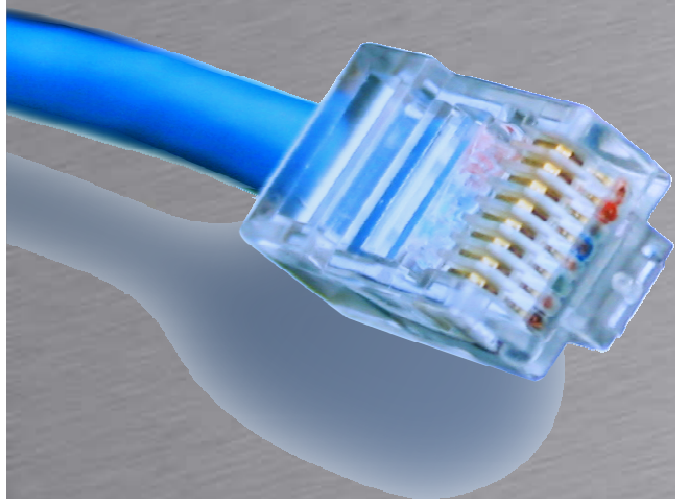


# Juniper



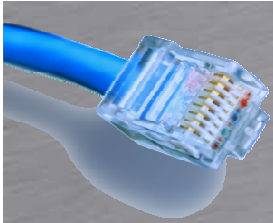
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- en del af **mercantec<sup>+</sup>**

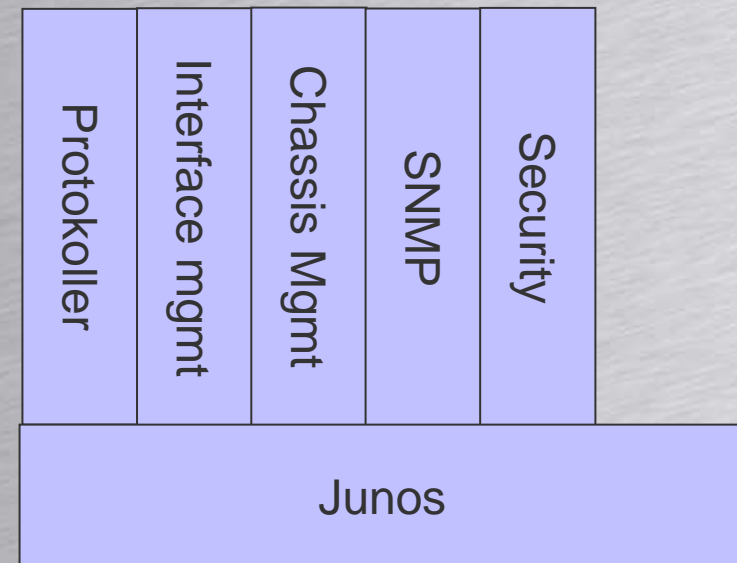
## IJOS: Juniper Intro

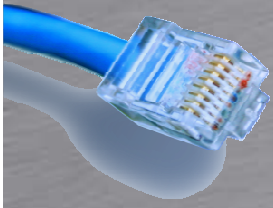
Rasmus Elmholt V1.0



# 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

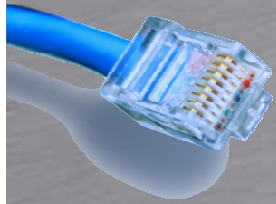




# Junos OS

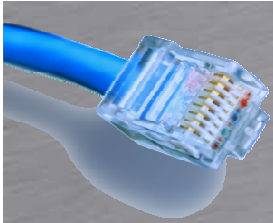
- Flere processer har forskellige funktioner
  - Hver proces kører i sit eget beskyttede hukommelses område
  - Kan crashe eller genstartet uden at genere andre processer
    - chassisd: Chassis Process
    - eswd: Ethernet Switching Process
    - pfem: Forwarding Process
    - dcd: Interface Process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



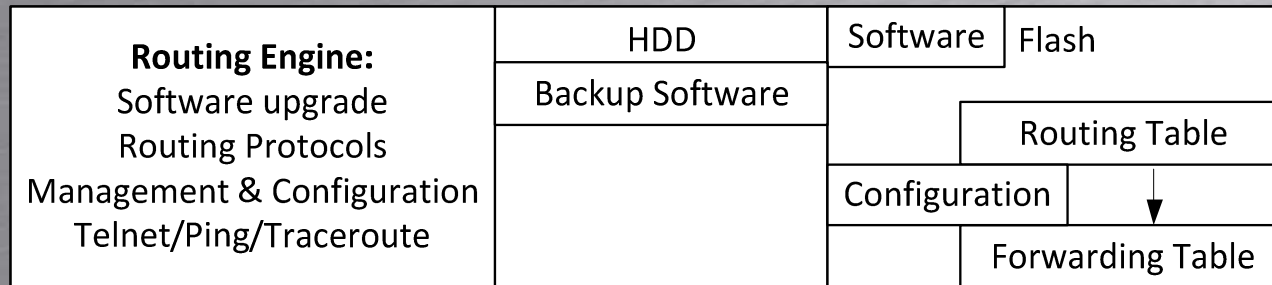
# Juniper Indmad

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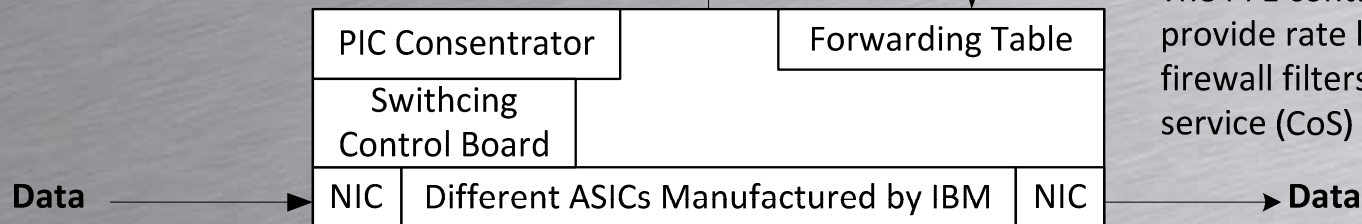
## Routing Engine(Intel PCI Motherboard)



Calculates Routing table and updates Forwarding table on the Routing Engine

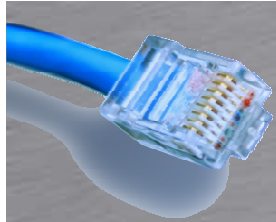
Internal Link

## Packet Forwarding Engine



The PFE contains Policers that provide rate limiting, stateless firewall filters, and class of service (CoS)

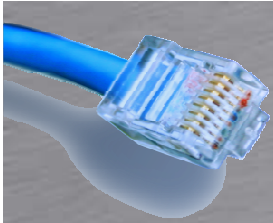
- RE og PFE opdelingen tillader bl.a.
  - Graceful Routing Engine switchover (GRES)
  - Nonstop Active Routing (NSR)
  - Unified In-Service Software Upgrades (ISSUs)



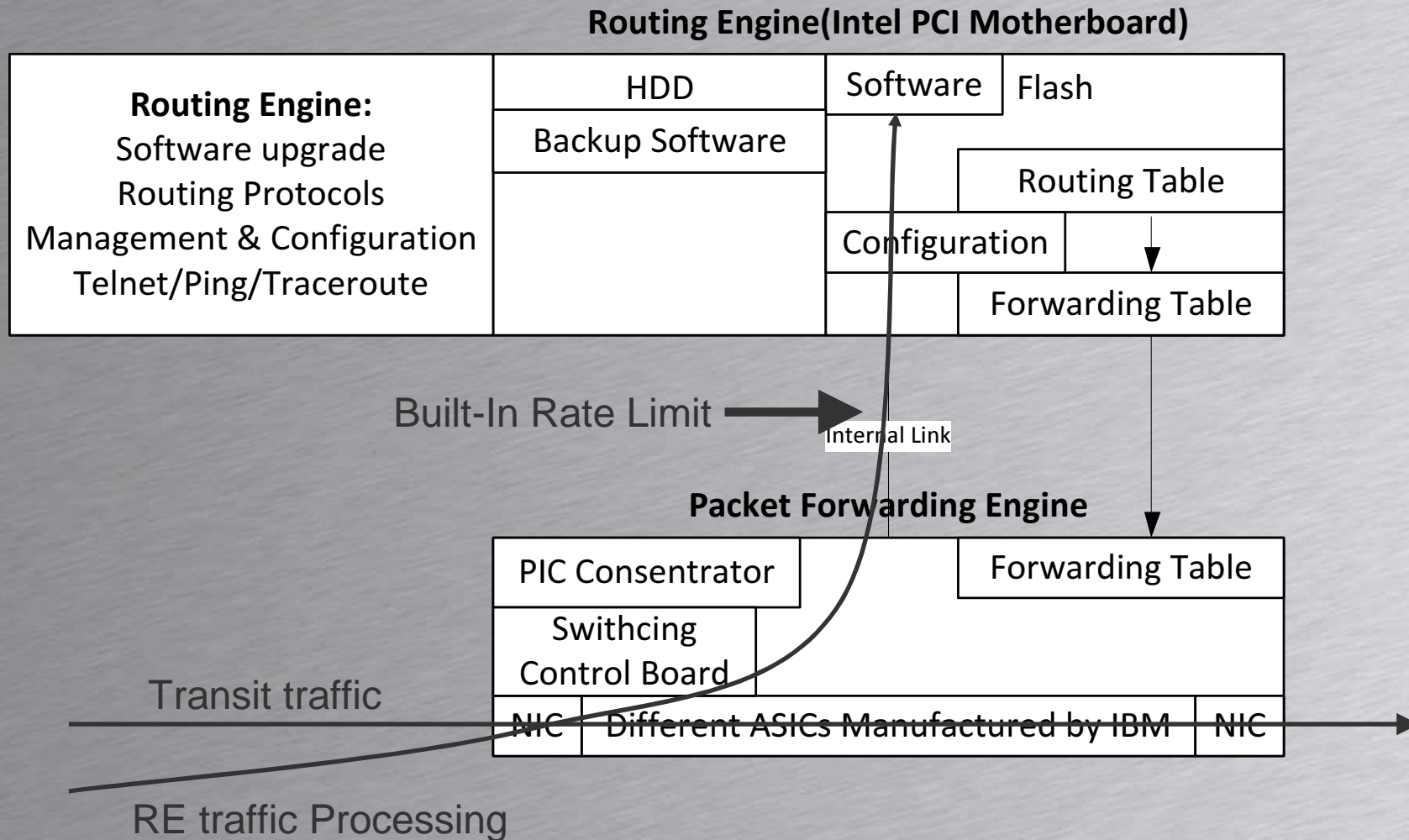
# Trafik Flow

- 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

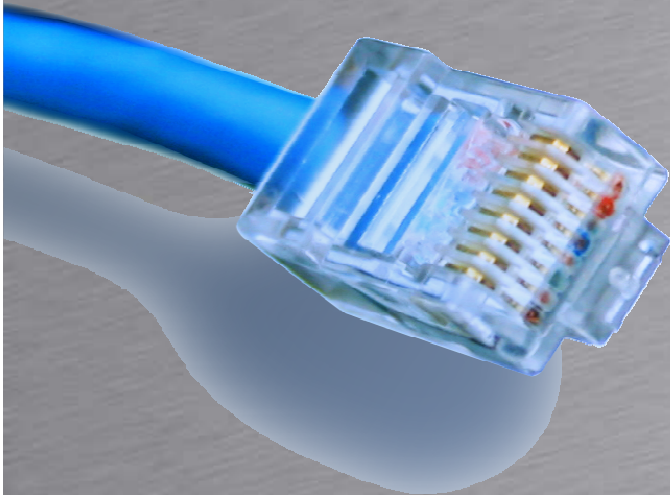




# Trafik Flow



# Junos CLI



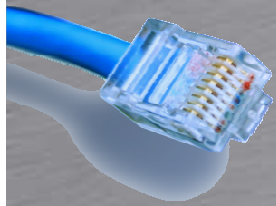
HOUSE OF  
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A row of ten colorful circles in various colors and patterns, including solid colors and concentric circles.

- en del af **mercantec<sup>+</sup>**

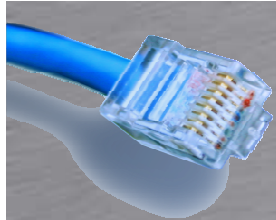
Operation Mode  
Configuration Mode





# 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

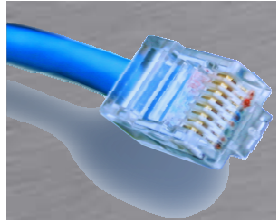
```
Login: root
```

```
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

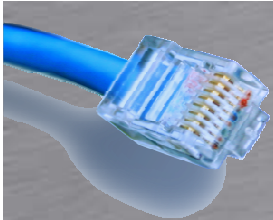
```
rael@SRX240>
```

- Configuration Mode
  - Konfiguration – protokoller, brugere, interfaces

```
[edit]
```

```
rael@SRX240#
```





# HJÆLP!!

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

```
rael@SRX240> ?
```

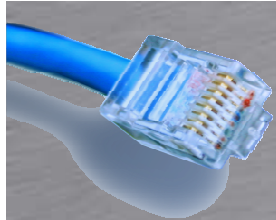
```
Possible completions:
```

<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
```

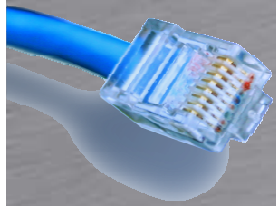
```
Configuring the Interface Address
```

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

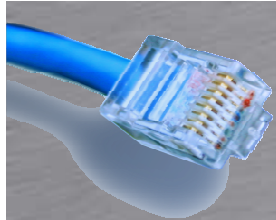
```
[edit interfaces interface-name unit logical-unit-number family family]
```

Release Information

Statement introduced before JUNOS Release 7.4.

**Prøv det**





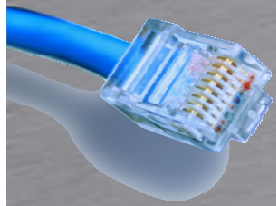
# HJÆLP!!

- 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
```

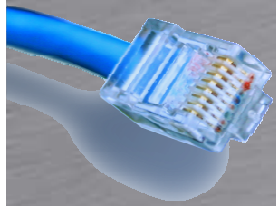
**Prøv det**



# 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
  - `Esc+d` = Delete 1 word to the right

**Prøv det**



# | the Pipe



- Output kan sorteres med Pipe

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

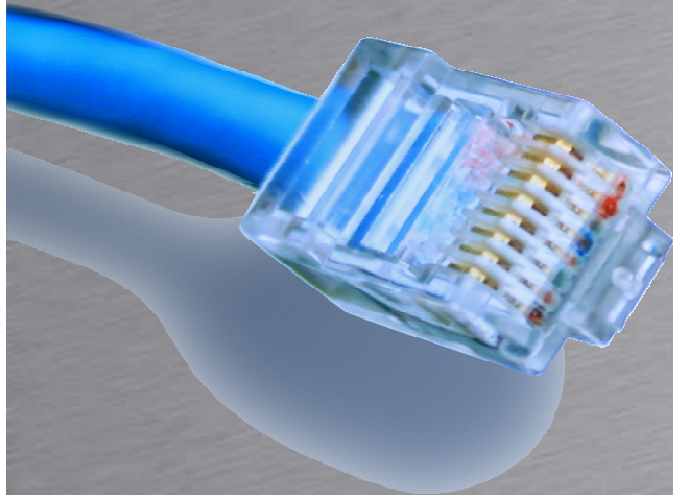
Possible completions:

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

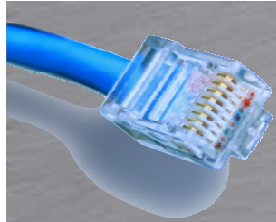


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A horizontal row of ten colorful circles. From left to right: a blue circle with a yellow center, a purple circle, a green circle with a white center, a blue circle with a yellow center, a green circle, a purple circle, a green circle with a white center, a purple circle, a green circle, and a blue circle with a white center.

- en del af **mercantec<sup>+</sup>**

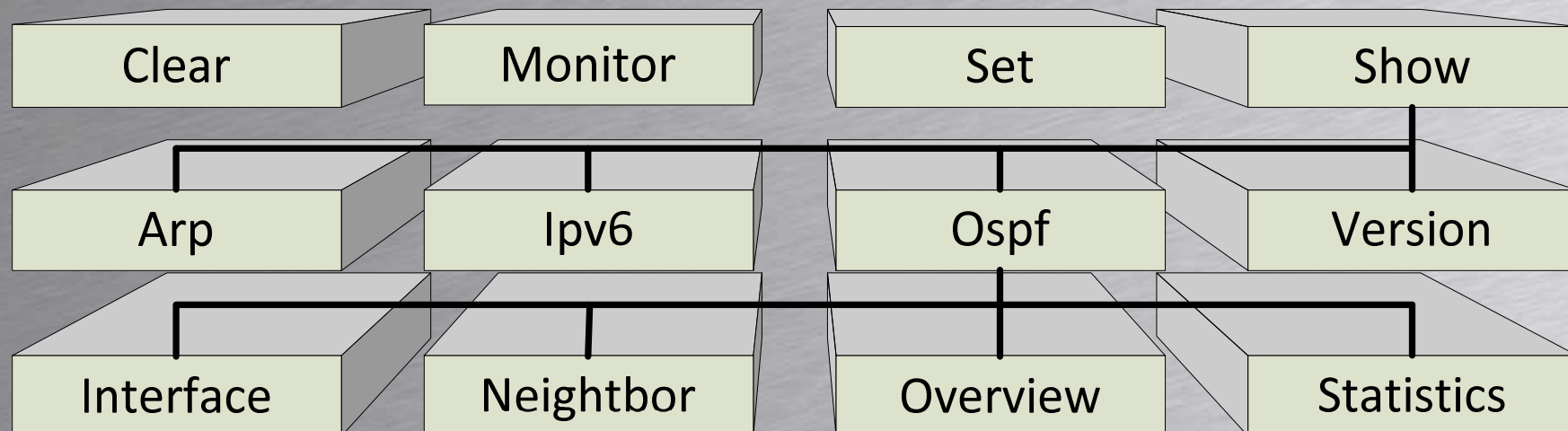
Kommando hierarki



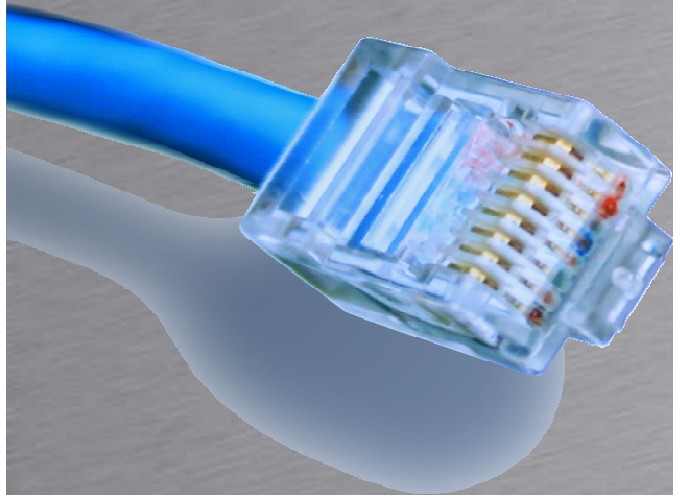
# Operational Mode



- Kommandoerne er hierarkisk opbygget



# CLI Configuration Mode



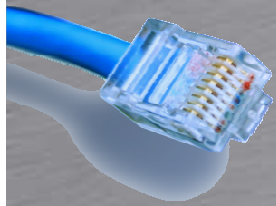
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- en del af **mercantec<sup>+</sup>**

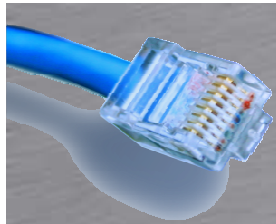
Opsætning



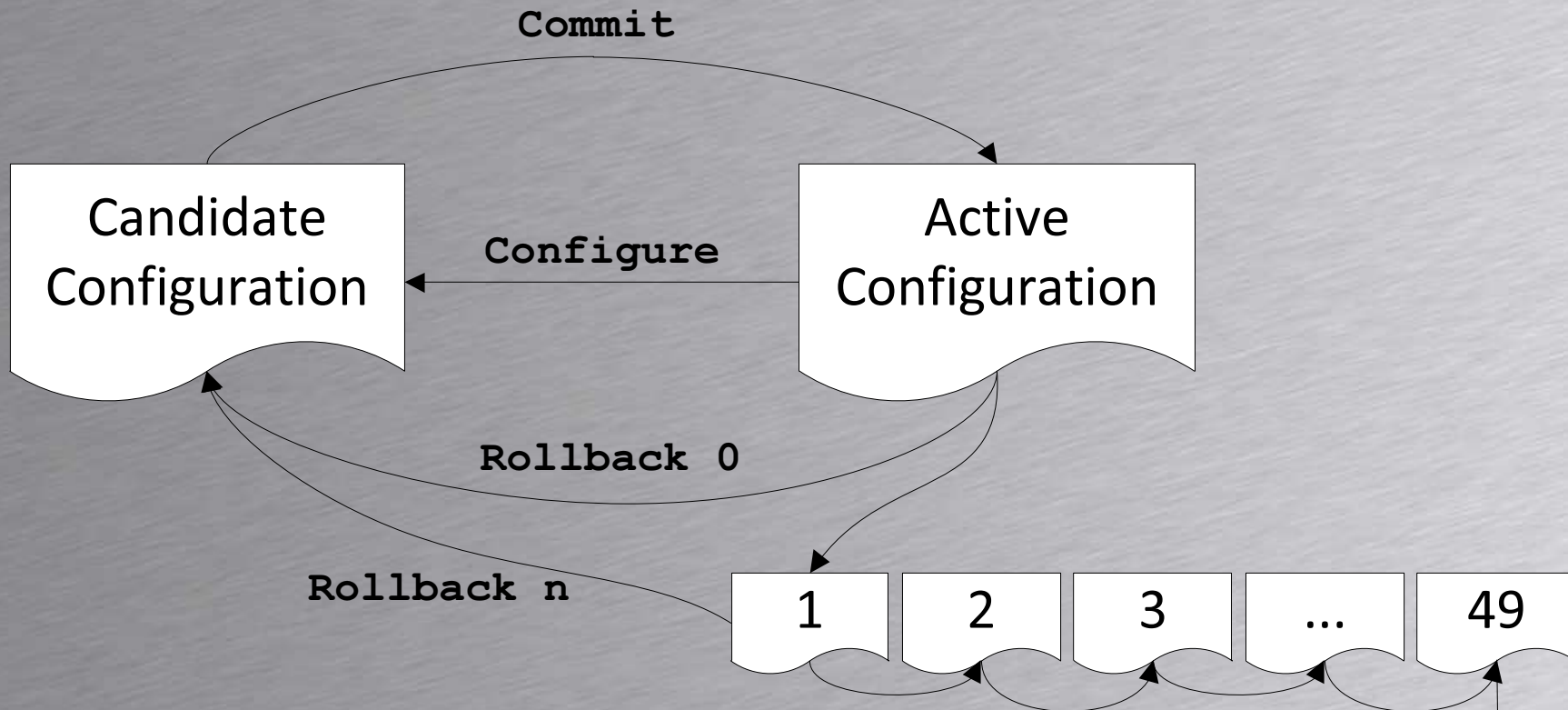


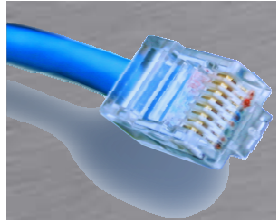
# Konfig håndtering

- 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

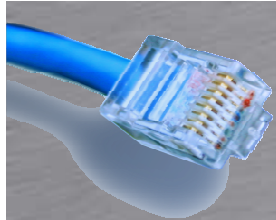
- Skriv `configure` for at konfigurere enheden
  - Flere brugere kan konfigurere samtidig.
  - Der vises en besked hvis andre er logget ind samtidig og hvor de er i hierakiet.

```
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**





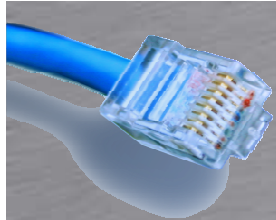
# Konfig Modes

- 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]

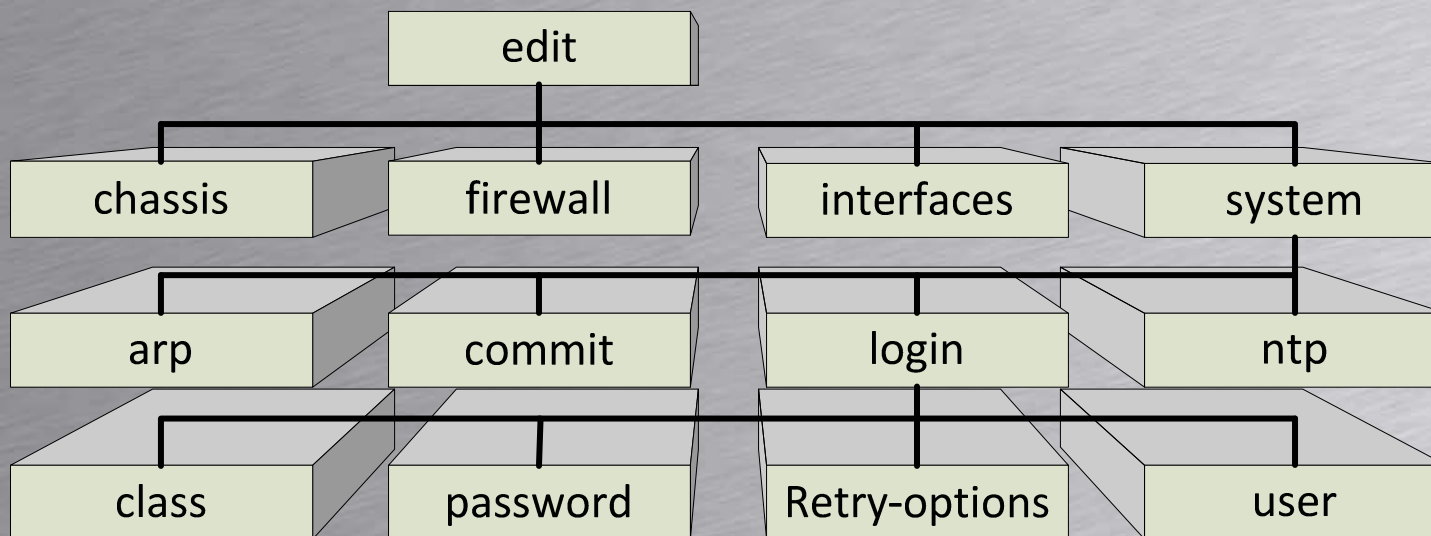
[edit]
rael@SRX240#commit
error: configuration database locked by:
  rael2 terminal p0 (pid 972) on since 2011-10-24 19:43:03 UTC
    exclusive [edit]
```

**Prøv det**



# Konfig ændring

- Kommandoerne er hierarkisk opbygget



```
[edit]
```

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

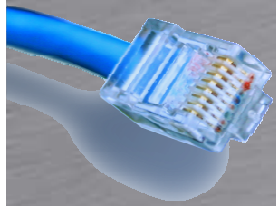
```
[edit interfaces ge-0/0/0 unit 0]
```

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

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

```
rael@SRX240#
```

**Prøv det**

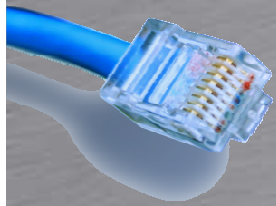


# Konfig ændring

- 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

Prøv det





# Konfig ændring

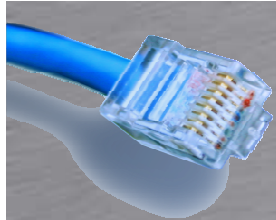
- Kommandoerne kan blandes

```
[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#
```

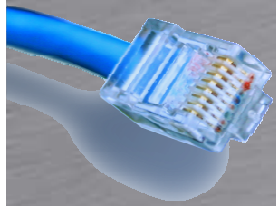


# Konfig test

- 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

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- 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
```

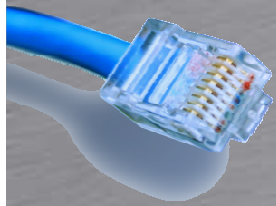
```
message "Dette er min Juniper";
```

```
[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
```

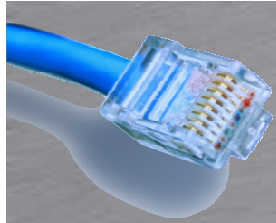
- Replace pattern erstatter i alle underelementer

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

- Copy kopierer et elemente til et andet

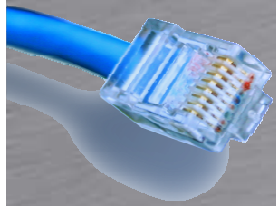
```
[edit system login]  
rael@SRX240# copy user rael to user rael2
```

**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

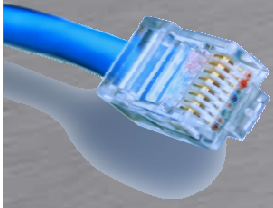
- Deactivate kommandoen deaktiverer et element og underlementer

– 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**





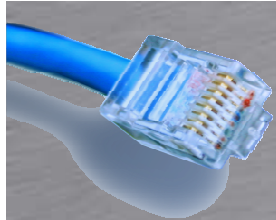
# Konfig Ændring



- `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**



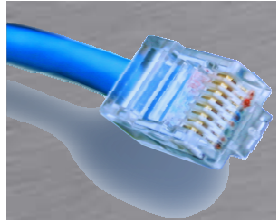
# Commit metoder

- 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]
```

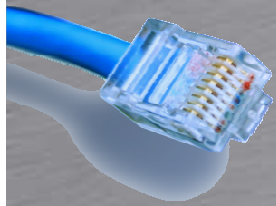
```
rael@SRX240# commit at 16:00
```

```
configuration check succeeds
```

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

```
Exiting configuration mode
```





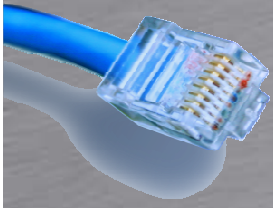
# Commit metoder

- Brug `commit comment` for at kommenterer et commit

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

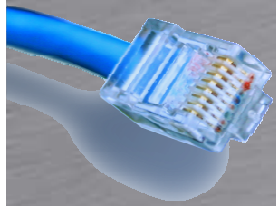
- Brug `commit and-quit` for at commite og gå til operational mode

```
[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

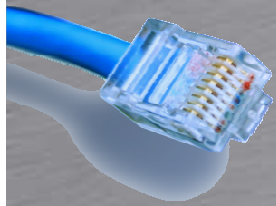


# Konfig rollback



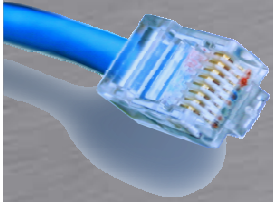
- For at resette candidate konfigurationen til den aktive konfiguration bruges:
  - # `rollback`
- Vil man gerne spole tiden længere tilbage:
  - # `rollback n`
- Husk at commite når man har lavet en rollback





# 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



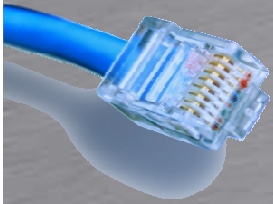
# Load Konfigurationen

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TECHNOLOGY



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- 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

HOUSE OF  
TECHNOLOGY

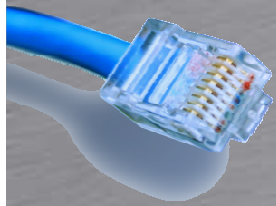


an ahl of mercontec<sup>+</sup>

- 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: Erstatter 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 ?