CONFIGURATION AUDIT ENGINE {{ CAE }}

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June 2018

AGENDA

❑ Configuration Compliance.

❑ CAE's Gold Standard | Policy & Runtime Configurations.

❑ CAE's Conceptual Architecture.

❑ CAE's Reference & Working Architecture.

❑ CAE's Enhanced Architecture.

❑ CAE Demo.

CONFIGURATION COMPLIANCE

VNF1-Instances

Configuration Accuracy | Compliance of Network Elements (NE) is a continuous operations challenge.
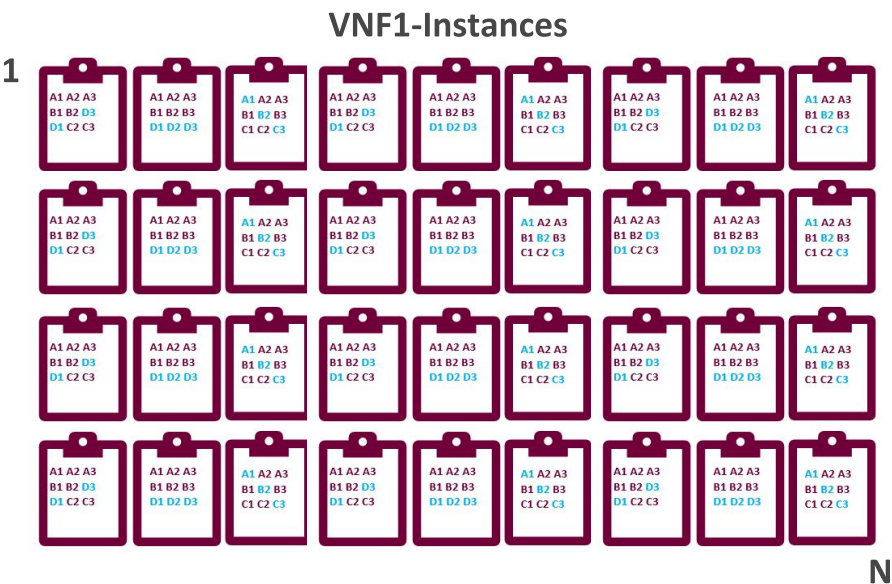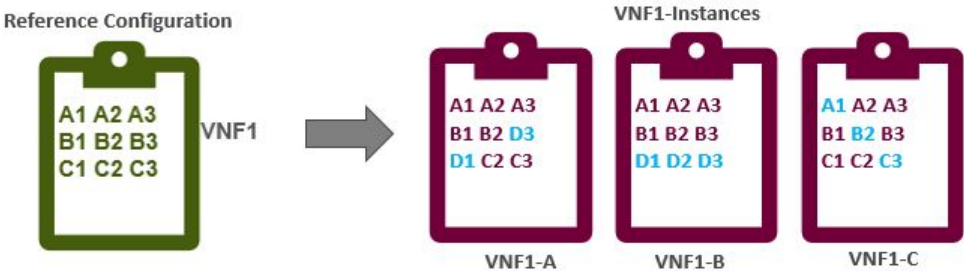
Active Configuration not aligned to reference Configuration.

What to do ?

Let's Audit the VNFs configuration periodically to discover unaligned settings.

What do we need?

❏ **A "Reference Configuration" we could use as a reference to compare.**

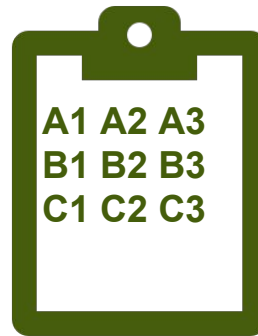❏ **The actual VNF's "runtime configuration".**

REFERENCE CONFIGURATION

The desired configuration state for any given VNF at the Production Network.

❑ **Normally kept by different and specific teams or VNF owners.**

❑ **Different Methodologies and Data formats used among VNFs, e.g. Excel Sheets, Word Docs.**
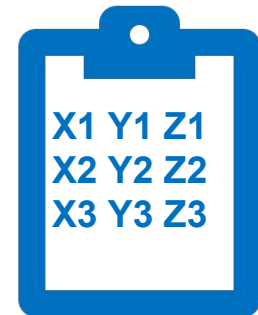
TEAM 1 OPS

A1 A2 A3 B1 B2 B3 C1 C2 C3 VNF1

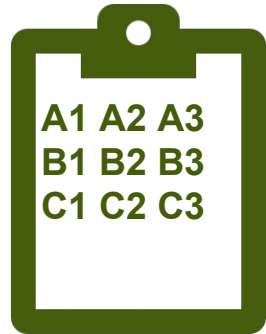**TEAM 2 OPS + VNF Vendor**

X1 Y1 Z1 X2 Y2 Z2 X3 Y3 Z3 VNF2

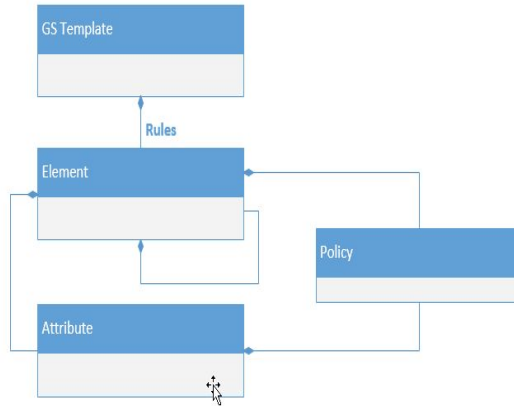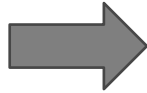# How to normalize this data?

- ❑ **A "Data Model", for normalizing Gold Standard Configuration.**

- ❑ **An "Audit Policy Definition" to govern audit actions.**
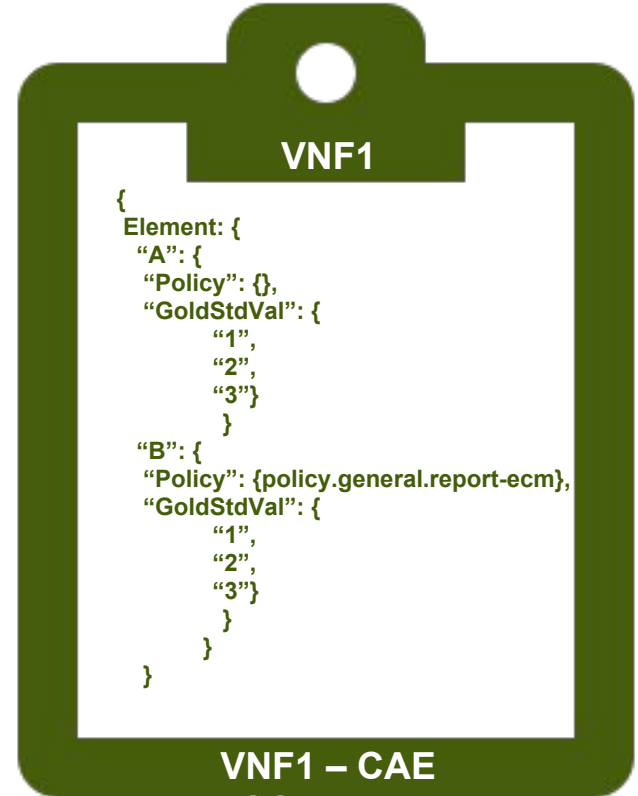
CAE – GOLD STANDARD DATA MODEL

CAE Defines and Implements a "Model Driven VNF Configuration (based on JSON) for abstracting VNFs Gold Standard Configurations governed by well defined / established & customizable policies.

A1 A2 A3
B1 B2 B3
C1 C2 C3

VNF1

GS Template

Rules

Element

Policy

Attribute

CAE Gold STD Data Model

VNF1

```
{
  Element: {
    "A": {
      "Policy": {},
      "GoldStdVal": {
        "1",
        "2",
        "3"}
      }
    "B": {
      "Policy": {policy.general.report-ecm},
      "GoldStdVal": {
        "1",
        "2",
        "3"}
      }
    }
}
```

VNF1 – CAE

CAE - POLICY

A Global JSON based document defining the "IF" "THEN" "ACTIONS" associated to CAE Policies conditions (NIT, NIC , MOD, OK, FAILED)

Conditions:

NIT (Not In Template) : the tag/variable is not in the template

NIC (Not In Config) : the tag/variable is not in the configuration

MOD (Modification) : for future use

OK : The value of the tag/variable matches the string or regular expression

FAIL : The value of the tag/variable does not match the string or regular expression

Action:

Each "Condition" will have an array of actions / Logic to be executed in serial mode whenever a "Condition" is true. This will facilitate future closed loop actions.

```
{
  "Identification": "VNF Policy",
  "Version":"1.0",
  "Updatedate":"2017-10-25",
  "SupportedVnf": [ "VNF1", "VNF2" ],
  "policy" : {
    "general":{
      "report-ecm" : {
        "Type" : "Node",
        "conditions" : {
          "NIT": [ "" ],
          "NIC": [ "do-something"],
          "MOD": [],
          "OK": [ "" ],
          "FAIL": [ "ALARM", "ECM"]
        }
      }
    }
  }
}
```
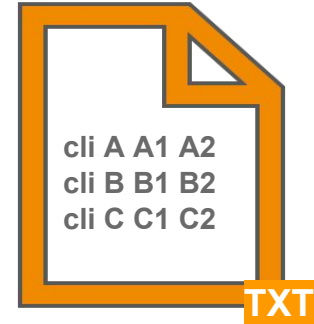
What about VNF Runtime Configuration?

VNF NATIVE CONFIGURATION

The runtime or active configuration at any given VNF in the Production Network.
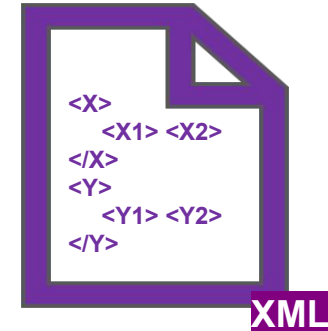
Although there are configuration standards many VNFs provide their runtime configuration print out in different formats e.g. XML, CLI Format in TXT file, JSON, etc.
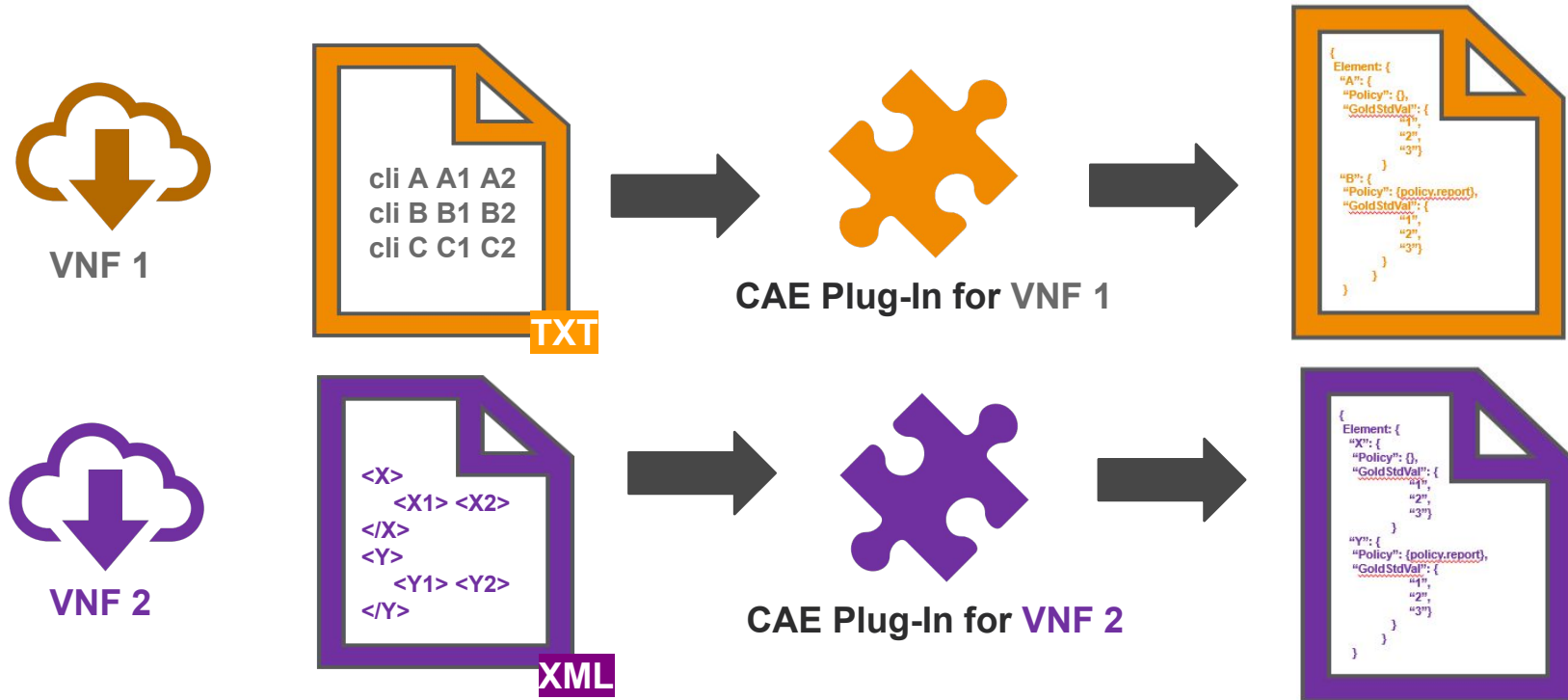
VNF 1

```
cli A A1 A2
cli B B1 B2
cli C C1 C2
```

TXT

VNF 2

```
<X>
    <X1> <X2>
</X>
<Y>
    <Y1> <Y2>
</Y>
```

XML
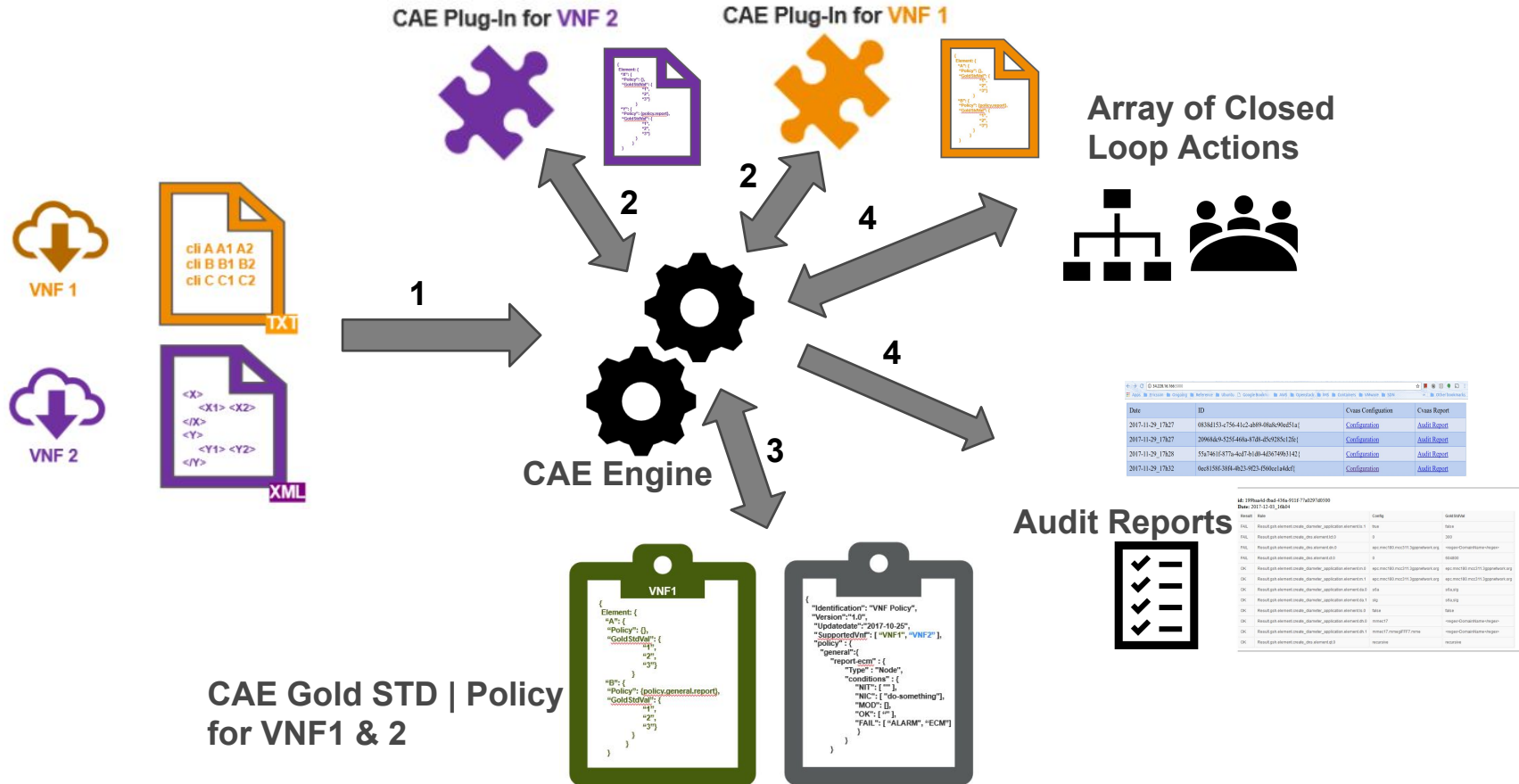
How to process multiple formats?

Leverage CAE Plug-Ins...

CAE - PLUGIN

Plug-In Modules are created for translating the native runtime VNF Configuration into a VNF CAE auditable JSON Format that the CAE Engine is able to process.
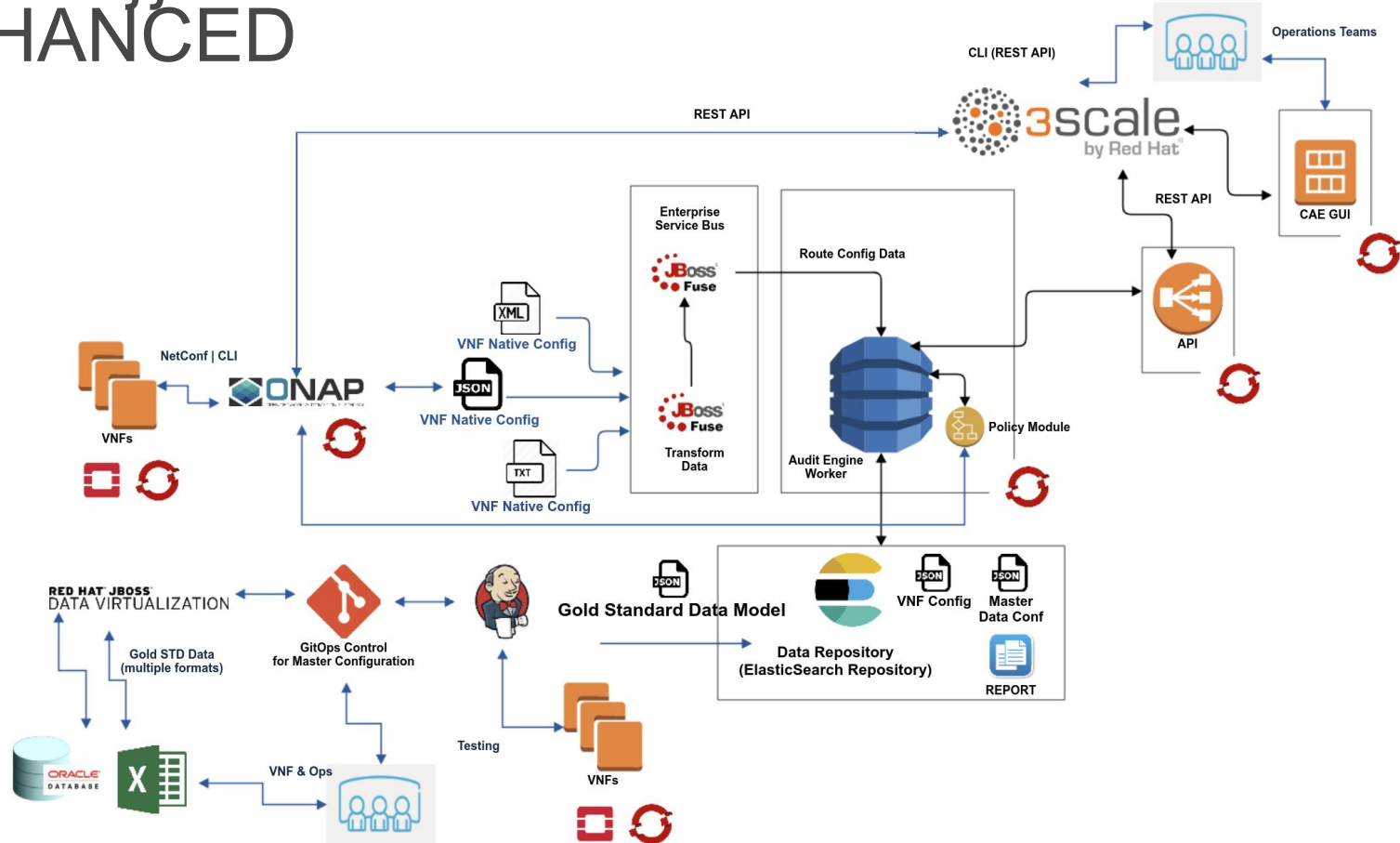

VNF 1

```
cli A A1 A2
cli B B1 B2
cli C C1 C2
```
TXT

CAE Plug-In for VNF 1

```
{
  Element: {
    "A": {
      "Policy": {},
      "GoldStdVal": {
        "1",
        "2",
        "3"}
    "B": {
      "Policy": {policy.report},
      "GoldStdVal": {
        "1",
        "2",
        "3"}
      }
    }
}
```

VNF 2

```
<X>
    <X1> <X2>
</X>
<Y>
    <Y1> <Y2>
</Y>
```
XML

CAE Plug-In for VNF 2

```
{
  Element: {
    "X": {
      "Policy": {},
      "GoldStdVal": {
        "1",
        "2",
        "3"}
    "Y": {
      "Policy": {policy.report},
      "GoldStdVal": {
        "1",
        "2",
        "3"}
      }
    }
}
```

CAE – CONCEPTUAL ARCHITECTURE

{{ CAE }} REFERENCE ARCHITECTURE.
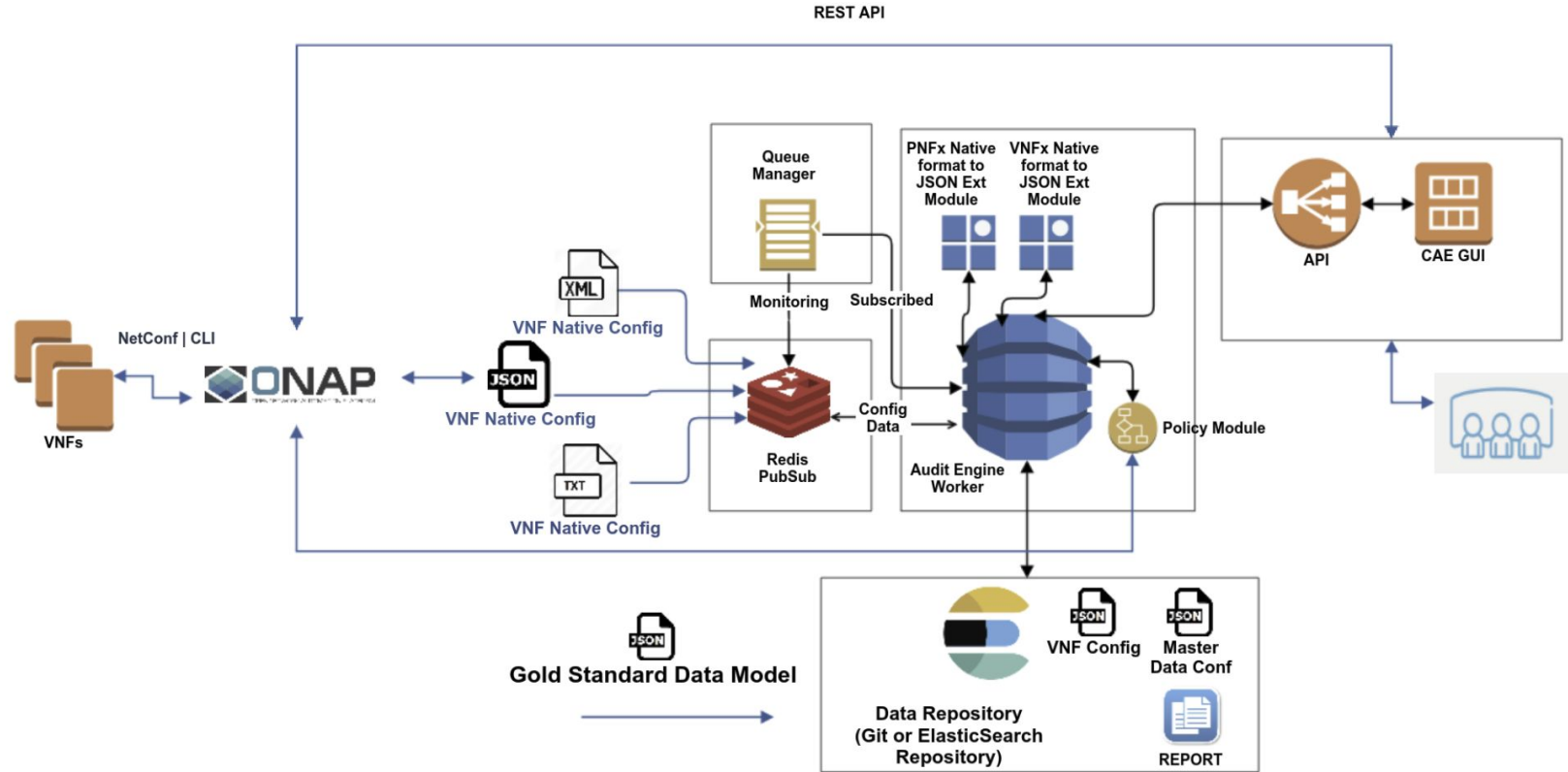
{{ CAE }} ARCHITECTURE ENHANCED

CAE DEMO

- ❑ Perform vMME Audit with CAE :
    - ❑ Review vMME Native Configuration.
    - ❑ Review vMME Gold Standard & Generic Policy (JSON).
    - ❑ Review Containerized Deployment | Scale Out.
    - ❑ Feed vMME configuration to CAE.
    - ❑ Review Audit Results.

THANK YOU.

https://github.com/moffzilla/CAE