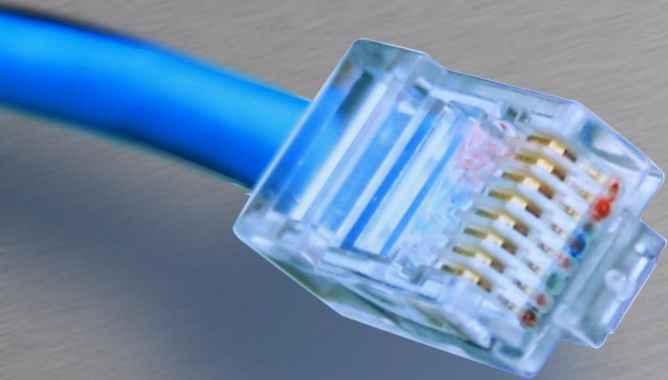


# Juniper



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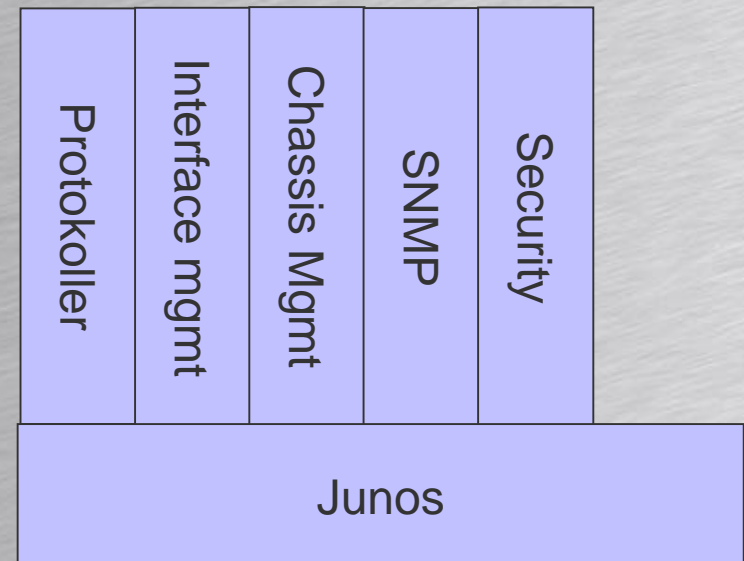
## IJOS: Juniper Intro

Rasmus Elmholt V1.0



# Junos OS

- Bygger på FreeBSD Unix Kerne
  - Samme SW til alle platforme(\*)
  - Kører på x86/PowerPC arkitektur
  - Vedligeholder information omkring:
    - Konfiguration
    - Routing protokoller
    - Route tabellen
    - Forwarding Table





# Junos OS

- Flere processer har forskellige funktioner
  - Hver proces kører i sit eget beskyttede hukommelses område
  - Kan crashe eller genstartet uden at genere andre processer
    - chassisd: Chassis Process
    - eswd: Ethernet Switching Process
    - pfem: Forwarding Process
    - dcd: Interface Process
    - mgd: Management Process
    - rpd: Routing Protocol Process



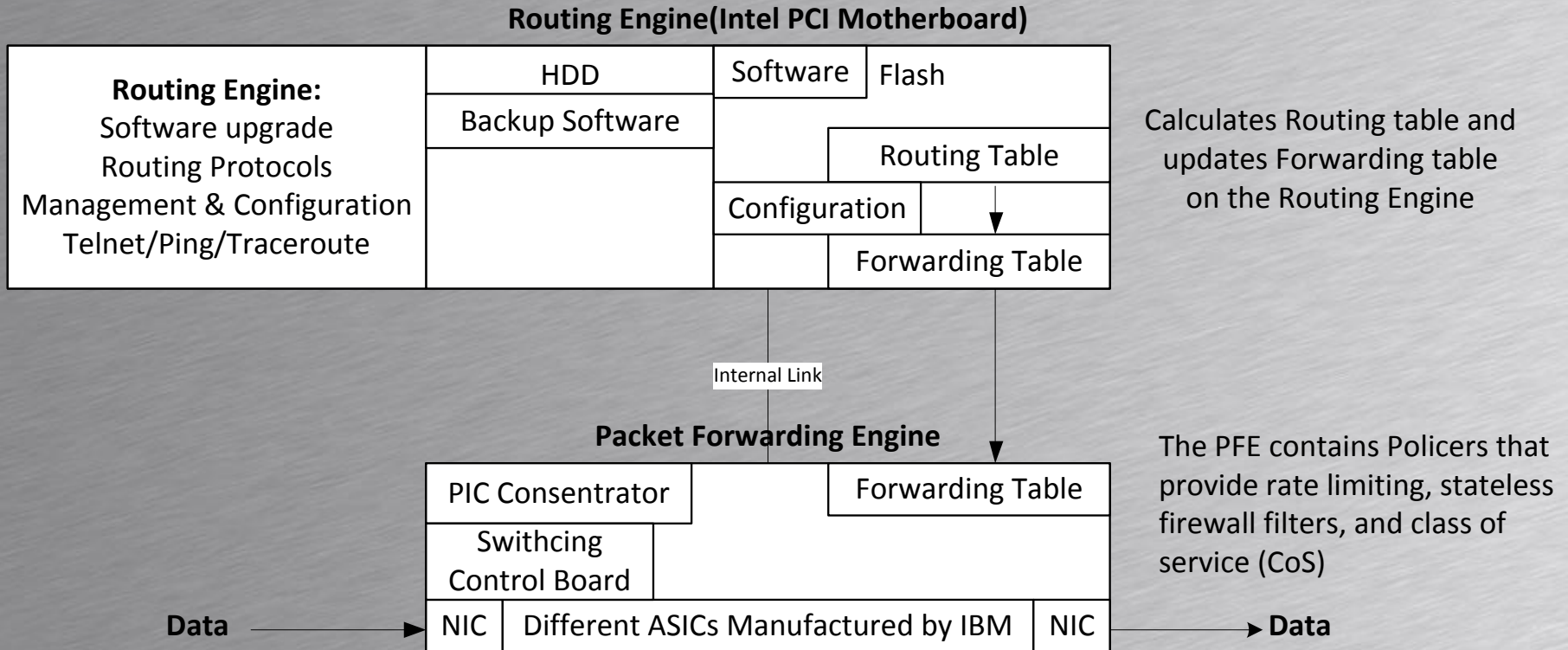


# Junos OS

- jbundle indeholder:
  - Jbase: tilføjelser til OS
  - Jkernel: OS pakke
  - Jroute: SW der kører på RE
  - Jcrypto: Sikkerheds SW med kryptografi
  - Jpfe: SW der kører på PFE
  - Jdocs: Dokumentation for softwaren
  
- `Show system software`



# Juniper Indmad



- RE og PFE opdelingen tillader bl.a.
  - Graceful Routing Engine switchover (GRES)
  - Nonstop Active Routing (NSR)
  - Unified In-Service Software Upgrades (ISSUs)



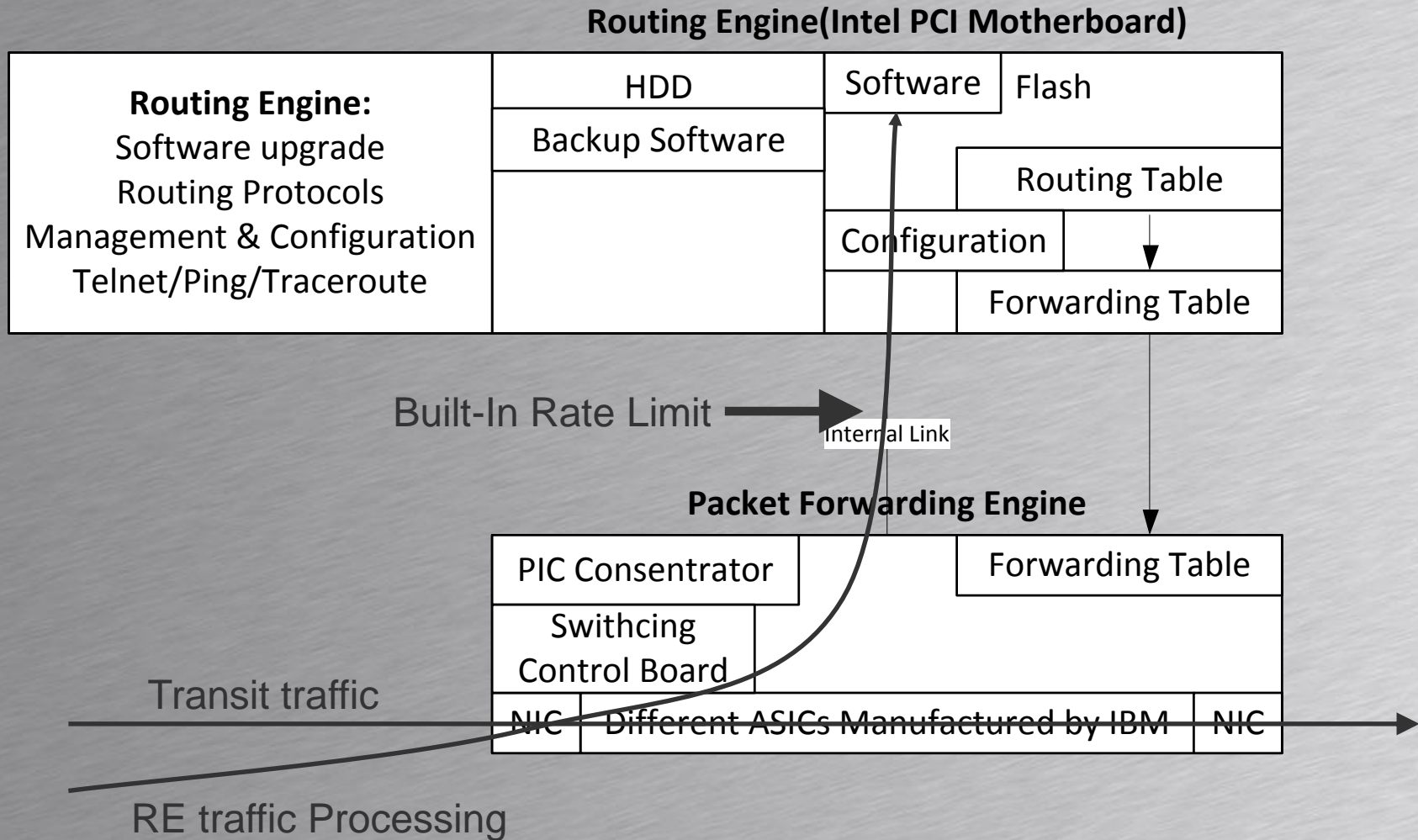
# Trafik Flow

- PFE
  - Pakke forwarding
  - Unicast
  - Multicast
  - Nogle ICMP fx. TTL Expired
- RE
  - Pakker til Chassiet(SSH, OSPF, MGMT)
  - Pakker med IP Options felt
  - Generering af og svar på ICMP beskeder

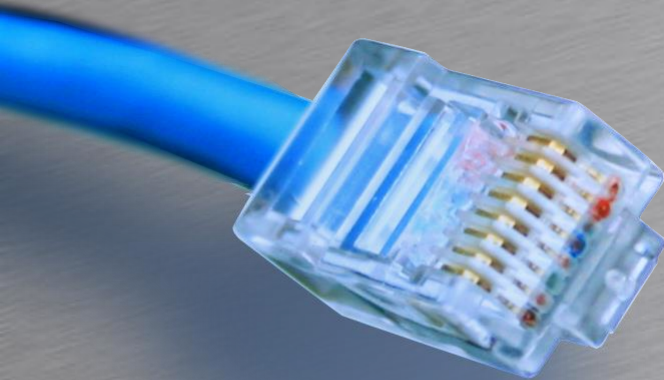




# Trafik Flow



# Junos CLI



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Operation Mode  
Configuration Mode





# CLI Setup

- Tekst baseret
  - Konsol port
  - RJ-45 RS-232 ved 9600Baud 8/1/N
  - Telnet
  - SSH



# CLI Setup

- Brugere kommer automatisk ind i CLI

```
Login: rael
```

```
Password:
```

```
--- JUNOS 9.5R1.8 built 2009-04-13 20:03:09 UTC
```

```
rael@SRX240>
```

- Root skal selv starte CLI

```
Login: root
```

```
Password:
```

```
--- JUNOS 9.5R1.8 built 2009-04-13 20:03:09 UTC
```

```
root@SRX240% cli
```

```
root@SRX240>
```



# CLI Setup

- Operational Mode
  - Monitor - show, test, ping

```
rael@SRX240>
```

- Configuration Mode
  - Konfiguration – protokoller, brugere, interfaces

```
[edit]
```

```
rael@SRX240#
```





# HJÆLP!!

- Man kan altid bruger ? Til at få kontekst tilrettet hjælp

```
rael@SRX240> ?
```

```
Possible completions:
```

<code>clear</code>	Clear information in the system
<code>configure</code>	Manipulate software configuration information
<code>file</code>	Perform file operations

```
rael@SRX240> show ?
```

```
Possible completions:
```

<code>accounting</code>	Show accounting profiles and records
<code>analyzer</code>	Show analyzer information
<code>arp</code>	Show system Address Resolution Protocol table entries



# HJÆLP!!

- `Help topic kommandoer`
  - Viser hvordan man bør bruge kommandoer

```
rael@SRX240> help topic interfaces address
```

```
Configuring the Interface Address
```

```
You assign an address to an interface by specifying the address when  
configuring the protocol family. For the inet family, configure the  
interface's IP address. For the iso family, configure one or more  
addresses for the loopback interface. For the ccc, tcc, mpls, tnp, and  
vpls families, you never configure an address.
```

```
To assign an address to an interface, include the address statement:
```

```
address address {  
    broadcast address;  
    destination address;  
    preferred;  
    primary;  
}
```

**Prøv det**



# HJÆLP!!

- Help reference kommandoer
  - Viser konfigurations eksempler

```
rael@SRX240> help reference interfaces address
```

## Syntax

```
address address {  
    arp ip-address (mac | multicast-mac) mac-address <publish>;  
    broadcast address;  
    destination address;  
}
```

## Hierarchy Level

```
[edit interfaces interface-name unit logical-unit-number family family]
```

## Release Information

Statement introduced before JUNOS Release 7.4.

**Prøv det**





# HJÆLP!!

- Help apropos kommandoer
  - Viser kontekst tilrettet kommandoer

```
rael@SRX240> help apropos ospf
clear ospf
    Clear Open Shortest Path First information
clear ospf neighbor
    Clear OSPF neighbors
clear ospf neighbor area <area>
    OSPF area ID
```

```
[edit protocols]
rael@SRX240# help apropos ospf
set ospf
    OSPF configuration
set ospf disable
    Disable OSPF
```

**Prøv det**



# Lucky Luke

- Tab og Space completion på alt
- EMACS-style editing
  - `Ctrl+a` = Home
  - `Ctrl+e` = End
  - `Ctrl+b` = Back 1 char
  - `Ctrl+f` = Forward 1 char
  - `Ctrl+d` = Delete
  - `Ctrl+k` = Delete to the end of the line
  - `Ctrl+u` = Delete the entire line
  - `Esc+d` = Delete 1 word to the right

**Prøv det**



# | the Pipe

- Output kan sorteres med Pipe

```
rael@SRX240> show interfaces | ?
```

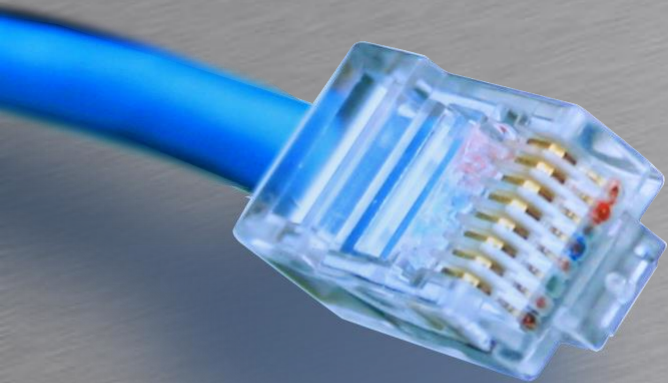
Possible completions:

count	Count occurrences
display	Show additional kinds of information
except	Show only text that does not match a pattern
find	Search for first occurrence of pattern
hold	Hold text without exiting the --More-- prompt
last	Display end of output only
match	Show only text that matches a pattern
no-more	Don't paginate output
request	Make system-level requests
resolve	Resolve IP addresses
save	Save output text to file
trim	Trim specified number of columns from start of line

**Prøv det**



# CLI Operational Mode



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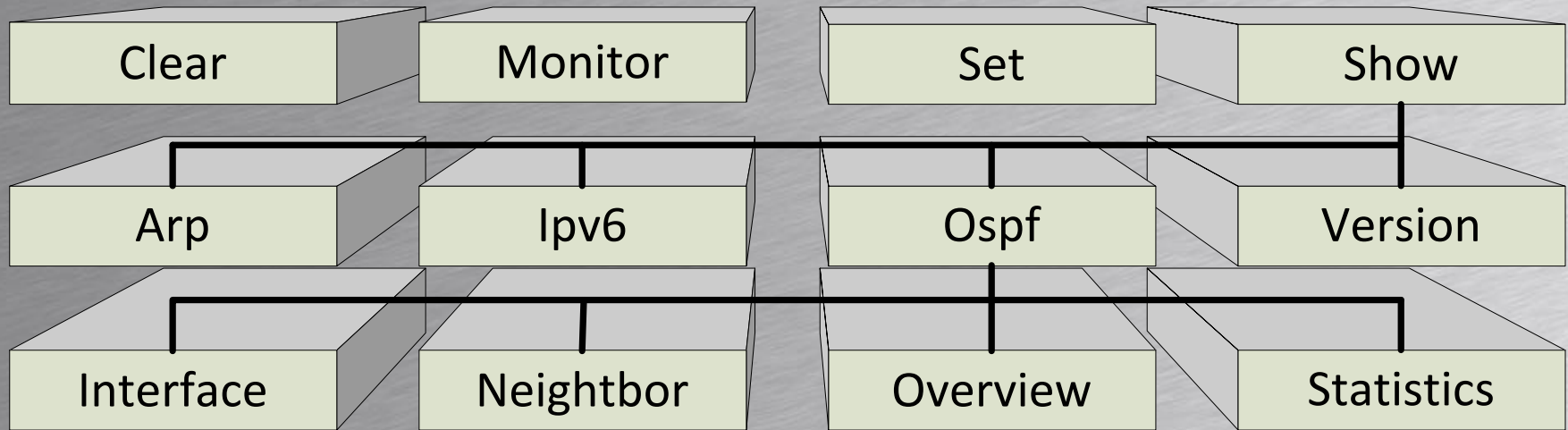
Kommando hierarki



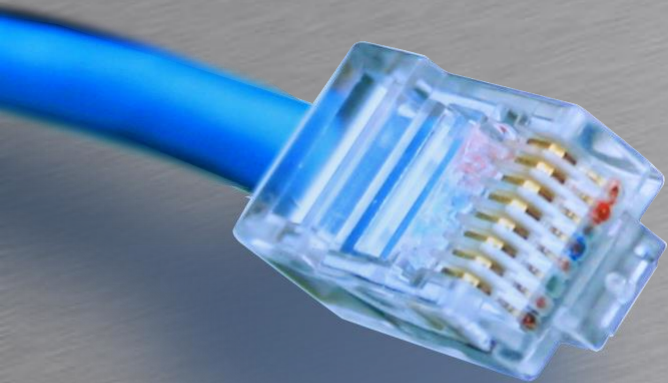
# Operational Mode



- Kommandoerne er hierarkisk opbygget



# CLI Configuration Mode



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Opsætning



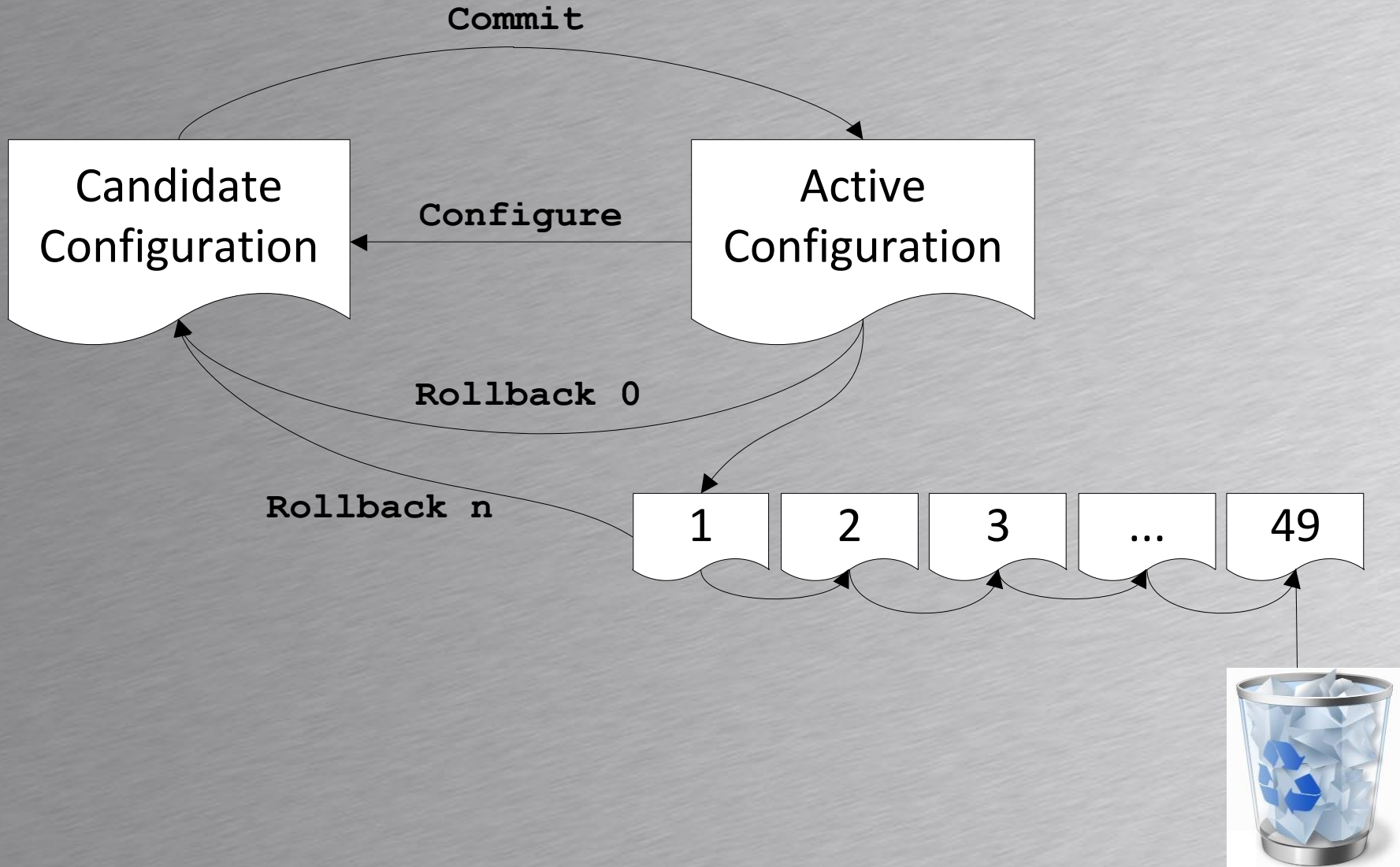


# Konfig håndtering

- Batch Configuration model
  - Alle ændringer træder i kræft ved commit
- Active Configuration
  - Running Config og Startup Config er den samme
- Candidate Configuration
  - Viderebygger på den aktive konfiguration
  - Bliver aktiv ved commit



# Konfig håndtering





# Konfig Modes

- Skriv `configure` for at konfigurere enheden
  - Flere brugere kan konfigurere samtidig.
  - Der vises en besked hvis andre er logget ind samtidig og hvor de er i hierakiet.

```
rael@SRX240> configure
Entering configuration mode
Users currently editing the configuration:
    rael2 terminal p0 (pid 972) on since 2011-10-24 19:32:38 UTC
    [edit system login]

[edit]
rael@SRX240#
```

**Prøv det**





# Konfig Modes

- Skriv `configure exclusive` for at konfigurere uden andres indblanding
  - Andre brugere kan ikke commite i configure mode.
  - Uncommitted ændringer bliver slettet ved exit

```
rael@SRX240> configure
warning: uncommitted changes will be discarded on exit
Entering configuration mode
Users currently editing the configuration:
    rael2 terminal p0 (pid 972) on since 2011-10-24 19:43:03 UTC
        exclusive [edit]

[edit]
rael@SRX240#commit
error: configuration database locked by:
    rael2 terminal p0 (pid 972) on since 2011-10-24 19:43:03 UTC
        exclusive [edit]
```

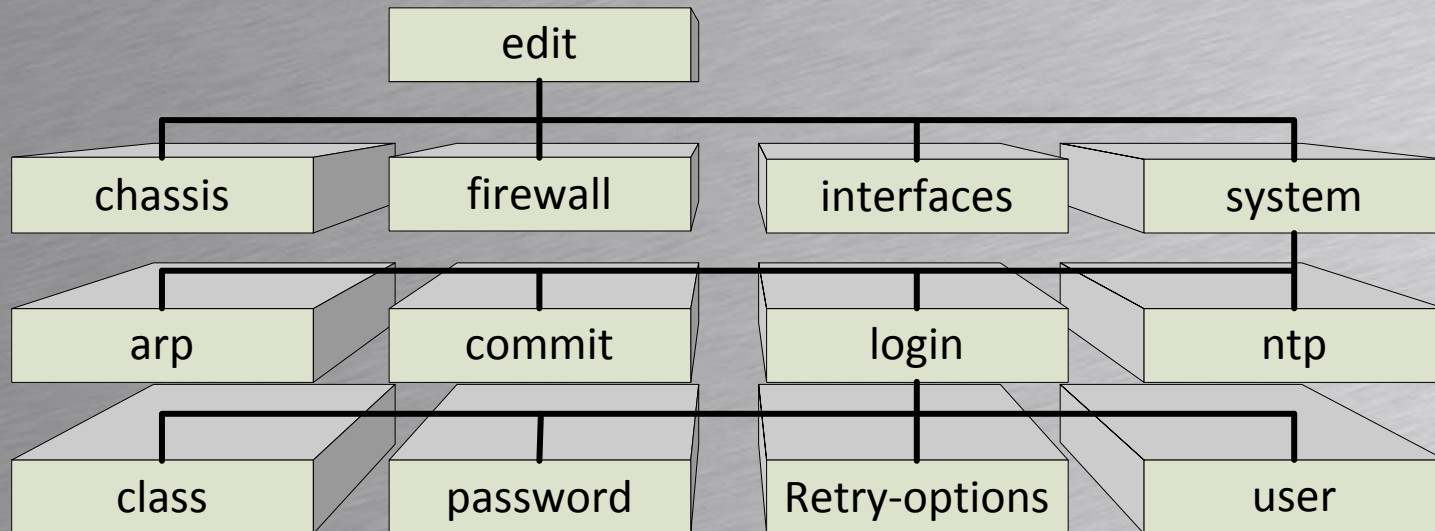
**Prøv det**



# Konfig ændring



- Kommandoerne er hierarkisk opbygget



```
[edit]
```

```
rael@SRX240# edit interfaces ge-0/0/0 unit 0
```

```
[edit interfaces ge-0/0/0 unit 0]
```

```
rael@SRX240# set family inet address 10.10.10.10/24
```

```
[edit interfaces ge-0/0/0 unit 0]
```

```
rael@SRX240#
```

**Prøv det**



# Konfig ændring

- Ændring af konfigurationen
  - `Edit` ændrer placering som ved `changedir`
  - `Set` sætter en parameter
  - `Up n` flytter placering op som ved `cd..`
  - `Top` flytter placering til toppen [ `edit` ]
  - `Show` viser konfigurationen fra ens placering og ned
  - `Rename` ændrer en parameter
  - `Delete` sletter en parameter eller placering med underlementer





# Konfig ændring

- Kommandoerne kan blandes

```
[edit system login user rael]  
rael@SRX240# top edit interfaces ge-0/0/0 unit 0
```

```
[edit interfaces ge-0/0/0 unit 0]  
rael@SRX240#
```

```
[edit system login user rael]  
rael@SRX240# up 2 edit login user rael2
```

```
[edit system login user rael2]  
rael@SRX240#
```



# Konfig test

- Hvordan aktiverer man et interface igen efter det er blevet disabled?

– Set interface ge-0/0/7 disable

```
[edit]
rael@SRX240# show interfaces ge-0/0/2
disable;
unit 0 {
    family inet {
        address 172.18.1.1/24;
    }
}
```

**Prøv det**



# Konfig ændring

- Wildcard sletninger

```
[edit system login]
```

```
rael@SRX240# show
```

```
message "Dette er min Juniper";
```

```
user rael {
```

```
    full-name Rasmus;
```

```
    class super-user;
```

```
}
```

```
user rael2 {
```

```
    full-name "Rasmus 2";
```

```
    class super-user;
```

```
}
```

```
[edit system login]
```

```
rael@SRX240#
```

```
[edit system login]
```

```
rael@SRX240# wildcard delete user ra*
```

```
    matched: rael
```

```
    matched: rael2
```

```
Delete 2 objects? [yes,no] (no) yes
```

```
[edit system login]
```

```
rael@SRX240# show
```

```
message "Dette er min Juniper";
```

```
[edit system login]
```

```
rael@SRX240#
```

**Prøv det**





# Konfig ændring

- Ninja kommandoer

- Rename kan omdøbe et element

```
[edit system login]  
rael@SRX240# rename user rael to user rael2
```

- Replace pattern erstatter i alle underelementer

```
[edit system login]  
rael@SRX240# replace pattern super-user with read-only
```

- Copy kopierer et elemente til et andet

```
[edit system login]  
rael@SRX240# copy user rael to user rael2
```

**Prøv det**



# Show kommandoer

- Prøv nogle show kommandoer
  - Show
  - Show system login
  - Edit system login -> show
  - Show | display set
  - Show | display ?
  - Show | compare rollback 0



# Konfig Ændring

- Deactivate kommandoen deaktiverer et element og underlementer
  - Deactivate interface ge-0/0/2

```
[edit]
rael@SRX240# show interfaces ge-0/0/2
##
## inactive: interfaces ge-0/0/2
##
unit 0 {
    family inet {
        address 172.18.1.1/24;
    }
}
```

**Prøv det**





# Konfig Ændring

- `annotate` kommandoen indsætter notater i konfigurationen

– `Annotate ntp "Den nye NTP server"`

```
[edit system]
rael@SRX240# show
/* Den nye NTP server */
ntp {
    boot-server mars.tekkom.dk;
    server 192.168.139.50;
}
```

**Prøv det**



# Commit metoder

- Brug `commit` for at aktivere ændringer

```
[edit]  
rael@SRX240# commit  
commit complete
```

- Brug `commit check` for at tjekke for fejl

```
[edit]  
rael@SRX240# commit check  
configuration check succeeds
```



# Commit metoder

- Brug `commit confirmed` til midlertidig `commit`

```
[edit]
```

```
rael@SRX240# commit confirmed
```

```
commit confirmed will be automatically rolled back in 10 minutes unless confirmed
```

```
commit complete
```

- Brug `commit at` for at commite på et andet tidspunkt

```
[edit]
```

```
rael@SRX240# commit at 16:00
```

```
configuration check succeeds
```

```
commit at will be executed at 2011-10-30 16:00:00 UTC
```

```
Exiting configuration mode
```





# Commit metoder

- Brug `commit comment` for at kommenterer et `commit`

```
[edit]  
rael@SRX240# commit comment "Ændring af CoS parametre"  
commit complete
```

- Brug `commit and-quit` for at commite og gå til operational mode

```
[edit]  
rael@SRX240# commit and-quit  
commit complete  
Exiting configuration mode  
rael@SRX240>
```



# Konfig sammenligning

- Sammenlign den aktive og candidate konfigurationen:
  - #show | compare
- Sammenlign den aktive og en rollback configuration:
  - >show configuration | compare rollback 10
  - >show configuration | compare <filename>
  - #show | compare rollback 10



# Konfig rollback

- For at resette candidate konfigurationen til den aktive konfiguration bruges:
  - # `rollback`
- Vil man gerne spole tiden længere tilbage:
  - # `rollback n`
- Husk at commite når man har lavet en rollback





# Gem Konfigurationen

- For at gemme configurationen kan man bruge save kommandoen:
  - Save <filnavn>
    - Gemmes automatisk i brugerens hjemmefolder
- Man kan også gemme til netværket
  - Save ftp://bruger:kode@servernavn/filnavn
  - Save scp://bruger@servernavn/filnavn



# Load Konfigurationen

- Indlæs en konfiguration med `load` kommandoen
  - `Load merge relative terminal`
    - Alle efterfølgende kommandoer bliver merget sammen med konfigurationen relativ til ens placering
- Husk at lave en `commit` for at gemme



# Load Konfigurationen

- Load parametre

- Merge: Sætter det nye konfiguration ind i det eksisterende
- Override: Overskriver alt konfiguration med det du sætter ind
- Patch: Tilretter konfigurationen ud fra en fil lavet med `save | compare | save`
- Replace: Erstatte eksisterende konfig med det indtastede.
- Set: Tillader at man loader set kommandoer i stedet for hierakiske.
- Terminal: Bruger input fra terminale. Afslut med Ctrl+d
- Relative: Indsætter relativ til ens placering





# Run kommandoen

- Run svarer til andres producenters do kommando
  - Run `show interface terse`
  - Understøtter tab completion og ?
    - I modsætning til andre producenter 😊