Bridging mini-HOWTO

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In dit document wordt beschreven hoe een ethernet bridge op te zetten. Wat is een ethernet bridge? Een ethernet bridge is een device dat datapackets bestuurt binnen een subnet in een poging de hoeveelheid verkeer te beperken. Een bridge wordt gewoonlijk tussen twee aparte groepen computers geplaatst welke binnen die groep communiceren, maar niet zoveel met de computers in de andere groep. Een goed voorbeeld hiervan is te zien in een cluster met Macintosh machines en een cluster unix machines. Beiden groepen machines neigen nogal babbelziek onder elkaar te zijn, en het verkeer dat ze op het netwerk produceren, veroorzaakt aanvaringen met de andere machines die met elkaar proberen te communiceren. Tussen deze groepen computers zou een bridge worden geplaatst. De taak van de bridge bestaat uit het één voor één bestuderen van de bestemming van de datapakketjes en te besluiten of het de pakketjes wel of niet aan de andere kant van het ethernetsegment zal doorgeven. Het resultaat is een sneller, stiller netwerk met minder aanvaringen.

Inhoudsopgave

1. Setup

- Haal Bridge Config op: BRCFG.tgz (ftp://ftp.tux.org/people/alan-cox/BRCFG.tgz)
- BRCFG is ook te vinden op: http://coledd.com/networking/bridge (http://coledd.com/networking/bridge/)
- Activeer meerdere ethernet devices op je machine door deze regel toe te voegen aan het bestand `/etc/lilo.conf`, en lilo uit te voeren:

  ```
  append = "ether=0,0,eth1"
  ```

  Als je drie interfaces op je bridge hebt, gebruik dan in plaats daarvan deze regel:

  ```
  append = "ether=0,0,eth1 ether=0,0,eth2"
  ```

Er kunnen meer interfaces worden gevonden door meer ether statements toe te voegen. Standaard detecteert een Linux kernel een enkele ethernetkaart, en zodra er één wordt gevonden, stopt de detectie. De bovenstaande append opdracht vertelt de kernel te blijven zoeken naar meer ethernet devices nadat de eerste werd gevonden. Als alternatief kan daarvoor in de plaats een bootparameter worden gebruikt:

```
linux ether=0,0,eth1
```

Of, gebruik bij 3 interfaces:

```
linux ether=0,0,eth1 ether=0,0,eth2
```

- Hercompileer de kernel met BRIDGING geactiveerd.
- Een bridge heeft geen IP-adres nodig. Het kan wel, maar voor een gewone bridge hoeft dat niet. Ga (bij een RedHat systeem) naar `/etc/sysconfig/network-scripts/` en kopieer `ifcfg-lo0` naar `ifcfg-eth0` & `ifcfg-eth1` om het IP-adres uit je bridge te verwijderen. Wijzig in deze twee nieuwe bestanden de regel met daarin `DEVICE=lo` in `DEVICE=eth0` en `DEVICE=eth1`. Aangezien andere distributies hiervan kunnen afwijken, moet je wellicht aanvullende documentatie raadplegen. Als er meer dan 2 interfaces naar deze bridge zijn, zorg dan dat je de corresponderende configuraties ook daarin maakt.
- Reboot zodat je de nieuwe kernel met BRIDGING draait, en zorg er ook voor dat er geen IP-adressen zijn verbonden met de netwerkinterfaces.
- Plaats de ethernetkaarten in promiscuous modus zodra een backup van het systeem is gemaakt, zodat ze elk pakket dat de interfaces passeert bekijken:

  ```
  ifconfig eth0 promisc ; ifconfig eth1 promisc
  ```

  Alle interfaces die zijn verbonden met netwerksegmenten aan de bridge worden in promiscuous modus geplaatst.
- Zet bridging aan met behulp van het programma brcfg:

  ```
  brcfg -ena
  ```

- Verifieer dat er ander verkeer op elke interface is:

  ```
  tcpdump -i eth0     (in een venster)
  tcpdump -i eth1     (in een ander venster)
  ```

- Start een sniffer of tcpdump op een andere machine om te verifiëren dat de bridge het segment correct scheidt.

2. Algemene Problemen

Vraag: Ik krijg de melding ioctl(SIOCGIFBR) failed: Package not installed . Wat betekent dit?

Antwoord: Je hebt de bridging mogelijkheid niet in je kernel. Haal een 2.0 of nieuwere kernel op, en compileer het met de optie BRIDGING geactiveerd.

Vraag: Machines aan de ene kant kunnen de andere kant niet pingen!

Antwoord:

- Heb je bridging met behulp van het programm brcfg -ena geactiveerd? (brcfg zou bridging is ENABLED aan moeten geven)
- Heb je de interfaces in promiscuous modus geplaatst? (roep de opdracht ifconfig aan. De vlag PROMISC zou aan moeten staan bij beide interfaces.)
- Als je multiple-media interface-adapters gebruikt, zorg dan dat de juiste is geactiveerd. Wellicht dat je het config/setup programma moet gebruiken dat met de netwerkinterfacekaart werd meegeleverd.

Vraag: Ik kan niet telnetten/ftp'en vanaf de bridge! Waarom niet?

Antwoord: Dit komt doordat er geen IP-adres is verbonden met een van de bridge interfaces. Een bridge dient een transparant deel van een netwerk te zijn.

Vraag: Wat heb ik nodig om de wijze van routing op te zetten?

Antwoord: Niets! Alle routing intelligentie wordt afgehandeld door de bridging code in de kernel. Gebruik het programma brcfg in debug modus om de ethernetadressen te zien zoals ze door de bridge worden geleerd:

```
brcfg -deb
```

Vraag: De bridge schijnt te werken, maar waarom toont traceroute de bridge niet als onderdeel van het pad?

Antwoord: Vanwege de aard van een bridge hoort traceroute de bridge niet als onderdeel van het pad te tonen. Een bridge dient als een transparante component van het netwerk.

Vraag: Is het noodzakelijk IP_FORWARD in de kernel te compileren?

Antwoord: Nee. De bridging code in de kernel zorgt voor het transport van pakketjes. IP_FORWARD is voor een gateway die IP-adressen aan zijn interfaces heeft verbonden.

Vraag: Waarom zijn de fysieke ethernetadressen voor poort 1 en poort 2 hetzelfde volgens het programma brcfg? Zouden ze niet verschillend moeten zijn?

Antwoord: Nee. Aan elke poort van een bridge wordt door de bridging code expres hetzelfde fysieke ethernetadres toegekend.

Vraag: Bridging verschijnt niet als optie wanneer een make config op de kernel uitvoert. Hoe activeert men dit?

Antwoord: Antwoord tijdens de kernelconfig "Y" op de vraag `Prompt for development and/or incomplete code/drivers (CONFIG_EXPERIMENTAL) [Y/n/?]`.

Vraag: Te veel hubs (4 of meer) zijn na elkaar in serie geketend, wat op een ethernet voor timing problemen zorgt. Welk effect heeft een bridge in een subnet dat met hubs in lagen werkt?

Antwoord: Een bridge reset de 3/4/5 hubs rule. Een bridge gaat niet zo om met pakketjes zoals een hub dat doet, en draagt daarom niet bij aan timing problemen op een netwerk.

Vraag: Kan een bridge interface naar zowel 10Mb als 100Mb ethernetsegmenten? Zal een dergelijke configuratie de rest van het verkeer op de hoge snelheidslijn vertragen?

Antwoord: Je, een bridge kan een 10Mb segment aan een 100Mb segment verbinden. Zolang als de netwerkkaart op het snelle netwerk 100Mb capabel is, zorgt TCP voor de rest. Ondanks dat het klopt dat de pakketjes van een host in het 100Mb netwerk die communiceert met een host in het 10Mb netwerk slechts met een snelheid van 10Mb's worden verplaatst, wordt de rest van het verkeer op het snelle ethernet niet vertraagd.

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