."/>
<input checked="" type="checkbox"/> SP7V102(Z1)	2008-04-18 14:09:30.450	2008-04-18 14:10:20.500	5005	5005	bar	Variable must be x	<input style="width: 20px; height: 20px;" type="button" value="..."/>
<input type="checkbox"/> SP7V103(Z1)	2008-04-18 14:09:30.450	2008-04-18 14:10:20.500	5005	5005	mbar	Variable must be x	<input style="width: 20px; height: 20px;" type="button" value="..."/>
<input checked="" type="checkbox"/> Abs-Druc(Z1)	2008-04-18 14:09:30.450	2008-04-18 14:10:20.500	5005	5005	bar	Variable must be x	<input style="width: 20px; height: 20px;" type="button" value="..."/>

Sum: 20020

Time range for Graph

Start	2008-04-18 14:09:30.450
End	2008-04-18 14:10:20.500
Time	<input type="button" value="from Graph"/> <input type="button" value="from File"/>

Factor

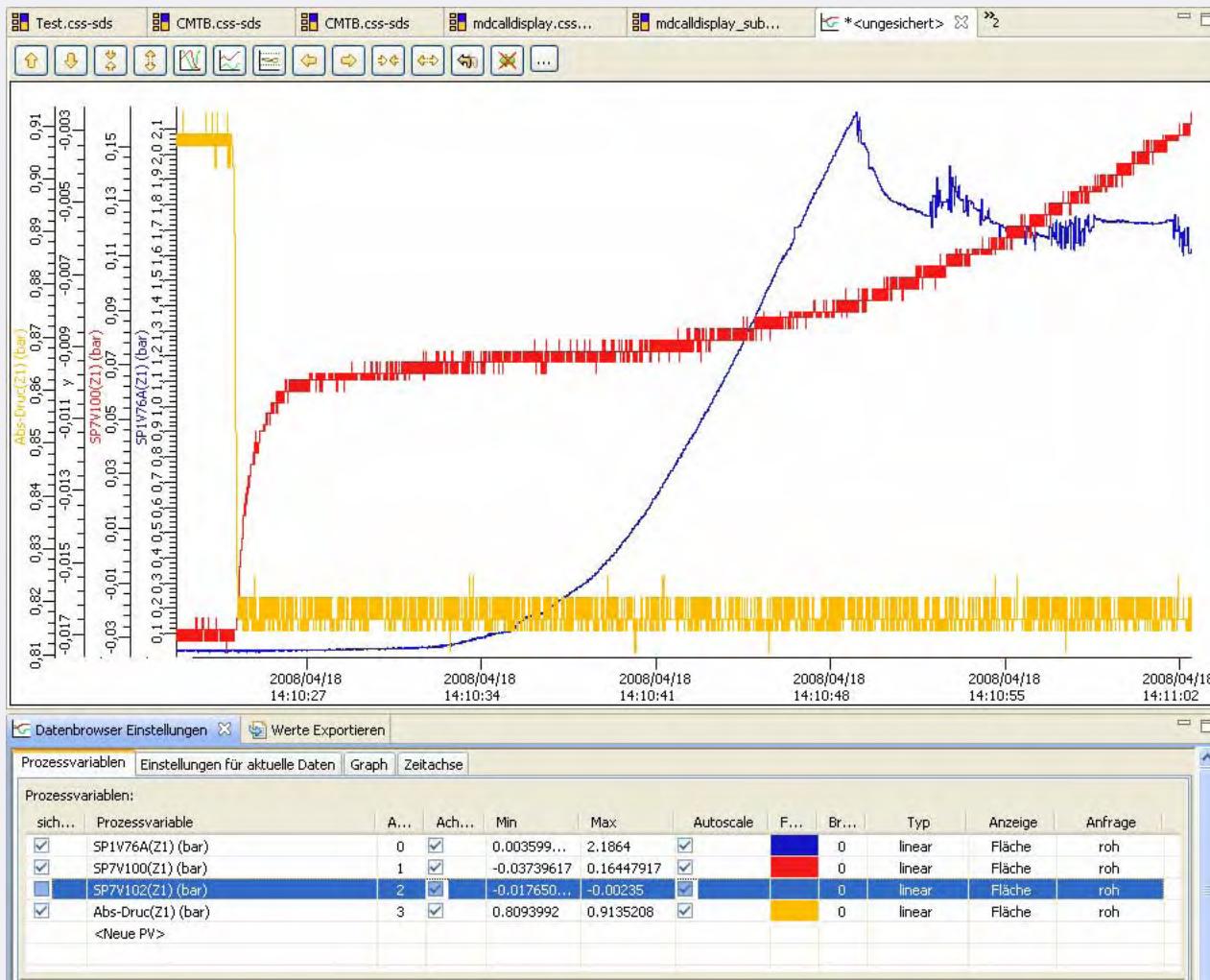
Factor for Sample	<input type="checkbox"/>
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Time offset

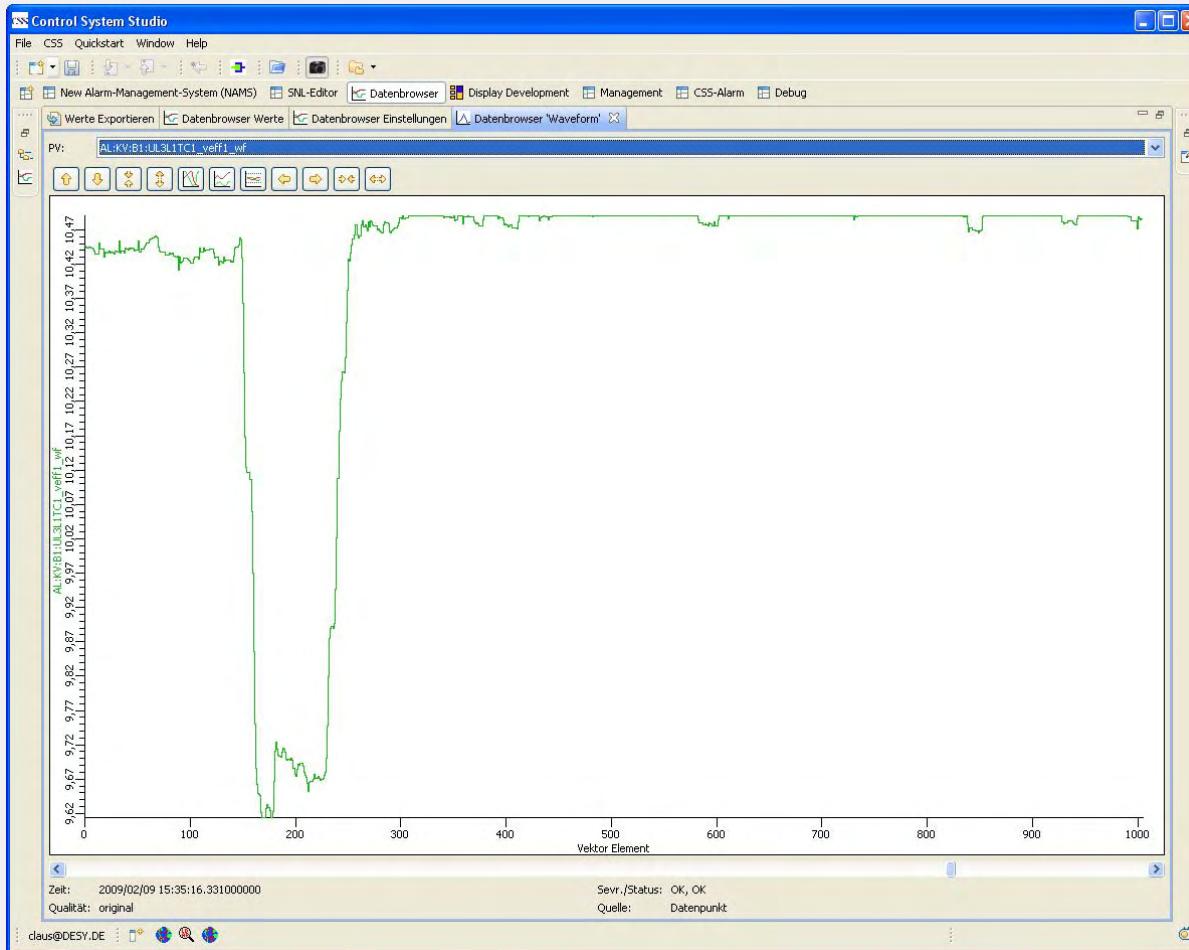
Absolute	Relative	
Date	Time	Milisec
18.04.2008	14:10:20	500

Buttons: Ok, Cancel

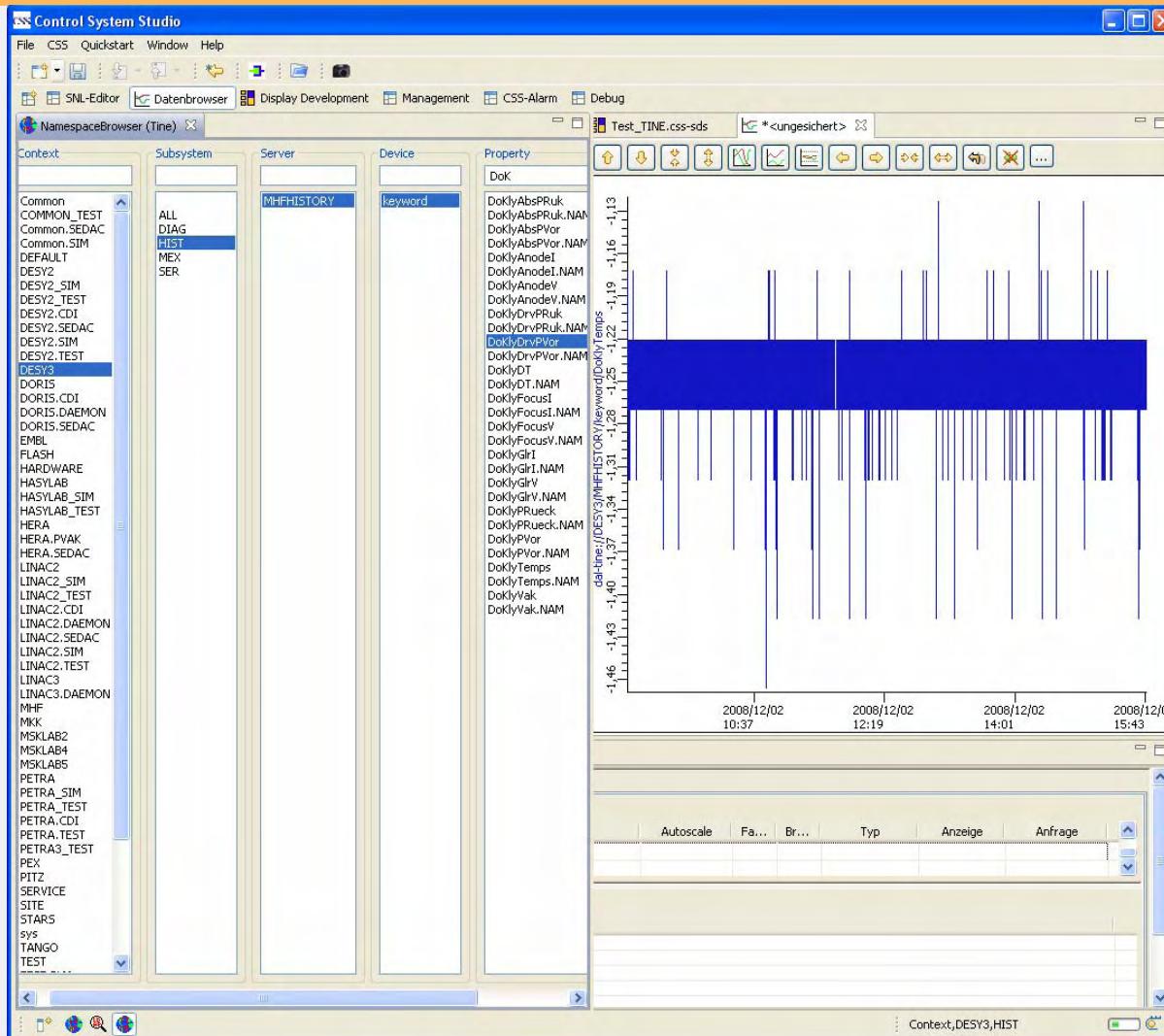
Scope Data - Plot



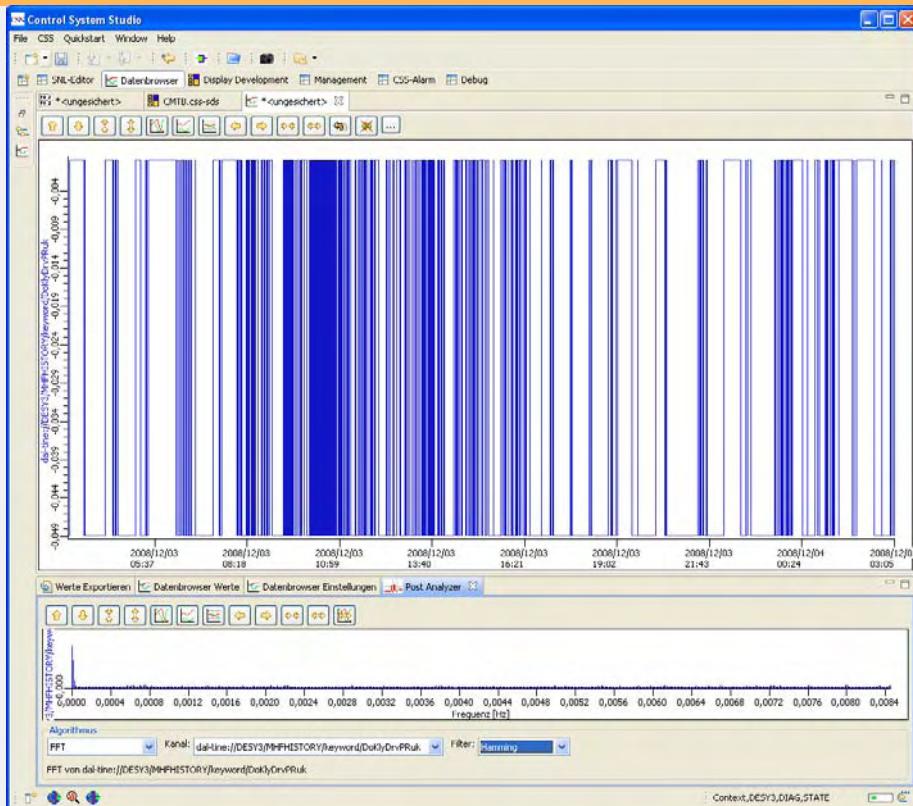
Waveform Display



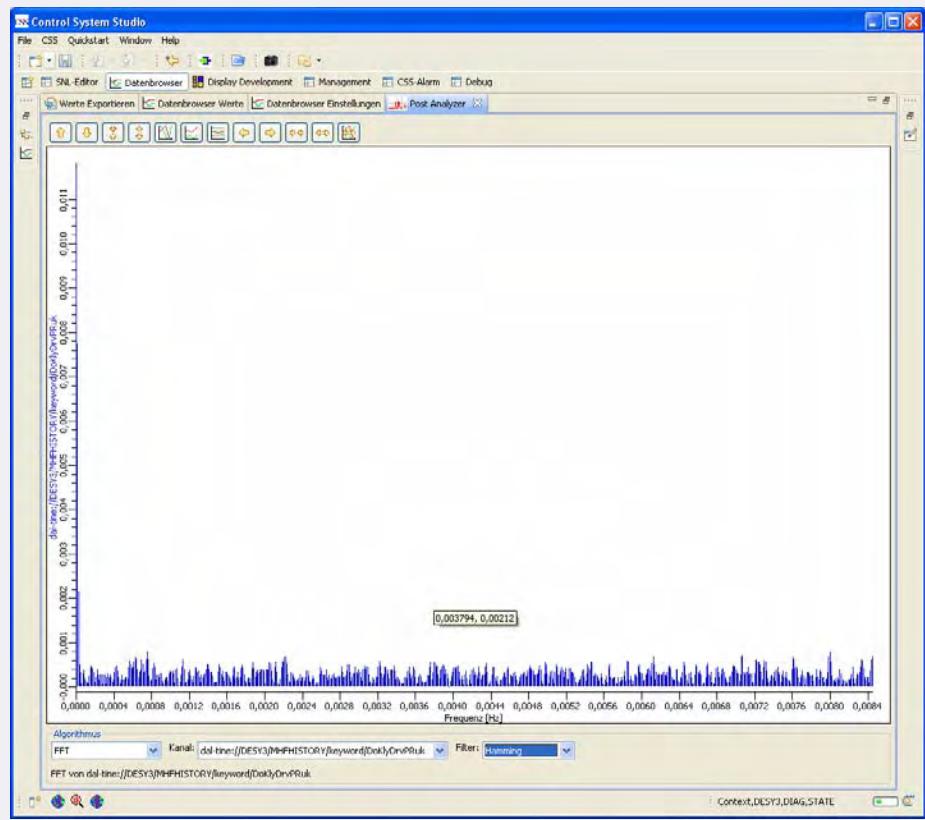
Namespace-Browser (TINE) and DataBrowser



dal-tine://DESY3/MHFHISTORY/keyword/DoKlyDrvPRuk



Data



FFT in Post Analyzer

Data Browser

Who is involved?

- Archive API specified by DESY and ORNL
- Implementation by ORNL (Kay Kasemir)
- Post Analyzer added by DESY
- Waveform Support modified by DESY

Data Browser

Relevance for GSI Users:

- The CSS Data Browser can be used for EPICS archived data as well as for other archive sources.
- Access to legacy systems will open the door for smooth transition plans (if any exist).

Data Browser

Future Plans:

- Add support for event displays
(ORNL and DESY)
 - Display archived data
 - Display waveform data
 - Display alarms
 - Display message based data

Synoptic Display and Data Browser

Questions ?