

# Build Your Custom VsCode/Eclipse Theia Event Viewer Within Days



....

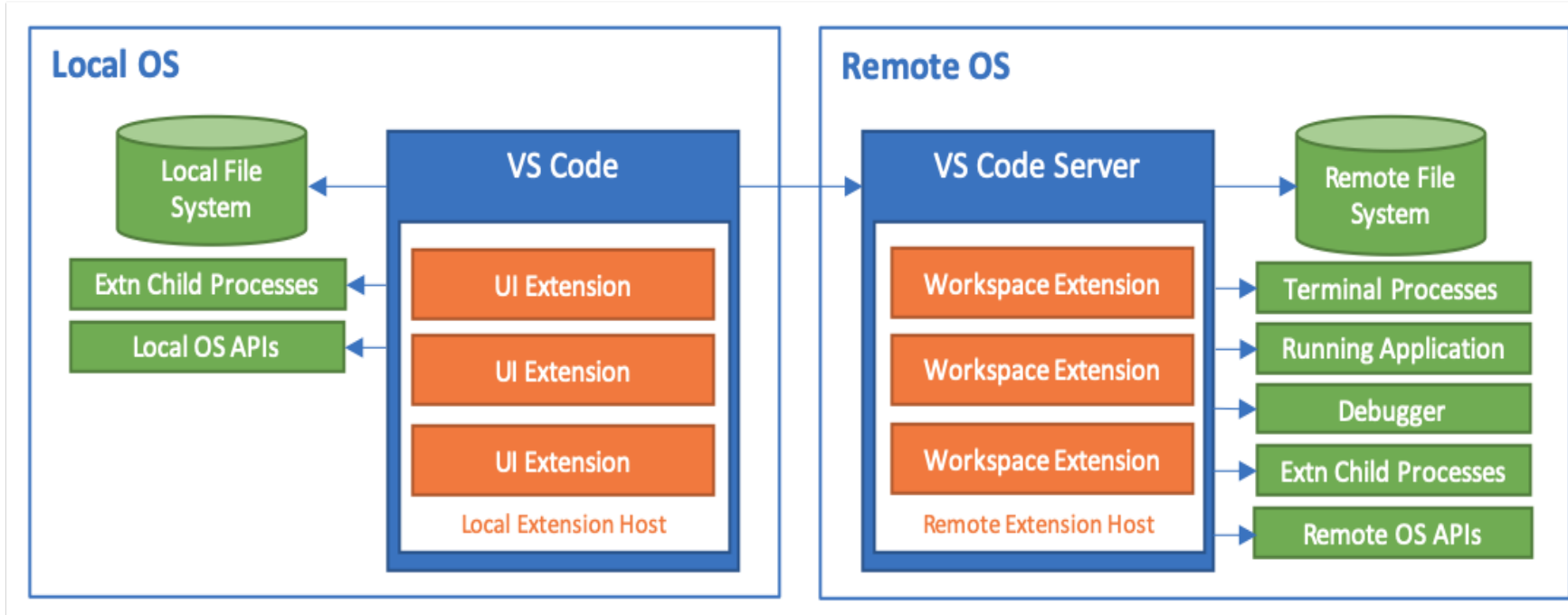
Thomas Haber  
toem GmbH

# VsCode / eclipse Theia

- Extensible/ Comfortable and Powerful IDEs
- HTML 5 Technology (Typescript)
- Extension API / Typescript / HTML / Javascript
- Desktop / Remote / HTML clients
- Client Server architecture



# Client Server architecture



# Tasks

The screenshot displays the Visual Studio Code interface for an embedded system. The Explorer on the left shows the project structure, including files like `fastlz.c`, `wavetest3.vcd`, and `uCOS_Start.SVdat`. The main window shows a real-time trace of tasks. The task list on the left includes:

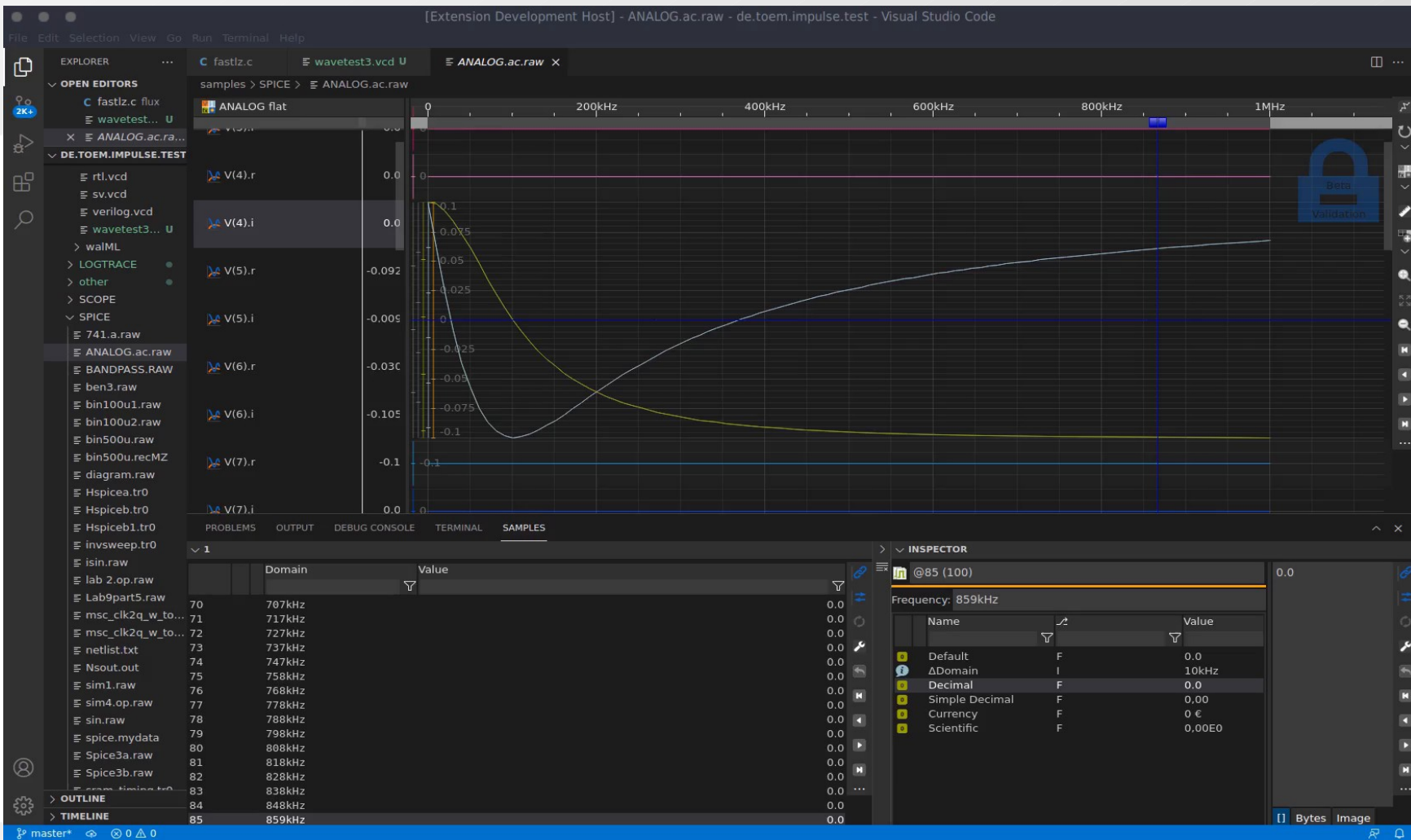
- OS\_Start\_LEDBlink flat
- Tasks
  - uC/OS-III Tick Task
  - uC/OS-III Stat Task
  - uC/OS-III Timer Task
  - App Task Start
  - Kernel Objects Task 0
  - Kernel Objects Task 1
- ISR
  - isr15
  - scheuler
  - idle

The timeline view shows the execution of these tasks over time, with a scale from 808900us to 809150us. The Inspector on the right shows the current state of the system, including the time (809015505ns) and the current task (ISR:18; dt:692).

Domain	[Event]	[dt]
6769	ISR_TO_SCHEDULER ()	692
6770	TASK_START_EXEC	611
6771	END_CALL	1184
6772	TASK_STOP_READY	1038
6773	IDLE (){17}	1106
6774	ISR_ENTER (isrId: 158883)	158883
6775	TASK_START_READY	1046
6776	END_CALL	817
6777	ISR_TO_SCHEDULER ()	692
6778	TASK_START_EXEC	611
6779	END_CALL	1184
6780	TASK_STOP_READY	1038
6781	IDLE (){17}	1106
6782	ISR_ENTER (isrId: 158664)	158664
6783	TASK_START_READY	1046
6784	END_CALL	817



# Analog



# Digital

The screenshot displays the Visual Studio Code interface for a digital logic simulation. The main window shows a timing diagram with multiple signals over time. The left sidebar shows a project tree for 'de.toem.impulse.test'. The bottom panel shows a data table with columns for Domain and Value, and an Inspector panel on the right showing signal details.

Domain	Value
b1	0
b1	1
b1	2
b0	3
b1	4
b0	5
b1	6
b0	7
b1	8
b0	9

Inspector Panel: @5 (28)  
Time: 937500ps  
Name: [Filter]  
Default: F  
ΔDomain: I  
Binary: F  
Hex: F  
Decimal: F  
Bytes Image

# Logs

[Extension Development Host] - chainsaw.xml - de.toem.impulse.test - Visual Studio Code

EXPLORER: fastlz.c, wavetest3.vcd, chainsaw.xml

OPEN EDITORS: chainsaw flat(1)

DE.TOEM.IMPULSE.TEST: org.apache.log4j.chainsaw

Timeline: 200ms, 400ms, 600ms, 800ms, 1s, 1200ms

Sequence 1 @0: Message Using "" for auto-configuration, Thread AWT-EventQueue-0

Sequence 2 @0 tag3: Message Could not find any local JavaDocs, you might want to consider running 'ant javadoc'. The release version will be able to access javadocs from t, Thread AWT-EventQueue-0

Sequence 3 @0 tag2: Message pluginDirectory cannot be null, and it must exist and must be readable, using the normal Class, Thread AWT-EventQueue-0

Sequence 14 @10 tag3: Message Failed to locate Receiver class:org.apache.log4j.chainsaw.vfs.VFSLogFilePatternRe, Thread AWT-EventQueue-0

Sequence 16 @1: Message Not OSX, ignoring..., Thread AWT-EventQueue-c

Sequence 17: Message Looks like ZeroConf stuff is available... Woof, Thread Chainsaw-WorkerThread

Sequence 19 @1: Message menu 'Connect to' was NOT added because the 'Help' menu could not be lo, Thread Chainsaw-WorkerThread

Sequence 18 @0 tag3: Message menu 'Connect to' was NOT added because the 'Help' menu could not be lo, Thread Chainsaw-WorkerThread

Domain	Signal	[Sequence]	[Message]	[Thread]
0/0	0us	org.apache.log4j.chain:1	Using "" for auto-	AWT-Ev
1/0	270000us	org.apache.log4j.chain:4	Located known	AWT-Ev
2/1	271000us	org.apache.log4j.chain:5	Located known	AWT-Ev
3/2	271000us	org.apache.log4j.chain:6	Located known	AWT-Ev
4/3	272000us	org.apache.log4j.chain:7	Located known	AWT-Ev
5/4	272000us	org.apache.log4j.chain:8	Located known	AWT-Ev
6/5	272000us	org.apache.log4j.chain:9	Failed to locate	AWT-Ev
7/6	273000us	org.apache.log4j.chain:10	Failed to locate	AWT-Ev
8/7	273000us	org.apache.log4j.chain:11	Failed to locate	AWT-Ev
9/8	276000us	org.apache.log4j.chain:12	Located known	AWT-Ev
10/9	276000us	org.apache.log4j.chain:13	Failed to locate	AWT-Ev
11/10	278000us	org.apache.log4j.chain:14	Failed to locate	AWT-Ev
12/0	508000us	org.apache.log4j.chain:15	OSXIntegration.init()	AWT-Ev
13/1	508000us	org.apache.log4j.chain:16	Not OSX, ignoring...	AWT-Ev
14/1	1145000us	org.apache.log4j.chain:20	waiting for	Chainsa
15/2	1146000us	org.apache.log4j.chain:21	out of system	Chainsa

INSPECTOR: @2(19)/1(11) org.apache.log4j.chainsaw.receivers.ReceiversH

Time: 271ms

Name	Value
Default	Sequence:5; M
ΔDomain	0us
Decimal	Sequence:5; M
[Sequence]	5
[Message]	Located knowe
[Thread]	AWT-EventQue
[Logger]	org.apache.log

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Obstacles :- (



# Obstacle 1: Data processing

*Data processing in a HTML environment ?!?*

- Data processing in java environment (backend)
- Binary data / pageables
- External processes (C/C++)



# Obstacle2 : UI

*No IDE ready UI components*

- Custom UI set
- Only HTML / Javascript



# Obstacle3 : Interface Bandwidth

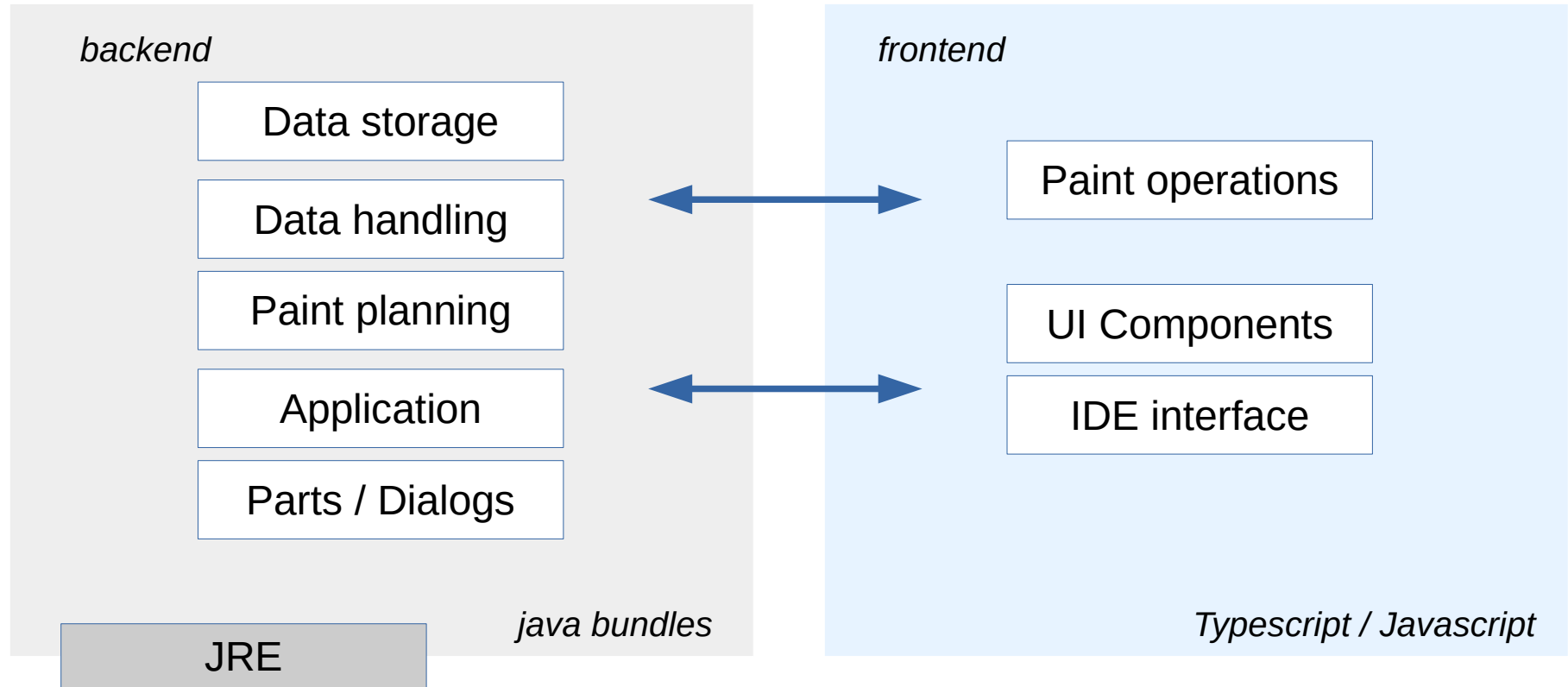
*Massive Data need to be transferred from back to frontend*

- Only transfer data that is visible
- Paint plans
- Compressed binary



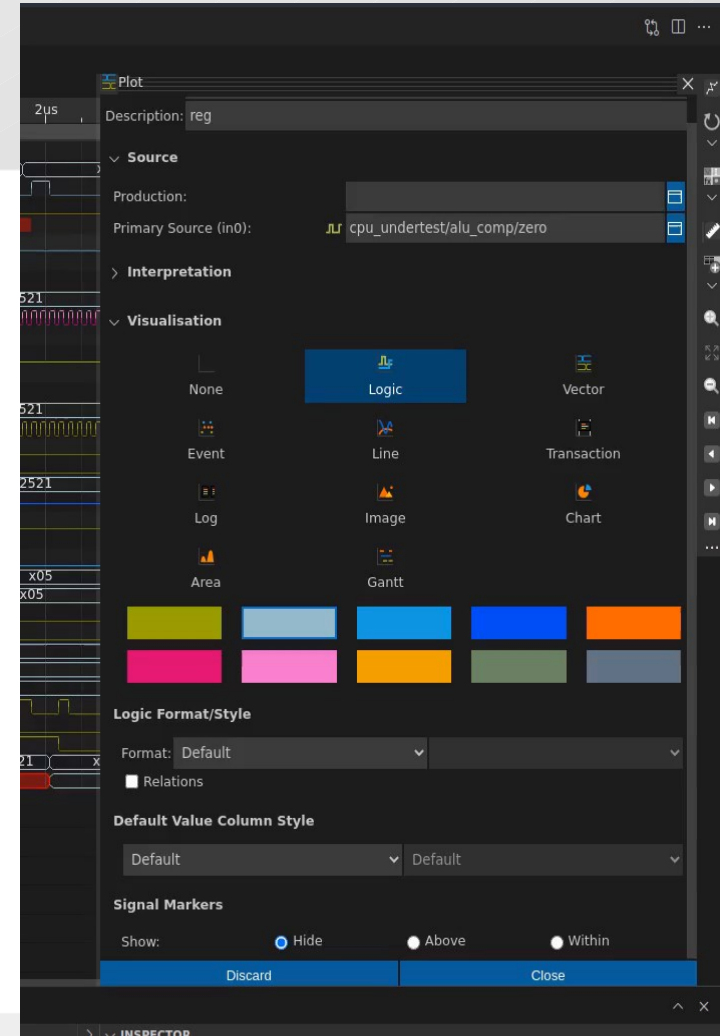


# Backend vs Frontend



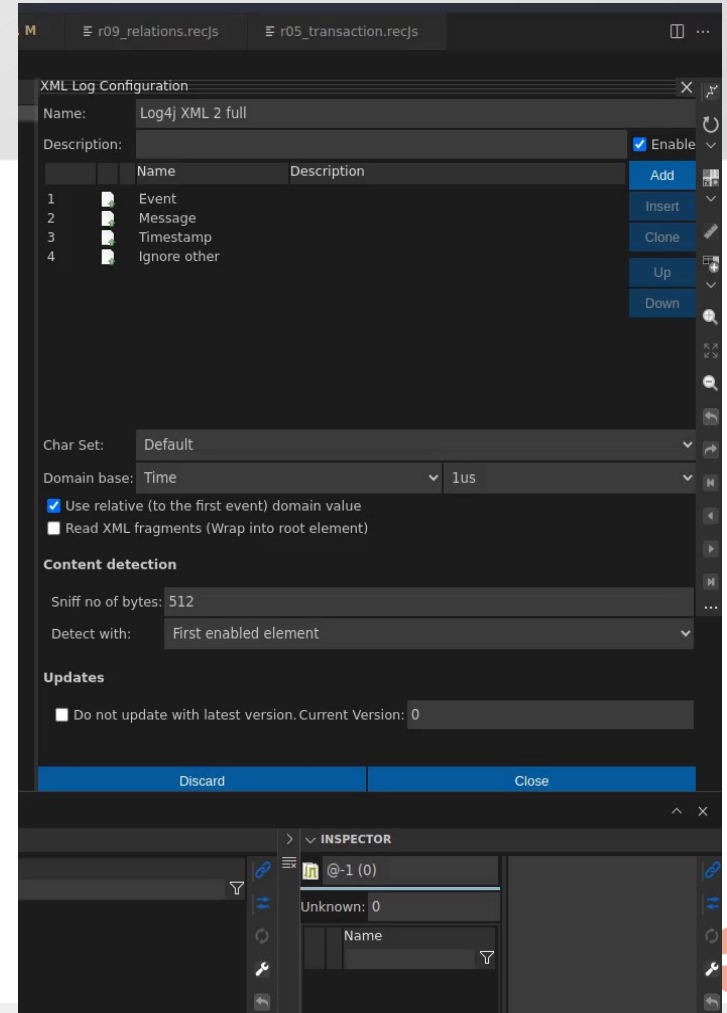
# UI Standards

- Text
- Label
- Combo
- Radio (Normal, Color, Tool)
- Check
- Button (Normal, Tool)



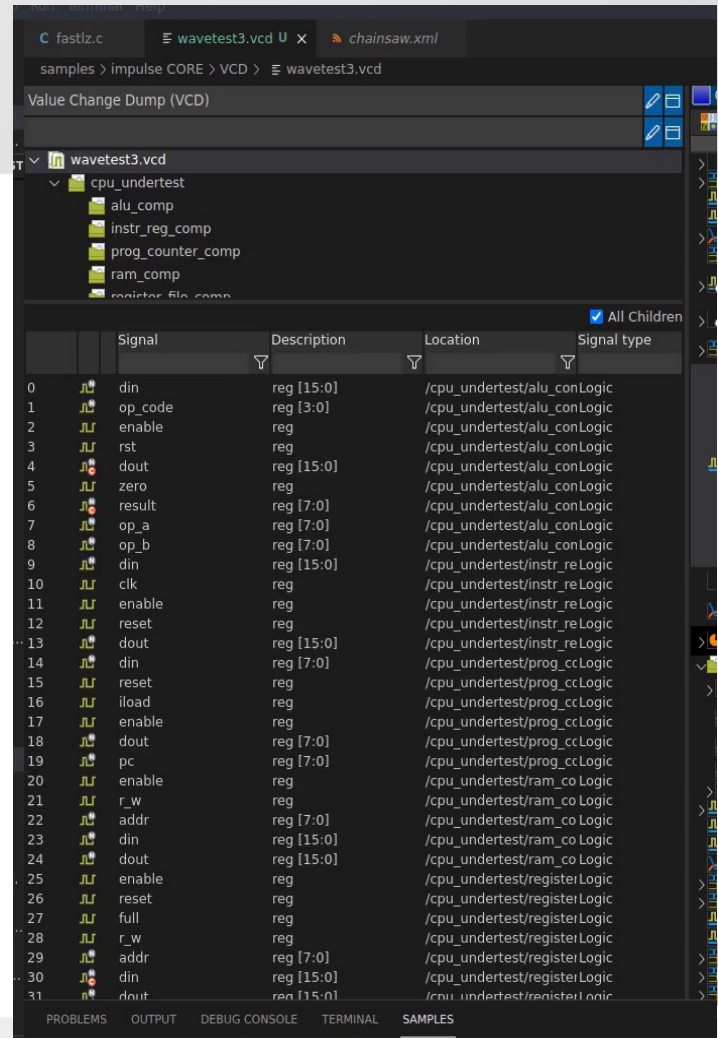
# Composites

- Composite
- Panel
- Groups
- Expandable
- TabFolder



# Tables

- Unlimited size
- Sort
- Filter
- Column re-order
- Cell Editors

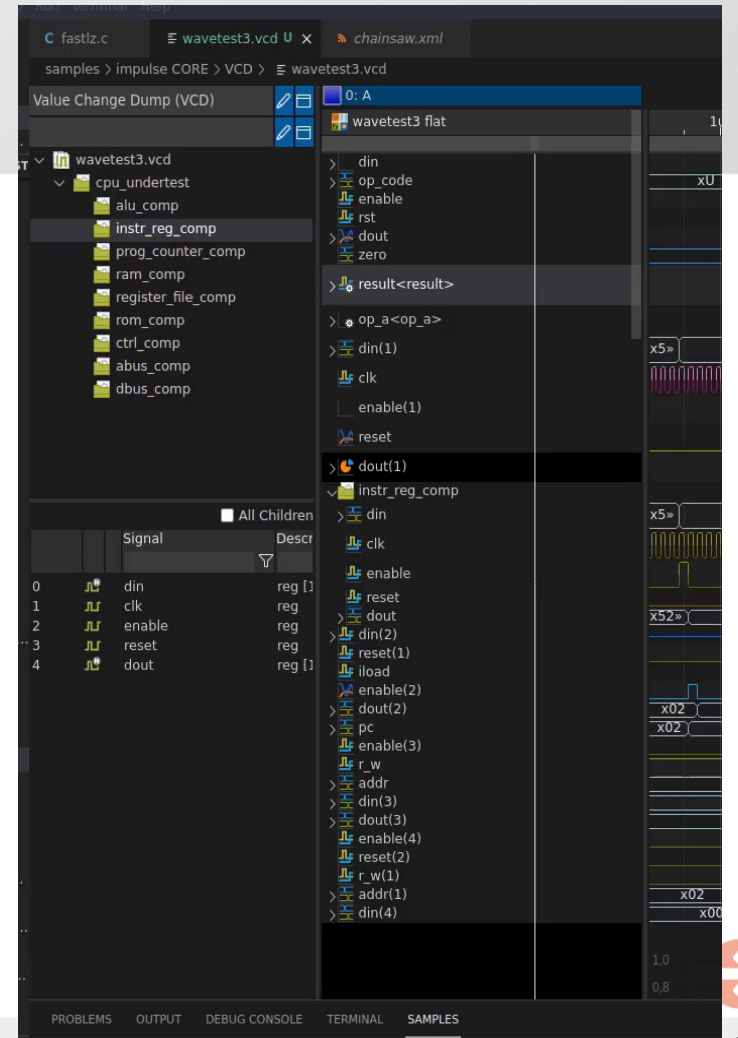


The screenshot shows a Value Change Dump (VCD) window in a debugger. The window title is "Value Change Dump (VCD)" and it displays a list of signals and their values over time. The signals are organized into a tree view on the left, showing a hierarchy of components like "cpu\_undertest", "alu\_comp", "instr\_reg\_comp", "prog\_counter\_comp", "ram\_comp", and "register\_file\_comp". The main table lists the signals with their values and locations.

	Signal	Description	Location	Signal type
0	din	reg [15:0]	/cpu_undertest/alu_conLogic	
1	op_code	reg [3:0]	/cpu_undertest/alu_conLogic	
2	enable	reg	/cpu_undertest/alu_conLogic	
3	rst	reg	/cpu_undertest/alu_conLogic	
4	dout	reg [15:0]	/cpu_undertest/alu_conLogic	
5	zero	reg	/cpu_undertest/alu_conLogic	
6	result	reg [7:0]	/cpu_undertest/alu_conLogic	
7	op_a	reg [7:0]	/cpu_undertest/alu_conLogic	
8	op_b	reg [7:0]	/cpu_undertest/alu_conLogic	
9	din	reg [15:0]	/cpu_undertest/instr_reLogic	
10	clk	reg	/cpu_undertest/instr_reLogic	
11	enable	reg	/cpu_undertest/instr_reLogic	
12	reset	reg	/cpu_undertest/instr_reLogic	
13	dout	reg [15:0]	/cpu_undertest/instr_reLogic	
14	din	reg [7:0]	/cpu_undertest/prog_ccLogic	
15	reset	reg	/cpu_undertest/prog_ccLogic	
16	iload	reg	/cpu_undertest/prog_ccLogic	
17	enable	reg	/cpu_undertest/prog_ccLogic	
18	dout	reg [7:0]	/cpu_undertest/prog_ccLogic	
19	pc	reg [7:0]	/cpu_undertest/prog_ccLogic	
20	enable	reg	/cpu_undertest/ram_co Logic	
21	r_w	reg	/cpu_undertest/ram_co Logic	
22	addr	reg [7:0]	/cpu_undertest/ram_co Logic	
23	din	reg [15:0]	/cpu_undertest/ram_co Logic	
24	dout	reg [15:0]	/cpu_undertest/ram_co Logic	
25	enable	reg	/cpu_undertest/registerLogic	
26	reset	reg	/cpu_undertest/registerLogic	
27	full	reg	/cpu_undertest/registerLogic	
28	r_w	reg	/cpu_undertest/registerLogic	
29	addr	reg [7:0]	/cpu_undertest/registerLogic	
30	din	reg [15:0]	/cpu_undertest/registerLogic	
31	dout	reg [15:0]	/cpu_undertest/registerLogic	

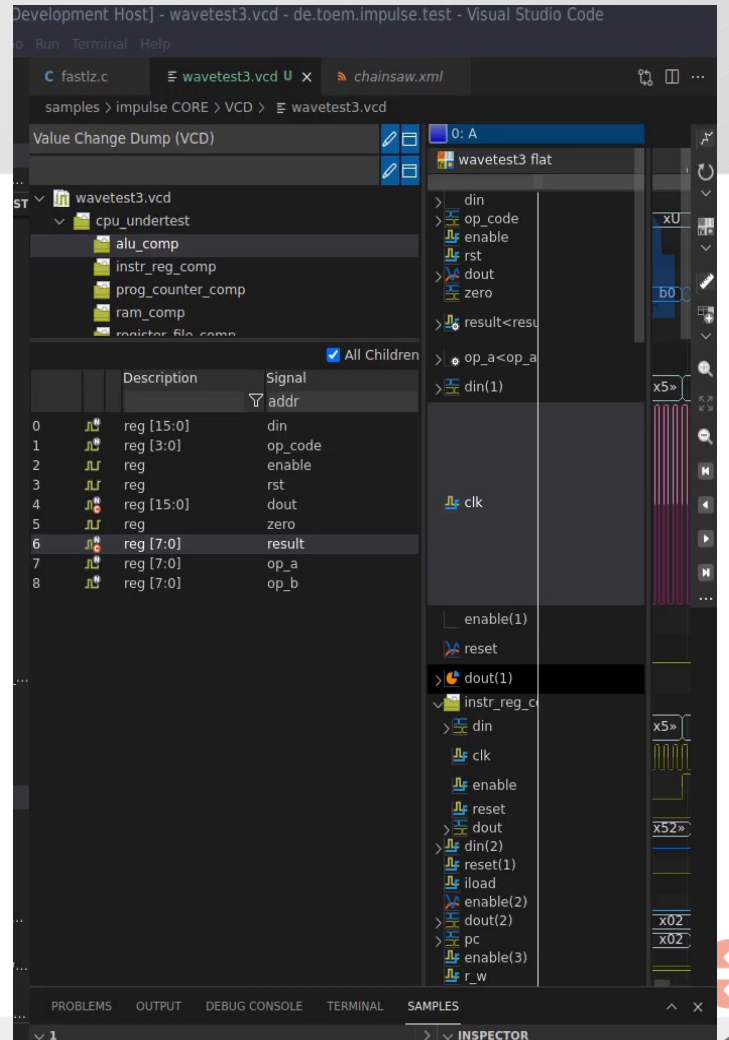
# Tree / Custom

- Standard Tree
- Custom (Plot Tree)
  - Value Column
  - Resizable rows



# and...

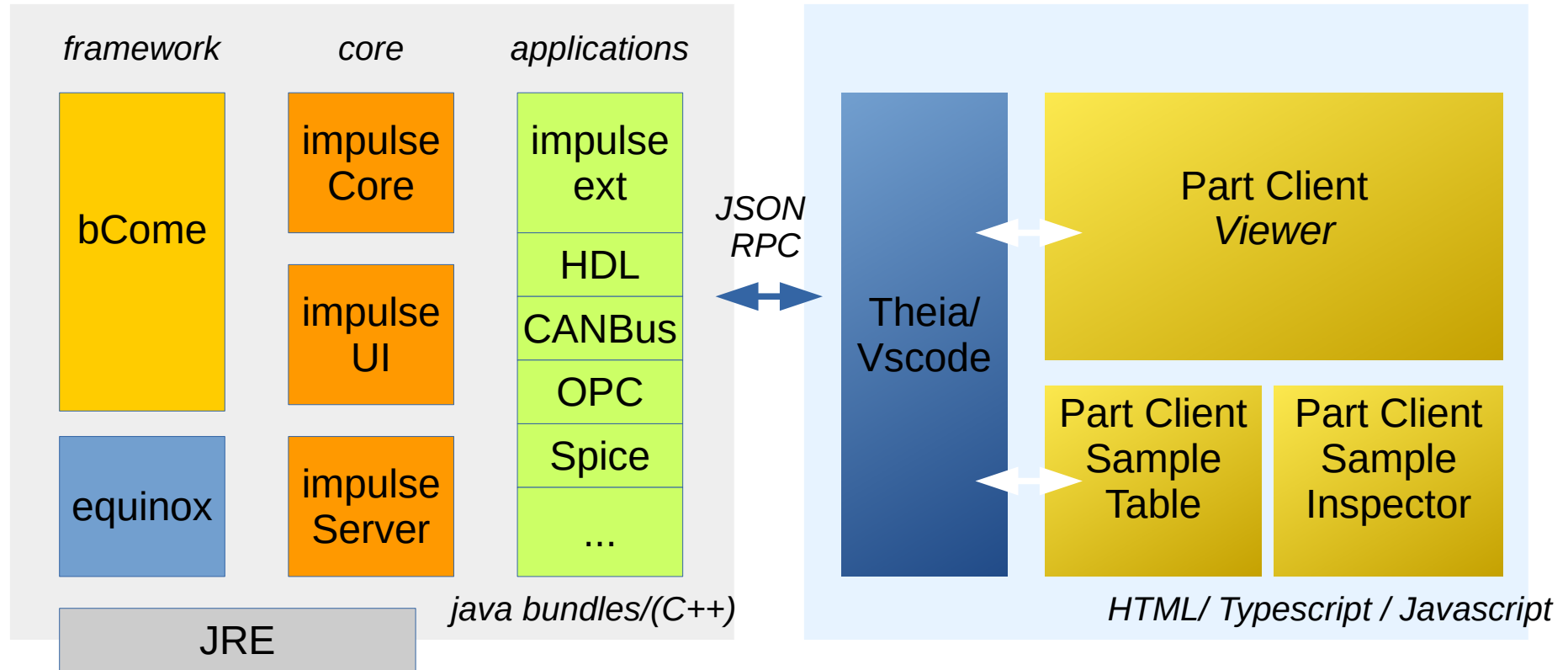
- Dialogs
- Nested dialogs
- Drag/Drop
- Context Menus
- Toolbars
- Theme integration



How is it done ?

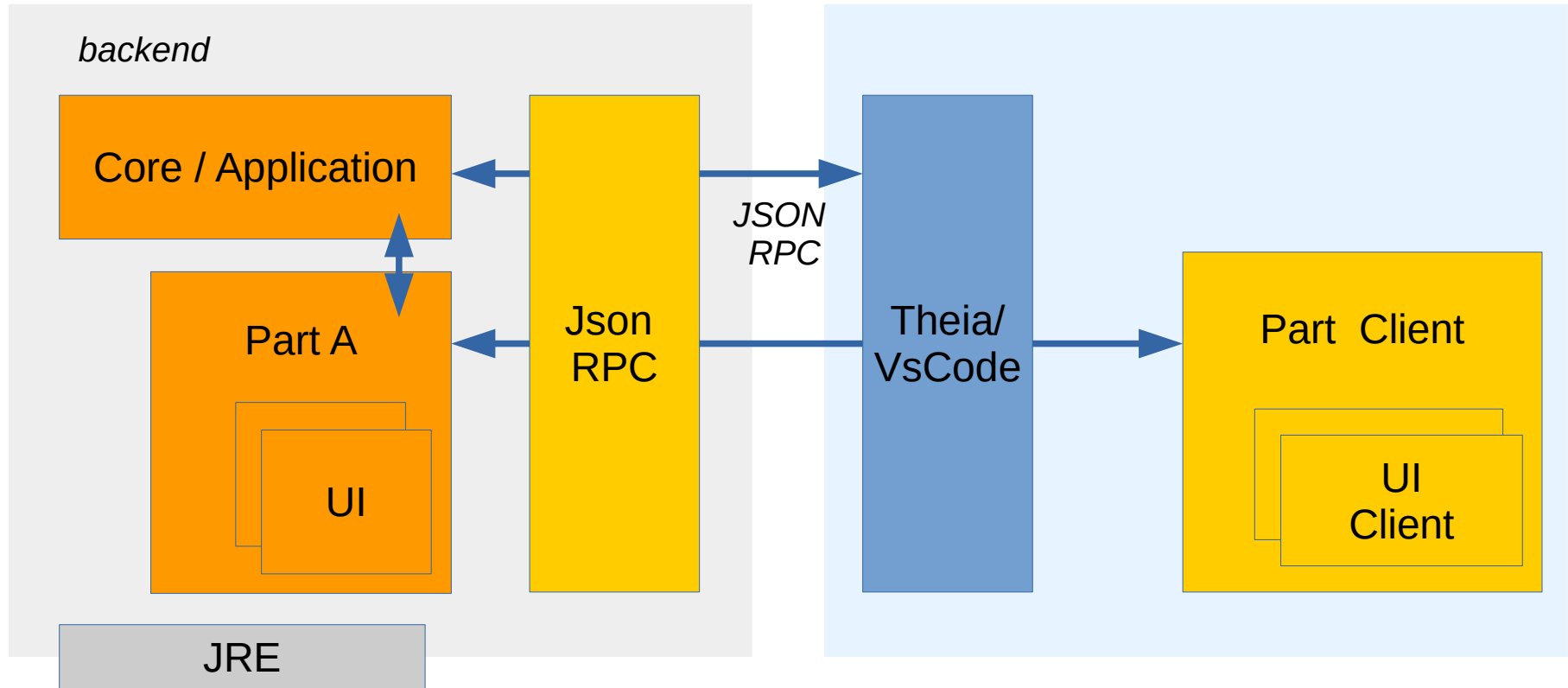


# Architecture Theia/Vscode

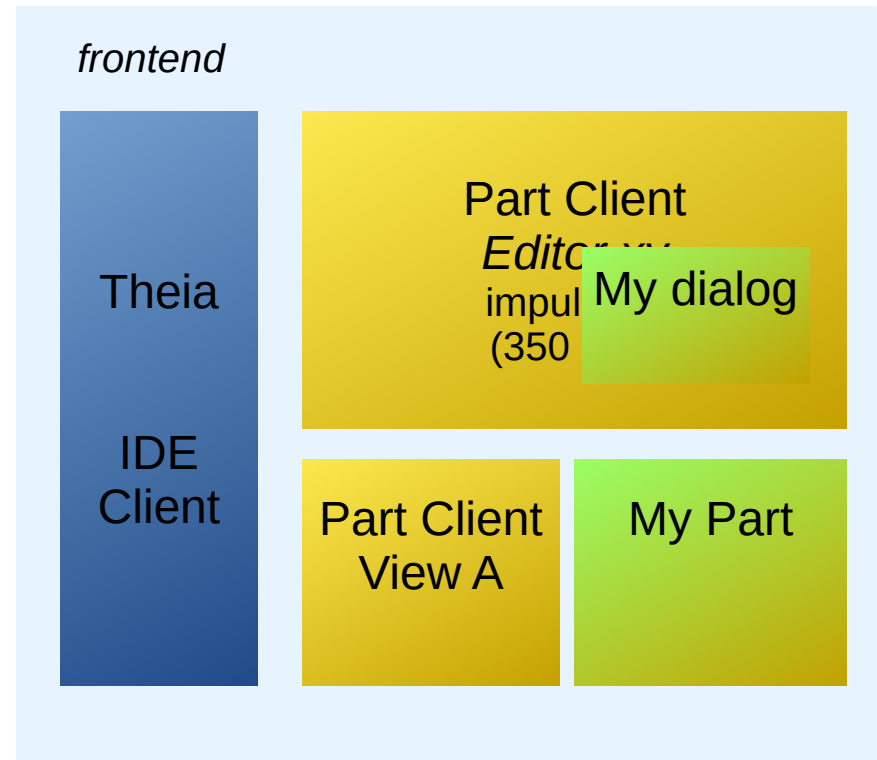
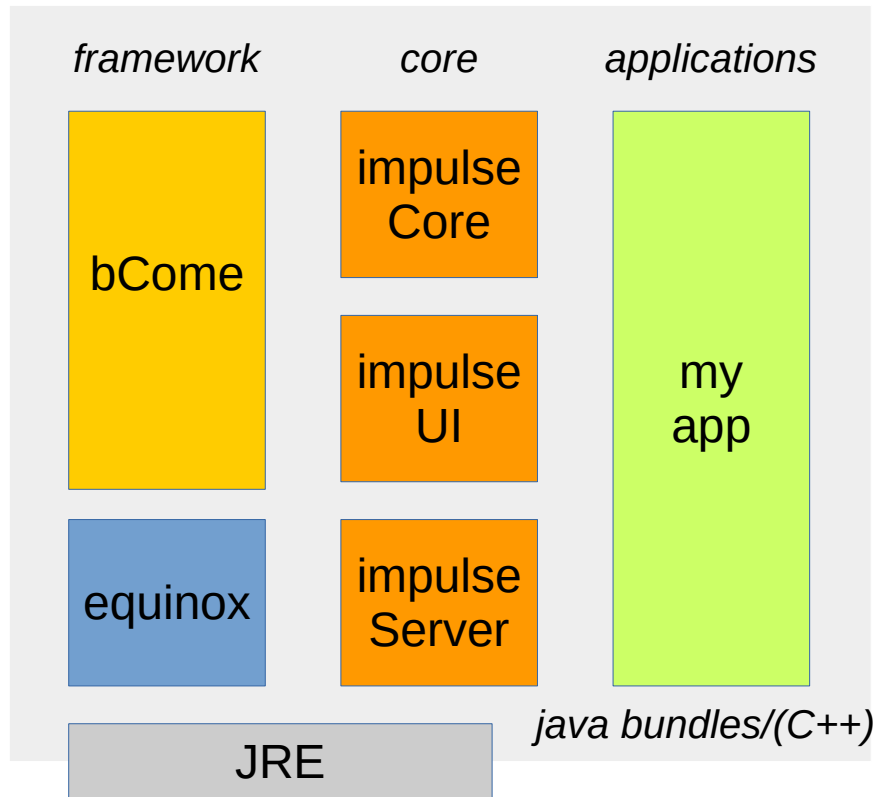




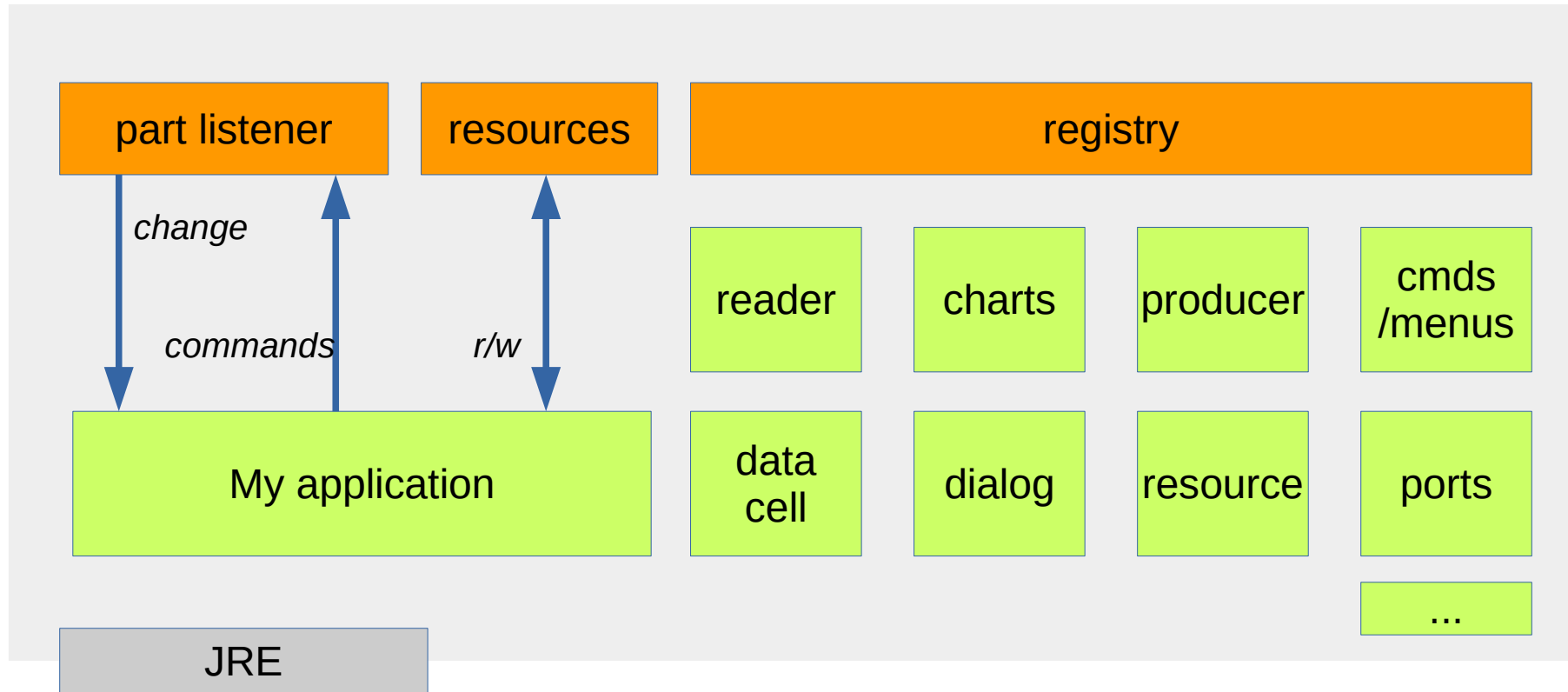
# Communication



# Backend Extensions



# Interfaces



# Features

- Designed to handle huge data
- Can work with streams or files (resources)
- Supports online display
- Extensible (reader, dialogs, interfaces,...)
- Interactive
- Scriptable



# Build your Application



# Open Source applications on github

- RT OS / Software Traces
- Logs (Text, XML, YAML, CSV, JSON)
- CAN Bus, OPC/UA
- HDL / Spice / Virtual Prototyping
- Templates

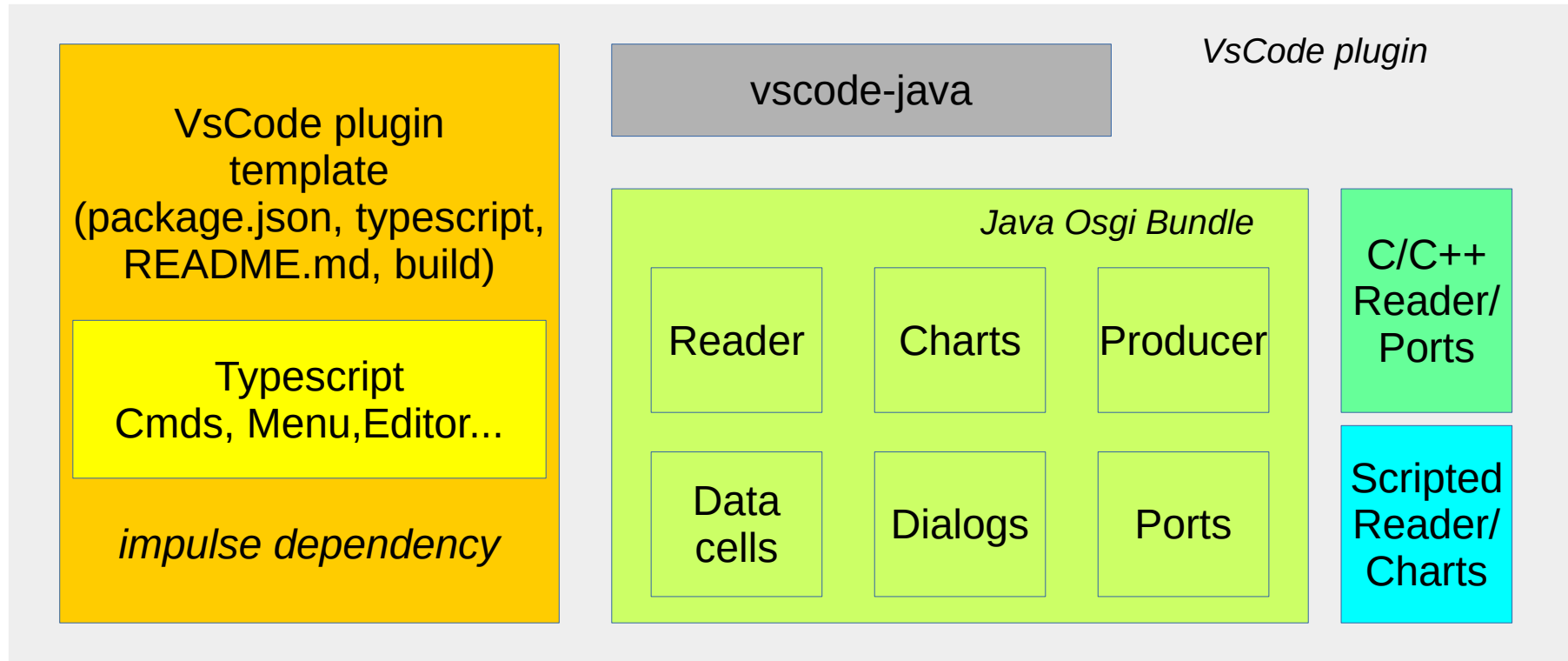


# Build you own application !

- Templates for building of custom applications
- Resulting into VsCode/Theia plugins
- Own listings on the marketplaces.
- Examples:
  - File viewer for a custom trace format
  - Interface to read/display events from custom hw
  - Display and analysis of measurement data



# Templates (github)





# Template

ExampleFloatReader.java - de.toem.impulse.vscodextension.toolkit - Visual Studio Code

File Edit Selection View Go Run Terminal Help

EXPLORER

- OPEN EDITORS
  - package.json
  - settings.json .vscode
  - ExampleFloatReader.java... 2
  - launch.json .vscode
- DE.TOEM.IMPULSE.VSCODE.EXTEN...
  - settings.json
  - tasks.json
  - bundle
    - bin
    - data
    - de
    - flux
    - i18n
    - icons
    - META-INF
    - samples
    - src/de/toem/impulse/ext...
      - charts
      - core
      - disclosure
      - i18n
      - other
      - ports
      - producer
      - serializer/examples
        - flux
          - ExampleBinaryReader.java 7
          - ExampleEventReader.java 1
          - ExampleFloatReader.java 2
          - ExampleGanttReader.java 5
          - ExampleIntegerReader.java... 3
          - ExampleLogicReader.java 5
          - ExampleStreamReader.j... 1
          - ExampleStructReader.java 1
          - ImpulseToolkitExtension.j... 1
    - .cproject
    - .gitignore
    - about.html
    - build.properties
    - plugin.xml
    - OUTLINE
    - TIMELINE

```

package.json
settings.json
ExampleFloatReader.java 2 x
launch.json
bundle > src > de > toem > impulse > extension > toolkit > serializer > examples > ExampleFloatReader.java > ExampleFloatReader
35  if (name != null && !name.equals("toem.Float.example"))
36      return NOT_APPLICABLE;
37      return 8; // need 8 bytes to check
38  }
39
40  @Override
41  protected int isApplicable(byte[] buffer) {
42      if (buffer[0] == '#' && buffer[1] == 'E' && buffer[2] == 'X' && buffer[3] == 'A')
43          return APPLICABLE;
44          return NOT_APPLICABLE;
45  }
46
47  @Override
48  protected void parse(IProgress progress, InputStream in) throws ParseException {
49
50      // Init the record
51      initRecord("Example Record", TimeBase.ns);
52
53      // We forget the input and create a record with scopes and 5 signals
54      Scope system = addScope(null, "System"); // null means at root
55      Signal float1 = addSignal(system, "Signal1", "My first float Signal (limitet to 32 bits)", ProcessType.Discrete, SignalType.Float, SignalD
56      Signal float2 = addSignal(system, "Signal2", "My second float Signal", ProcessType.Discrete, SignalType.Float, SignalDescriptor.DEFAULT);
57      Scope another = addScope([system, "Another"]);
58      Signal float3 = addSignal(another, "Signal3", "Another float (limitet to 32 bits)", ProcessType.Discrete, SignalType.Float, SignalDescript
59      Signal float4 = addSignal(another, "Signal4", "Rectangle", ProcessType.Discrete, SignalType.Float, SignalDescriptor.DEFAULT);
60      Signal float5 = addSignal(another, "Signal", "XY", ProcessType.Discrete, SignalType.FloatArray, new SignalDescriptor(ISample.CONTENT_DEFAU
61
62
63      // if you find a problem, throw an exception
64      if (false)
65          throw new ParseException("Not Valid");
66
67      // We start at 0 ns
68      long t = 0; // 0 ns
69      open(t);

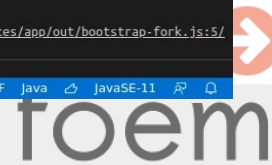
```

PROBLEMS 51 OUTPUT DEBUG CONSOLE TERMINAL SAMPLES

at o.fire (/home/thomas/.vscode/extensions/redhat.java-0.82.0/dist/extension.js:2:880176)  
 at Z (/home/thomas/.vscode/extensions/redhat.java-0.82.0/dist/extension.js:2:866928)  
 at invoke (/home/thomas/.vscode/extensions/redhat.java-0.82.0/dist/extension.js:2:879415)  
 at o.fire (/home/thomas/.vscode/extensions/redhat.java-0.82.0/dist/extension.js:2:880176)  
 at p.fireClose (/home/thomas/.vscode/extensions/redhat.java-0.82.0/dist/extension.js:2:888067)  
 at Socket.<anonymous> (/home/thomas/.vscode/extensions/redhat.java-0.82.0/dist/extension.js:2:889652)  
 at Socket.emit (events.js:327:22)  
 at Pipe.<anonymous> (net.js:673:12)  
 at Pipe.callbackTrampoline (internal/async\_hooks.js:131:14)  
 11884 ;IdeSocket closed: [1005] null ;null ;de.toem.impulse.html.backend

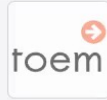
Filter (e.g. text, lexclude) Run Extension

master+ 0 51 1 Run Extension (de.toem.impulse.vscodextension.toolkit) Ln 57, Col 37 Spaces: 4 UTF-8 LF Java JavaSE-11



# 15 steps

- <https://github.com/toem/impulse.vscode.extensions.example.simple-reader>
- Initializing the development environment
- Implementing the reader
- Creating signals
- Debugging
- Creating the publishing a VsCode/Theia plugin



**toem**  
technical software matters  
Germany http://www.toem.de info@toem.de

- Overview
- Repositories 7
- Packages
- People 1
- Teams 1
- Projects
- Settings

Pinned

toem doesn't have any pinned public repositories yet.

Customize your pins

People



Invite someone

Repositories

Find a repository... Type Language Sort New

- impulse.vscode.extension.example.simple-reader** Public  
Java 0 stars 0 forks 0 issues Updated 27 minutes ago
- impulse.vscode** Public  
impulse is an event and waveform visualization and analysis workbench (simulation, traces, logs) which helps engineers to comfortably understand and debug complex semiconductor and multi-core software systems.  
C 7 stars 0 forks 3 issues Updated 5 days ago
- impulse.playground** Public  
impulse is an event and waveform visualization and analysis workbench (simulation, traces, logs) which helps engineers to comfortably understand and debug complex semiconductor and multi-core software systems.  
0 stars 0 forks 0 issues Updated on 26 Aug
- flux** Public  
flux trace is a multi-functional open-source waveform/trace format targeted at semiconductor and embedded multicore system applications. The trace data is packed into a binary format and allows scalable compression.  
HTML 1 star 1 fork 0 issues Updated on 11 Aug

Top languages

- C
- Java
- HTML



Thank You !




# Playground

The screenshot shows a web browser displaying the GitHub repository page for 'toem/impulse.playground'. The browser's address bar shows the URL 'https://github.com/toem/impulse.playground'. The repository page includes a navigation bar with options like 'Code', 'Issues', 'Pull requests', 'Actions', 'Projects', 'Wiki', 'Security', 'Insights', and 'Settings'. The main content area shows a commit history table and a preview of the 'README.md' file. The 'README.md' preview features a logo consisting of a white plus sign inside a white circle, which is itself inside a green rounded square. Below the logo, the text 'impulse playground' is displayed. On the right side of the repository page, there is an 'About' section with a description of the project, a 'Releases' section, and a 'Packages' section.

Commit	Message	Time	Commits
thomasAtToem	Added video	9326137 3 days ago	4
	core	Added README	19 days ago
	spice/raw	Added README	19 days ago
	vp	Added README	19 days ago
	.gitpod.yml	Added README	19 days ago
	README.md	Added video	3 days ago
	impulse.png	Added README	19 days ago

**README.md**



impulse playground

**About**

impulse is an event and waveform visualization and analysis workbench (simulation, traces, logs) which helps engineers to comfortably understand and debug complex semiconductor and multi-core software systems.

[Readme](#)

**Releases**

No releases published  
[Create a new release](#)

**Packages**

No packages published  
[Publish your first package](#)