

# LSDN — Manage complex (virtual) networks in cloud environment with Linux kernel facilities

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# Motivation

- Tool for easy management of data-center scenarios
- Using TC as a workhorse, no other dependency such as OvS
- Attempt to be “high-level” and easy to use
- Validate TC capabilities and limits in such a deployment
- Leverage rapid development of TC
- Attempt to provide a lot of features without a long-running daemons
- Fix some bugs in kernel (Not original motivation)

## What We Can Do

- Support for virtual networks, switches and ports
- Network overlay
- Multi tenancy
- Stateless firewall
- QoS
- API for management via C-library
- DSL (Domain Specific Language) for stand-alone management

# Network Model

- Virtual networks (**nets**)
  - **geneve**, **vxlان**, **vlan**
  - Identifier **VID** from the underlying technology
- Physical Machines (**physes**)
  - Connected to one or more **nets**
  - Usually real physical interface, e.g. **eth0**
- Virtual machines (**virts**)
  - Always part of one **net**
  - Live on one of **phys**, can migrate
  - Usually some **tap** interface
- All lives in one **context**
- Validation can be used for finding errors
- **Commit** validates and applies changes

- LSDN provides 2 styles of configurations:
  - ① C API
    - Library `liblsdn`
    - For integration with orchestration, hypervisors ...
    - Just link `liblsdn` and use it
  - ② `lsctl`
    - Command line tool
    - Tool for stand-alone configuration
    - Uses C API
    - Own DSL based on TCL
    - `lsctl < config.lsctl`

- C API and `lsctl` example

- Modular testing system example
- Generated TC rules

# Conclusion

- LSDN is a network management tool on top of TC (Data-center like scenarios)
- Packages for Arch, RPM and DEB based distributions
- Minimal dependencies → Trivial for trying out
- Fixed various bugs in upstream:
  - 4 in net part of Linux Kernel
  - 1 in iproute2
- Future plans:
  - Stabilize the project
  - Migrations without daemon
  - Stateful firewall
  - ...