# Network Infrastructure Device Management Plane Security Baseline

https://datatracker.ietf.org/doc/draft-lin-sacm-nid-mp-security-baseline/

Qiushi Lin

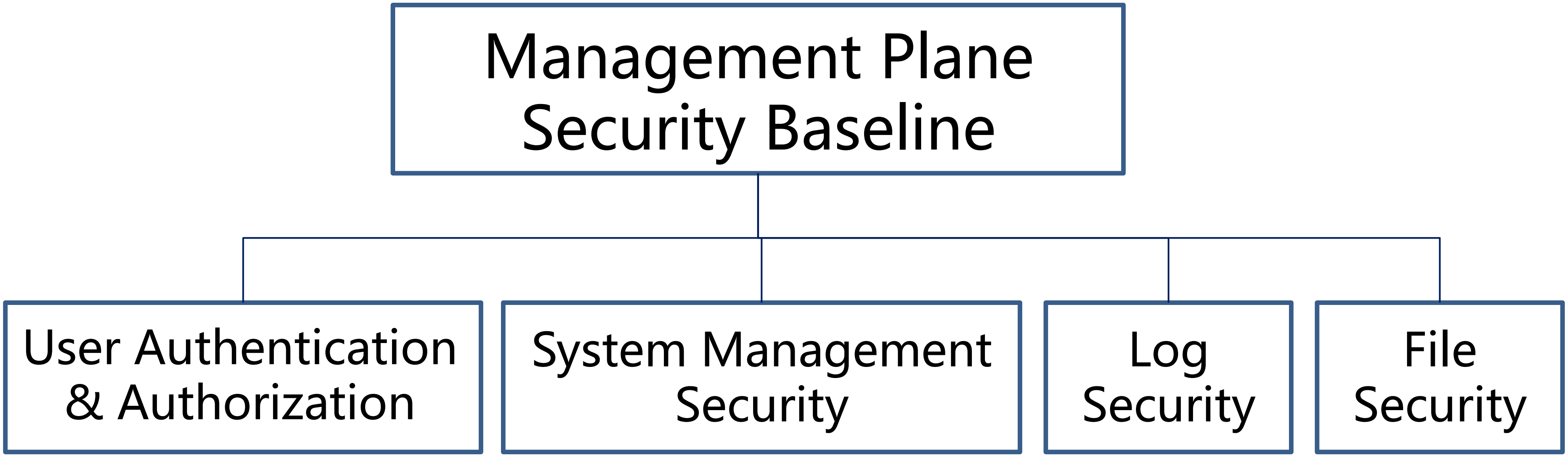
Liang Xia

IETF 100

# Motivation

- Define security baseline for network infrastructure devices, which can be further used in security posture assessment
- Focus on management plane security baseline and provide a data model
- Reuse the existing YANG models and provide additional modules or groupings for the missing parts

# Overall Structure



Management Plane Security Baseline

User Authentication & Authorization

System Management Security

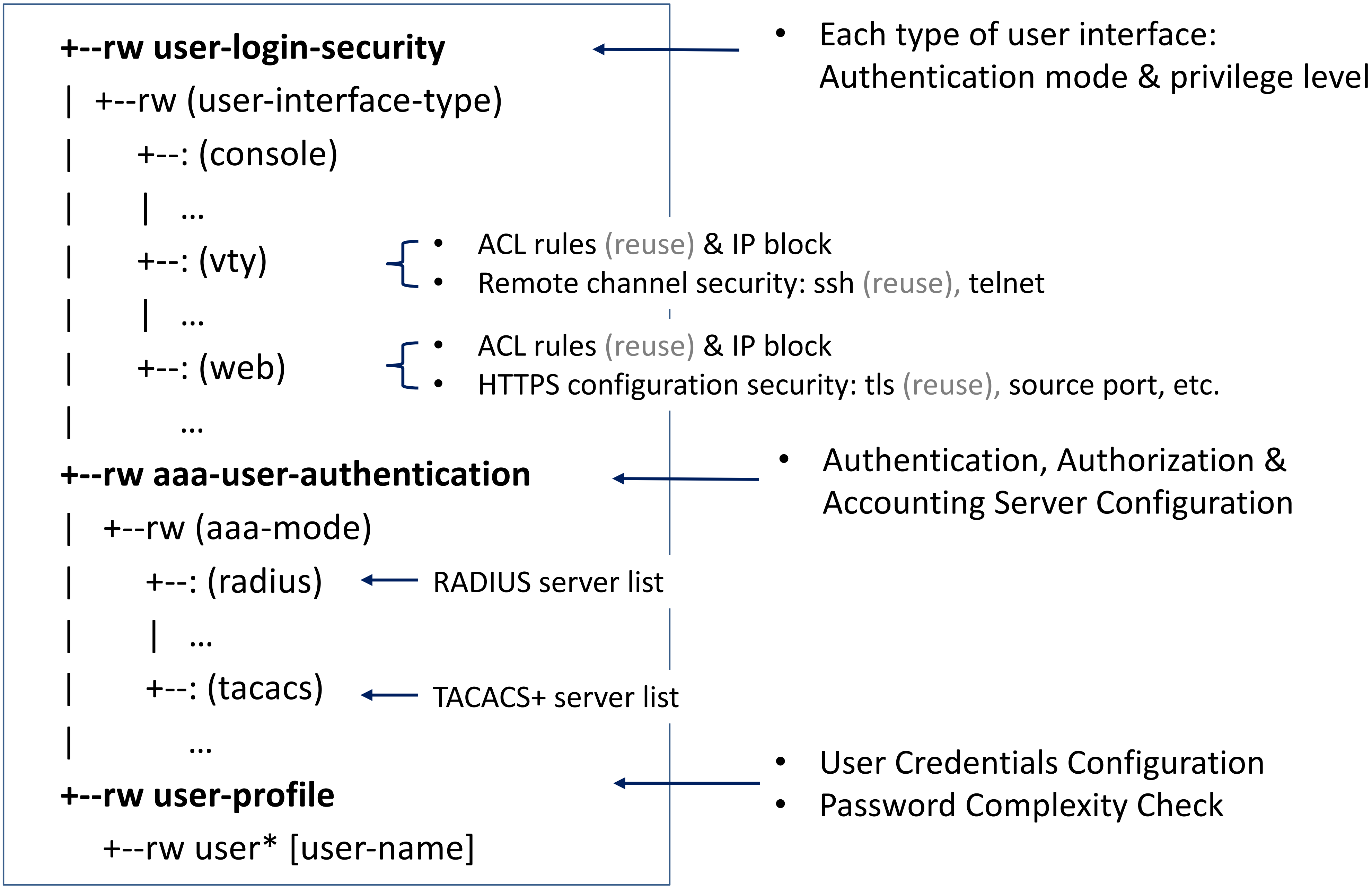
Log Security

File Security

**Existing YANG Models**

- RFC7317: A YANG Data Model for System Management
- RFC7407: A YANG Data Model for SNMP Configuration
- I-D.ietf-netconf-tls-client-server
- I-D.ietf-netconf-ssh-client-server
- I-D.ietf-netconf-netconf-client-server
- I-D.ietf-netmod-syslog-model
- I-D.ietf-netmod-acl-model

# User Authentication & Authorization



```
+--rw user-login-security
|  +--rw (user-interface-type)
|      +--: (console)
|      |   ...
|      +--: (vty)
|      |   ...
|      +--: (web)
|          ...
+--rw aaa-user-authentication
|  +--rw (aaa-mode)
|      +--: (radius)
|      |   ...
|      +--: (tacacs)
|          ...
+--rw user-profile
   +--rw user* [user-name]
```

- Each type of user interface: Authentication mode & privilege level

(vty):

- ACL rules (reuse) & IP block
- Remote channel security: ssh (reuse), telnet

(web):

- ACL rules (reuse) & IP block
- HTTPS configuration security: tls (reuse), source port, etc.

- Authentication, Authorization & Accounting Server Configuration

RADIUS server list

TACACS+ server list

- User Credentials Configuration
- Password Complexity Check

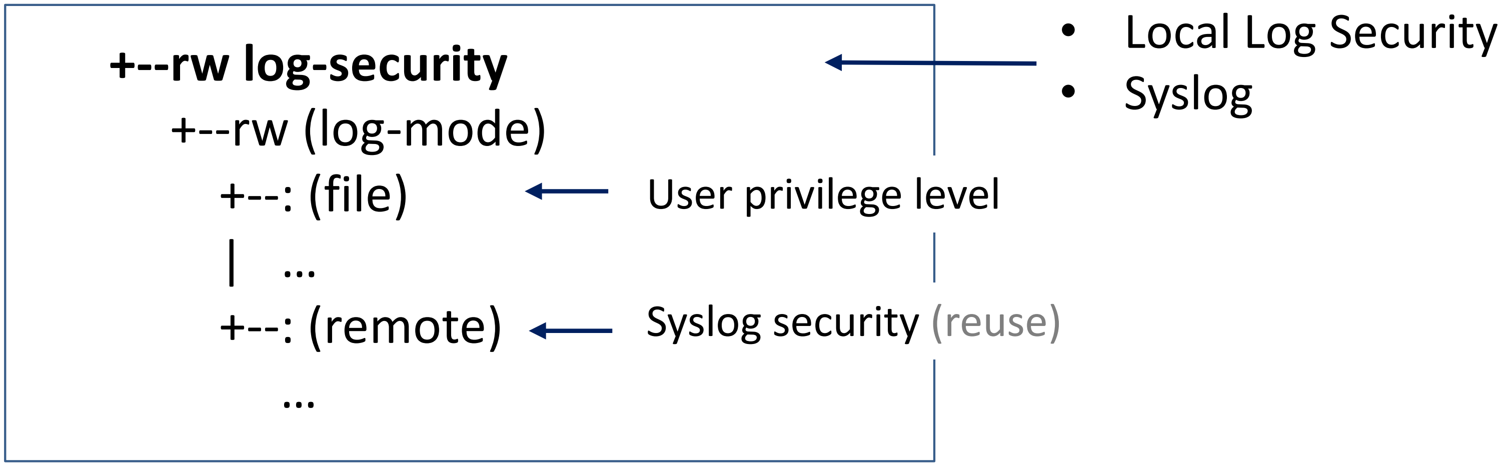
# System Management Security

```
+--rw snmp-security
|  +--rw target* [name]
|  |   …
|  +--rw target-params* [name]
|  |   …
|  +--rw community* [index]
|  |   …
|  +--rw vacm
|  |   …
|  +--rw usm
|  |   …
|  +--rw tsm
|      …
+--rw netconf-security
   +--rw listen {listen}?
   |   …
   +--rw call-home {call-home}?
```

- Reuse the definition in RFC7407
  - Community-based Security Model for SNMPv1 and SNMPv2c
  - View-based Access Control Model and User-based Security Model for SNMPv3

- Reuse the definition in I-D.ietf-netconf-netconf-client-server

# Log Security & File Security

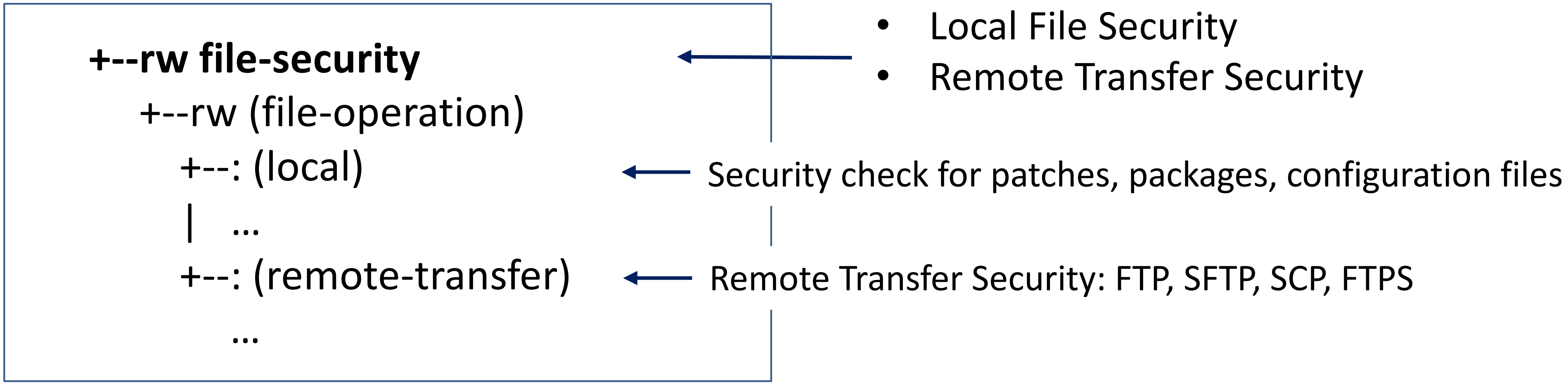


```
+--rw log-security
   +--rw (log-mode)
      +--: (file)
      |   …
      +--: (remote)
          …
```

- Local Log Security
- Syslog

User privilege level

Syslog security (reuse)



```
+--rw file-security
   +--rw (file-operation)
      +--: (local)
      |   …
      +--: (remote-transfer)
          …
```

- Local File Security
- Remote Transfer Security

Security check for patches, packages, configuration files

Remote Transfer Security: FTP, SFTP, SCP, FTPS

# Next Steps

- Refine the data model

- Combine the data model with SACM framework to assess network infrastructure device security posture

- Combine with existing YANG push and sub/pub mechanisms

- Please review and comment