



Access Control for a Database-Defined Network

Temple University REU 2016

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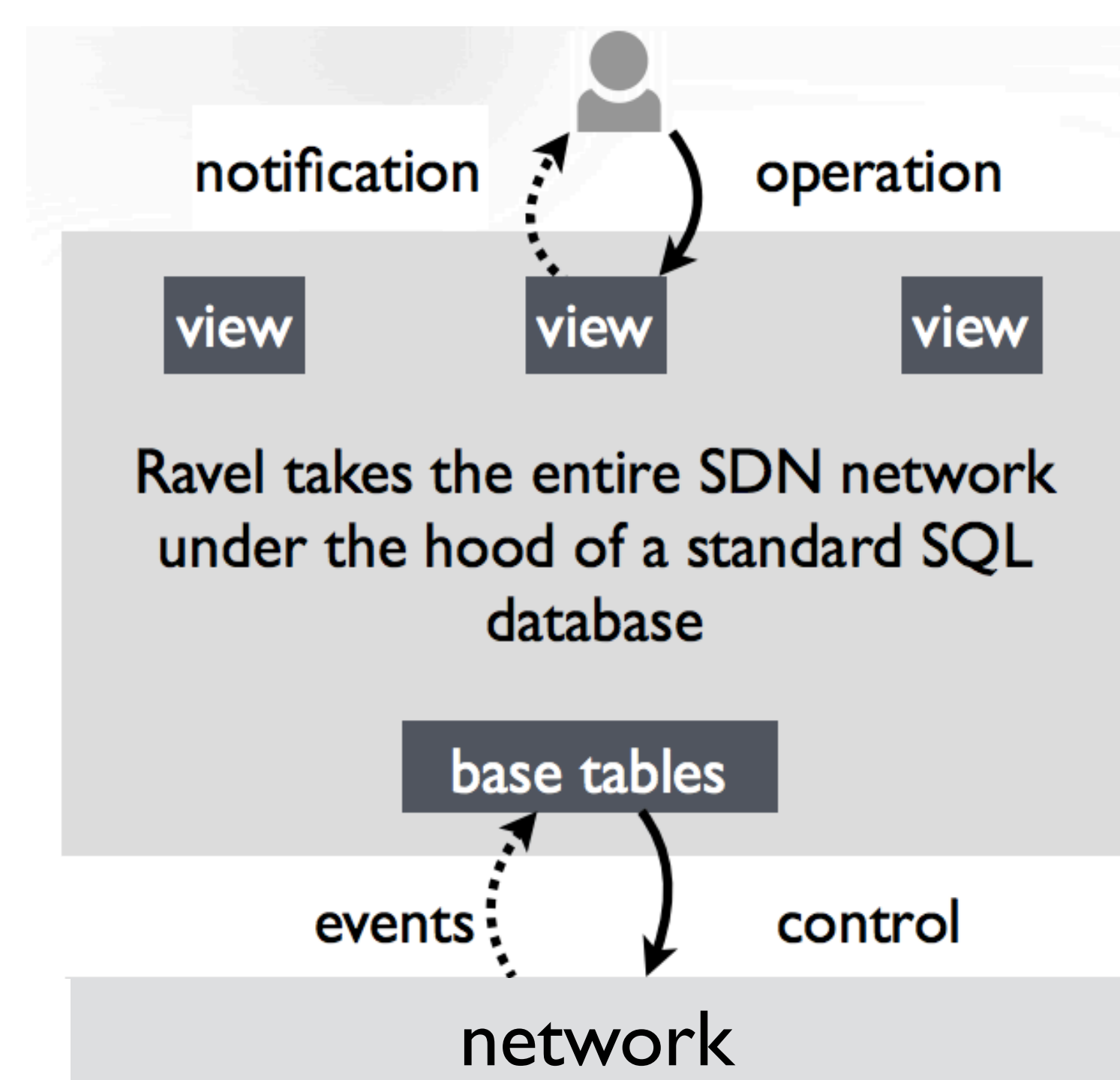


Introduction

- Software-defined networking (SDN) allows insertion of software to manage network through centralized controller
- Ravel, a database-defined controller, like many others currently exposes all network states to its users
- More efforts are needed to improve security in SDN
- This project adds an access control application to Ravel

Database-Defined Network

SDN: control distributed set of devices with a centralized controller

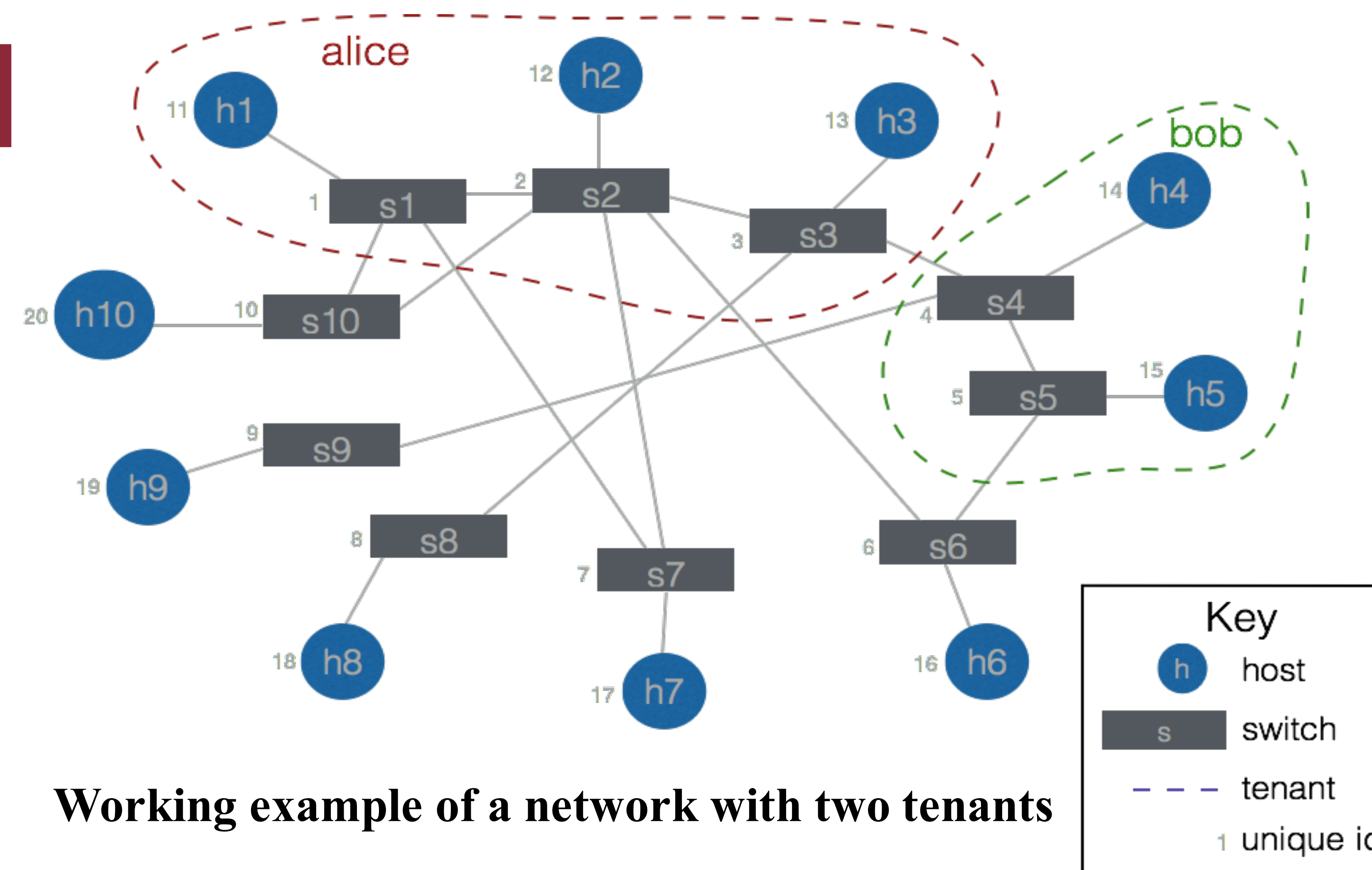


Ravel is the realization of SDN by database

- SQL interface
- *Views*: user-defined abstractions for individual applications
- *Orchestration*: coordinate updates between multiple applications

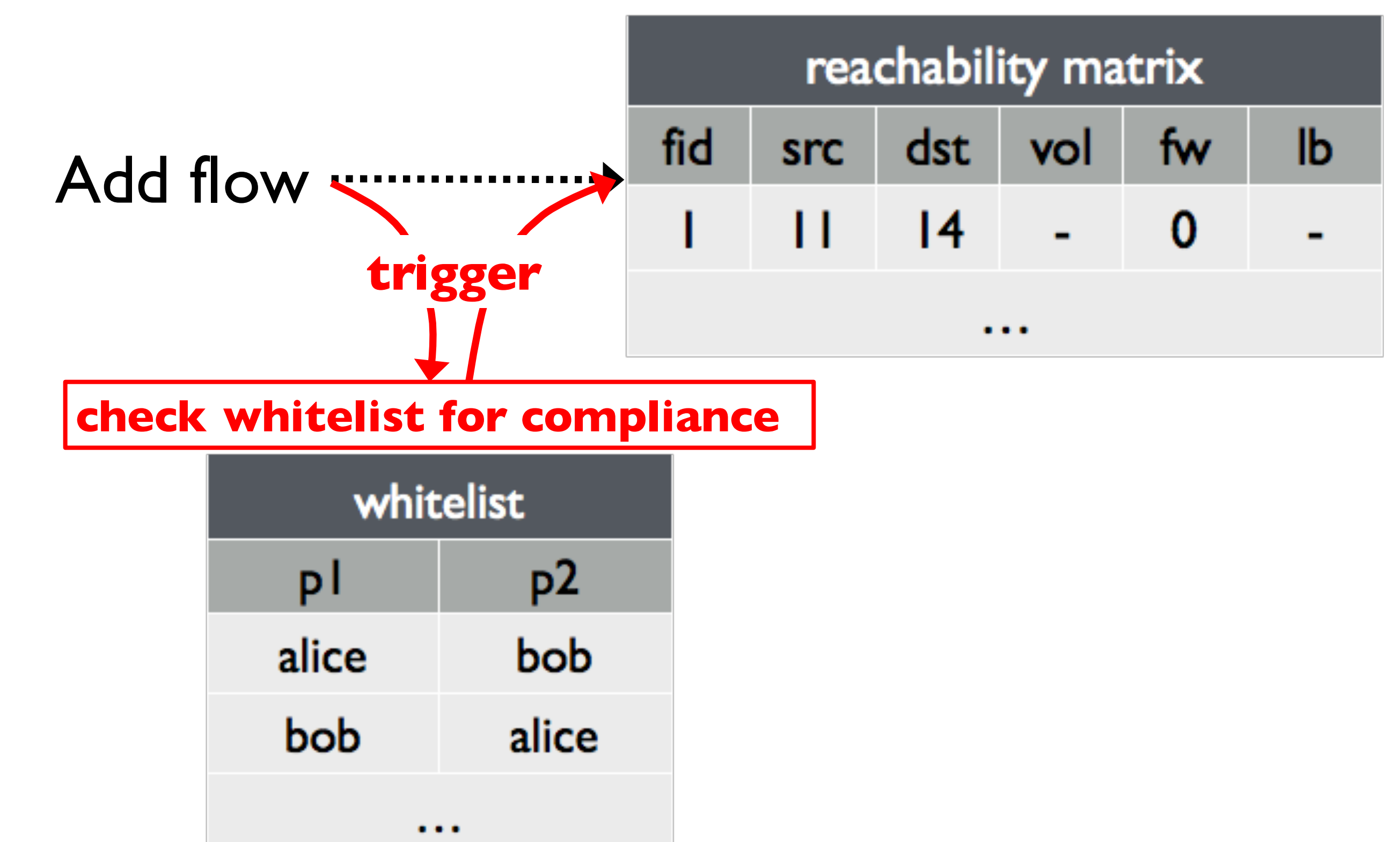
Security

- Ravel does not yet have security implemented
- This project adds access control, a specific aspect of security



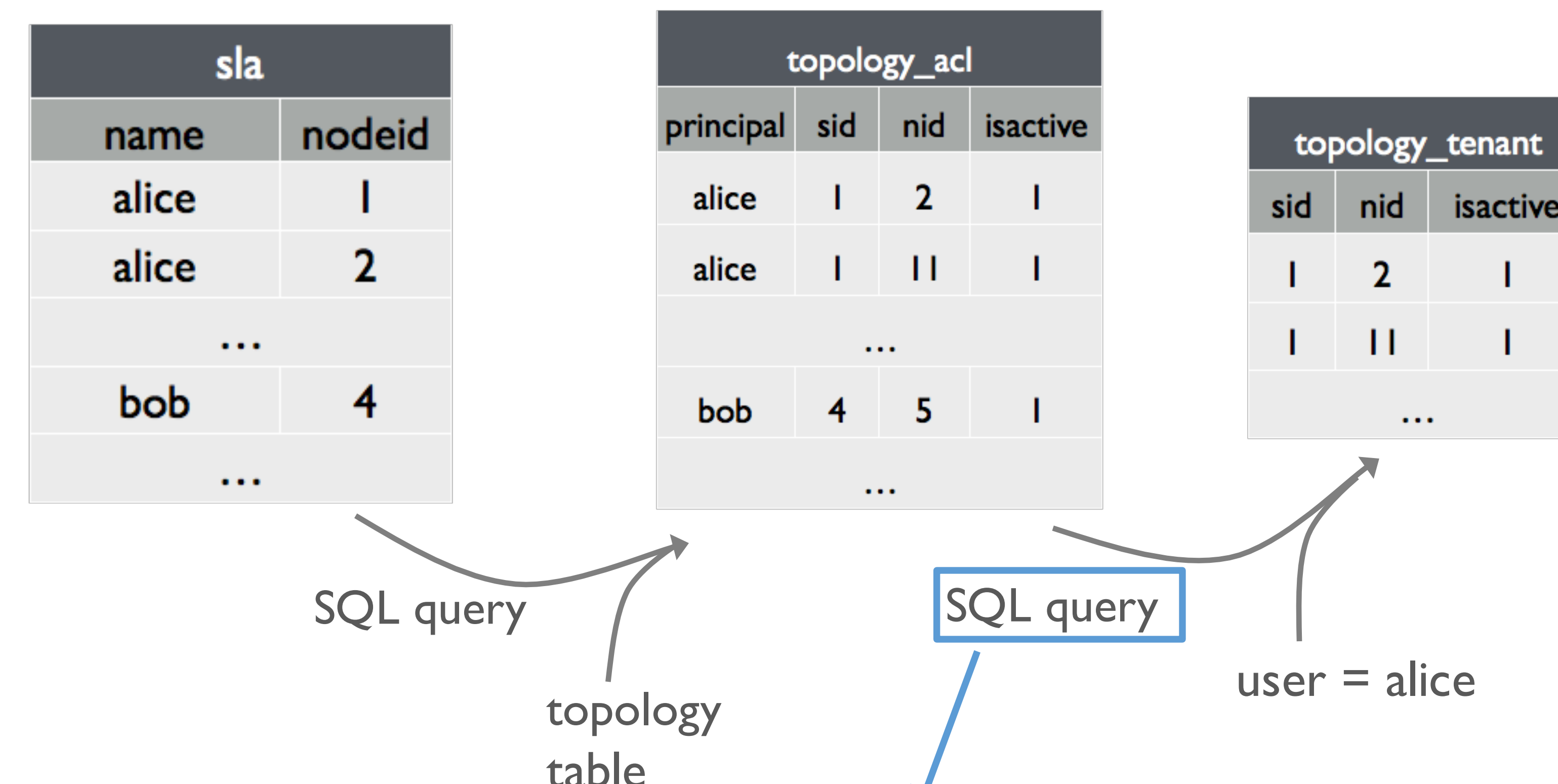
Working example of a network with two tenants

Access Control for Network Updates



Access Control for Network Resources

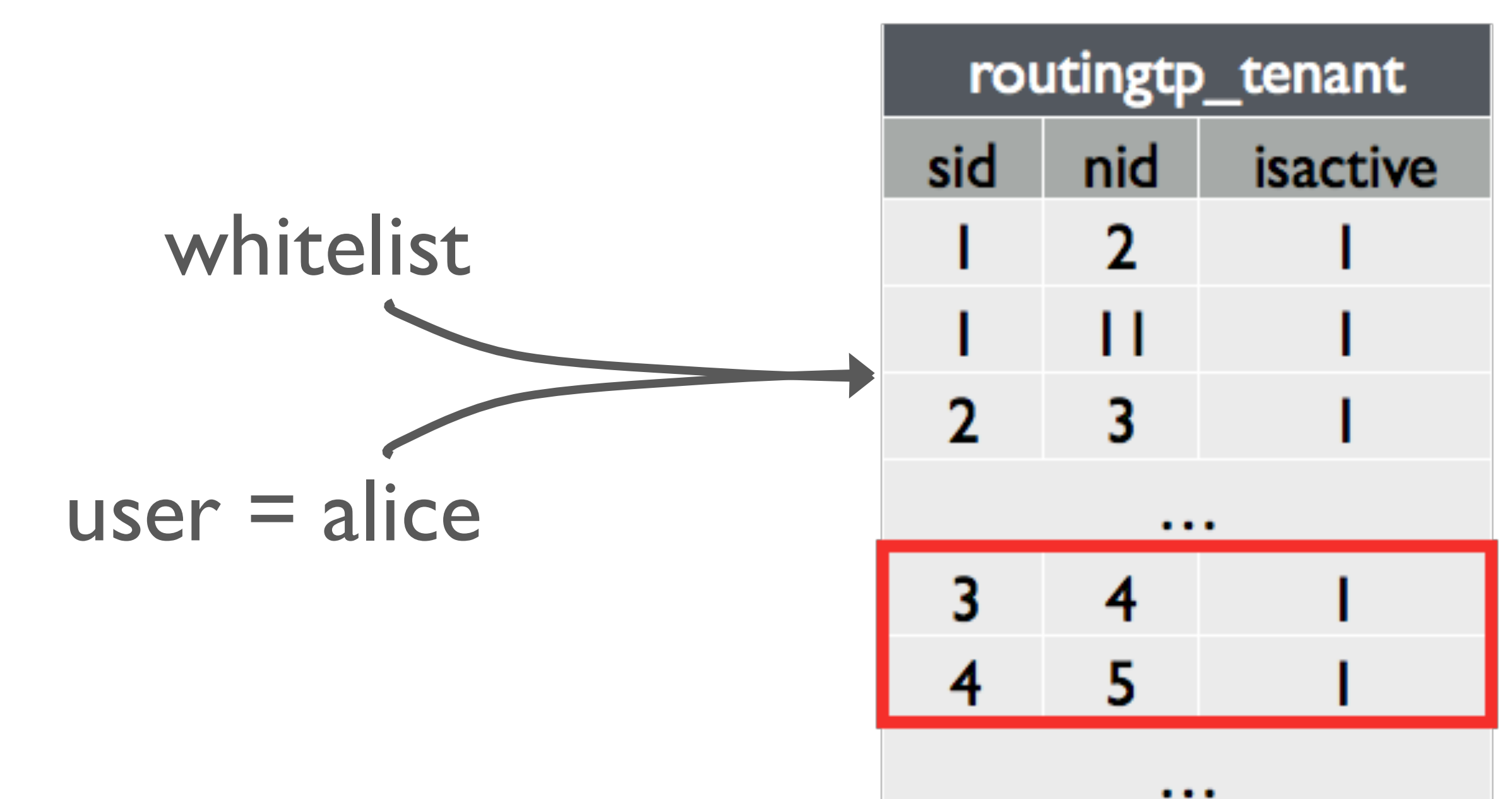
Service-level agreement (SLA)



```
CREATE OR REPLACE VIEW topology_tenant AS (
  SELECT sid, nid, isactive FROM topology_acl
  WHERE principal = current_user);
```

Challenge: Controlling Network Updates

Goal: Select a path through only nodes compliant with a user's SLA.



- Create **routingtp_tenant** view to achieve this goal
- Calculate a path that contains only nodes listed in this view

Ravel: ravel-net.org

Demo: github.com/ravel-net/REU-access-control