

INR Lab Practice - Week 2

1. Algemeen

In [Week 1](#) had ik al een begin gemaakt voor een eigen Python-script, voor de configuratie en generatie van compleet nieuwe UML-netwerkstructuren. Deze week heb ik dit script samen met Tjerk verder ontwikkeld. Het uiteindelijke script is [hier](#) te vinden. Het ontwikkelen van dit script was voor mij ook een goede oefening in Python, omdat ik voorheen vrijwel niet met Python heb gewerkt.

Note:

Inmiddels zijn ook mede-studenten actief geweest met het produceren van hun eigen configuratiescripts, waaronder [Jeroen](#) en [Gert Jan](#). Het is absoluut de moeite waard om ook de andere scripts dus eens te bekijken. Met het script van Gert Jan is het bijvoorbeeld mogelijk om de netwerkconfiguraties in XML op te slaan.

1.1. Starten van het UML-script

Om met het [umlnet.py](#)-script een nieuw UML-netwerk op te zetten, is een configuratiebestandje nodig waarin de betreffende netwerkconfiguraties staat opgeslagen. De inhoud van dit configuratiebestandje zal verderop in dit document worden besproken. Met het volgende commando kun je het netwerk starten:

```
./umlnet.py start configbestand.py
```

Op de plaats van "configbestand.py" dient uiteraard de naam van het betreffende configuratiebestand te worden ingevuld.

1.2. Stoppen van het UML-script

Om te zorgen dat alle UML-processen ook weer netjes worden gestopt, kan het volgende commando worden gebruikt:

```
./umlnet.py stop configbestand.py
```

Uiteraard dient ook hier het juiste configbestandje meegegeven te worden, omdat anders het verkeerde virtuele netwerk wordt gestopt.

2. Voorbeeldconfiguratie (H-network)

Als voorbeeld is hieronder de configuratie van het H-netwerk weergegeven. Dit voorbeeldscript is ook te downloaden: my-h-network.py

```
# Dit is een voorbeeld-configuratie, waarmee het H-netwerk kan worden gebouwd.

networkName = 'H-Network'          # De naam van je netwerk (maak dit uniek)
numOfSubnets = 9                  # Uit hoeveel subnetten het bestaat.

# Samenstelling ethInfo (beschrijving posities in de array):
# =====
# Voor Host \ Router:              Voor een Bridge:
# - Naam ethernetkaart            - Naam ethernetkaart
# - (sub)Netwerknnummer           - (sub)Netwerknnummer
# - IP-adres                       - MAC-adres van de netwerkkaart
# - Networkmasker
# - Broadcastadres
ethInfo1 = [['eth0', '1', '10.0.1.7', '255.255.255.0', '10.0.1.255']] # WS1
ethInfo2 = [['eth0', '4', '10.0.4.8', '255.255.255.0', '10.0.1.255']] # WS2
ethInfo3 = [['eth0', '5', '10.0.6.9', '255.255.255.0', '10.0.1.255']] # WS3
ethInfo4 = [['eth0', '8', '10.0.9.10', '255.255.255.0', '10.0.1.255']] # WS4

ethInfo5 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255'], # Router 1
            ['eth1', '2', '10.0.2.1', '255.255.255.0', '10.0.1.255']]
ethInfo6 = [['eth0', '2', '10.0.2.2', '255.255.255.0', '10.0.1.255'], # Router 2
            ['eth1', '5', '10.0.5.2', '255.255.255.0', '10.0.1.255'],
            ['eth2', '3', '10.0.3.2', '255.255.255.0', '10.0.1.255']]
ethInfo7 = [['eth0', '3', '10.0.3.3', '255.255.255.0', '10.0.1.255'], # Router 3
            ['eth1', '4', '10.0.4.3', '255.255.255.0', '10.0.1.255']]
ethInfo8 = [['eth0', '6', '10.0.6.4', '255.255.255.0', '10.0.1.255'], # Router 4
            ['eth1', '7', '10.0.7.4', '255.255.255.0', '10.0.1.255']]
ethInfo9 = [['eth0', '7', '10.0.7.5', '255.255.255.0', '10.0.1.255'], # Router 5
            ['eth1', '5', '10.0.5.5', '255.255.255.0', '10.0.1.255'],
            ['eth2', '8', '10.0.8.5', '255.255.255.0', '10.0.1.255']]
ethInfo10 = [['eth0', '8', '10.0.8.6', '255.255.255.0', '10.0.1.255'], # Router 6
            ['eth1', '9', '10.0.9.6', '255.255.255.0', '10.0.1.255']]

# Samenstelling networkSettings (beschrijving posities in de array):
# =====
# - Hostnaam
# - systeemtype (bijv. router, generic of bridge)
# - de gegevens van de ethernetkaart(en) zie ook ethInfo
# - Default Gateway (kan ook leeg zijn: '')
networkSettings = [['WS1', 'generic', ethInfo1, '10.0.1.1'],
                  ['WS2', 'generic', ethInfo2, '10.0.4.3'],
                  ['WS3', 'generic', ethInfo3, '10.0.6.4'],
                  ['WS4', 'generic', ethInfo4, '10.0.9.6'],
                  ['Router1', 'router', ethInfo5, ''],
                  ['Router2', 'router', ethInfo6, ''],
                  ['Router3', 'router', ethInfo7, ''],
                  ['Router4', 'router', ethInfo8, ''],
```

```
['Router5', 'router', ethInfo9, ''],  
['Router6', 'router', ethInfo10, '']]
```

3. Netwerktopologie - opdrachten

Hieronder staan de configuratiebestandjes vermeld, waarin de configuraties staan opgeslagen van de te maken netwerktopologieën.

3.1. Opdracht 1

[Download opdracht1.py hier.](#)

```
networkName = 'Opdracht1'  
numOfSubnets = 2  
  
ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1  
ethInfo2 = [['eth0', '1', '00:30:48:28:01:01'], # bridge  
            ['eth1', '2', '00:30:48:28:01:02']]  
ethInfo3 = [['eth0', '2', '10.0.1.3', '255.255.255.0', '10.0.1.255']] # host2  
  
networkSettings = [['Host1', 'generic', ethInfo1, ''],  
                  ['Bridge', 'bridge', ethInfo2, ''],  
                  ['Host2', 'generic', ethInfo3, '']]
```

3.2. Opdracht 2

[Download opdracht2.py hier.](#)

```
networkName = 'Opdracht2'  
numOfSubnets = 2  
  
ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1  
ethInfo2 = [['eth0', '1', '00:30:48:28:01:01'], # bridge1  
            ['eth1', '2', '00:30:48:28:01:02']]  
ethInfo3 = [['eth0', '1', '00:30:48:28:02:01'], # bridge2  
            ['eth1', '2', '00:30:48:28:02:02']]  
ethInfo4 = [['eth0', '2', '10.0.1.2', '255.255.255.0', '10.0.1.255']] # host2  
  
networkSettings = [['Host1', 'generic', ethInfo1, ''],  
                  ['Bridge1', 'bridge', ethInfo2, ''],  
                  ['Bridge2', 'bridge', ethInfo3, ''],  
                  ['Host2', 'generic', ethInfo4, '']]
```

3.3. Opdracht 3

[Download opdracht3.py hier.](#)

```

networkName = 'Opdracht3'
numOfSubnets = 2

ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1
ethInfo2 = [['eth0', '1', '00:30:48:28:01:01'], # bridge1
            ['eth1', '2', '00:30:48:28:01:02']]
ethInfo3 = [['eth0', '1', '00:30:48:28:02:01'], # bridge2
            ['eth1', '2', '00:30:48:28:02:02']]
ethInfo4 = [['eth0', '1', '00:30:48:28:03:01'], # bridge3
            ['eth1', '2', '00:30:48:28:03:02']]
ethInfo5 = [['eth0', '2', '10.0.1.2', '255.255.255.0', '10.0.1.255']] # host2

networkSettings = [['Host1', 'generic', ethInfo1, ''],
                  ['Bridge1', 'bridge', ethInfo2, ''],
                  ['Bridge2', 'bridge', ethInfo3, ''],
                  ['Bridge3', 'bridge', ethInfo4, ''],
                  ['Host2', 'generic', ethInfo5, '']]

```

3.4. Opdracht 4

[Download opdracht4.py hier.](#)

```

networkName = 'Opdracht4'
numOfSubnets = 3

ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1
ethInfo2 = [['eth0', '1', '00:30:48:28:01:01'], # bridge1
            ['eth1', '2', '00:30:48:28:01:02']]
ethInfo3 = [['eth0', '2', '00:30:48:28:02:01'], # bridge2
            ['eth1', '3', '00:30:48:28:02:02']]
ethInfo4 = [['eth0', '3', '10.0.1.2', '255.255.255.0', '10.0.1.255']] # host2

networkSettings = [['Host1', 'generic', ethInfo1, ''],
                  ['Bridge1', 'bridge', ethInfo2, ''],
                  ['Bridge2', 'bridge', ethInfo3, ''],
                  ['Host2', 'generic', ethInfo4, '']]

```

3.5. Opdracht 5

[Download opdracht5.py hier.](#)

```

networkName = 'Opdracht5'
numOfSubnets = 4

ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1
ethInfo2 = [['eth0', '1', '00:30:48:28:01:01'], # bridge1
            ['eth1', '2', '00:30:48:28:01:02']]
ethInfo3 = [['eth0', '2', '00:30:48:28:02:01'], # bridge2
            ['eth1', '3', '00:30:48:28:02:02']]

```

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```
ethInfo4 = [['eth1', '3', '00:30:48:28:02:02']]
ethInfo5 = [['eth0', '3', '00:30:48:28:03:01'], # bridge3
            ['eth1', '4', '00:30:48:28:03:02']]
ethInfo5 = [['eth0', '4', '10.0.1.3', '255.255.255.0', '10.0.1.255']] # host2

networkSettings = [['Host1', 'generic', ethInfo1, ''],
                  ['Bridge1', 'bridge', ethInfo2, ''],
                  ['Bridge2', 'bridge', ethInfo3, ''],
                  ['Bridge3', 'bridge', ethInfo4, ''],
                  ['Host2', 'generic', ethInfo5, '']]
```

3.6. Opdracht 6

[Download opdracht6.py hier.](#)

```
networkName = 'Opdracht6'
numOfSubnets = 6

ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1
ethInfo2 = [['eth0', '2', '10.0.1.2', '255.255.255.0', '10.0.1.255']] # host2
ethInfo3 = [['eth0', '3', '10.0.1.3', '255.255.255.0', '10.0.1.255']] # host3
ethInfo4 = [['eth0', '1', '00:30:48:28:01:01'], # bridge1
            ['eth1', '4', '00:30:48:28:01:02'],
            ['eth2', '6', '00:30:48:28:01:03']]
ethInfo5 = [['eth0', '2', '00:30:48:28:02:01'], # bridge2
            ['eth1', '4', '00:30:48:28:02:02'],
            ['eth2', '5', '00:30:48:28:02:03']]
ethInfo6 = [['eth0', '3', '00:30:48:28:03:01'], # bridge3
            ['eth1', '5', '00:30:48:28:03:02'],
            ['eth2', '6', '00:30:48:28:03:03']]

networkSettings = [['Host1', 'generic', ethInfo1, ''],
                  ['Host2', 'generic', ethInfo2, ''],
                  ['Host3', 'generic', ethInfo3, ''],
                  ['Bridge1', 'bridge', ethInfo4, ''],
                  ['Bridge2', 'bridge', ethInfo5, ''],
                  ['Bridge3', 'bridge', ethInfo6, '']]
```

3.7. Opdracht 7

[Download opdracht7.py hier.](#)

```
networkName = 'Opdracht7'
numOfSubnets = 4

ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1
ethInfo2 = [['eth0', '2', '10.0.1.2', '255.255.255.0', '10.0.1.255']] # host2
ethInfo3 = [['eth0', '3', '10.0.1.3', '255.255.255.0', '10.0.1.255']] # host3
ethInfo4 = [['eth0', '1', '00:30:48:28:01:01'], # bridge1
```

```

ethInfo5 = [['eth1', '4', '00:30:48:28:01:02']]
ethInfo6 = [['eth0', '3', '00:30:48:28:03:01'], # bridge3
            ['eth1', '4', '00:30:48:28:03:02']]

networkSettings = [['Host1', 'generic', ethInfo1, ''],
                  ['Host2', 'generic', ethInfo2, ''],
                  ['Host3', 'generic', ethInfo3, ''],
                  ['Bridge1', 'bridge', ethInfo4, ''],
                  ['Bridge2', 'bridge', ethInfo5, ''],
                  ['Bridge3', 'bridge', ethInfo6, '']]

```

3.8. Opdracht 8

[Download opdracht8.py hier.](#)

```

networkName = 'Opdracht8'
numOfSubnets = 8

ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1
ethInfo2 = [['eth0', '2', '10.0.1.2', '255.255.255.0', '10.0.1.255']] # host2
ethInfo3 = [['eth0', '3', '10.0.1.3', '255.255.255.0', '10.0.1.255']] # host3
ethInfo4 = [['eth0', '4', '10.0.1.4', '255.255.255.0', '10.0.1.255']] # host4
ethInfo5 = [['eth0', '1', '00:30:48:28:01:01'], # bridge1
            ['eth1', '5', '00:30:48:28:01:02'],
            ['eth2', '8', '00:30:48:28:01:03']]
ethInfo6 = [['eth0', '2', '00:30:48:28:02:01'], # bridge2
            ['eth1', '5', '00:30:48:28:02:02'],
            ['eth2', '6', '00:30:48:28:02:03']]
ethInfo7 = [['eth0', '3', '00:30:48:28:03:01'], # bridge3
            ['eth1', '6', '00:30:48:28:03:02'],
            ['eth2', '7', '00:30:48:28:03:03']]
ethInfo8 = [['eth0', '3', '00:30:48:28:04:01'], # bridge4
            ['eth1', '7', '00:30:48:28:04:02'],
            ['eth2', '8', '00:30:48:28:04:03']]

networkSettings = [['Host1', 'generic', ethInfo1, ''],
                  ['Host2', 'generic', ethInfo2, ''],
                  ['Host3', 'generic', ethInfo3, ''],
                  ['Host4', 'generic', ethInfo4, ''],
                  ['Bridge1', 'bridge', ethInfo5, ''],
                  ['Bridge2', 'bridge', ethInfo6, ''],
                  ['Bridge3', 'bridge', ethInfo7, ''],
                  ['Bridge4', 'bridge', ethInfo8, '']]

```

3.9. Opdracht 9

[Download opdracht9.py hier.](#)

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```
networkName = 'Opdracht9'
numOfSubnets = 5

ethInfo1 = [['eth0', '1', '10.0.1.1', '255.255.255.0', '10.0.1.255']] # host1
ethInfo2 = [['eth0', '2', '10.0.1.2', '255.255.255.0', '10.0.1.255']] # host2
ethInfo3 = [['eth0', '3', '10.0.1.3', '255.255.255.0', '10.0.1.255']] # host3
ethInfo4 = [['eth0', '4', '10.0.1.4', '255.255.255.0', '10.0.1.255']] # host4
ethInfo5 = [['eth0', '1', '00:30:48:28:01:01'], # bridge1
            ['eth1', '5', '00:30:48:28:01:02']]
ethInfo6 = [['eth0', '2', '00:30:48:28:02:01'], # bridge2
            ['eth1', '5', '00:30:48:28:02:02']]
ethInfo7 = [['eth0', '3', '00:30:48:28:03:01'], # bridge3
            ['eth1', '5', '00:30:48:28:03:02']]
ethInfo8 = [['eth0', '3', '00:30:48:28:04:01'], # bridge4
            ['eth1', '5', '00:30:48:28:04:02']]

networkSettings = [['Host1', 'generic', ethInfo1, ''],
                   ['Host2', 'generic', ethInfo2, ''],
                   ['Host3', 'generic', ethInfo3, ''],
                   ['Host4', 'generic', ethInfo4, ''],
                   ['Bridge1', 'bridge', ethInfo5, ''],
                   ['Bridge2', 'bridge', ethInfo6, ''],
                   ['Bridge3', 'bridge', ethInfo7, ''],
                   ['Bridge4', 'bridge', ethInfo8, '']]
```