



RISE

# Wide-Area SDN Testbed

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# RISE

*Research Infrastructure for large-**S**cale network **E**xperiments*

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Wide-area  
SDN Testbed  
in Japan

SDN Testbed  
for users

# How large is the RISE?

## How large?

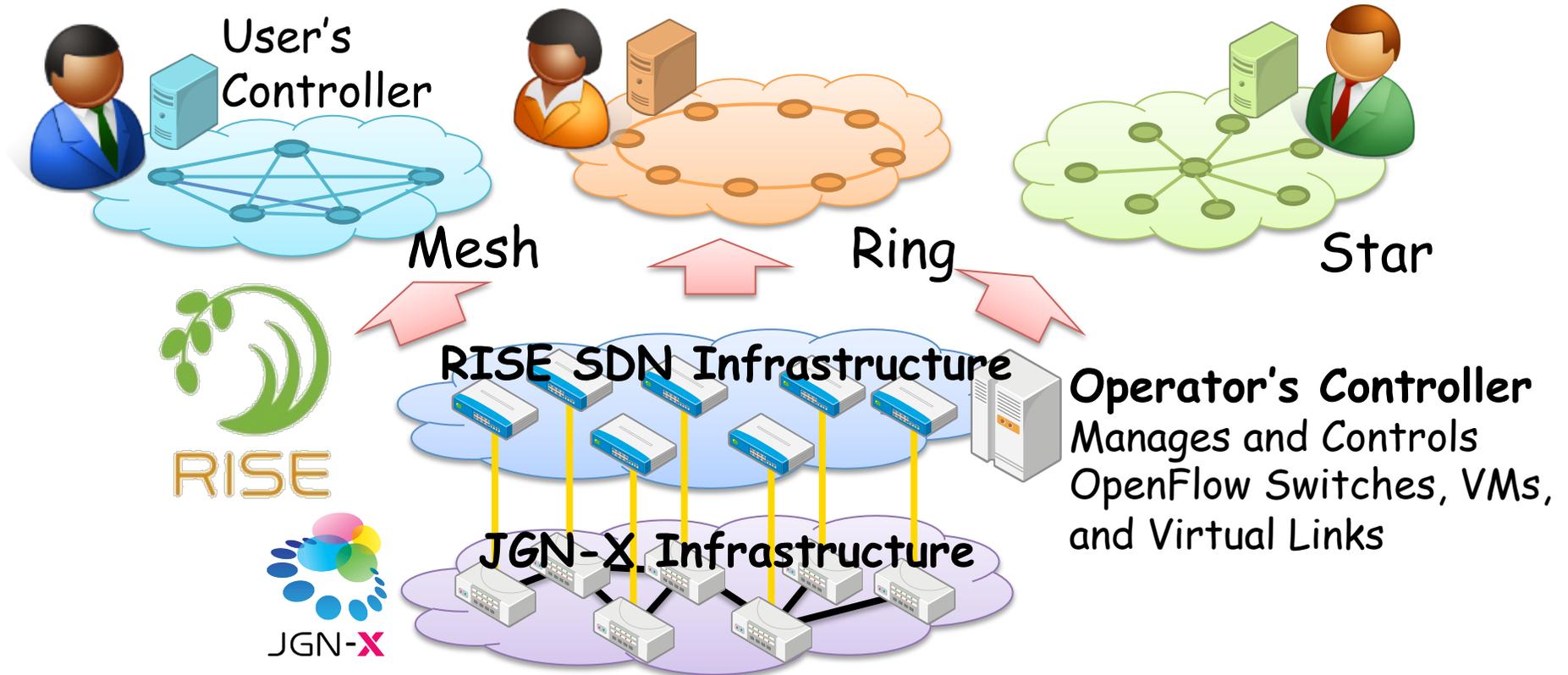
Foreign : 5 sites  
Domestic : 11 sites

72 switches  
53 servers

3 operators manage the RISE



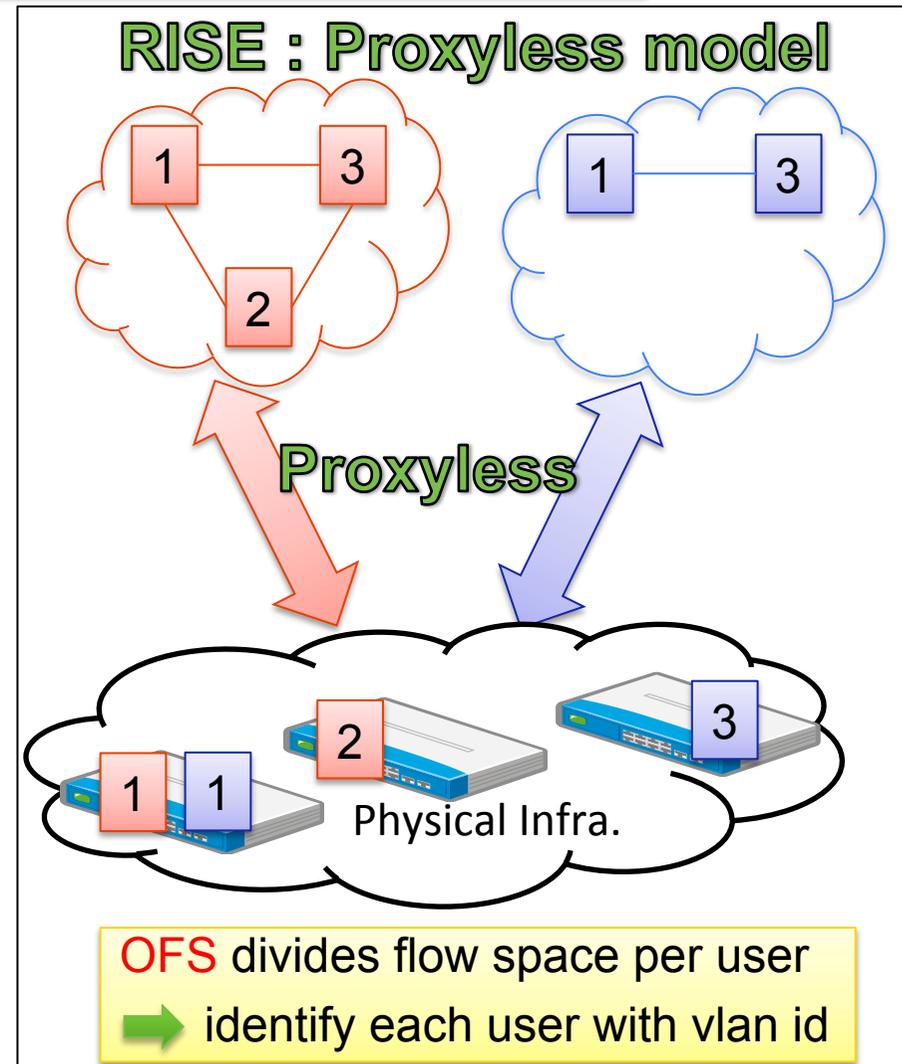
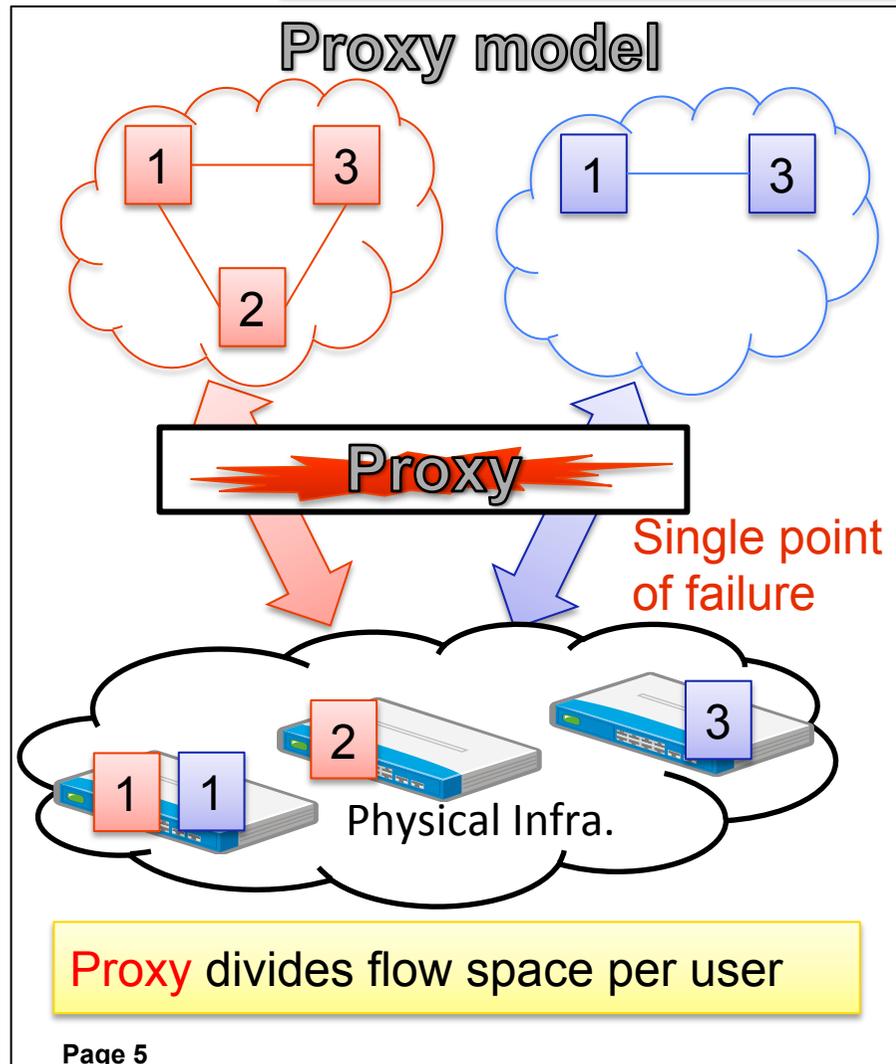
## User SDN Slices



- High capacity in terms of the number of slices (more than 50 slices)
- Provide various network topologies to fit user requirements
- Reduce the time to setup a user slice (less than 10 minutes)

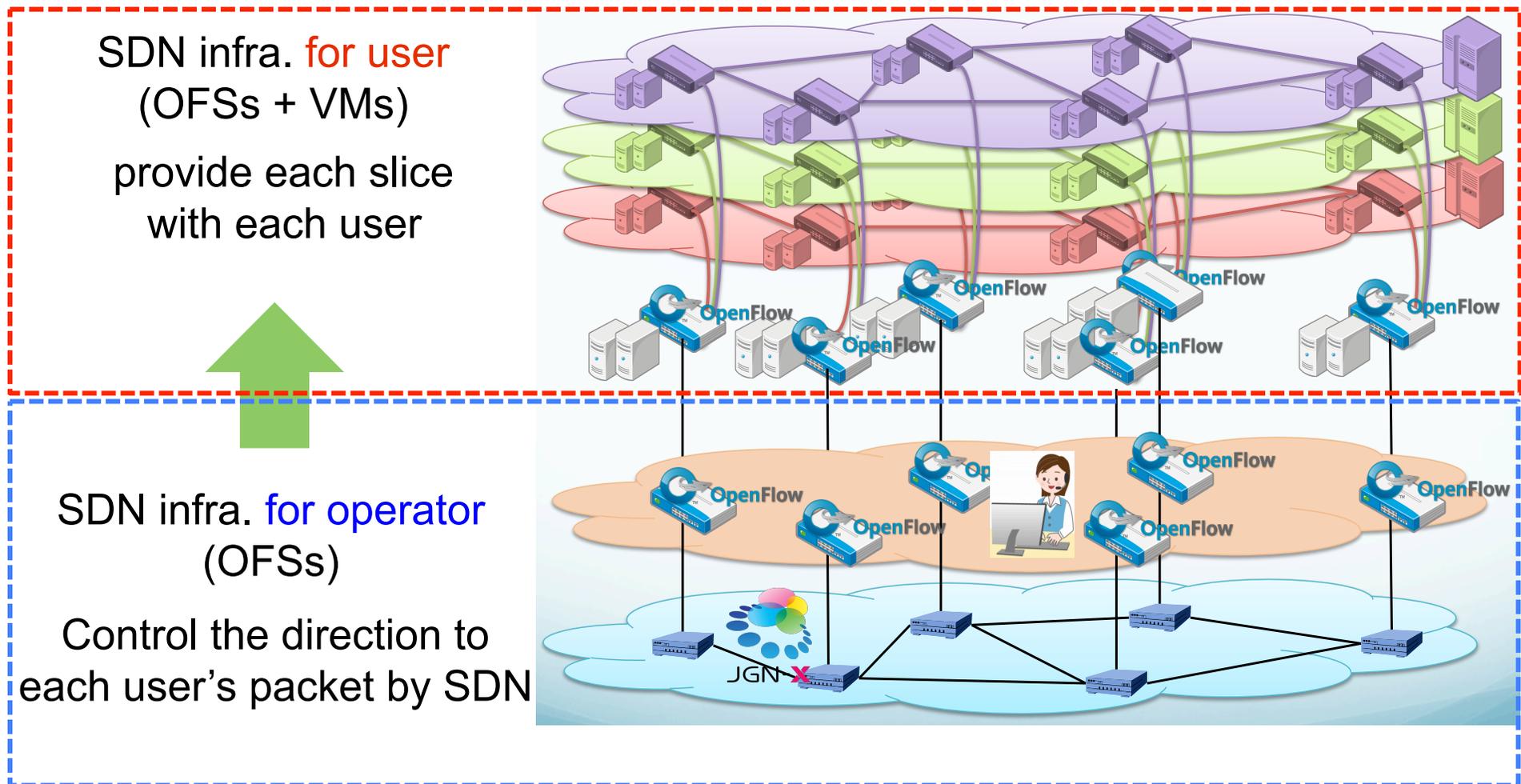
# RISE realizes Multi-Tenancy w/o proxy

Q: Why is the RISE architecture Proxyless?  
A: To avoid single point of failure



# RISE Architecture

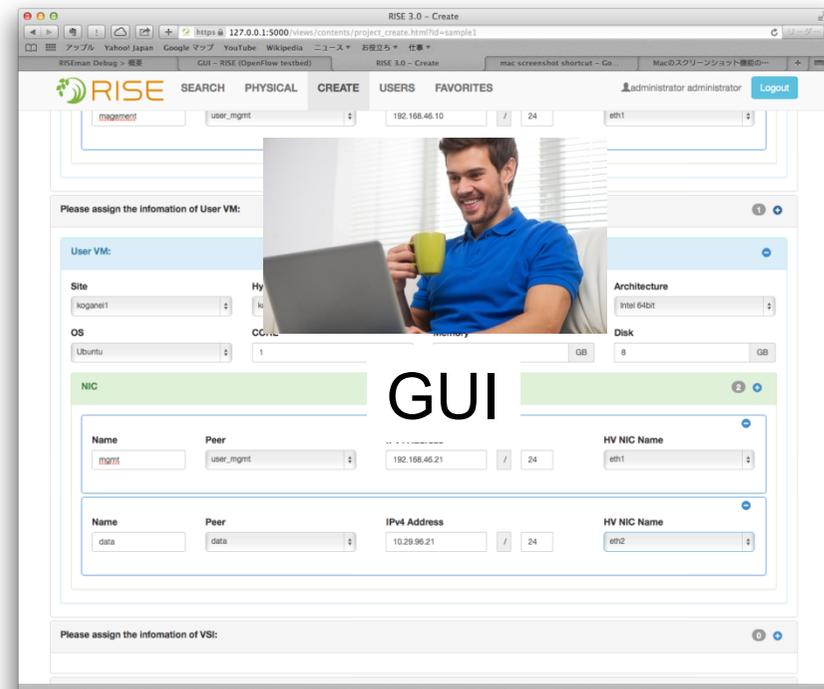
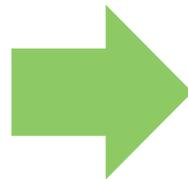
Prepared SDN infra. for **user** and **operator** in several



# RISE Management System

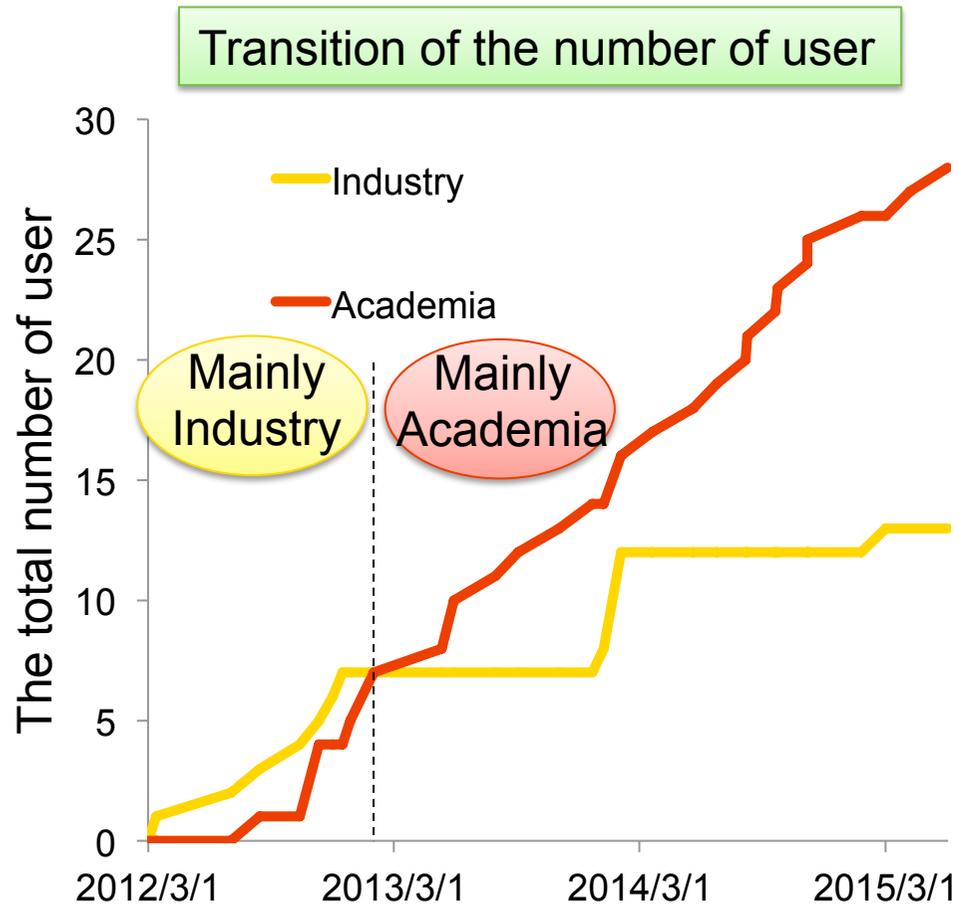
## Effects

1. Reduce the time to setup a user slice (less than 10 minutes)
2. Reduce configuration mistake
3. Visually understand user's topology and usage status of resource



# Interest on SDN shifted from Industry to Academia

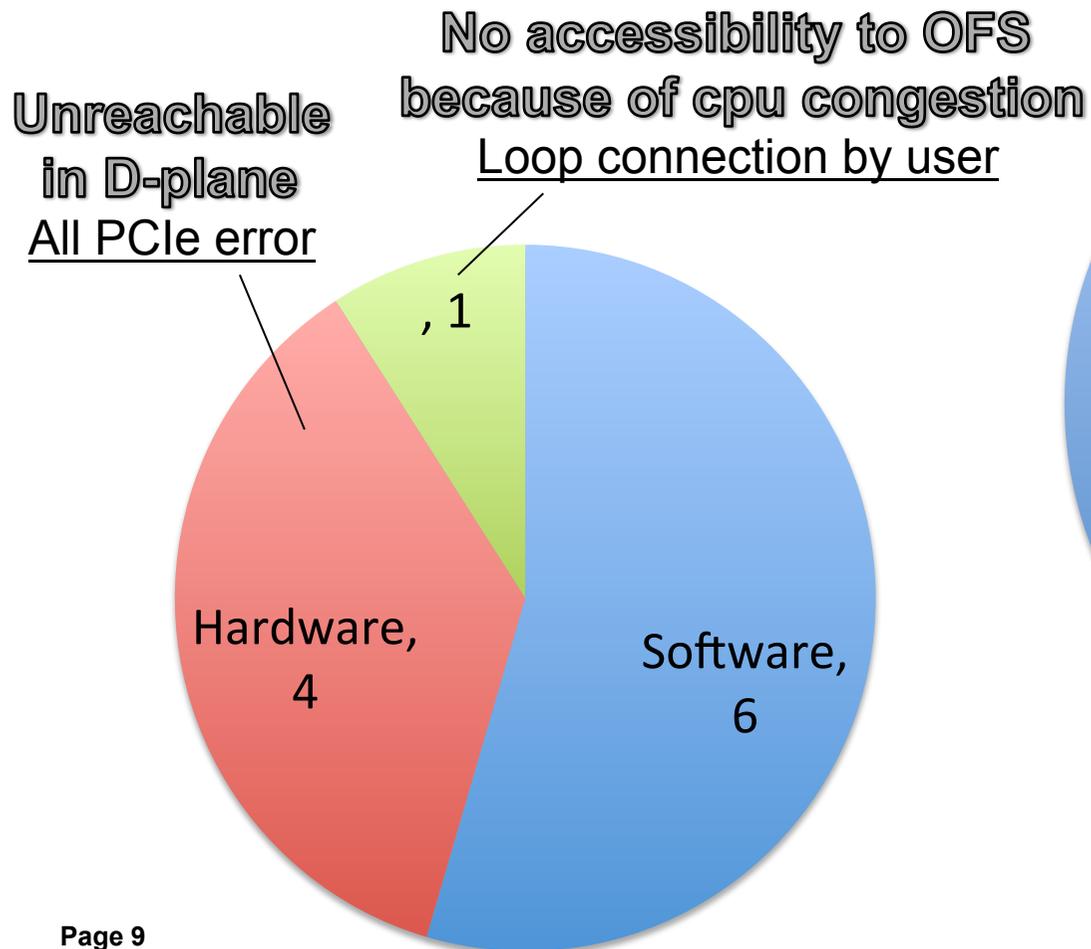
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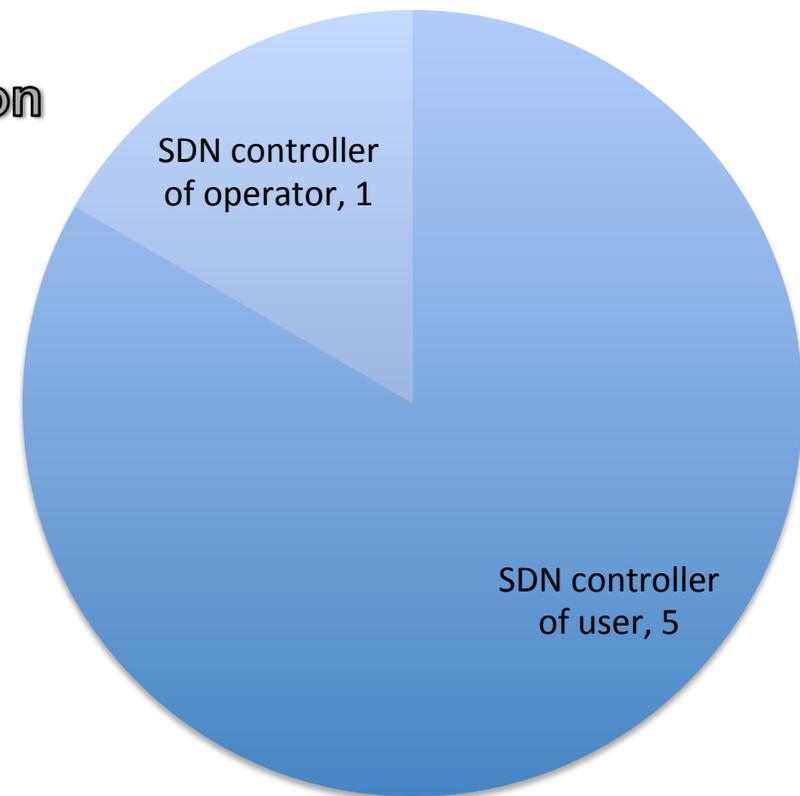
# What is the cause of network failure?

The half of network failure is caused by SDN controller of user. Because RISE gives the authority of controlling it.

The number of network failure



Detail of network failure by software



# Typically network failure caused by user

Trouble	Cause	How to resolve
User's packets are unreachable.	User sent a mount of data packet. Port number of each packet is different value like a DoS attack. Controller hang-up. Because Controller needs to create each flow entry to each packet.	We had user roughened the granularity of flow.
	User controller set miss action. So, OpenFlow Switch response error message.	We had user modified action of flow entry.
The response to command in OpenFlow switch grows worse. Because The usage of CPU in OpenFlow switch is more than 50[%].	A mount of Packet-in and Packet-out message were generated because User's controller was runaway.	We suspended application of user's controller.
	Multicast storm was generated.	Shutdown interface multicast storm was generated in.

# Questions / Comments?

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## Group Website

- <http://www.jgn.nict.go.jp/english/index.html>

## Contact Information

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