

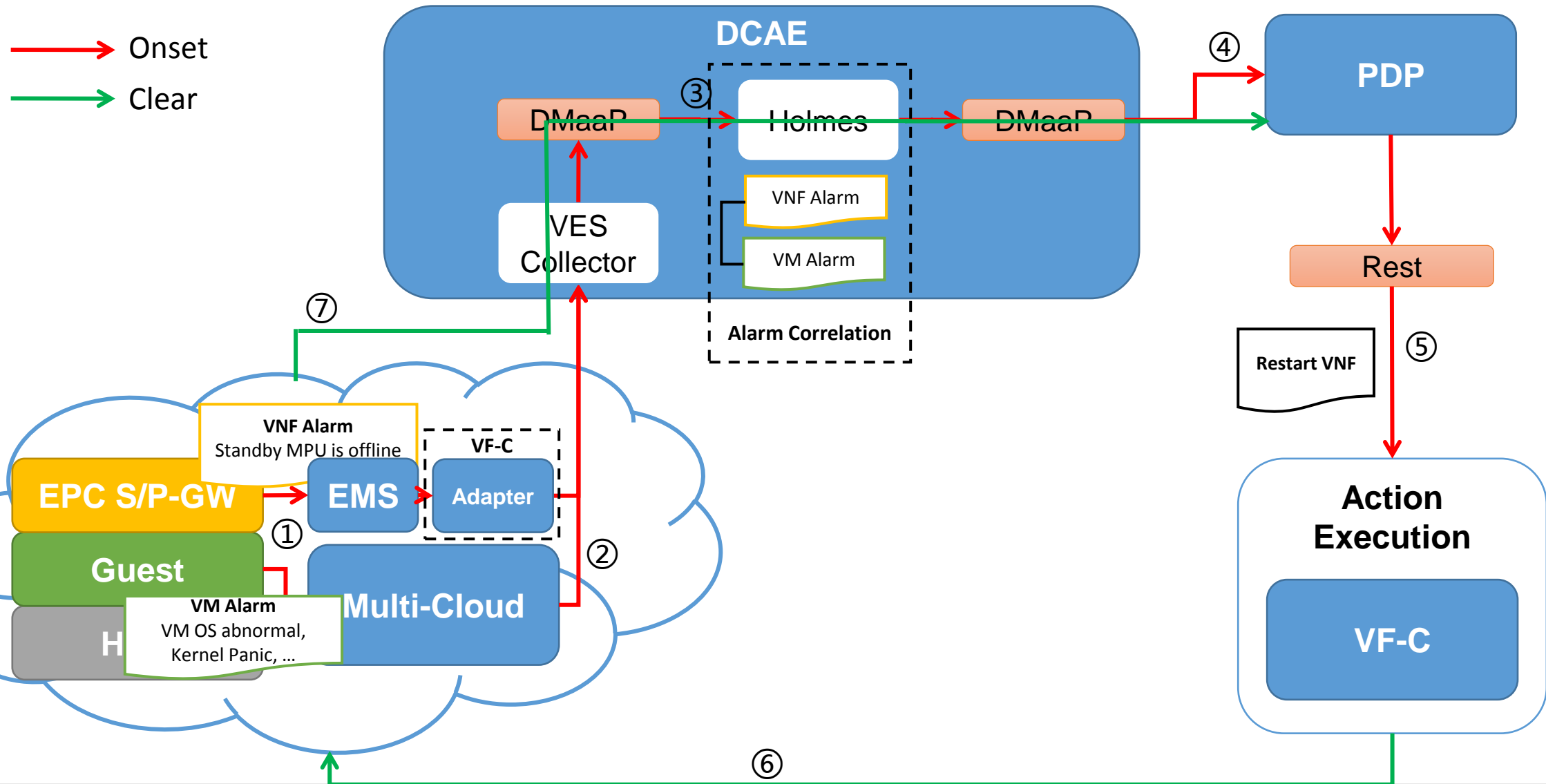


# Closed-Loop Automation Requirements for Beijing Release

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# What we have done in R1?



# What we want to extend in R2?

- Enhanced alarm-correlation
  - Add more kinds of rules.
  - Consider how to deal with a large number of rules.
  - Add UI to show rules LCM and alarm-correlation results.
- Add new function of auto-scaling
  - Support two kinds of auto-scaling. Alert or condition.
  - Set threshold values.
- Collect more data from host and VM
  - Alarm
  - KPI Metrics

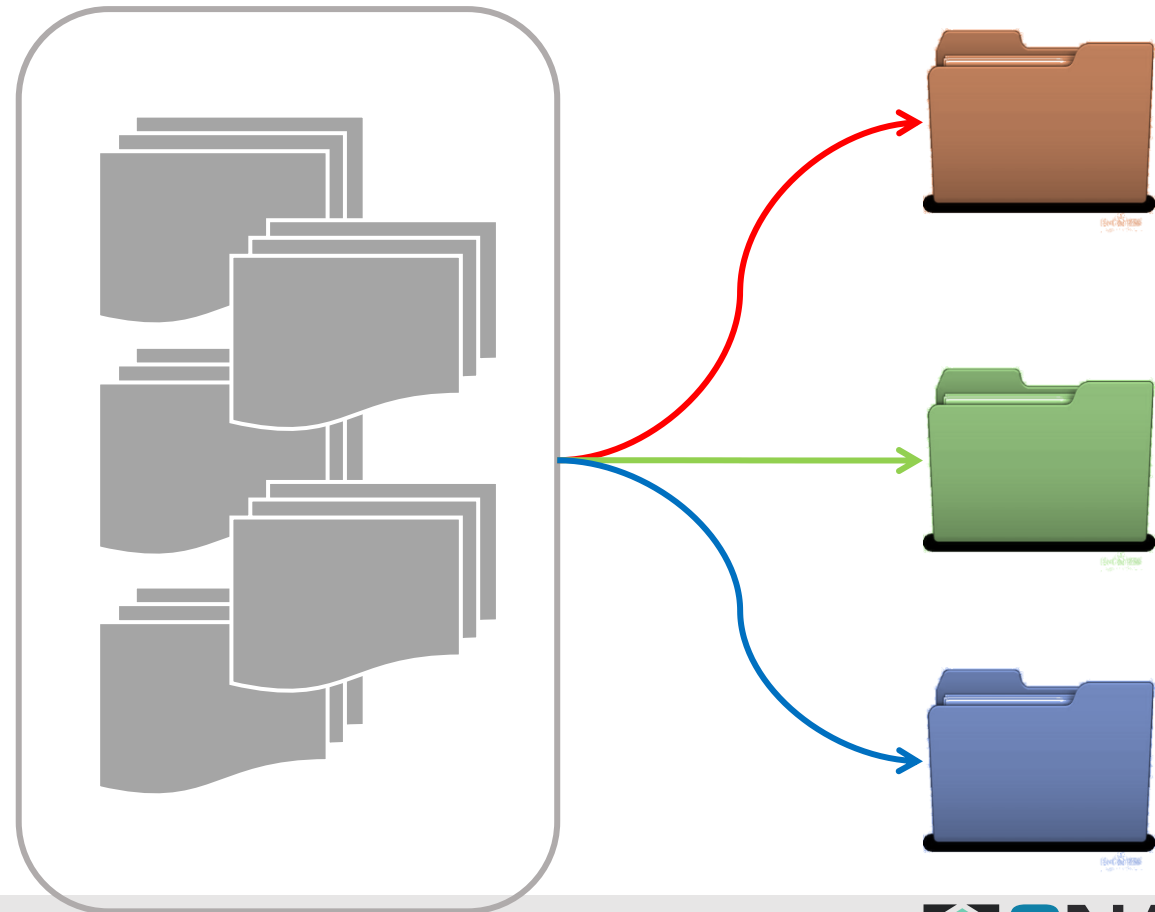
# Alarm-correlation I

## • Alarm-correlation Classification

Relation	Direction	Hierarchy	Description & Examples
Homologous	Intra Horizontal	VNF/VM/Host	Do the correlation for the alarms from the same VNF/VM/Host, e.g. - the host is abnormal - CPU usage of the host > threshold value
Primary & Secondary	Horizontal	VNF/VM/Host	Do the correlation for the alarms from different VNF/VM/Host, e.g. - TAS is offline - S-CSCF cannot link to TAS
	Vertical	VNF-VM-HOST	Do the correlation for the alarms from VNF, VM or Host (at least two neighbors), e.g. - S-CSCF is abnormal - VM (S-CSCF) failure
	Hybrid		Do the correlation for the alarms from both horizontal and vertical.

# Alarm-correlation II

- Infrastructures + services ↑ -> alarms ↑ -> rules ↑
- How to deal with a large number of rules to ensure efficiency?
  - Classify the rules?
    - e,g,
      - Rules for host
      - Rules for VoLTE
      - ...



# Alarm-correlation III

- UI related to Holmes
  - Rules CRUD
  - Alarm-correlation topology / results

# Auto-Scaling I

- Auto-Scaling Classification

	Description & Examples
Based on Alert	Data -> VES -> TCA -> (Holmes ->) Policy -> Action Execution -> Alert clear, e.g. Alert - the call volume > threshold value Action - Scaling VNF
Based on Condition	Condition -> Policy -> Action Execution, e.g. Condition - set 8 pm as the peak hour Action - Scaling VNF

- Thresholds Definition

Single source threshold, e.g. the number of users

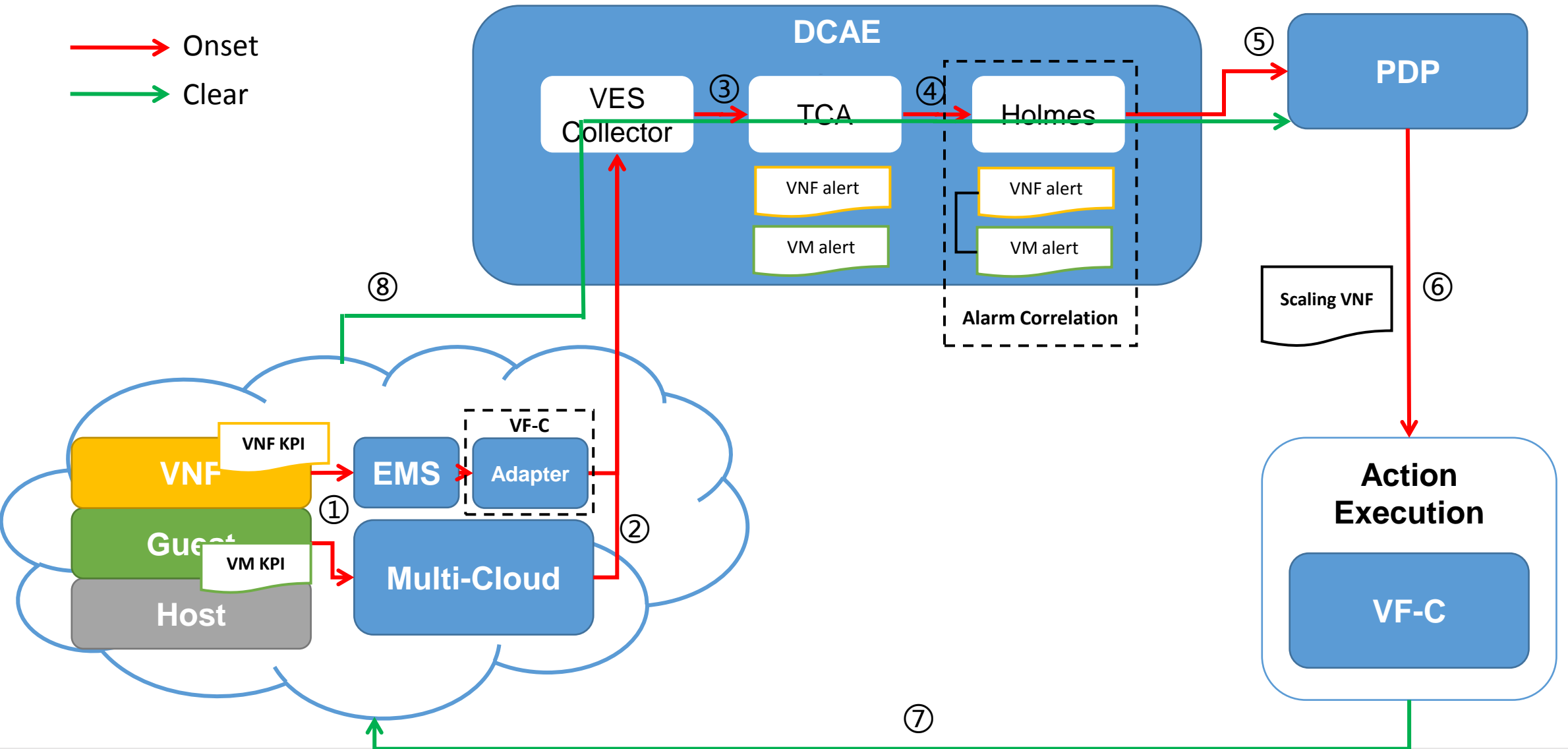
Cross source thresholds, e.g. the number of users + the CPU usage

Based on human experience.

Based on algorithm to calculate, e.g. use machine learning algorithm to train the model based on history data.

# Auto-Scaling II

→ Onset  
→ Clear





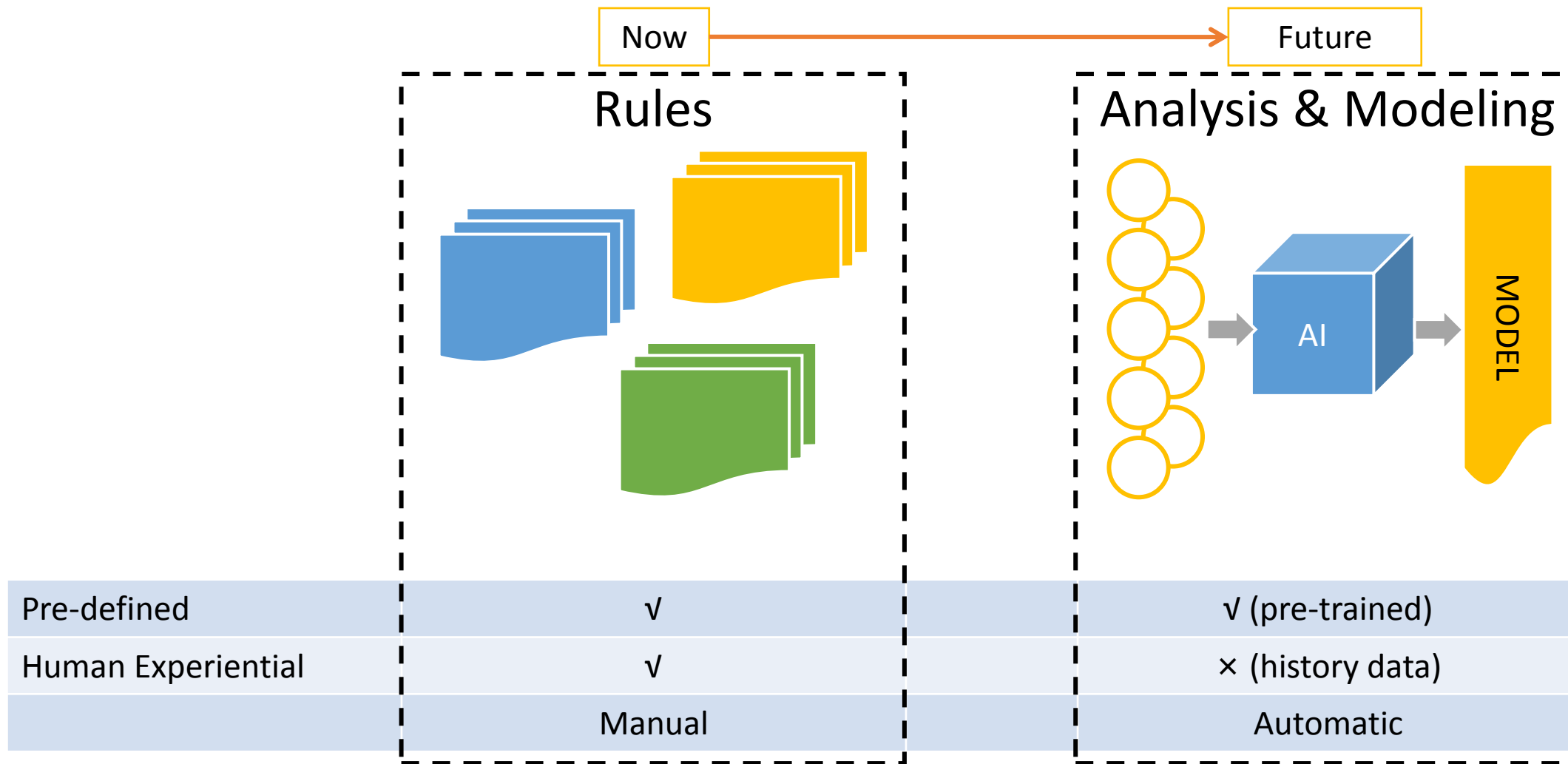
# Alarm + KPI Metrics Collection

	Alarm		KPI Metrics	
	R1	R2	R1	R2
VF-C	Real-time Full set from EMS		Periodical Full set from EMS	
Multi-Cloud	insufficient Alarm	Real-time Host + VM	N/A	Non-real-time Host + VM

# Summary

- Enhanced alarm-correlation
  - Add more kinds of rules.
  - Consider how to deal with a large number of rules.
  - Add UI to show rules LCM and alarm-correlation results.
- Add new function of auto-scaling
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  - Set threshold values.
- Collect more data from host and VM
  - Alarm
  - KPI Metrics

# Alarm-correlation: Future





**ONAP**

OPEN NETWORK AUTOMATION PLATFORM

Thanks