



FOSDEM2017

L. Miniero

Janus

Where were we?
Admin API

Monitoring

Event Handlers
Homer/HEP

Demo

EchoTest
VideoRoom

Next steps

Asynchronous event/state notifications in the Janus WebRTC server

Providing administrators and developers with more tools to manage a Janus instance

Lorenzo Miniero

 @elminiero

FOSDEM 2017 Real Time devroom
4th February 2017, Brussels 🍰



Outline

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- 1 Janus: a general purpose WebRTC gateway (application) server
Where were we? (FOSDEM 2016)
First take at monitoring: the Admin API
- 2 A new type of Janus plugins: Event Handlers
An asynchronous approach to monitoring/troubleshooting
Real example: integrating Homer as a monitoring framework
- 3 Playing with Event Handlers: a look at the real thing
Monitoring a single PeerConnection: Echo Test
Correlating multiple PeerConnections: Video Room
- 4 Next steps



Janus: a general purpose WebRTC gateway server

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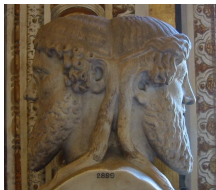
Next steps

- A door between the communications past and future
 - Legacy technologies (the “past”)
 - WebRTC (the “future”)

Janus

General purpose, open source WebRTC gateway

- <https://github.com/meetecho/janus-gateway>
- Demos and documentation: <https://janus.conf.meetecho.com>
- Community: <https://groups.google.com/forum/#!forum/meetecho-janus>





A quick recap: modular architecture

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- The core only implements the WebRTC stack
 - JSEP/SDP, ICE, DTLS-SRTP, Data Channels, ...
- Plugins expose Janus API over different “transports”
 - Currently HTTP / WebSockets / RabbitMQ / Unix Sockets / MQTT
- “Application” logic implemented in plugins too
 - Users attach to plugins via the Janus core
 - The core handles the WebRTC stuff
 - Plugins route/manipulate the media/data
- Plugins can be combined on client side as “bricks”
 - Video SFU, Audio MCU, SIP gatewaying, broadcasting, etc.

FOSDEM 2016 slides

- <http://bit.ly/2jQGsgH>



Anything wrong? Check the Admin API!

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- Requests/response API to interrogate Janus
 - Query server capabilities
 - Control some aspects (e.g., enable/disable debugging)
 - Inspect handles and WebRTC “internals”
 - ... assuming you know the identifiers to query (session/handle)

Sessions (1) ↻

1489448365

Handles (1) ↻

783422373

Handle Info ↻

```
{
  "session_id": 1489448365,
  "handle_id": 783422373,
  "plugin": "janus.plugin.echotest",
  "plugin_specific": {
    "audio_active": "true",
    "video_active": "true",
    "bitrate": 0,
    "slowlink_count": 0,
    "destroyed": 0
  },
  "flags": {
    "processing_offer": 0
```

<http://www.meetecho.com/blog/understanding-the-janus-admin-api/>



Admin API overview: polling for information

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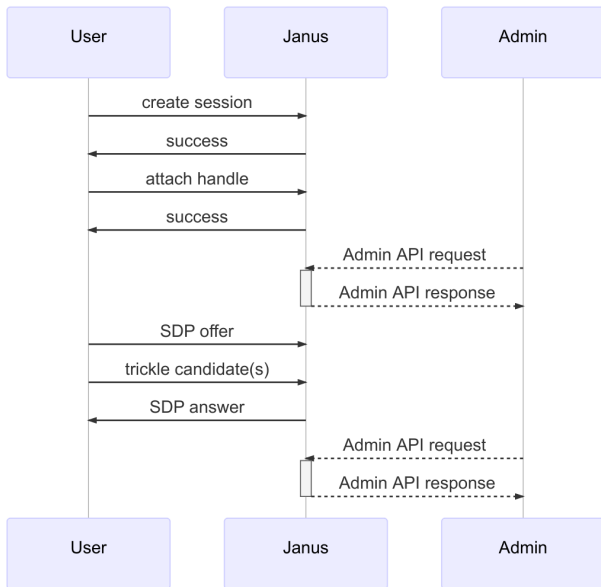
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```
{
  "session_id": 6281631500841242,
  "handle_id": 6383008526518405,
  "plugin": "janus.plugin.echotest",
  [...]
  "plugin_specific": {
    [...]
  },
  "flags": {
    [...]
  },
  "sdps": {
    [...]
  },
  "streams": [
    [...]
  ]
}
```



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```
{
  "session_id": 6281631500841242,
  "handle_id": 6383008526518405,
  "plugin": "janus.plugin.echotest",
  [..]
  "plugin_specific": {
    [..]
  },
  "flags": {
    [..]
  },
  "sdps": {
    [..]
  },
  "streams": [
    [..]
  ]
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```




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{
  "session_id": 6281631500841242,
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  "plugin": "janus.plugin.echotest",
  [..]
  "plugin_specific": {
    [..]
  },
  "flags": {
    [..]
  },
  "sdps": {
    [..]
  },
  "streams": [
    [..]
  ]
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```



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{
  "session_id": 6281631500841242,
  "handle_id": 6383008526518405,
  "plugin": "janus.plugin.echotest",
  [..]
  "plugin_specific": {
    [..]
  },
  "flags": {
    [..]
  },
  "sdps": {
    [..]
  },
  "streams": [
    [..]
  ]
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```



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  "sdps": {
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  },
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```



An asynchronous approach to monitoring/troubleshooting

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- Admin API is cool, but is request/response...
 - Needs you to poll again to see changes
 - Information is lost when session/handle is gone
 - What about an asynchronous approach instead?
- A new mechanism: Event Handlers
 - Core and plugins generate events
 - Shared “header” (e.g., to identify target of event)
 - Different type of events allows for filtering
 - Custom modules can subscribe to and handle them
 - e.g., save to DB, send to external service, CDR, etc.
 - *Sample Event Handler* forwards JSON events via HTTP
 - Third-party plugins may provide integration with existing frameworks



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Event Handlers overview: routing and managing async events

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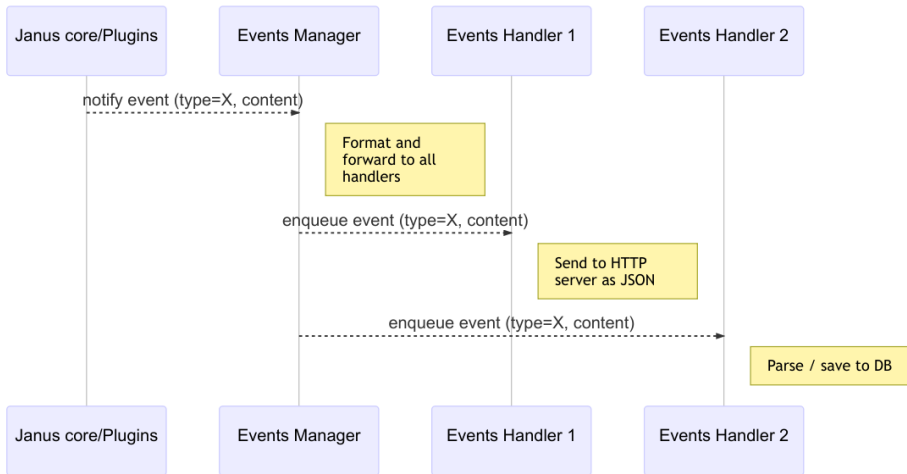
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Type of events

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- Different events you can subscribe to
 - Session related events (e.g., session created/destroyed, etc.)
 - Handle related events (e.g., handle attached/detached, etc.)
 - JSEP related events (e.g., got/sent offer/answer)
 - WebRTC related events (e.g., PeerConnection up/down, ICE state changes, DTLS state, etc.)
 - Media related events (e.g., media started/stopped flowing, stats on packets/bytes, etc.)
 - Plugin-originated events (specific to the application)
 - Transport-originated (specific to the transport)
- Correlation possible on different identifiers
 - Transport instances that originate specific session
 - Opaque ID applications can set on handles of same “user”
 - Plugin-specific identifiers (e.g., in VideoRoom)



Type of events

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Sample Event Handler: a first proof-of-concept

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- Example of Event Handler we provide out of the box
- Simply forwards all events as JSON to an HTTP backend
 - Supports basic authentication
 - Can group events (i.e., JSON array vs. multiple JSON objects)
 - Implements simple retransmission (exponential back-off)
- Does nothing more than that: logic needs to be elsewhere
 - HTTP backend decides what to do with events, if anything
 - Demo in a minute to show exactly that!
- May be extended later on with different transports
 - e.g., WebSockets, RabbitMQ, etc.
 - ... or does this belong to different handlers entirely?



Sample Event Handler example: notifying an Admin application

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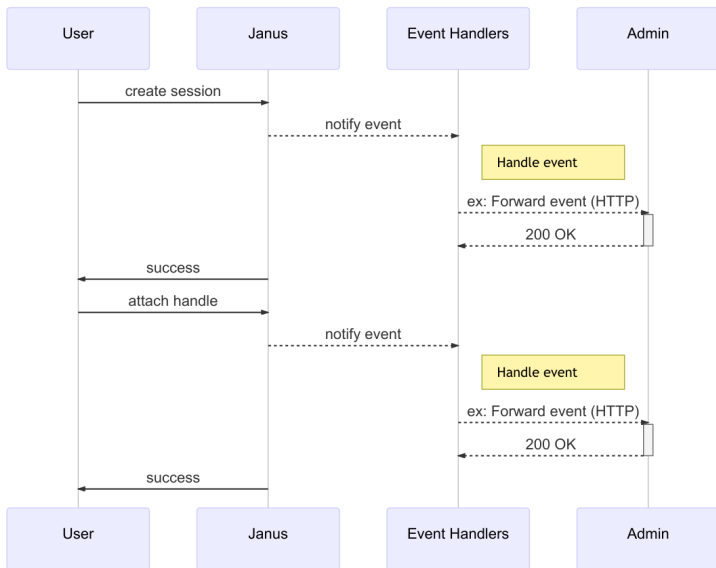
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Sample Event Handler example: notifying an Admin application

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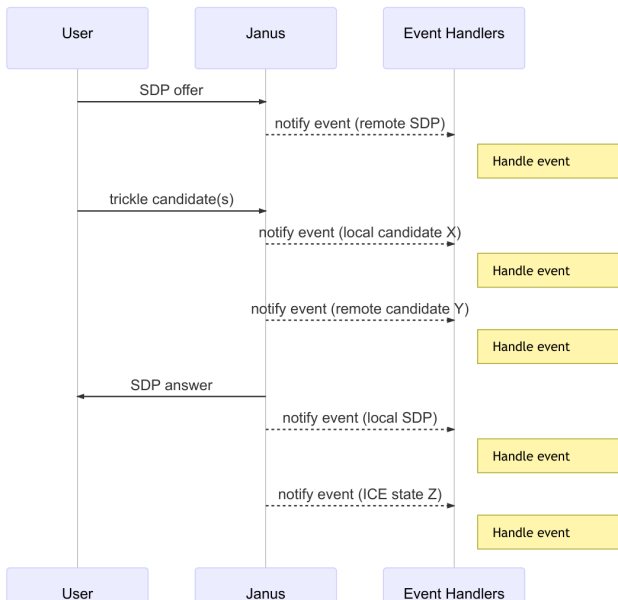
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Meetecho+Janus+Homer: awesome on multiple levels!

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<https://www.youtube.com/watch?v=TkgDOMSv9PE>



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Next steps

- Sample Event Handler forwards all events to web backend
- node.js web backend saves events to DB

Janus WebRTC Gateway

localhost:8000/echotest.html

Meetecho

Plugin Demo: Echo Test

Local Stream

Remote Stream

Write a DataChannel message

<http://www.meetecho.com/blog/event-handlers-a-practical-example/>



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```
{
  "type": 1,
  "timestamp": 1485872279008725,
  "session_id": 192621687169800,
  "event": {
    "name": "created",
    "transport": {
      "transport": "janus.transport.http",
      "id": "0x60e00003e160"
    }
  }
}
```



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      "transport": "janus.transport.http",  
      "id": "0x60e00003e160"  
    }  
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Next steps

```
{
  "type": 2,
  "timestamp": 1485872279029549,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "name": "attached",
    "plugin": "janus.plugin.echotest",
    "opaque_id": "echotest-17jLWaHvyU9q"
  }
}
```



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```
{  
  "type": 2,  
  "timestamp": 1485872279029549,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "name": "attached",  
    "plugin": "janus.plugin.echotest",  
    "opaque_id": "echotest-17jLWaHvyU9q"  
  }  
}
```



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```
{
  "type": 2,
  "timestamp": 1485872279029549,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "name": "attached",
    "plugin": "janus.plugin.echotest",
    "opaque_id": "echotest-17jLWaHvyU9q"
  }
}
```



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```
{
  "type": 8,
  "timestamp": 1485872279129034,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "owner": "remote",
    "jsep": {
      "type": "offer",
      "sdp": "v=0\r\n[...]"
    }
  }
}
```




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```
{
  "type": 8,
  "timestamp": 1485872279129034,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "owner": "remote",
    "jsep": {
      "type": "offer",
      "sdp": "v=0\r\n[...]"
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```
{
  "type": 8,
  "timestamp": 1485872279129034,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
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      "sdp": "v=0\r\n[...]"
    }
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```
{
  "type": 8,
  "timestamp": 1485872279131464,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "owner": "local",
    "jsep": {
      "type": "answer",
      "sdp": "v=0\r\n[...]"
    }
  }
}
```



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```
{
  "type": 8,
  "timestamp": 1485872279131464,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "owner": "local",
    "jsep": {
      "type": "answer",
      "sdp": "v=0\r\n[...]"
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```
{
  "type": 8,
  "timestamp": 1485872279131464,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "owner": "local",
    "jsep": {
      "type": "answer",
      "sdp": "v=0\r\n[...]"
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```
{
  "type": 16,
  "timestamp": 1485872279153835,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "ice": "connecting",
    "stream_id": 1,
    "component_id": 1
  }
}
```



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{  
  "type": 16,  
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  "type": 16,  
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{
  "type": 16,
  "timestamp": 1485872279230699,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "ice": "connected",
    "stream_id": 1,
    "component_id": 1
  }
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{
  "type": 16,
  "timestamp": 1485872279349240,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "selected-pair": "192.168.1.69:33755 [host,udp]
                    <-> 192.168.1.69:55537 [host,udp]",
    "stream_id": 1,
    "component_id": 1
  }
}
```



Monitoring a single PeerConnection: Echo Test

FOSDEM2017

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Janus

Where were we?
Admin API

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Next steps

```
{
  "type": 16,
  "timestamp": 1485872279349240,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "selected-pair": "192.168.1.69:33755 [host,udp]
                    <-> 192.168.1.69:55537 [host,udp]",
    "stream_id": 1,
    "component_id": 1
  }
}
```



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Next steps

```
{
  "type": 16,
  "timestamp": 1485872279349713,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "dtls": "trying",
    "stream_id": 1,
    "component_id": 1
  }
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{  
  "type": 16,  
  "timestamp": 1485872279349713,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "dtls": "trying",  
    "stream_id": 1,  
    "component_id": 1  
  }  
}
```



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Next steps

```
{  
  "type": 16,  
  "timestamp": 1485872279349713,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "dtls": "trying",  
    "stream_id": 1,  
    "component_id": 1  
  }  
}
```



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Next steps

```
{
  "type": 16,
  "timestamp": 1485872279361899,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "dtls": "connected",
    "stream_id": 1,
    "component_id": 1
  }
}
```




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VideoRoom

Next steps

```
{  
  "type": 16,  
  "timestamp": 1485872279361899,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "dtls": "connected",  
    "stream_id": 1,  
    "component_id": 1  
  }  
}
```



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Next steps

```
{
  "type": 16,
  "timestamp": 1485872279362615,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "connection": "webrtcup"
  }
}
```



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Next steps

```
{  
  "type": 16,  
  "timestamp": 1485872279362615,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "connection": "webrtcup"  
  }  
}
```



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Next steps

```
{  
  "type": 16,  
  "timestamp": 1485872279362615,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "connection": "webrtcup"  
  }  
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{
  "type": 32,
  "timestamp": 1485872279386850,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "media": "audio",
    "receiving": true
  }
}
```



Monitoring a single PeerConnection: Echo Test

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Where were we?

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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872279386850,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "audio",  
    "receiving": true  
  }  
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872279386850,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "audio",  
    "receiving": true  
  }  
}
```



Monitoring a single PeerConnection: Echo Test

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Where were we?

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Next steps

```
{
  "type": 32,
  "timestamp": 1485872279559121,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "media": "video",
    "receiving": true
  }
}
```




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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872279559121,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "video",  
    "receiving": true  
  }  
}
```



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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872279559121,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "video",  
    "receiving": true  
  }  
}
```



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Next steps

```
{
  "type": 32,
  "timestamp": 1485872280230983,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "media": "audio",
    "base": 48000,
    "lsr": 454522762,
    "lost": 0,
    "lost-by-remote": 0,
    "jitter-local": 134488,
    "jitter-remote": 0,
    "packets-received": 43,
    "packets-sent": 43,
    "bytes-received": 4089,
    "bytes-sent": 4519,
    "nacks-received": 0,
    "nacks-sent": 0
  }
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872280230983,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "audio",  
    "base": 48000,  
    "lsr": 454522762,  
    "lost": 0,  
    "lost-by-remote": 0,  
    "jitter-local": 134488,  
    "jitter-remote": 0,  
    "packets-received": 43,  
    "packets-sent": 43,  
    "bytes-received": 4089,  
    "bytes-sent": 4519,  
    "nacks-received": 0,  
    "nacks-sent": 0  
  }  
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872280230983,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "audio",  
    "base": 48000,  
    "lsr": 454522762,  
    "lost": 0,  
    "lost-by-remote": 0,  
    "jitter-local": 134488,  
    "jitter-remote": 0,  
    "packets-received": 43,  
    "packets-sent": 43,  
    "bytes-received": 4089,  
    "bytes-sent": 4519,  
    "nacks-received": 0,  
    "nacks-sent": 0  
  }  
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872281236922,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "audio",  
    "base": 48000,  
    "lsr": 454522762,  
    "lost": 0,  
    "lost-by-remote": 0,  
    "jitter-local": 5338,  
    "jitter-remote": 0,  
    "packets-received": 93,  
    "packets-sent": 93,  
    "bytes-received": 8940,  
    "bytes-sent": 9870,  
    "nacks-received": 0,  
    "nacks-sent": 0  
  }  
}
```



Monitoring a single PeerConnection: Echo Test

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Demo

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Next steps

```
{
  "type": 32,
  "timestamp": 1485872280231007,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "media": "video",
    "base": 90000,
    "lsr": 454528520,
    "lost": 0,
    "lost-by-remote": 0,
    "jitter-local": 42459,
    "jitter-remote": 3,
    "packets-received": 45,
    "packets-sent": 45,
    "bytes-received": 22779,
    "bytes-sent": 23229,
    "nacks-received": 0,
    "nacks-sent": 0
  }
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872280231007,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "video",  
    "base": 90000,  
    "lsr": 454528520,  
    "lost": 0,  
    "lost-by-remote": 0,  
    "jitter-local": 42459,  
    "jitter-remote": 3,  
    "packets-received": 45,  
    "packets-sent": 45,  
    "bytes-received": 22779,  
    "bytes-sent": 23229,  
    "nacks-received": 0,  
    "nacks-sent": 0  
  }  
}
```




Monitoring a single PeerConnection: Echo Test

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Janus

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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872280231007,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "video",  
    "base": 90000,  
    "lsr": 454528520,  
    "lost": 0,  
    "lost-by-remote": 0,  
    "jitter-local": 42459,  
    "jitter-remote": 3,  
    "packets-received": 45,  
    "packets-sent": 45,  
    "bytes-received": 22779,  
    "bytes-sent": 23229,  
    "nacks-received": 0,  
    "nacks-sent": 0  
  }  
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{  
  "type": 32,  
  "timestamp": 1485872281236949,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "media": "video",  
    "base": 90000,  
    "lsr": 454619874,  
    "lost": 0,  
    "lost-by-remote": 0,  
    "jitter-local": 6537,  
    "jitter-remote": 2,  
    "packets-received": 74,  
    "packets-sent": 74,  
    "bytes-received": 39933,  
    "bytes-sent": 40673,  
    "nacks-received": 0,  
    "nacks-sent": 0  
  }  
}
```



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Next steps

```
{
  "type": 64,
  "timestamp": 1485872288429976,
  "session_id": 192621687169800,
  "handle_id": 7684775393694722,
  "event": {
    "plugin": "janus.plugin.echotest",
    "data": {
      "audio_active": true,
      "video_active": true,
      "bitrate": 256000
    }
  }
}
```



Monitoring a single PeerConnection: Echo Test

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Next steps

```
{  
  "type": 64,  
  "timestamp": 1485872288429976,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "plugin": "janus.plugin.echotest",  
    "data": {  
      "audio_active": true,  
      "video_active": true,  
      "bitrate": 256000  
    }  
  }  
}
```



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Next steps

```
{  
  "type": 64,  
  "timestamp": 1485872288429976,  
  "session_id": 192621687169800,  
  "handle_id": 7684775393694722,  
  "event": {  
    "plugin": "janus.plugin.echotest",  
    "data": {  
      "audio_active": true,  
      "video_active": true,  
      "bitrate": 256000  
    }  
  }  
}
```



Correlating multiple PeerConnections: Video Room

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Next steps

- VideoRoom demo uses “opaque ID” with handles for correlation
- Again, node.js web backend stores events in updated DB

Janus WebRTC Gateway

localhost:8000/video room test.html

Meetecho

Plugin Demo: Video Room

Local Video **titiclio**

Remote Video #1 **pippo**

Remote Video #2

Remote Video #3

Remote Video #4

Remote Video #5

<http://www.meetecho.com/blog/correlating-janus-event-handlers/>



Correlating multiple PeerConnections: Video Room

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Next steps

```
{
  "type": 64,
  "timestamp": 1485877400989640,
  "session_id": 6706708418803609,
  "handle_id": 5978921396405279,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "joined",
      "room": 1234,
      "id": 8361242010771549,
      "private_id": 2895980005,
      "display": "ciccio"
    }
  }
}
```



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Next steps

```
{
  "type": 64,
  "timestamp": 1485877400989640,
  "session_id": 6706708418803609,
  "handle_id": 5978921396405279,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "joined",
      "room": 1234,
      "id": 8361242010771549,
      "private_id": 2895980005,
      "display": "ciccio"
    }
  }
}
```




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VideoRoom

Next steps

```
{
  "type": 64,
  "timestamp": 1485877400989640,
  "session_id": 6706708418803609,
  "handle_id": 5978921396405279,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "joined",
      "room": 1234,
      "id": 8361242010771549,
      "private_id": 2895980005,
      "display": "ciccio"
    }
  }
}
```



Correlating multiple PeerConnections: Video Room

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Where were we?

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Demo

EchoTest

VideoRoom

Next steps

```
{
  "type": 64,
  "timestamp": 1485877410046996,
  "session_id": 2273950556695883,
  "handle_id": 7656381184336435,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "joined",
      "room": 1234,
      "id": 5265065137454348,
      "private_id": 935695062,
      "display": "pippo"
    }
  }
}
```



Correlating multiple PeerConnections: Video Room

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VideoRoom

Next steps

```
{
  "type": 64,
  "timestamp": 1485877410046996,
  "session_id": 2273950556695883,
  "handle_id": 7656381184336435,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "joined",
      "room": 1234,
      "id": 5265065137454348,
      "private_id": 935695062,
      "display": "pippo"
    }
  }
}
```



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Next steps

```
{
  "type": 64,
  "timestamp": 1485877410046996,
  "session_id": 2273950556695883,
  "handle_id": 7656381184336435,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "joined",
      "room": 1234,
      "id": 5265065137454348,
      "private_id": 935695062,
      "display": "pippo"
    }
  }
}
```



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Next steps

```
{
  "type": 64,
  "timestamp": 1485877410162143,
  "session_id": 2273950556695883,
  "handle_id": 3756409443147593,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "subscribing",
      "room": 1234,
      "feed": 8361242010771549,
      "private_id": 935695062
    }
  }
}
```



Correlating multiple PeerConnections: Video Room

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Next steps

```
{
  "type": 64,
  "timestamp": 1485877410162143,
  "session_id": 2273950556695883,
  "handle_id": 3756409443147593,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "subscribing",
      "room": 1234,
      "feed": 8361242010771549,
      "private_id": 935695062
    }
  }
}
```



Correlating multiple PeerConnections: Video Room

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Next steps

```
{
  "type": 64,
  "timestamp": 1485877410162143,
  "session_id": 2273950556695883,
  "handle_id": 3756409443147593,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "subscribing",
      "room": 1234,
      "feed": 8361242010771549,
      "private_id": 935695062
    }
  }
}
```



Correlating multiple PeerConnections: Video Room

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Next steps

```
{
  "type": 64,
  "timestamp": 1485877414055211,
  "session_id": 6706708418803609,
  "handle_id": 6827135960427146,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "subscribing",
      "room": 1234,
      "feed": 5265065137454348,
      "private_id": 2895980005
    }
  }
}
```




Correlating multiple PeerConnections: Video Room

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Janus

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```
{
  "type": 64,
  "timestamp": 1485877414055211,
  "session_id": 6706708418803609,
  "handle_id": 6827135960427146,
  "event": {
    "plugin": "janus.plugin.videoroom",
    "data": {
      "event": "subscribing",
      "room": 1234,
      "feed": 5265065137454348,
      "private_id": 2895980005
    }
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```



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    "plugin": "janus.plugin.videoroom",
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      "feed": 5265065137454348,
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```
{
  "type": 2,
  "timestamp": 1485877399393018,
  "session_id": 6706708418803609,
  "handle_id": 5978921396405279,
  "event": {
    "name": "attached",
    "plugin": "janus.plugin.videoroom",
    "opaque_id": "videoroomtest-3REdGHcrZPMk"
  }
}
```

```
{
  "type": 2,
  "timestamp": 1485877408504312,
  "session_id": 2273950556695883,
  "handle_id": 7656381184336435,
  "event": {
    "name": "attached",
    "plugin": "janus.plugin.videoroom",
    "opaque_id": "videoroomtest-vZEKMO4F5JiL"
  }
}
```

```
{
  "type": 2,
  "timestamp": 1485877410137130,
  "session_id": 2273950556695883,
  "handle_id": 3756409443147593,
  "event": {
    "name": "attached",
    "plugin": "janus.plugin.videoroom",
    "opaque_id": "videoroomtest-vZEKMO4F5JiL"
  }
}
```

```
{
  "type": 2,
  "timestamp": 1485877414039724,
  "session_id": 6706708418803609,
  "handle_id": 6827135960427146,
  "event": {
    "name": "attached",
    "plugin": "janus.plugin.videoroom",
    "opaque_id": "videoroomtest-3REdGHcrZPMk"
  }
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 - Publishing with ID **8361242010771549** (handle 5978921396405279)
 - Subscribed to ID **5265065137454348** (handle 6827135960427146)
- **pippo** (2273950556695883 / videoroomtest-vZEKMO4F5JiL)
 - Publishing with ID **5265065137454348** (handle 7656381184336435)
 - Subscribed to ID **8361242010771549** (handle 3756409443147593)
- Hey, they're both publishing and subscribed to each other! (d'uh...)
 - PS: did you notice *private_id*? It can also help, in VideoRoom...
 - PPS: What about transports? (spoiler alert: both used HTTP)



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Next steps

- Event Handlers are a very recent addition
 - Still figuring out if existing events are enough
 - Are the correlation identifiers sufficient?
 - Experimenting with this will give us more info
- Hopefully more Event Handlers in the future
 - Homer/HEP native module on the way!
 - Other cool ideas for features/integration?
- Monitoring/troubleshooting framework
 - Student working on it (Master Degree thesis)

Help us improve this!

- Play with it, more testing is important
- Write your own applications/handlers!



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Questions?

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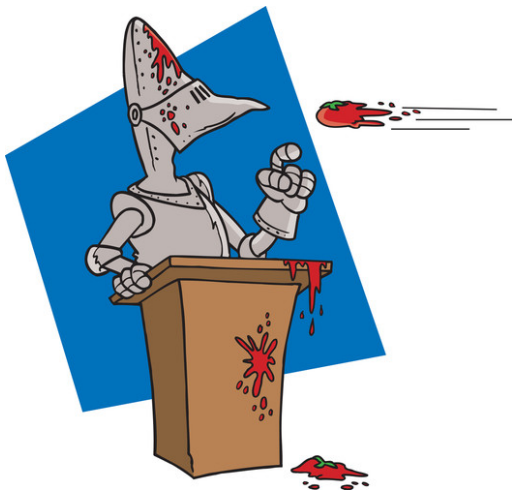
Homer/HEP

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Next steps



 @elminiero
 @meetecho