

Streaming and remote control architecture



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About me

- Michael Sills-Lavoie
- Graduate student at École Polytechnique de Montréal
- Several contributions to :
 - Streaming and remote control architecture
 - TCF binary transfer and plugin system
 - TCF LTTng agent/client plugin with streaming support
 - TMF remote control interface for LTTng tracepoints activation
- Work on dependency analysis

Remote control and streaming architecture

Needs for the tools

Overview of the functionalities and characteristics

Inside the architecture

Installation

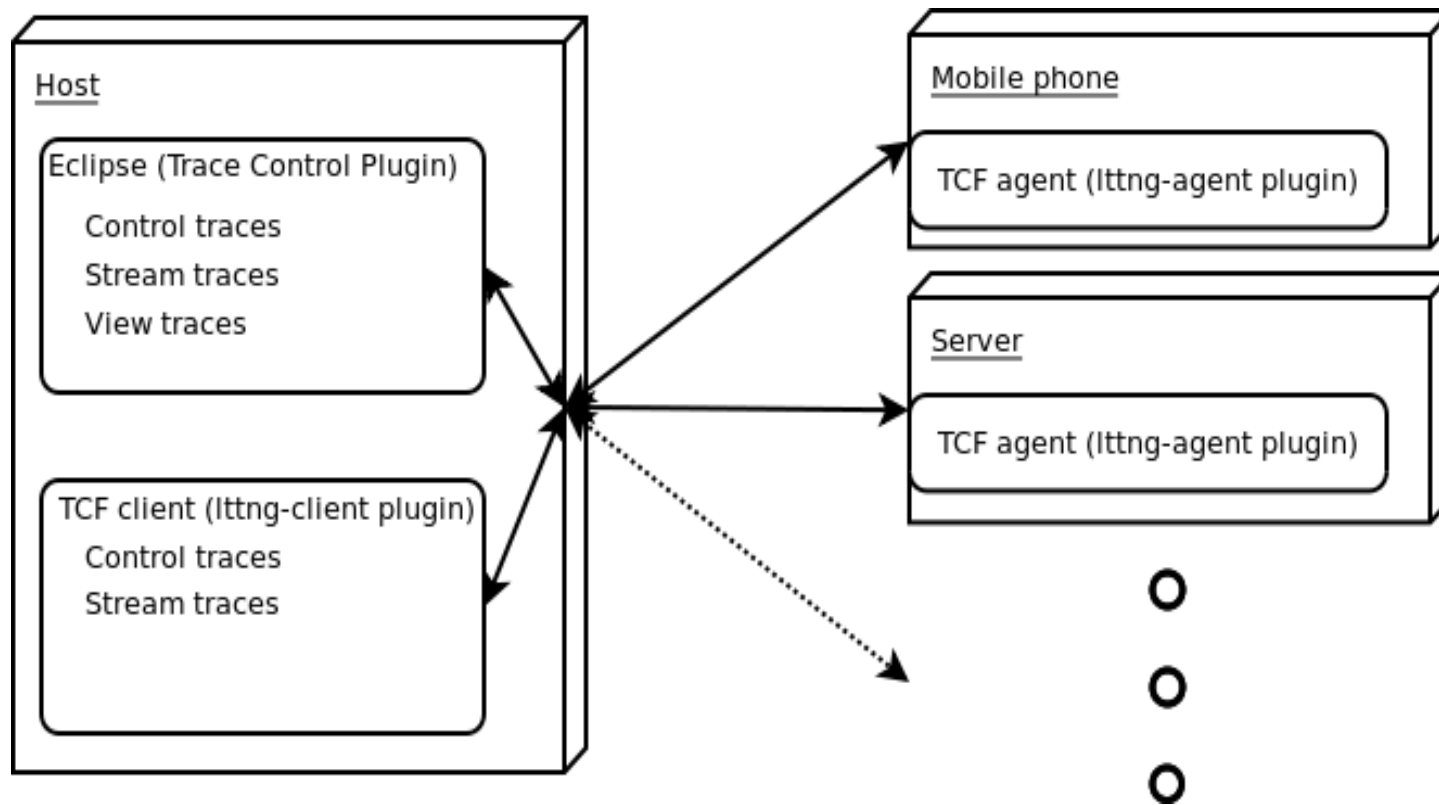
Use case

Future work

1. Remote control and streaming architecture (1 of 2)

- Tools developed to stream and control LTTng and UST traces remotely
- Consists of :
 - A **server** called Ittng-agent (TCF agent plugin) installed on the traced systems
 - A **client** called Ittng-client (TCF client plugin) installed on the system used to control the tracing
 - Graphical client integrated with Eclipse (LTTng only)
 - Command line client

1. Remote control and streaming architecture (2 of 2)



Remote control and streaming architecture

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2. Needs for the tools

- Developers often need to trace :
 - Small underpowered systems (ex. mobile phone)
 - No screen or small screen
 - Very small or no on-board storage
 - Servers in corporate environment
 - No screen or direct interface
 - Security constraints (ex. impossible to open many firewalls or router ports exclusively for tracing)
 - Most developers like to have everything included in the same IDE (Eclipse)
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3. Overview of the functionalities and characteristics (1 of 2)

3.1 Characteristics

- TCF agent
 - Small program written in C
 - One daemon integrates many services (file system, process management, ...)
 - Only the required services are compiled
 - Supports plugins (ex. LTTng-agent)
 - Standard, simple and efficient communication protocol
 - Many services multiplexed into the same channel (port)
 - Easy to extend
 - Easy to interface with Eclipse or a C client

3. Overview of the functionalities and characteristics (2 of 2)

3.2 Fonctionnalités

- On par with the local LTTng and UST tools, it allows to:
 - Create/destroy traces
 - Control each channel individually
 - Enable/disable
 - Enable/disable flight recorder mode
 - Set the number of subbuffers
 - Set the size of the subbuffers
 - Set the periodical flush timer
 - Enable/disable markers
 - Stream LTTng and UST traces

Remote control and streaming architecture

Needs for the tools

Overview of the functionalities and characteristics

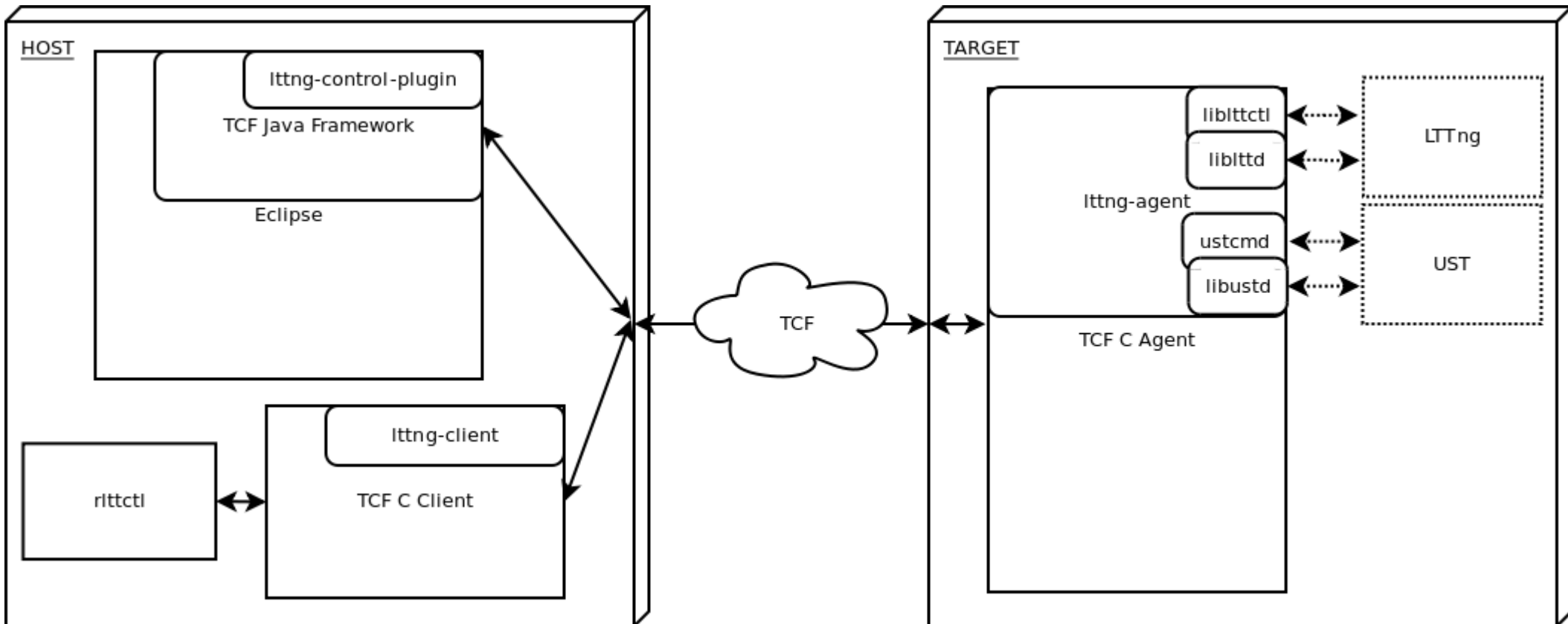
Inside the architecture

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4. Inside the architecture



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5. Installation (1 of 3)

5.1 Server (on the traced system)

- 1) Install LTTng, UST or both (see *lttng.org*)
- 2) For LTTng, checkout and install Ittcontrol (see *lttng.org*)
- 3) Checkout and install TCF from svn :
<http://dev.eclipse.org/svnroot/dsdp/org.eclipse.tm.tcf/trunk/agent/>
- 4) Checkout and install Ittng-agent from git :
<git://git.dorsal.polymtl.ca/git/lttng-agent.git>

5. Installation (2 of 3)

5.2 Command line client (on the host)

1) Checkout and install TCF from svn :

<http://dev.eclipse.org/svnroot/dsdp/org.eclipse.tm.tcf/trunk/agent/>

2) Checkout and install Ittng-client from git :

<git://git.dorsal.polymtl.ca/git/Ittng-agent.git>

5. Installation (3 of 3)

5.3 Graphical client (on the host)

- 1) Install Eclipse (<http://eclipse.org/>)
- 2) Install Remote System Explorer (RSE) from the Eclipse package manager
- 3) Checkout and install the TCF Eclipse plugins :
<http://dev.eclipse.org/svnroot/dsdp/org.eclipse.tm.tcf/trunk/agent/>
- 4) Checkout and install the Ittng eclipse control plugin from git :
<git://git.dorsal.polymtl.ca/git/Ittng-eclipse-control.git>

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6. Use case (1 of 4)

6.1 Trace a remote system with command line client

1) Create the trace and start the transfer

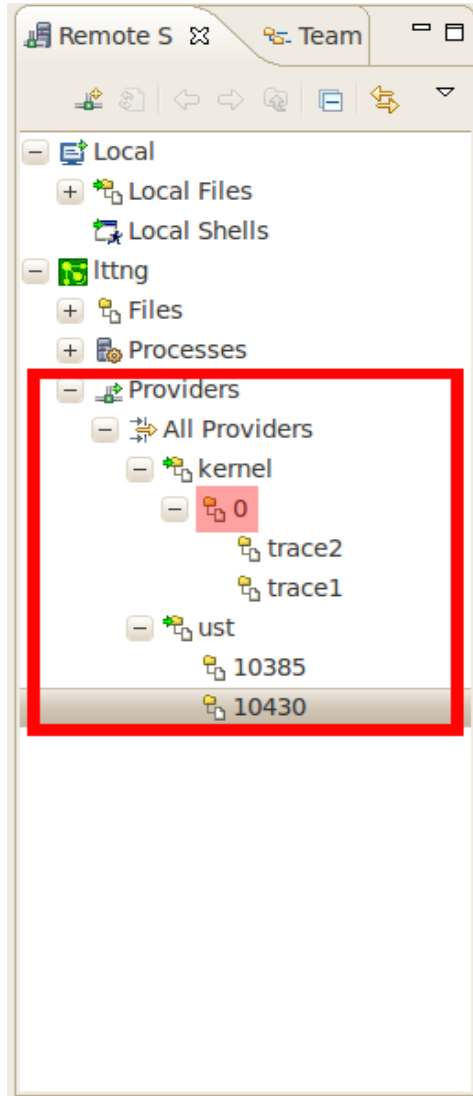
```
rlttctl -H test.domain.org -C -w /tmp/trace1 trace1
```

2) Destroy the trace

```
rlttctl -H test.domain.org -D trace1
```

6. Use case (2 of 4)

6.2 Trace a remote system with the graphical client

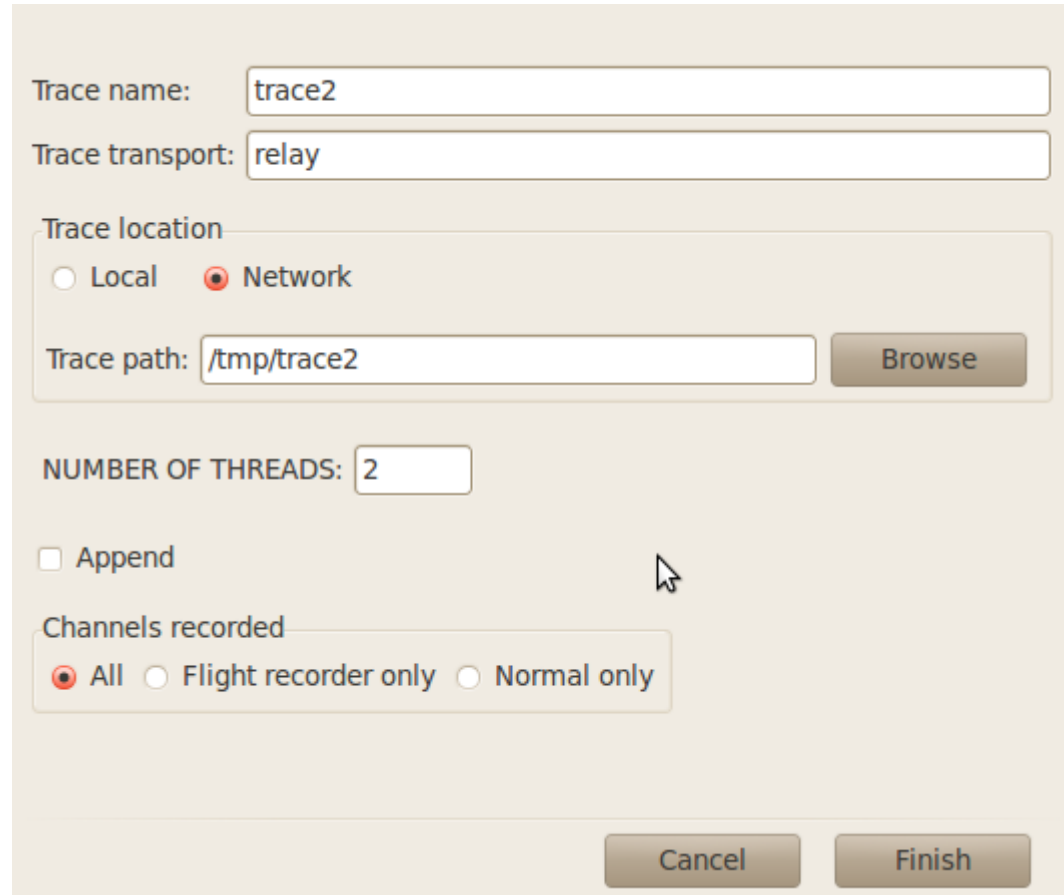
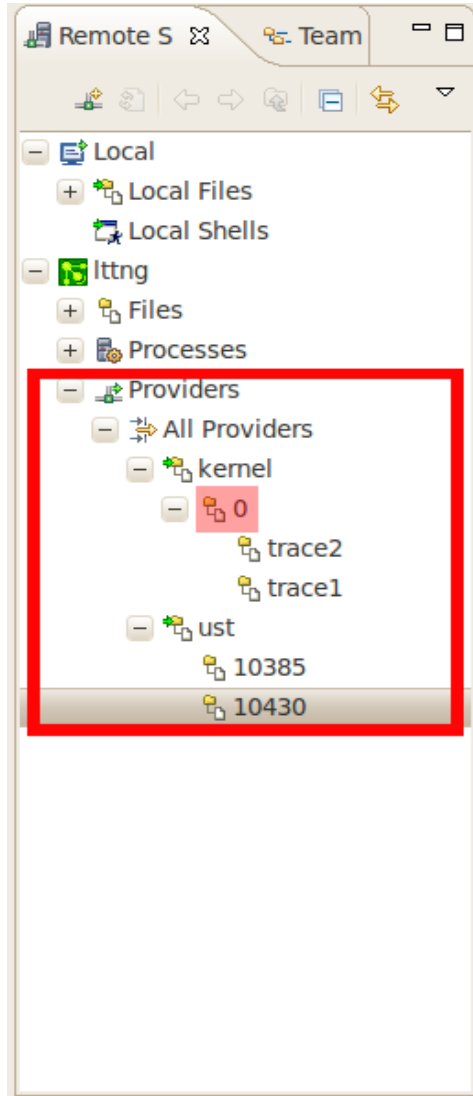


Name	Location	Format	Event_id	Call	Probe single
<input checked="" type="checkbox"/> userspace/event	ltt_userspace_event	"string %s"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> kprobe_state/kprobe_table	ltt_kprobes	"ip 0x%X symbol %s"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> vm_state/vm_map	ltt_statedump	"pid %d start %lu end %lu flags %lu pgoff %lu"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> fd_state/file_descriptor	ltt_statedump	"filename %s pid %d fd %u"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> task_state/process_state	ltt_statedump	"pid %d parent_pid %d name %s type %d mod %d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input checked="" type="checkbox"/> global_state/statedump_end	ltt_statedump	" "	0	0xffffffff810c5c50	0xffffffff810c5720
<input checked="" type="checkbox"/> pm/idle_entry	pm_trace	"irqstate #1%d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> pm/idle_exit	pm_trace	"irqstate #1%d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> pm/suspend_entry	pm_trace	"irqstate #1%d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input checked="" type="checkbox"/> pm/suspend_exit	pm_trace	"irqstate #1%d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> netif_state/network_ipv4_interface	ltt_statedump	"name %s address #n4u%lu up %d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> netif_state/network_ip_interface	ltt_statedump	"name %s address #n4u%lu up %d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> netif_state/insert_ifa_ipv4	net_trace	"label %s address #4u%u"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> netif_state/del_ifa_ipv4	net_trace	"label %s address #4u%u"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> netif_state/insert_ifa_ipv6	net_trace	"label %s a15 #1x%c a14 #1x%c a13 #1x%c a12 #1x%c a11 #1x%c a10 #1x%c a9 #1x%c a8 #1x%c a7 #1x%c a6 #1x%c a5 #1x%c a4 #1x%c a3 #1x%c a2 #1x%c a1 #1x%c"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> net/dev_xmit	net_trace	"skb %p protocol #n2u%hu"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> net/dev_receive	net_trace	"skb %p protocol #n2u%hu"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> net/socket_create	net_trace	"family %d type %d protocol %d sock %p ret %d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> net/socket_bind	net_trace	"fd %d umyaddr %p addrlen %d ret %d"	0	0xffffffff810c5c50	0xffffffff810c5720
<input type="checkbox"/> net/socket_connect	net_trace	"fd %d usevaddr %p addrlen %d ret %d"	0	0xffffffff810c5c50	0xffffffff810c5720

Select All Deselect All Cancel Ok

6. Use case (3 of 4)

6.2 Trace a remote system with the graphical client

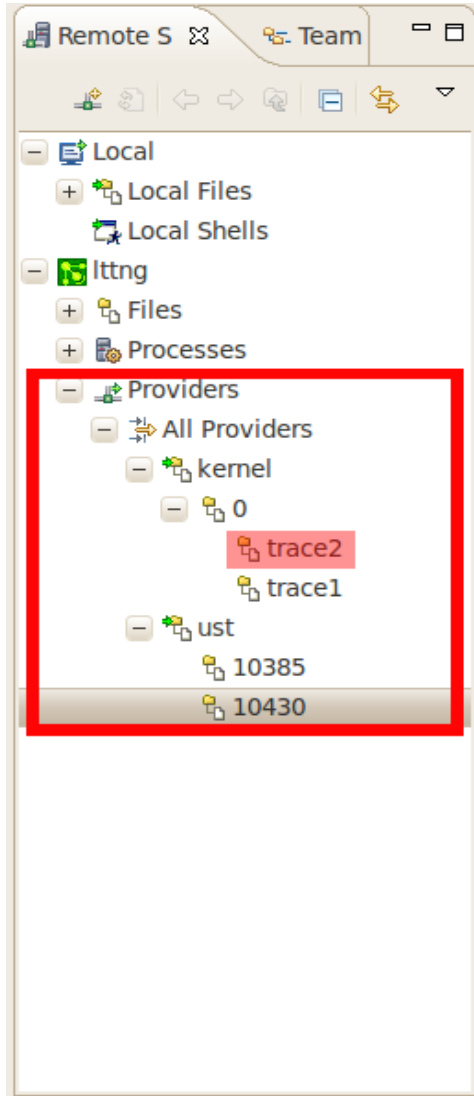


The screenshot shows a configuration dialog for tracing a remote system. The dialog has the following fields and options:

- Trace name:
- Trace transport:
- Trace location:
 - Local
 - Network
- Trace path:
- NUMBER OF THREADS:
- Append
- Channels recorded:
 - All
 - Flight recorder only
 - Normal only
-

6. Use case (4 of 4)

6.2 Trace a remote system with the graphical client



Enable	Name	Flush Timer	Subbuffer Number	Subbuffer Size	Overwrite Mode
<input checked="" type="checkbox"/>	pm	1000	8	1048576	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	fd_state	1000	8	1048576	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	global_state	1000	8	1048576	<input type="checkbox"/>
<input checked="" type="checkbox"/>	netif_state	1000	8	1048576	<input type="checkbox"/>
<input checked="" type="checkbox"/>	metadata	1000	8	1048576	<input type="checkbox"/>

Value:

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7. Future work

- Finish the integration of UST with the Eclipse plugin
- Provide an autotools based build system for TCF
- Integrate the Eclipse Trace Control plugin with TMF
- Update the viewing and analysis tools to take advantage of streaming traces

Questions ?