

# VTrace: Automatic Diagnostic System for Persistent Packet Loss in Cloud- Scale Overlay Network(SIGCOMM' 20)

——8.26组会分享

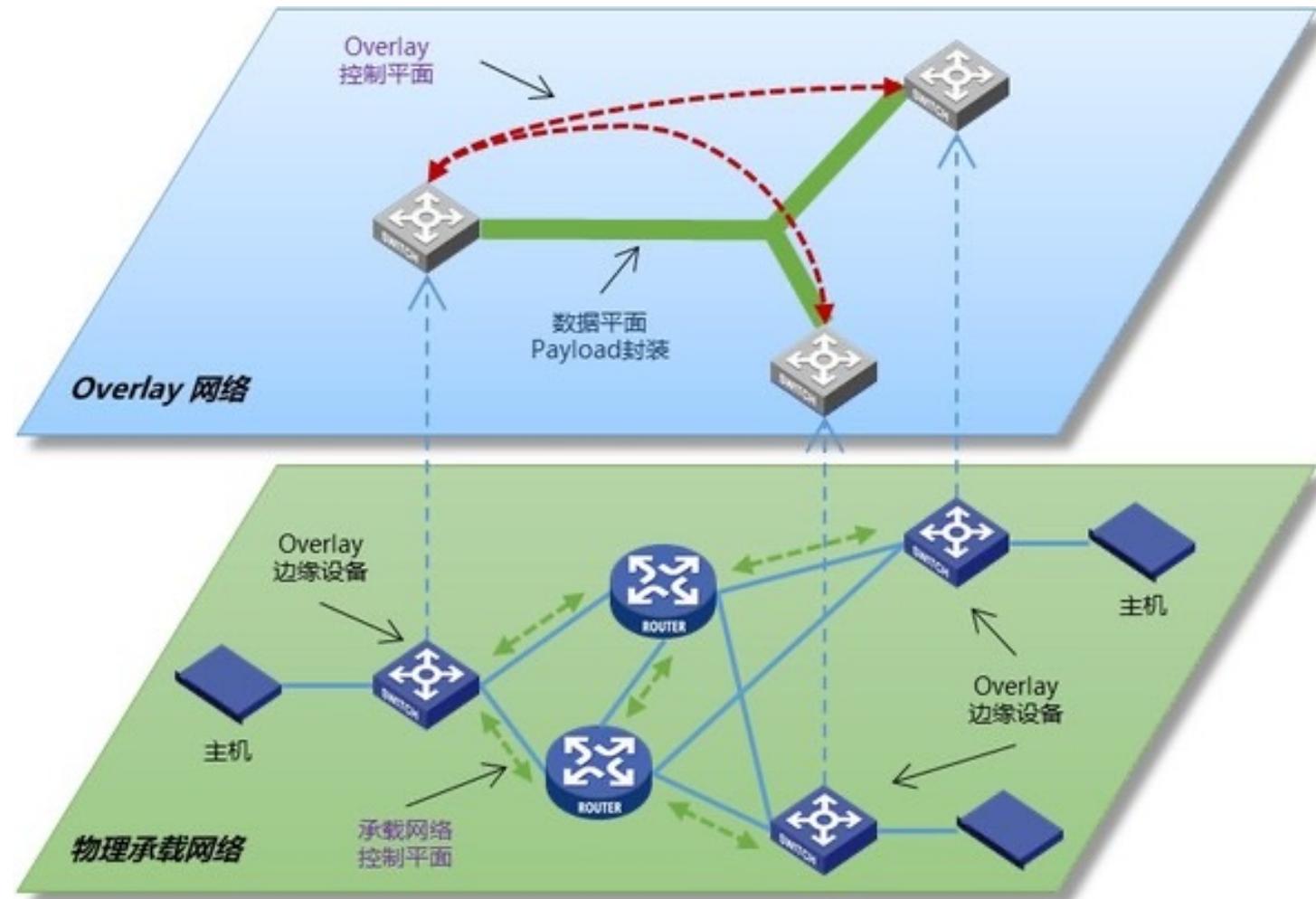
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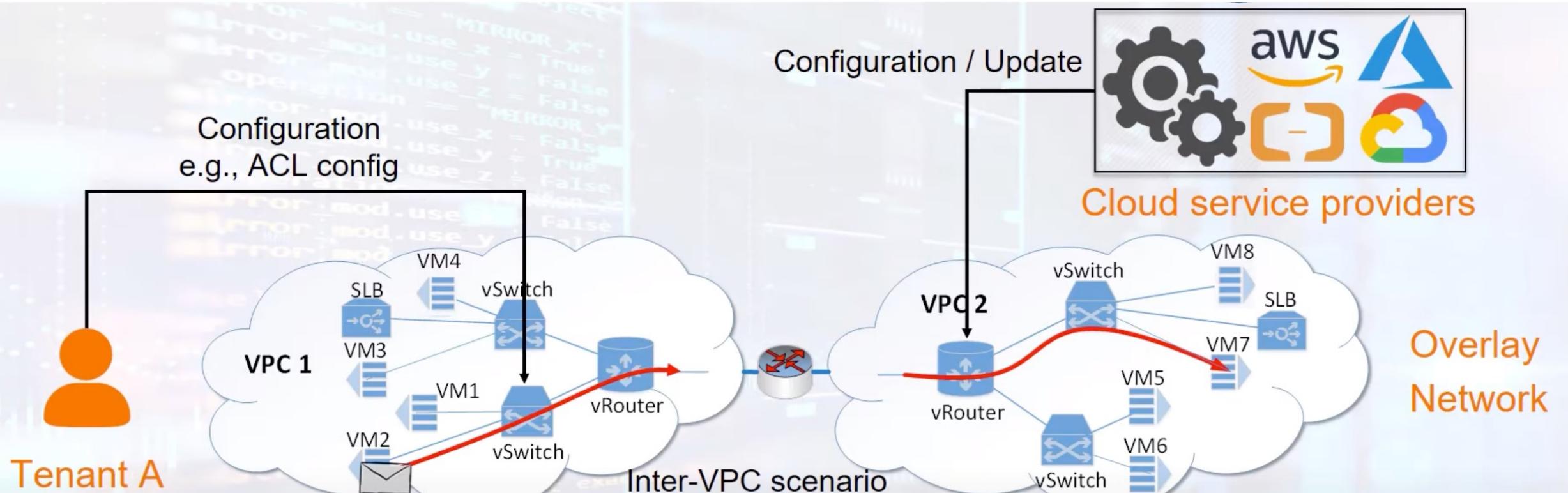
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# 背景介绍

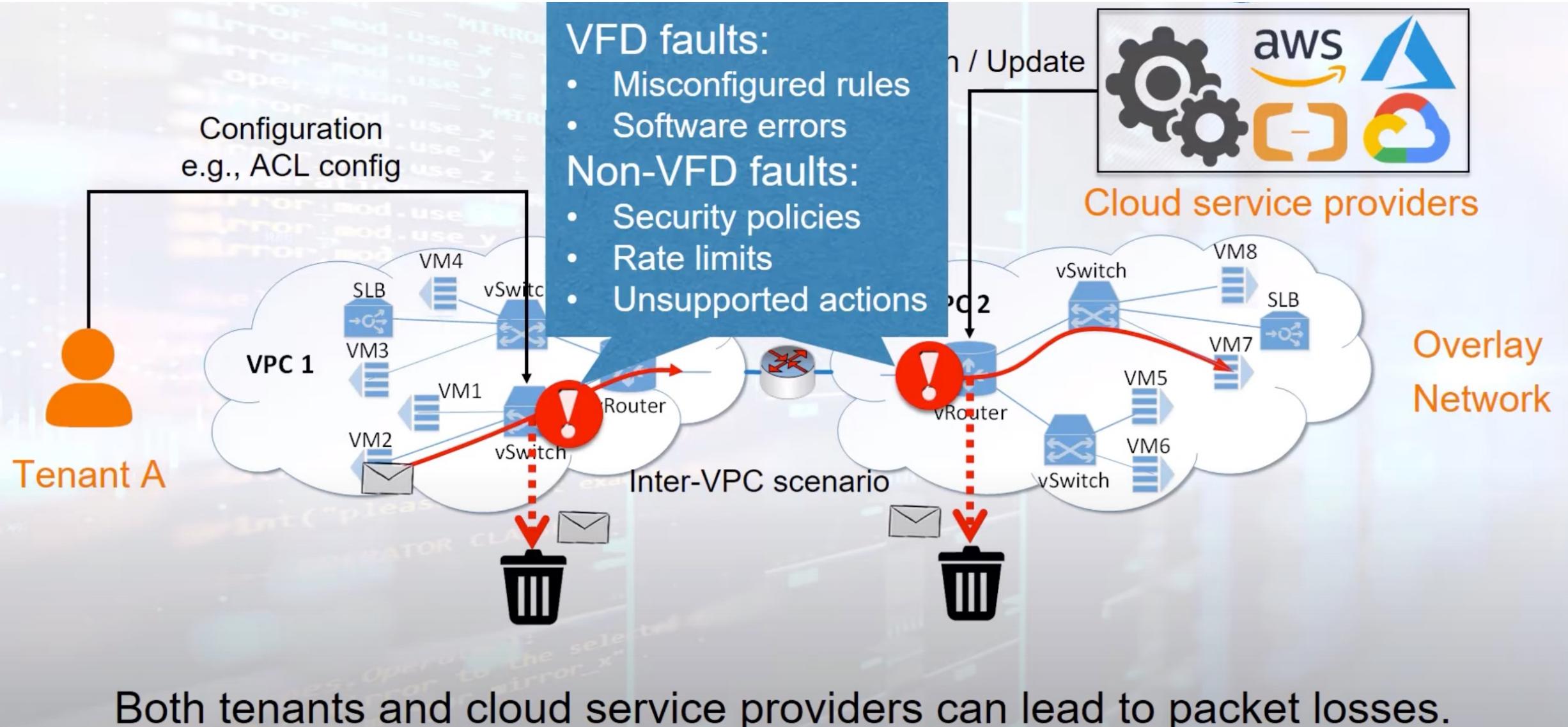


# 背景介绍 VPC(Virtual Private Cloud)

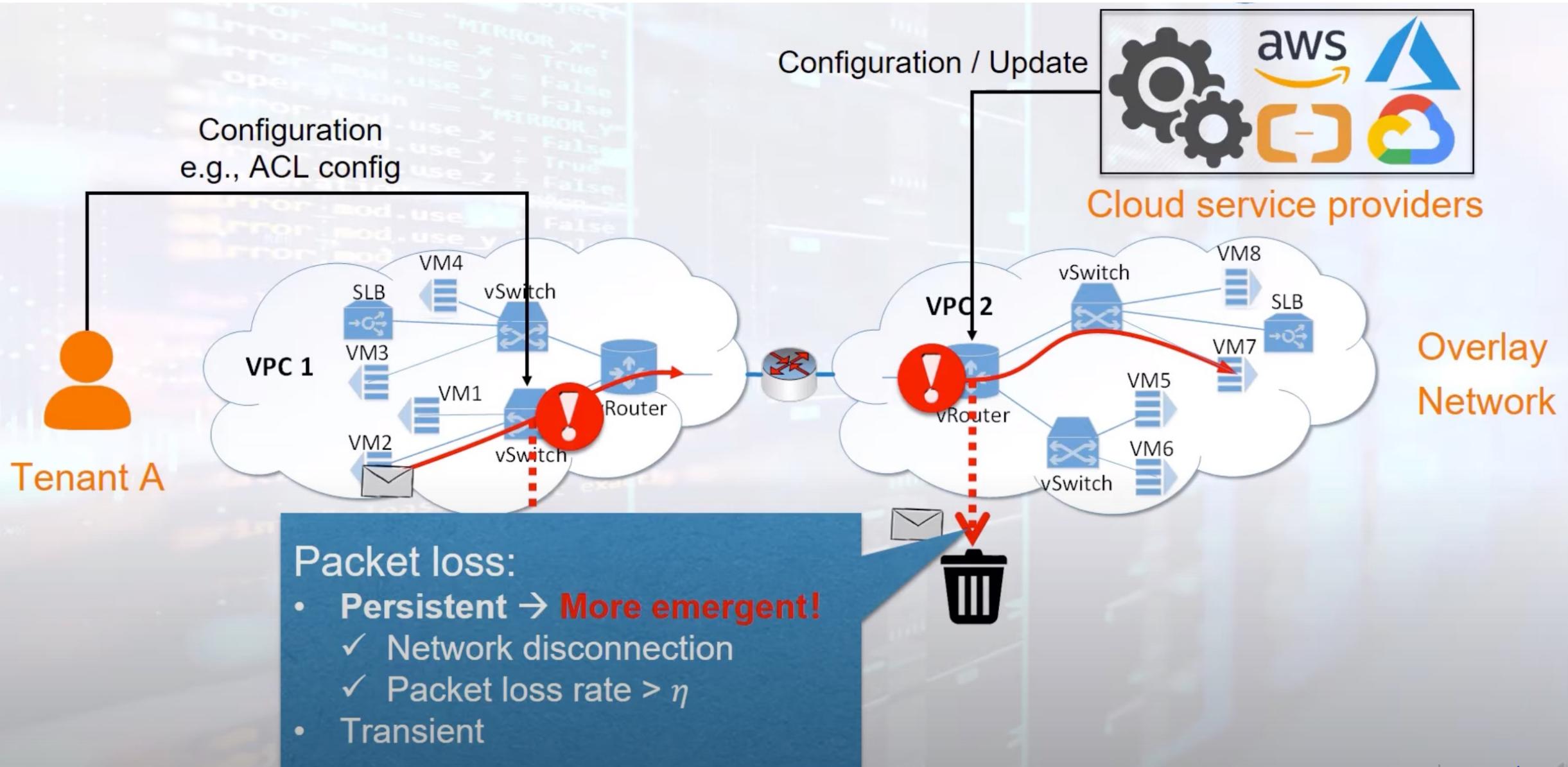


Both tenants and cloud service providers can lead to packet losses.

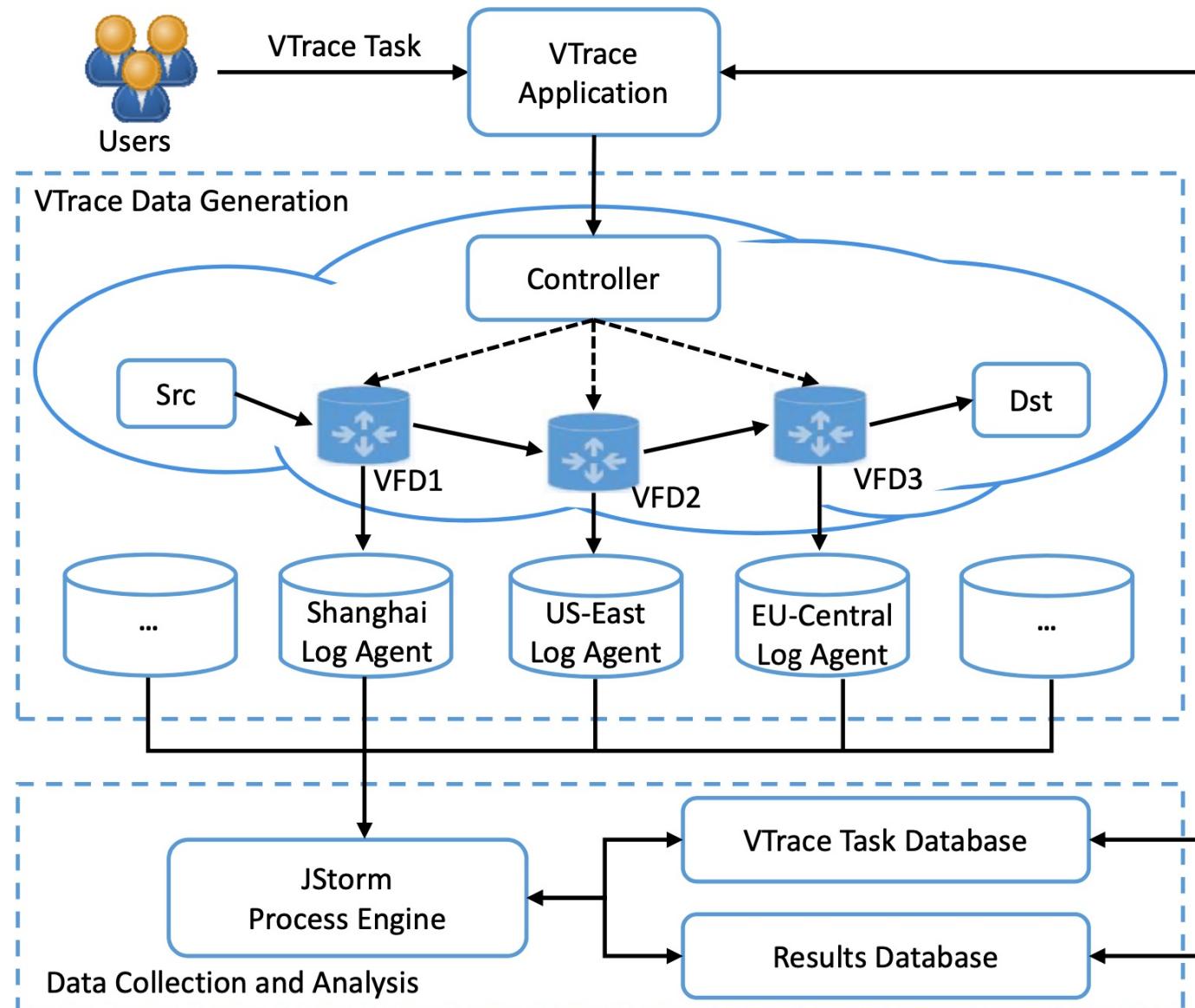
# 背景介绍



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# Overview



## Vtrace API

`addVTrace(filter, packet_count, trace_time)`

`getVTraceResult(filter)`

5-tuple = (sIP,sPort,dIP,dPort,Protocol)

# VDG Design

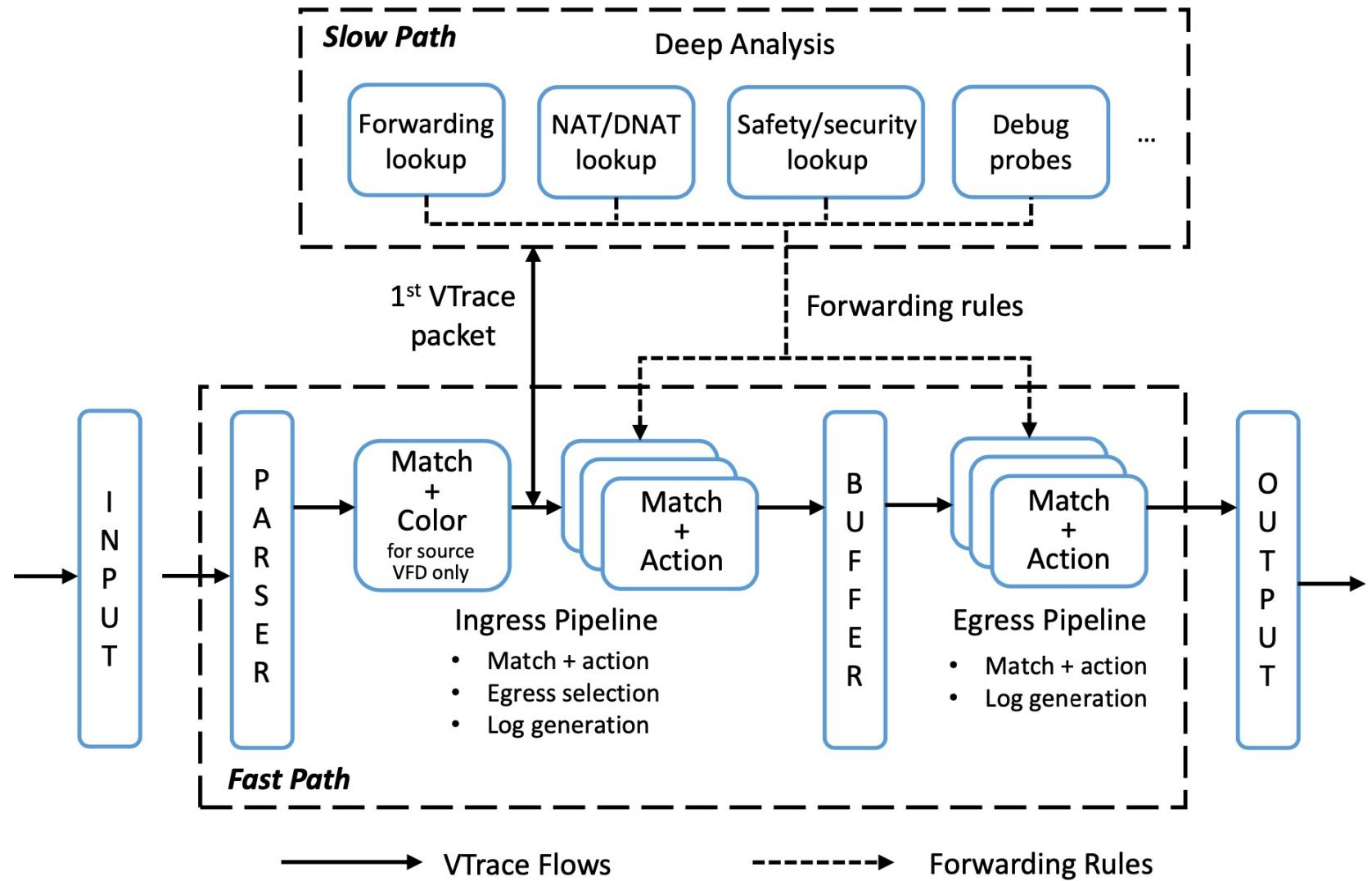


Figure 3: The forwarding model in a VFD.

# VDG Implementation

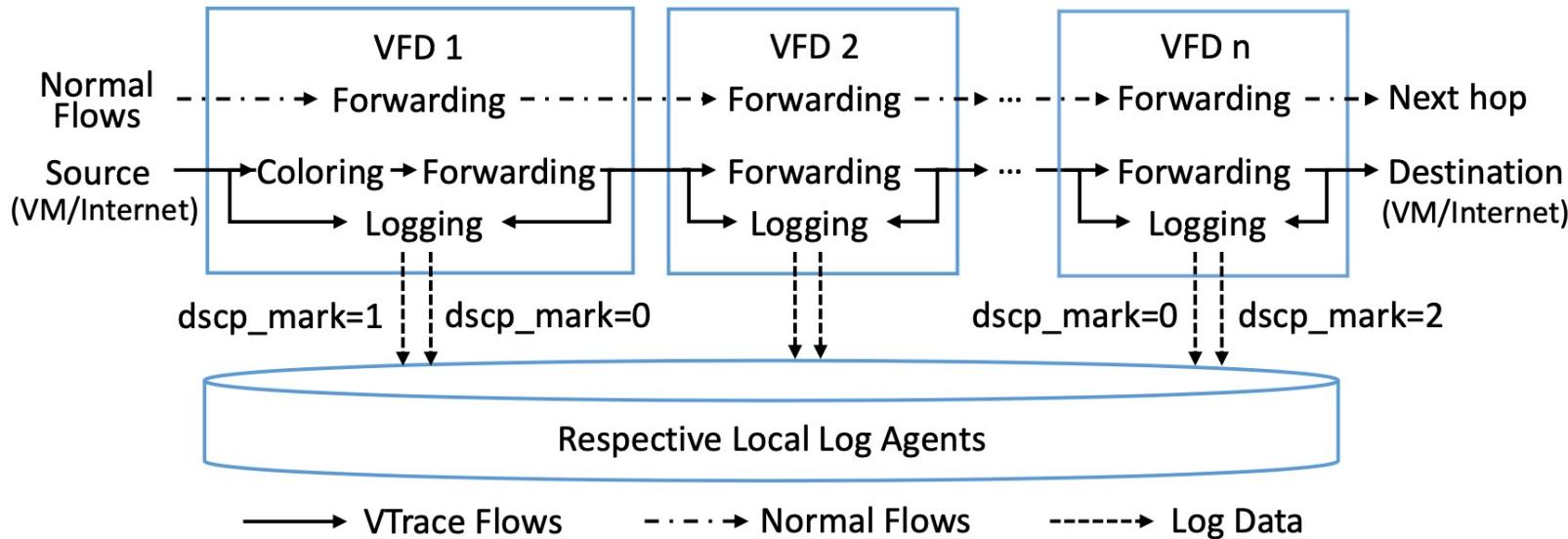
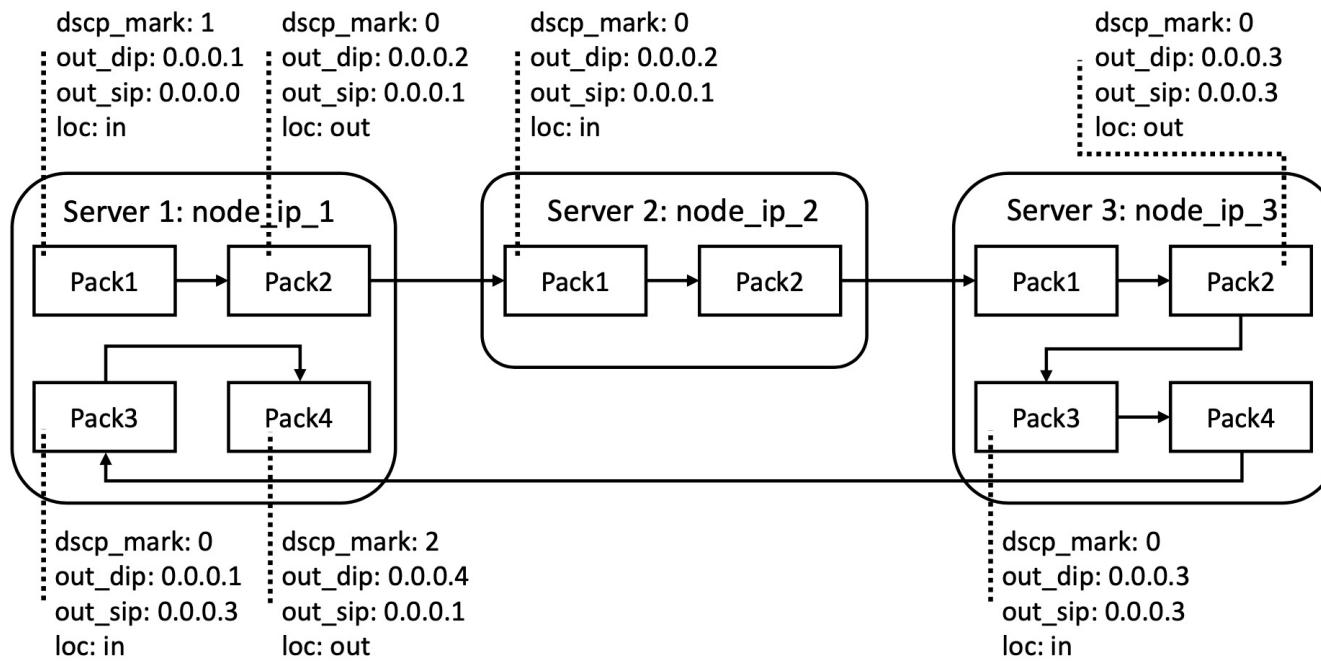
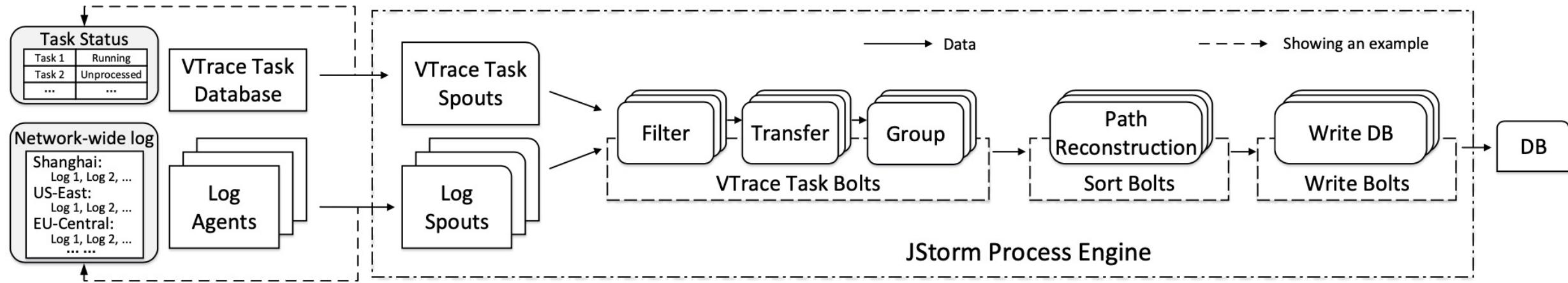


Figure 4: Procedure of coloring, matching and logging.

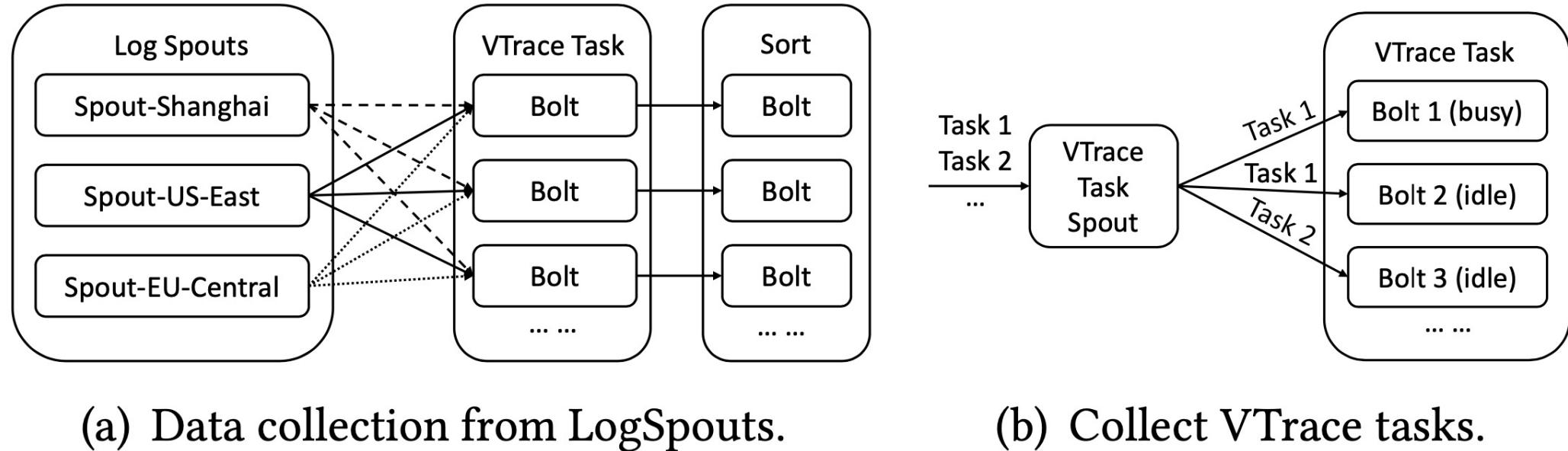
Table 2: Metrics in the log.

Metrics	Description
5-tuple	unique flow ID for a VTrace task
packet_ID	the unique mark of each packet
out_sip	the outer source IP of VXLAN packet
out_dip	the outer destination IP of VXLAN packet
node_ip	the IP of server where the VFD runs
loc	packet's location in a VFD: in, out, or error
NAT_key	the 5-tuple after NAT operation
dscp_mark	packet's location in the packet trajectory
msg	the diagnosis result of problems
timestamp	the time in the server where the VFD locates

# DCA Design



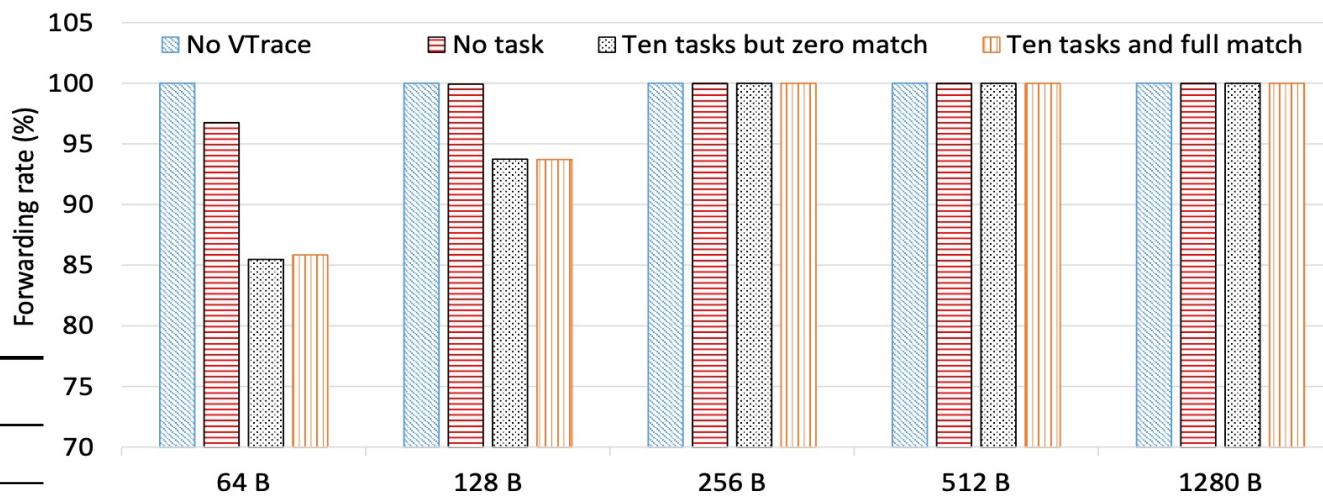
# DCA Implementation



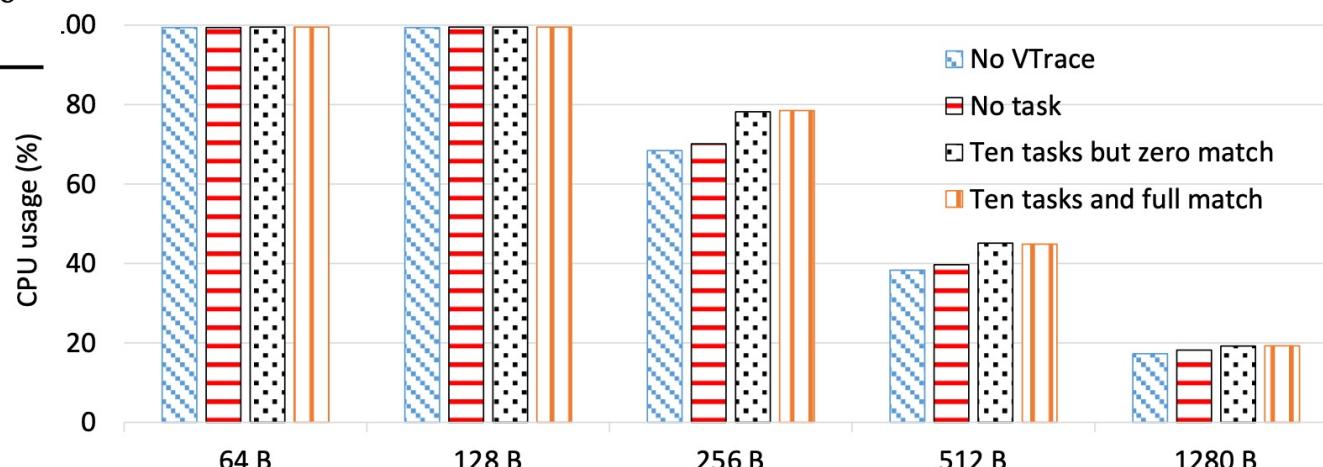
**Figure 7: Implementation of data collection in JStorm.**

# Evaluation

Settings/Scenarios	Description
No VTrace	The VFD does not support VTrace
No task	Support VTrace but no VTrace task is issued now
Ten tasks but zero match	Ten tasks are issued but there is no matched packet for any task
Ten tasks and full match	Ten tasks are issued and there are 100 target packets to be tracked for each task



(a) The influence on the packet forwarding rate.



(b) The influence on the average CPU usage.

# Development Experiences

## Speed

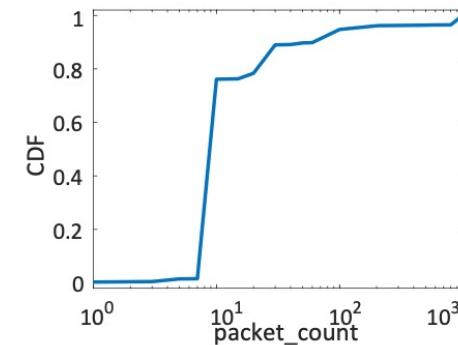
Configuring VFD: 600-700ms

short\_buffer\_time = 12s long\_buffer\_time = 24s

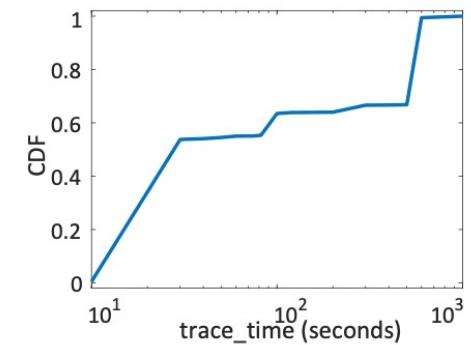
Average time to process a packet trajectory = 0.54ms

Packet preprocessing and path reconstruction = 5ms

trace\_time = 10 to 40 seconds or 500 to 600 seconds (small flows)



(a) The CDF of packet\_count.



(b) The CDF of trace\_time.

Figure 9: The use of parameters by VTrace users.

Type of cause	vSwitch (%)	vRouter (%)	Proportion (%)
Rate limit	4.6	5.4	10
Tenant security policy blocking	52.4	3.8	56.2
Tenant configuration error	5.3	18.5	23.8
Unsupported actions	3.9	4.6	8.5
Unknown	0	1.5	1.5
Total	66.2	33.8	100

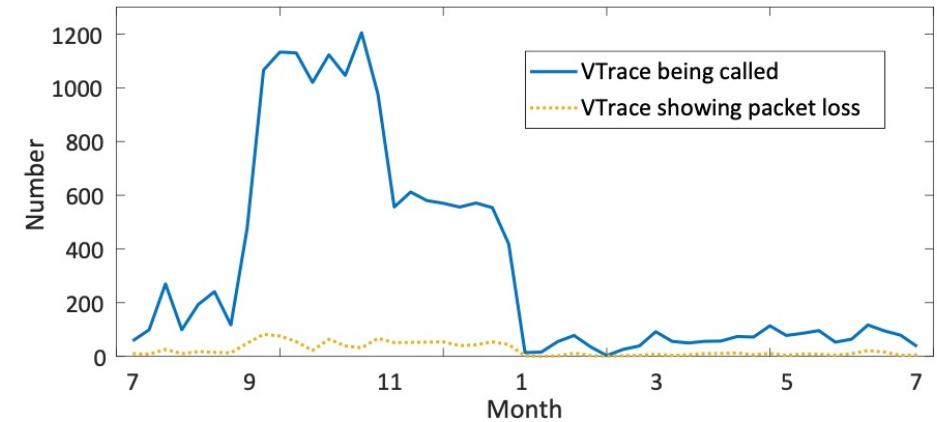


Figure 10: Statistics of VTrace usage and diagnosis result.



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