Juniper Event Driven Infrastructure

Junos configuration continuous backup

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OVERVIEW OF THE DEMO

- At each new Junos commit, SaltStack automatically backs up the new Junos configuration file on a Gitlab server

- Benefits are:
  - Archive automatically new junos configuration files with timestamps and user on gitlab
  - Provides history of each configuration file, so we can compare easily changes between 2 configuration files
  - Provides who did which change, and when that happens

Juniper Event Driven Infrastructure (J-EDI)

- Uses regular/native SaltStack building blocks
  - Salt master, minions, event bus, reactor, …
  - Salt proxies for Junos (Juniper contribution to SaltStack)
  - Salt sls and execution modules for Junos (Juniper contribution to SaltStack)
  - Salt junos_syslog engines (Juniper contribution to SaltStack)

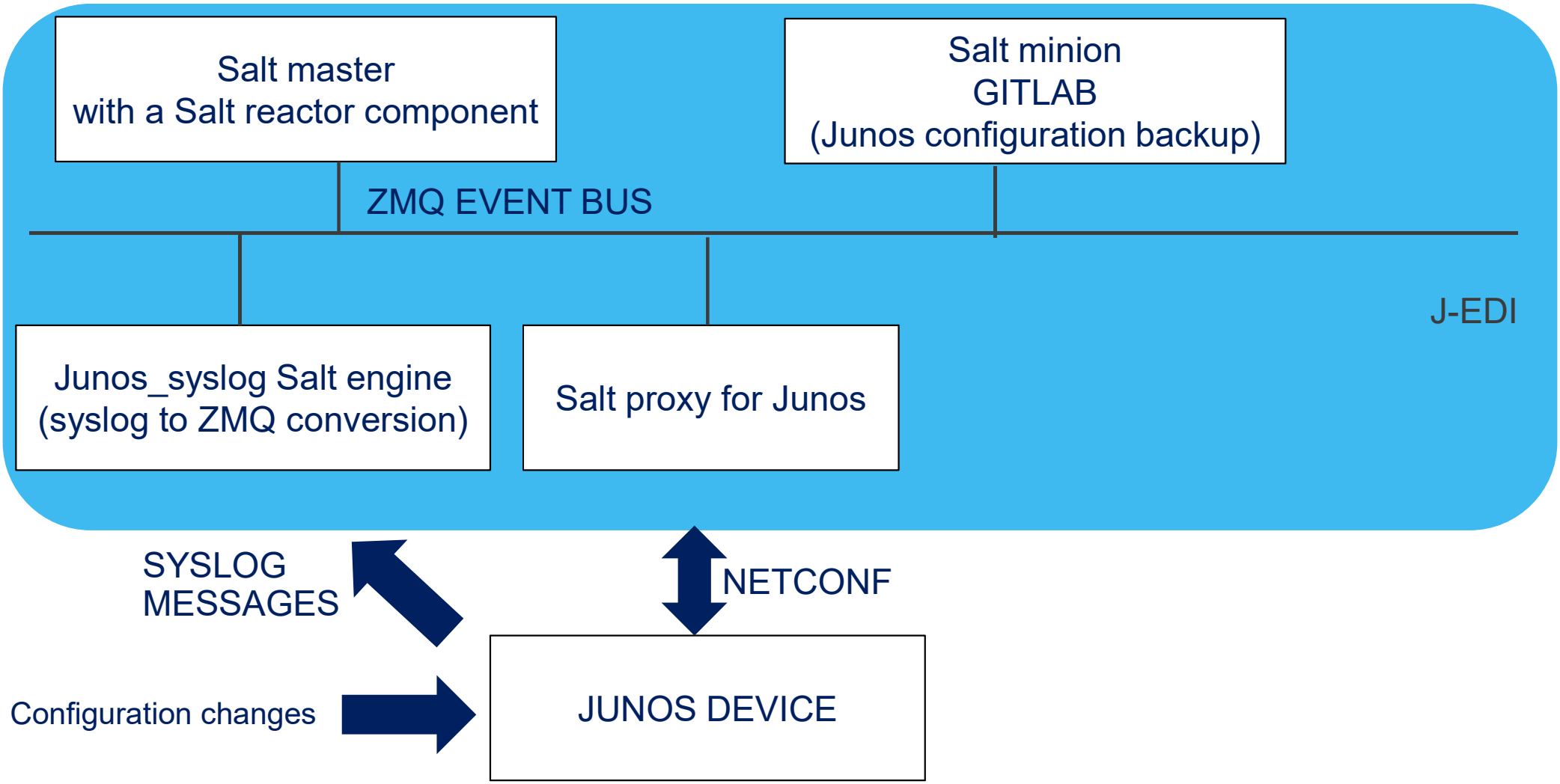
- Uses the event bus as an automation backplane

- Loosely couples a growing collection of open-source and Juniper maintained tools
  - Junos Space, JSNAPy, OpenNTI, Appformix, Juniper Secure Analytics, Request Tracker 4, …

- Is developed by Juniper. Is installed, configured, and supported by Juniper Professional Services.

J-EDI PLUGINS USED FOR THIS DEMO

- Junos Backup plugin
  - To automate JUNOS configuration backup on a GITLAB server at each JUNOS commit.



SALT PROXY for JUNOS

- For help about Junos automation with SaltStack, you can visit this repository https://github.com/ksator/junos-automation-with-saltstack

- SaltStack supports Junos automation with a Salt proxy
  - Proxy controls junos devices without installing salt on device.
  - It uses Junos API: junos-eznc python library (pyez) and NETCONF on the device.

- It provides execution modules for Junos so you can run commands on various machines in parallel with a flexible targeting system
  - https://docs.saltstack.com/en/latest/ref/modules/all/salt.modules.junos.html

- It provides state modules for Junos so you can apply sls files
  - https://docs.saltstack.com/en/latest/ref/states/all/salt.states.junos.html

- Junos facts are stored in salt grains

SALT PROXY for JUNOS

```
root@JEDI-cluster-demo:~# salt 'vsrx' test.ping
vsrx:
    True

root@JEDI-cluster-demo:~# salt 'vsrx' junos.cli 'show version'
vsrx:
    ----------
    message:

        Hostname: vsrx
        Model: vsrx
        Junos: 15.1X49-D100.6
        JUNOS Software Release [15.1X49-D100.6]
    out:
        True
```

JUNOS SYSLOG SALT ENGINE

- Listens to syslog events
- Extracts events information
- Sends information on the master/minion event bus.
- Control the type of events to be sent.
- Salt reactors has the ability to take actions according to these events (event driven automation).

- Junos_syslog engine configuration

```
root@JEDI-cluster-demo:~# more /etc/salt/master
...
engines:
  - junos_syslog:
      port: 516
...
```

JUNOS SYSLOG CONFIGURATION

- For junos_syslog engine to receive events, syslog must be set on the junos device:
  - The ip address is the one of the server running the syslog engine
  - The port is the port where the engine is listening for events.

```
root@JEDI-cluster-demo:~# salt -G 'junos_facts:model:VMX' state.apply junos.syslog
```

```
lab@dc-vmx-2> show system commit
0   2017-11-27 12:17:33 UTC by SaltStack via netconf
    configured with SaltStack using the model syslog

lab@dc-vmx-2> show configuration system syslog host 172.30.52.150
any any;
match UI_COMMIT_COMPLETED;
port 516;
```

SALTSTACK REACTOR CONFIGURATION

```
root@JEDI-cluster-demo:~# salt-run reactor.list
....
|_
  ----------
  jnpr/syslog/*/UI_COMMIT_COMPLETED:
      - /srv/reactor/junos_backup.sls
```

This 0MQ is pub by junos_syslog salt engine

This reactor file backup the junos configuration on gitllab

DEMO

EVENT DRIVEN AUTOMATION

- A human or a process commits a configuration change on a junos device
  - The junos device sends a UI_COMMIT_COMPLETED syslog message to SaltStack
    - The SaltStack junos_syslog engine publishes a 0MQ message
- The reactor component of the master is subscribing to this 0MQ topic
  - So it executes sls files
    - To backup the new configuration file in a git repository
    - To run a configuration compliance test using JSNAPy.
      - As this configuration change is permitted, the compliance test passes
- No other action is automated

COMMIT A PERMITTED CHANGE ON JUNOS

- Commit a configuration change on a junos device:

```
ksator@vsrx# set system login message "welcome to J-EDI demo"

[edit]
ksator@vsrx# show | compare
[edit system login]
+   message "welcome to J-EDI demo";

[edit]
ksator@vsrx# commit and-quit
commit complete
Exiting configuration mode

ksator@vsrx> show system commit
0   2017-11-05 21:58:59 UTC by ksator via cli
```

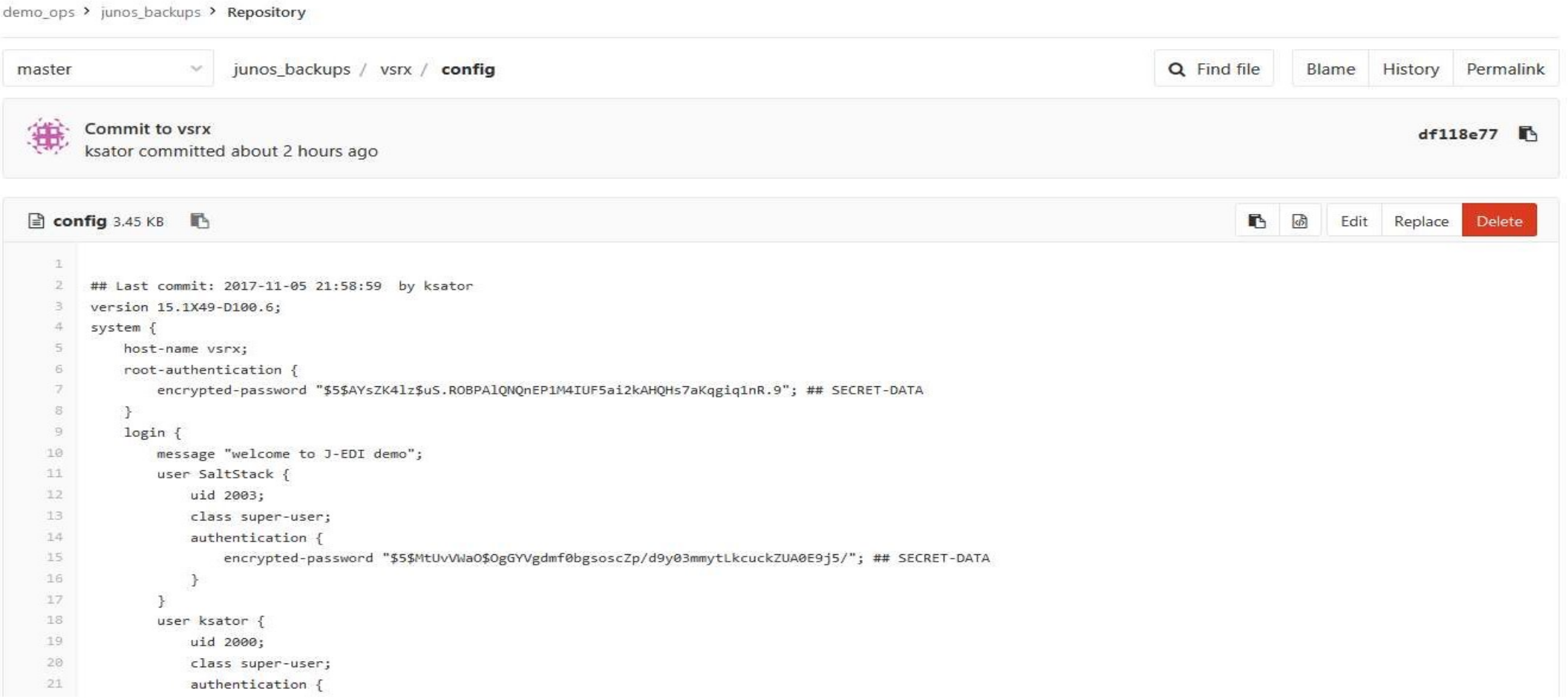
TCPDUMP OUTPUT ON JUNOS_SYSLOG ENGINE

```
root@JEDI-cluster-demo:~# tcpdump -i ens33 port 516 -XX
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on ens33, link-type EN10MB (Ethernet), capture size 262144 bytes
14:00:02.817674 IP 192.168.233.165.syslog > cluster.516: SYSLOG
local7.warning, length: 74
        0x0000:  000c 29fd f54a 000c 2973 7ad1 0800 4500  ..)..J..)sz...E.
        0x0010:  0066 8967 0000 4011 9c5c c0a8 e9a5 c0a8  .f.g..@..\......
        0x0020:  e9cc 0202 0204 0052 68a4 3c31 3838 3e4e  .......Rh.<188>N
        0x0030:  6f76 2020 3620 3030 3a31 313a 3238 2076  ov..6.00:11:28.v
        0x0040:  7372 7820 6d67 645b 3833 3731 325d 3a20  srx.mgd[83712]:.
        0x0050:  5549 5f43 4f4d 4d49 545f 434f 4d50 4c45  UI_COMMIT_COMPLE
        0x0060:  5445 443a 2063 6f6d 6d69 7420 636f 6d70  TED:.commit.comp
        0x0070:  6c65 7465                                lete
```

EVENT PUBLISHED BY JUNOS_SYSLOG SALT ENGINE


```
jnpr/syslog/vsrx/UI_COMMIT_COMPLETED    {
    "_stamp": "2017-11-15T13:00:02.849128",
    "daemon": "mgd",
    "event": "UI_COMMIT_COMPLETED",
    "facility": 23,
    "hostip": "192.168.233.165",
    "hostname": "vsrx",
    "message": "commit complete",
    "pid": "83712",
    "priority": 188,
    "raw": "<188>Nov  6 00:11:28 vsrx mgd[83712]: UI_COMMIT_COMPLETED: commit
complete",
    "severity": 4,
    "timestamp": "2017-11-15 14:00:02"
}
```

ENTIRE CONFIGURATION IS PLACED INTO GITLAB



BACKUP HISTORY INTO GITLAB

- Backup history shows the configuration change details and the timestamp and the user

JUNOS AUTOMATION RESOURCES

If you are looking for more details about Junos automation, you can visit these repositories
https://github.com/ksator?tab=repositories
https://gitlab.com/users/ksator/projects
https://gist.github.com/ksator/


Thank you