

OpenDaylight VTN project

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The project lead of the VTN project

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Summary: VTN project

- One of the mature projects in OpenDaylight
- Provides network virtualization support
- Supports OpenFlow network
- Key features
 - Virtual network provisioning
 - Flexible traffic control
 - Automatic detouring on link failures

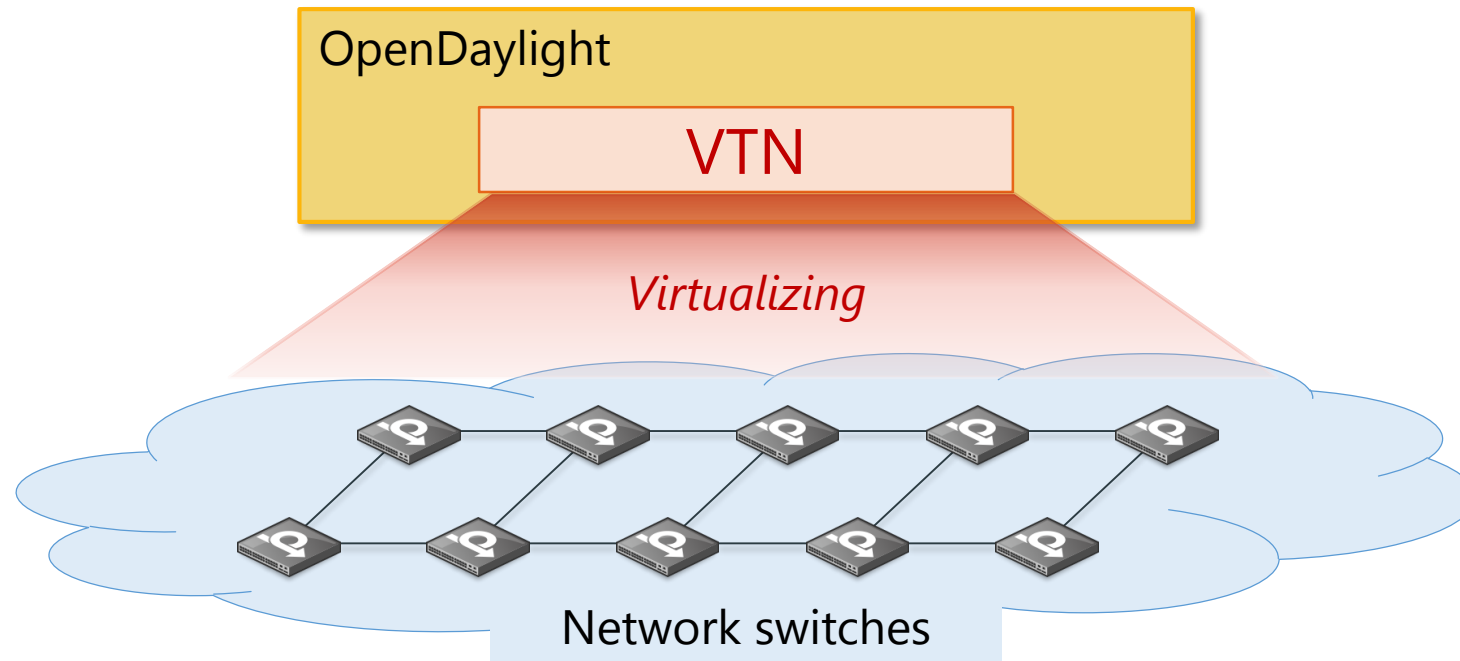
What is VTN project?

- One of **the mature projects** in OpenDaylight
- Starts from June 2013
- Develops the network virtualization support
- Provides VTN features in all the releases of OpenDaylight



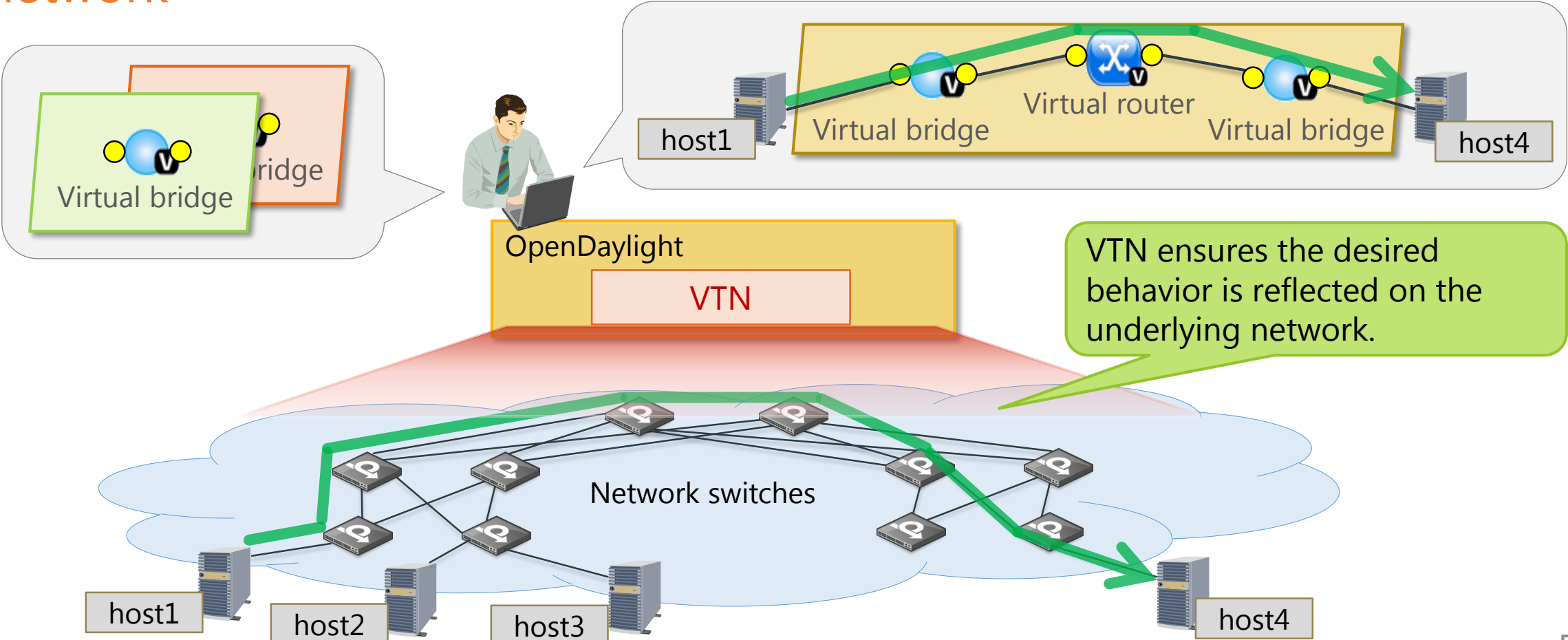
What is VTN?

- Stands for **V**irtual **T**enant **N**etwork
- The network virtualization function
- VTN features are implemented in OpenDaylight



Network Virtualization

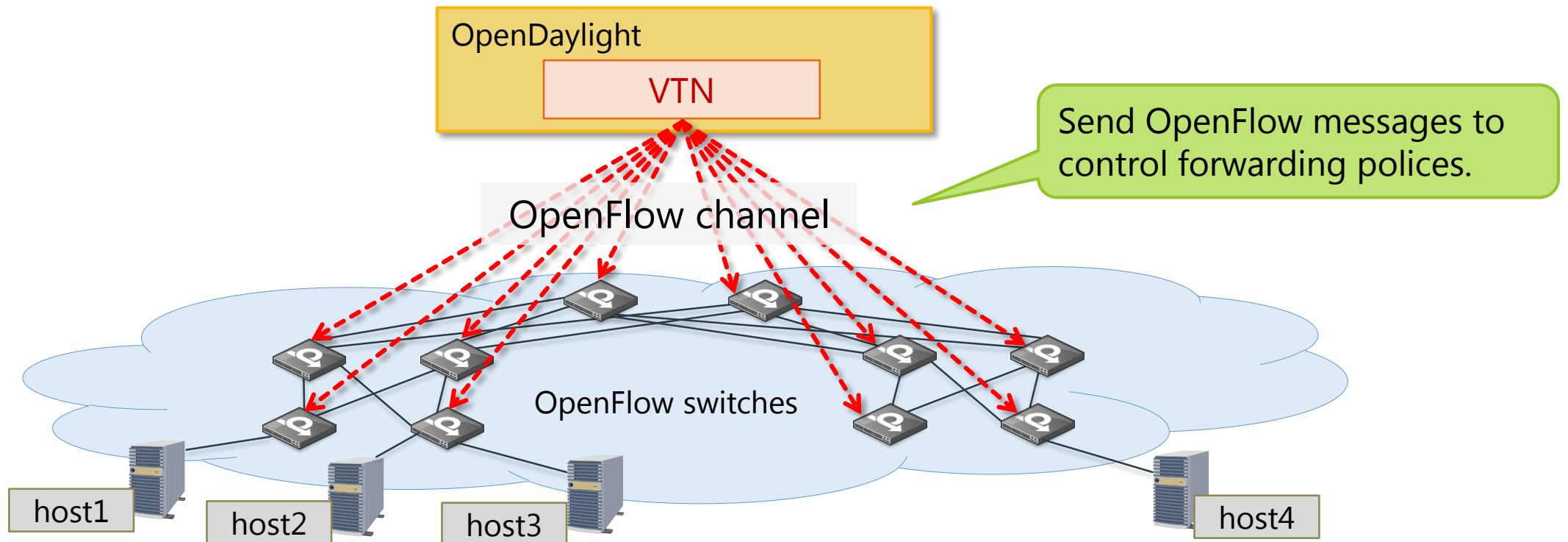
Provides a logical network abstraction on top of a physical network



Approach

Current implementation leverages **OpenFlow**

- Controls forwarding policies of switches
- Requires OpenFlow support of all switches



Key Benefits of VTN

■ Easy to manage networks

- Provides abstracted, simple network view
- Automatically detours data flow paths on link failures
- Provides end-to-end data flow information

■ Flexible traffic control

- Increases efficiency of network resource use
- Allows users to deploy advanced use cases
 - ✓ E.g.) Service Function Chaining

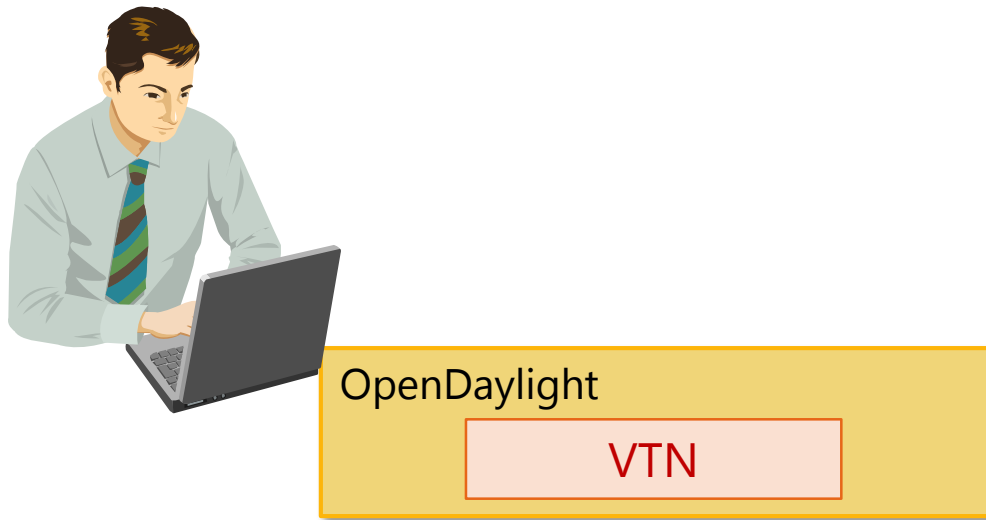
Key Features

- Virtual network provisioning
 - Virtual bridges
- Automatic detouring on link failures
- Flexible traffic control
 - ACLs
 - Redirecting traffic
- Integration with OpenStack

Virtual networks provisioning

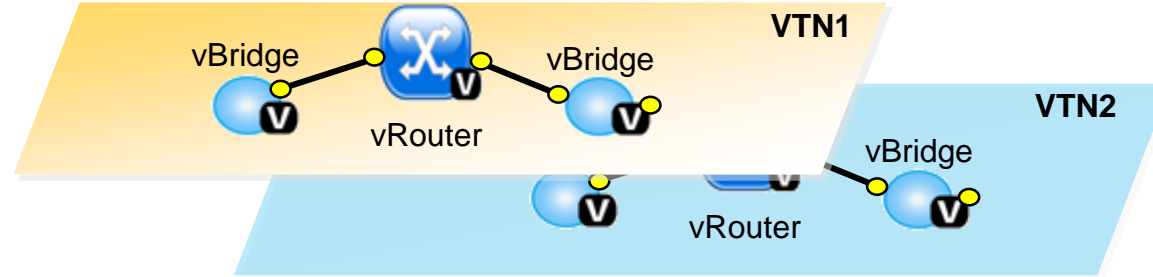
Two steps a network admin needs to do

1. Designing virtual networks using virtual elements
2. Associating virtual elements with underlying physical network



1. Design virtual networks

The following elements are available to design virtual networks



Components		Description
Virtual node (vNode)	vBridge	logical representation of L2 switch function.
	vRouter	logical representation of L3 router function
Virtual interface	interface	representation of end point on the virtual node.
Virtual Link	vLink	logical representation of connectivity between virtual interfaces.

2. Associate virtual to physical

VTN provides several ways for mapping

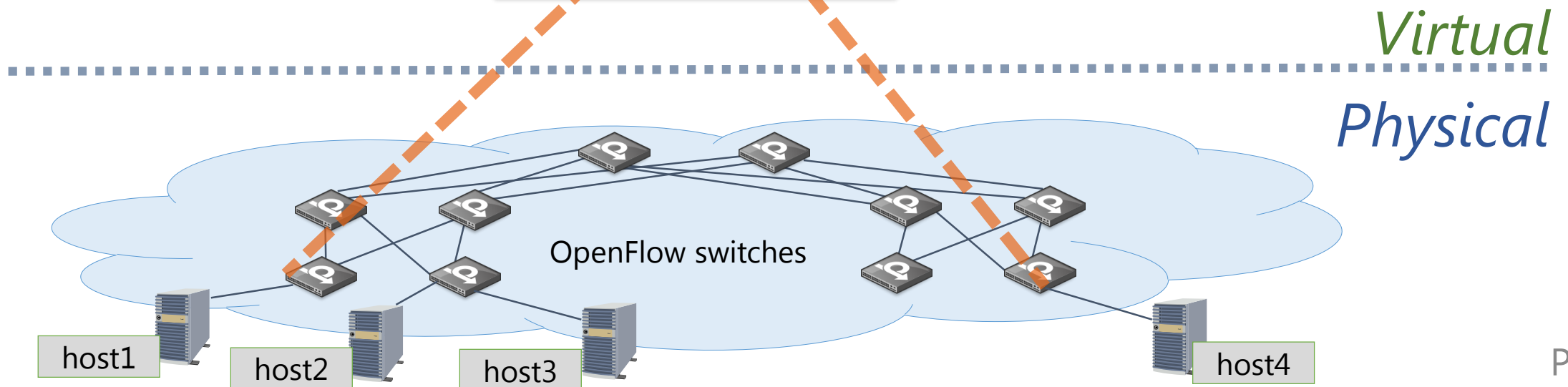
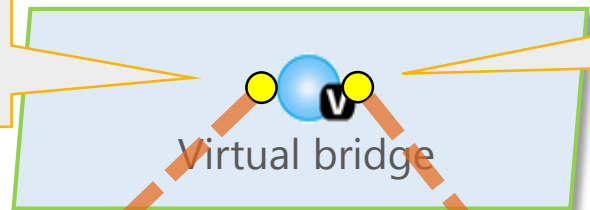
- E.g.) Port mapping: Maps a virtual interface to a switch port

[Port Mapping]

```
switch: {"id": "00:00:00:00:00:00:00:01"}  
port: {"name": "s1-eth1"}
```

[Port Mapping]

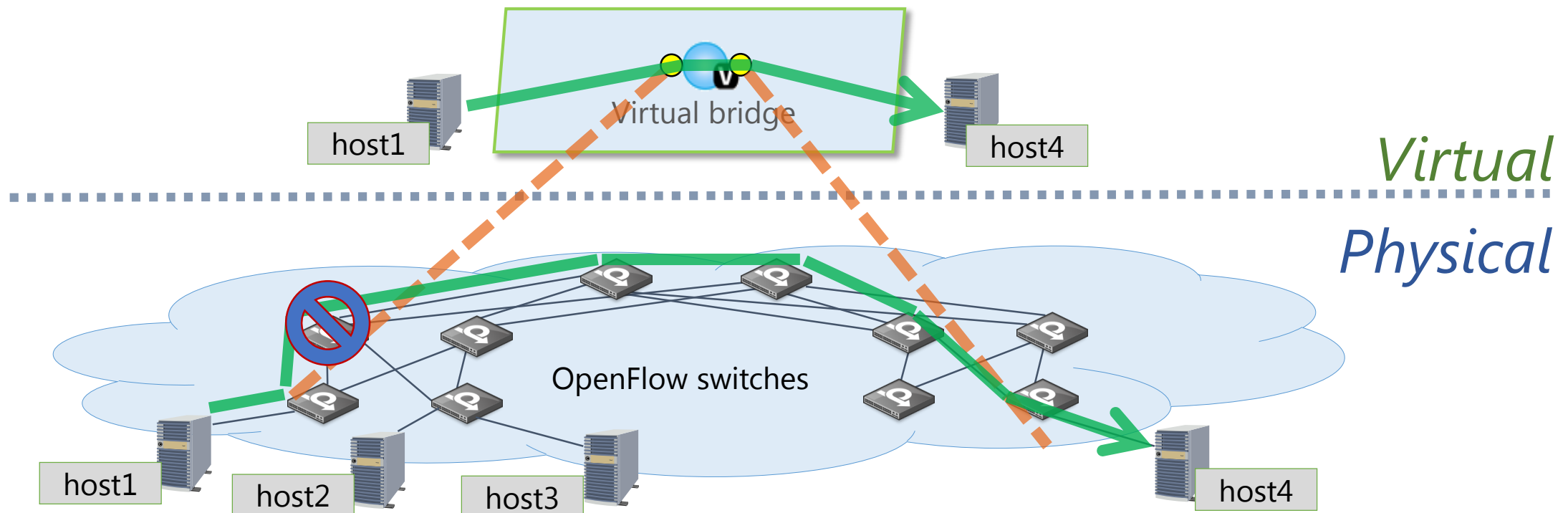
```
switch: {"id": "00:00:00:00:00:00:00:04"}  
port: {"name": "s4-eth1"}
```



Recovery from switch/link failures

VTN handles any network failures or topology changes to **make sure virtual networks always functional**

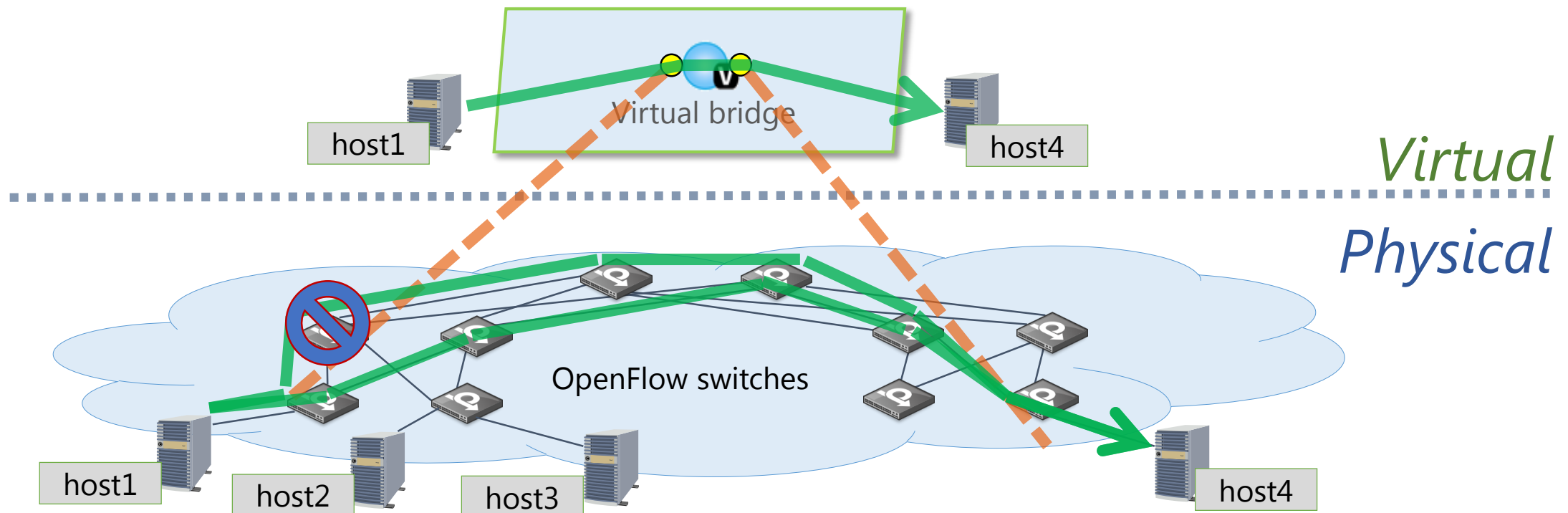
1. Monitoring physical resources
2. Routing traffic through alternate paths in the event of network changes



Recovery from switch/link failures

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1. Monitoring physical resources
2. Routing traffic through alternate paths in the event of network changes



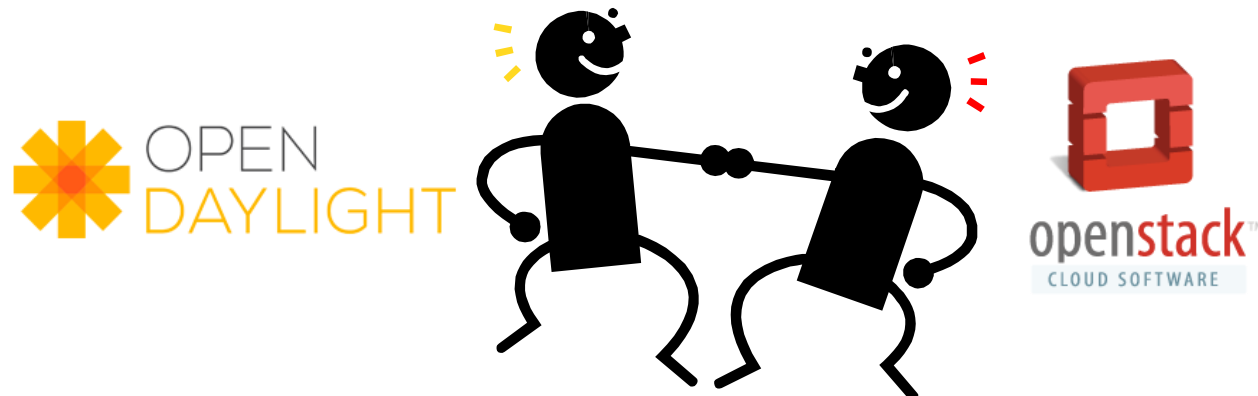
Flow Filter functions

- Filter traffic based on specific conditions, and perform specific action
 - Actions:
 - ✓ Drop, Pass, Redirect, and Remark
 - Conditions:
 - ✓ Any matching condition available in OpenFlow
 - ✓ E.g. MAC/IP Address, IP Protocol, TCP/UDP port, etc.
- Can be applied to any virtual elements

OpenStack integration

VTN works as network service provider for OpenStack Neutron

- Creates virtual networks based on network configuration which users create in OpenStack
- Enables OpenStack to work in **pure OpenFlow environment** in which all switches in data plane are OpenFlow switches



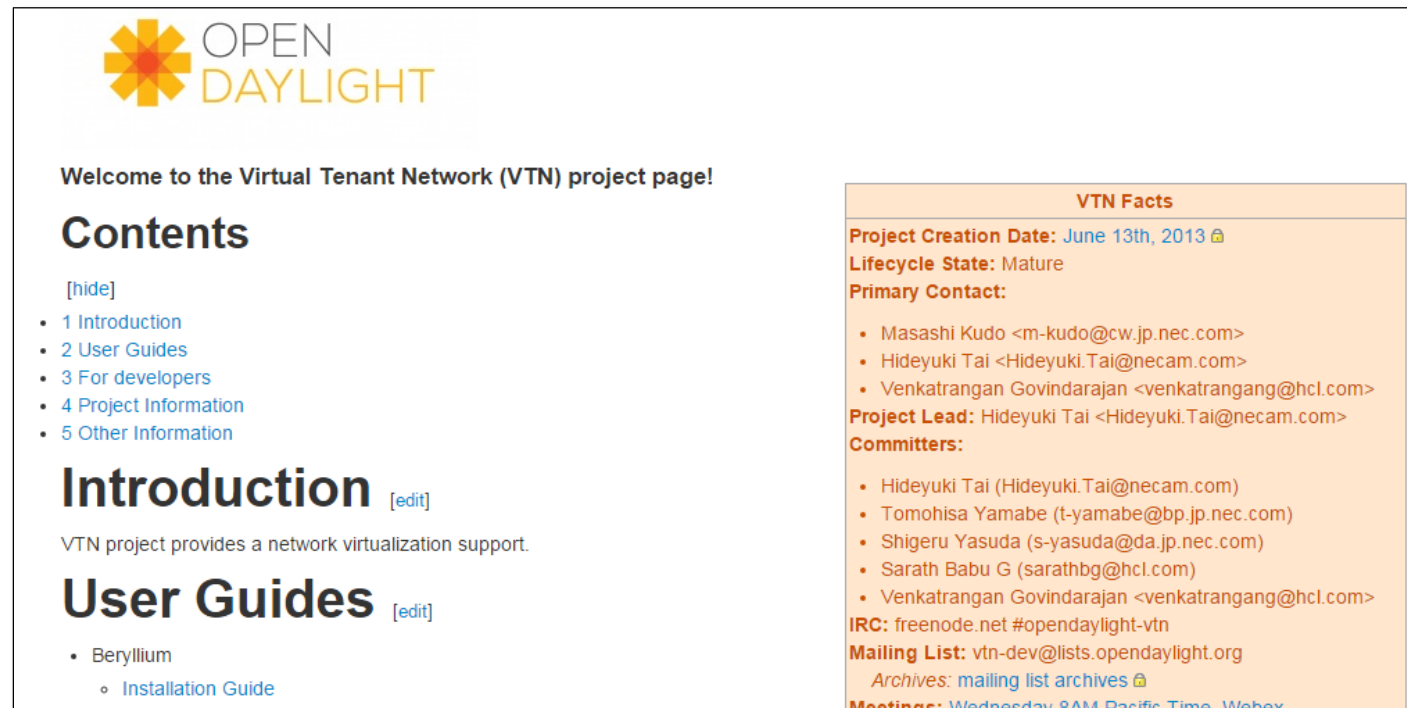
What is the current VTN missing?

- Clustering support
- Virtual Router (Layer 3)
- IPv6 support
- QoS
- CLI command
- GUI for VTN configuration
- Aggregation of flow entries

Jump into the VTN project!

VTN project wiki page

- You can know more on VTN from VTN wiki page
 - <https://wiki.opendaylight.org/view/VTN:Main>
- User guides and developer guides are available



The screenshot shows the VTN project page on the OpenDaylight wiki. At the top left is the OpenDaylight logo, a stylized orange flower. Below it, the text reads "Welcome to the Virtual Tenant Network (VTN) project page!". The main content is divided into two columns. The left column has a "Contents" section with a "[hide]" link and a list of five items: "1 Introduction", "2 User Guides", "3 For developers", "4 Project Information", and "5 Other Information". Below this is an "Introduction" section with an "[edit]" link, followed by the text "VTN project provides a network virtualization support." and a "User Guides" section with an "[edit]" link. Under "User Guides", there is a list starting with "Beryllium" and "Installation Guide". The right column is titled "VTN Facts" and contains several key pieces of information: "Project Creation Date: June 13th, 2013", "Lifecycle State: Mature", "Primary Contact:" followed by a list of three contacts (Masashi Kudo, Hideyuki Tai, Venkatrangan Govindarajan), "Project Lead: Hideyuki Tai", "Committers:" followed by a list of five committers (Hideyuki Tai, Tomohisa Yamabe, Shigeru Yasuda, Sarath Babu G, Venkatrangan Govindarajan), "IRC: freenode.net #opendaylight-vtn", "Mailing List: vtn-dev@lists.opendaylight.org" with a link to "mailing list archives", and "Meetings: Wednesday 8AM Pacific Time Webex".

Communication tools

- IRC Channel
 - **#opendaylight-vtn** on freenode
- Mailing lists
 - vtn-dev@lists.opendaylight.org
 - vtn-users@lists.opendaylight.org
- Task list on Trello
 - <https://trello.com/b/2g3lw1GU/opendaylight-vtn>

VTN weekly meeting

- <https://wiki.opendaylight.org/view/VTN:Meetings>
- Every Wednesday at 08:00 AM PST/PDT

Conclusion

- VTN project is one of mature projects in OpenDaylight
- Provides **network virtualization** support for OpenFlow
- Key features
 - Virtual network provisioning
 - Flexible traffic control
 - Automatic detouring on link failures

New contributors are highly welcome!
Please bring your ideas!