Dev Machine Setup

raj@acloudfan.com

@acloudfan

http://ACloudFan.com

Discount Coupon Links to UDEMY courses:

https://www.udemy.com/hyperledger/?couponCode=DKHLF1099

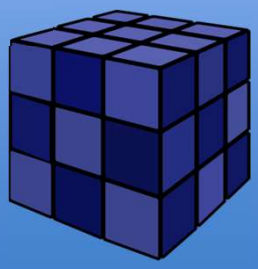
http://www.ACloudFan.com

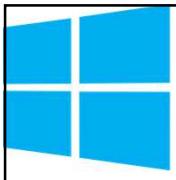
https://www.udemy.com/ethereum-dapp/?couponCode=DKETH1099

https://www.udemy.com/rest-api/?couponCode=DKRST1099

mentoring, seeking Blockchain part time work, project guidance, advice … …
http://www.bcmentors.com

This deck is part of a online course on "Hyperledger Fabric Development with Composer"





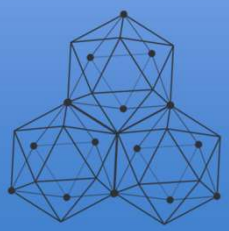
Fabric Development Environment

http://www.ACloudFan.com

raj@acloudfan.com

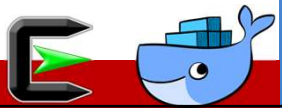
@acloudfan

http://ACloudFan.com



PREREQUISITES

Cygwin & Docker installed on your machine



STEP 1 Clone the for windows Fabric runtime

STEP 2 Download images for fabric

http://www.ACloudFan.com

STEP 3 Launch Fabric in terminal

STEP 4 Create the *PeerAdmin*

STEP 1 Clone the for windows Fabric runtime

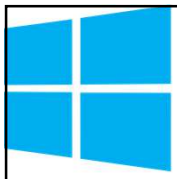
```
git config --get core.autocrlf
```

<If it prints true then run the next command>

http://www.ACloudFan.com

```
git config --global core.autocrlf false
```

```
git config --global core.longpaths true
```



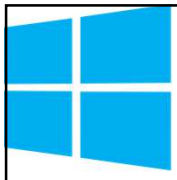
STEP 1 Clone the for windows Fabric runtime

```
git config --global core.longpaths true
```

http://www.ACloudFan.com

problem

On Cloning you may run into error related to long paths not supported on windows



STEP 1 Clone the for windows Fabric runtime

https://github.com/acloudfan/**HLF-Windows-Fabric-Tool**

http://www.ACloudFan.com

Shell scripts tweaked to address windows incompatibilities

problem

Windows directory path issues encountered in original scripts

STEP 2 Download images for fabric

Make sure Docker daemon is up

http://www.ACloudFan.com

```
./downloadFabric.sh
```

STEP 3 Launch Fabric in terminal

```
./startFabric.sh
```

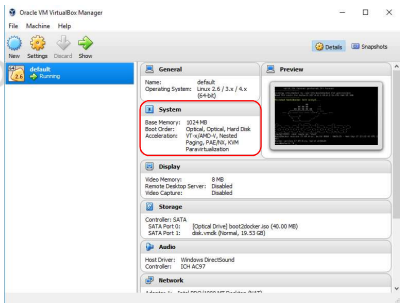
http://www.ACloudFan.com

problem

Docker Toolkit

- startFabric.sh Fails with memory related error message
- Performance of containers is sluggish

http://www.ACloudFan.com



Increase the VM Memory >= 4GB

STEP 4

Create the *PeerAdmin*

```
./createPeerAdminCard.sh
```

http://www.ACloudFan.com

```
./stopFabric.sh
```

Dev Machine Setup

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@acloudfan

http://ACloudFan.com

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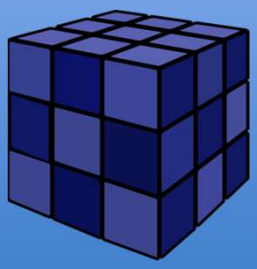


This deck is part of a online course on "Hyperledger Fabric Development with Composer"

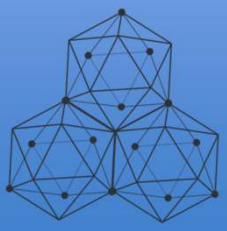
ubuntu

Fabric Development Environment

raj@acloudfan.com

@acloudfan

http://ACloudFan.com



PREREQUISITES

Hands on experience with Cloud VM setup

ubuntu

Ubuntu Linux 14.04 / 16.04 LTS (both 64-bit)

http://www.ACloudFan.com

https://en.wikipedia.org/wiki/Ubuntu_version_history

ubuntu

Ubuntu Linux 14.04 / 16.04 LTS (both 64-bit)

www.ACloudFan.com

amazon web services™

DigitalOcean

IBM Bluemix

… …

ubuntu

www.ACloudFan.com

Skip to Pre-Reqs Installation Step

amazon web services™

ubuntu

Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-cd0f5cb6

Free tier eligible

Ubuntu Server 16.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).

Root device type: ebs Virtualization type: hvm

http://www.ACloudFan.com

Currently selected: t2.medium (Variable ECUs, 2 vCPUs, 2.5 GHz, Intel Xeon Family, 4 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)
☐	General purpose	t2.nano	1	0.5	EBS only
☐	General purpose	t2.micro Free tier eligible	1	1	EBS only
☐	General purpose	t2.small	1	2	EBS only
☑	General purpose	t2.medium	2	4	EBS only

amazon web services™

http://www.ACloudFan.com

- You may incur charges for the use of VM on cloud
  - Use the cost explorer tools to estimate
- Keep the VM down to control the cost

amazon web services™

Set up SSH as per Cloud Providers Instructions

DO NOT Install using the root identity

http://www.ACloudFan.com

```
$ sudo adduser USER-NAME

$ sudo adduser USER-NAME sudo
```

Validate

```
$ su USER-NAME

$ whoami
```

DO NOT Install using the root identity

http://www.ACloudFan.com

```
curl -O https://hyperledger.github.io/composer/prereqs-ubuntu.sh
```

https://hyperledger.github.io/composer/installing/development-tools.html

ubuntu

```
mkdir ~/fabric-tools && cd ~/fabric-tools
curl -O https://raw.githubusercontent.com/hyperledger/composer-tools/master/packages/fabric-dev-servers/fabric-dev-servers.tar.gz

tar xvzf fabric-dev-servers.tar.gz
```

Execute the <script>

an.com

Installed in folder: ~/fabric-tools

https://hyperledger.github.io/composer/installing/development-tools.html

ubuntu

Install the Composer CLI Tool

http://www.ACloudFan.com

```
npm install -g composer-cli
```

https://hyperledger.github.io/composer/installing/development-tools.html

ubuntu

```
./downloadFabric.sh
```

http://www.ACloudFan.com

```
./startFabric.sh
```

```
./createPeerAdminCard.sh
```

Composer Runtime Setup

raj@acloudfan.com

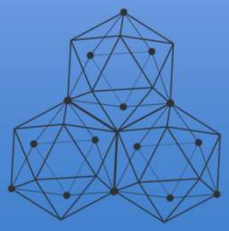
@acloudfan

http://ACloudFan.com

Learning Objectives:

http://www.ACloudFan.c

- Mac OS
- Windows



https://docker-curriculum.com/

Dev Machine Setup

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@acloudfan

http://ACloudFan.com

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http://www.ACloudFan.c

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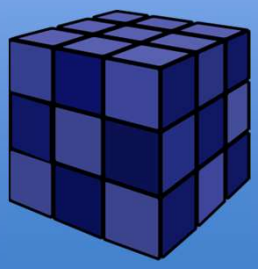


Composer Connection Profile

raj@acloudfan.com

@acloudfan

http://ACloudFan.com

Learning Objectives:

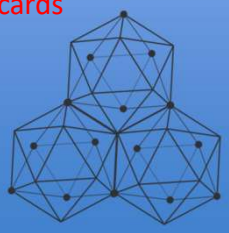
http://www.ACloudFan

WHOLE LECTURE RETIRED

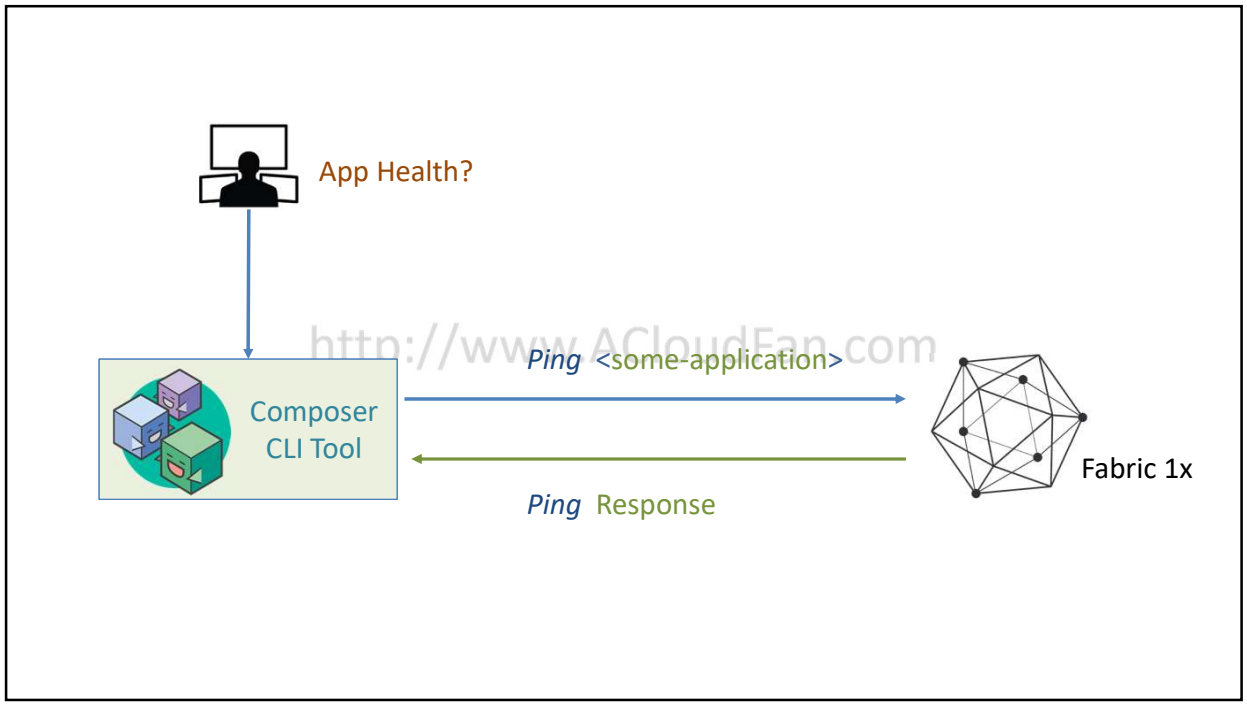
- Connection Profile

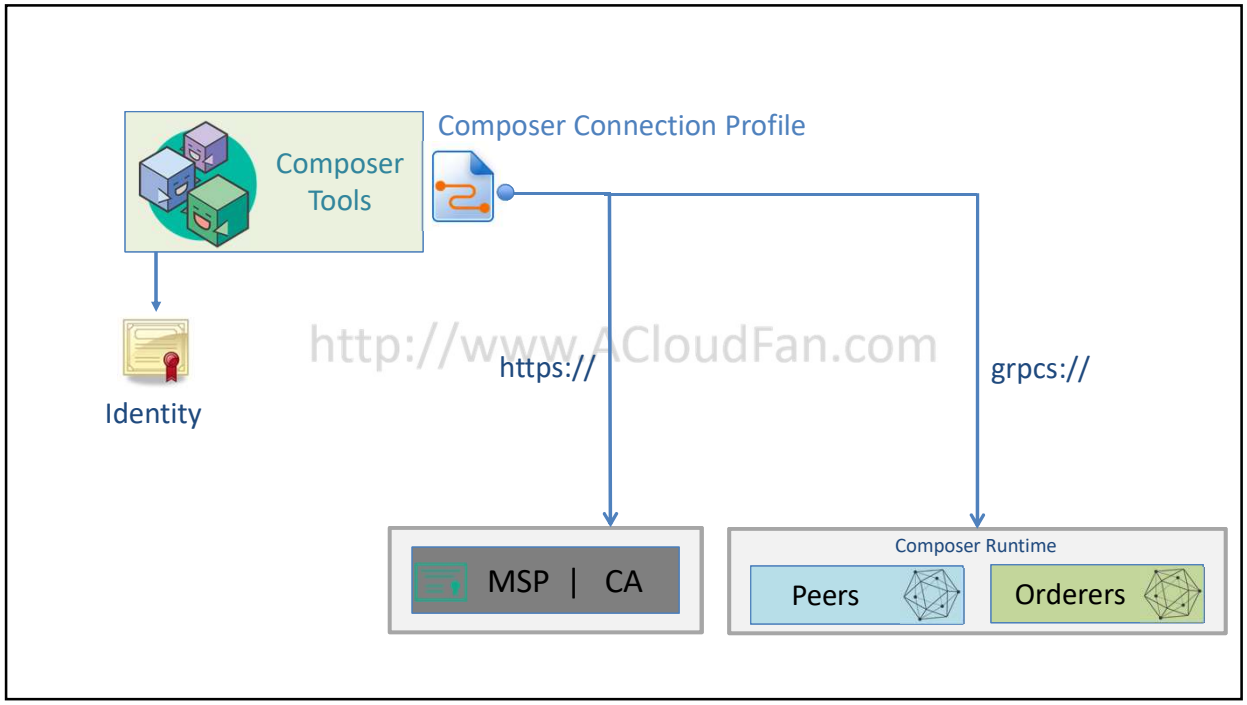
REPLACED by lecture on network cards

- Walkthrough of setup



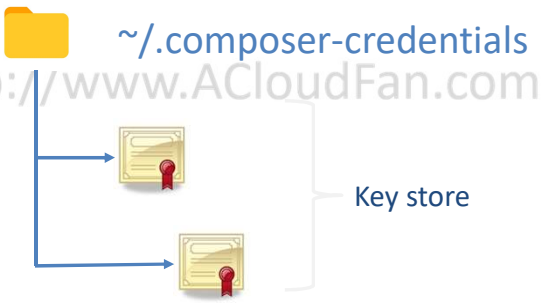
PS: Composer tools will be covered in details in next section



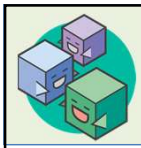


http://www.ACloudFan.com

Requires an identity to access the Fabric

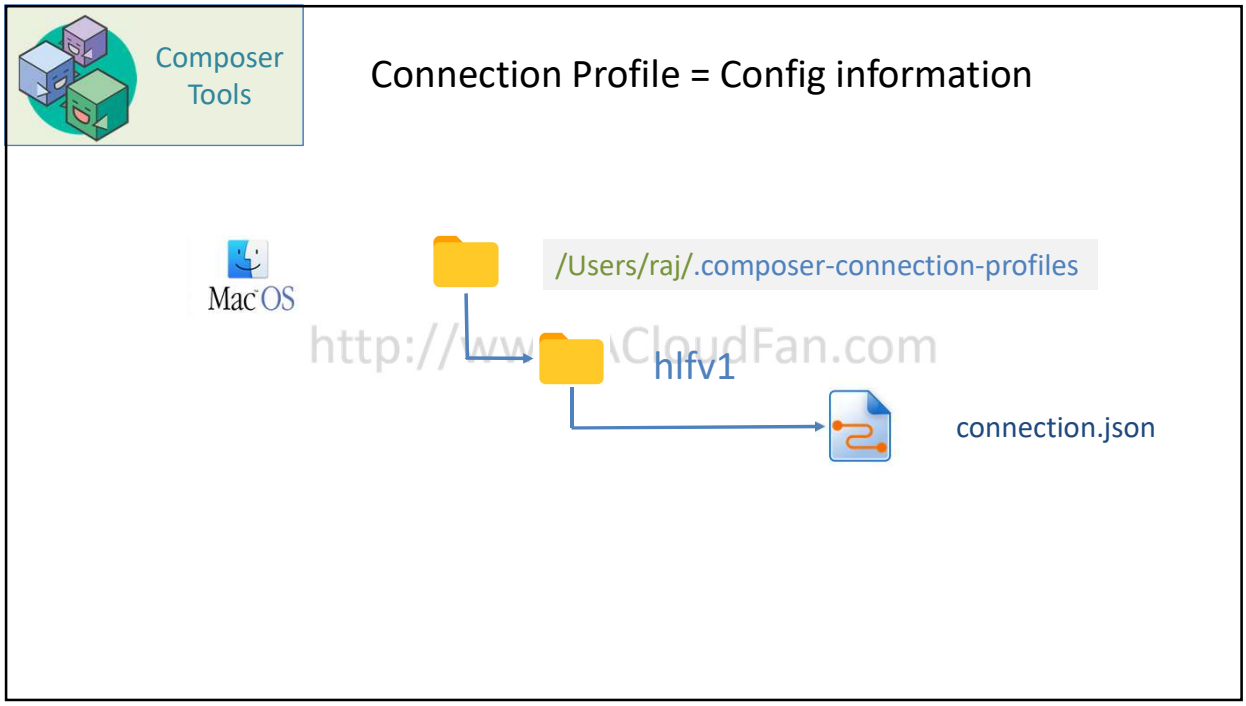


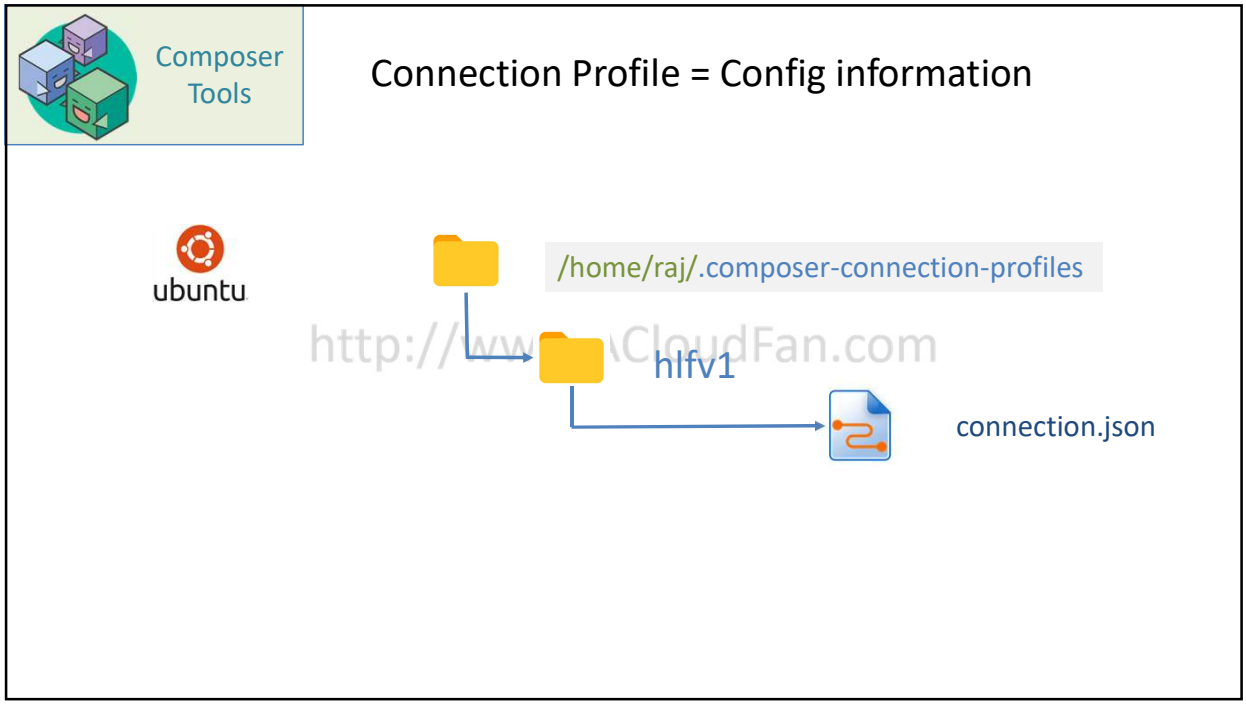
http://www.ACloudFan.com

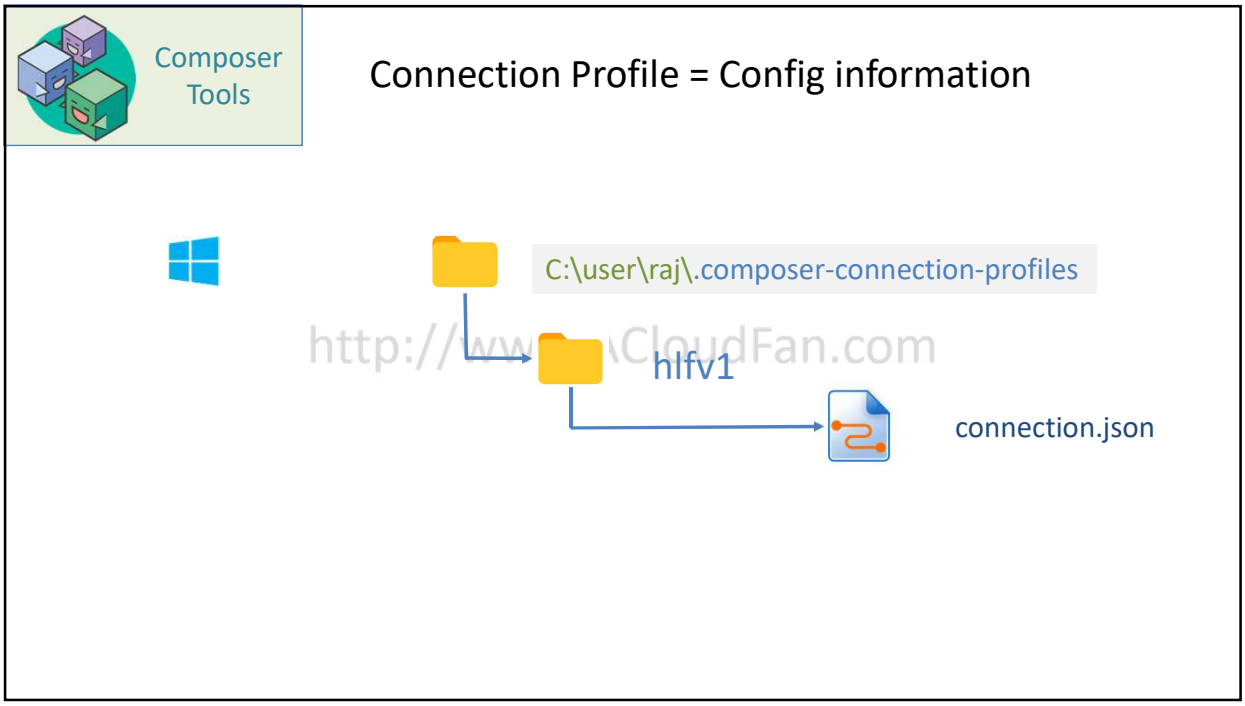


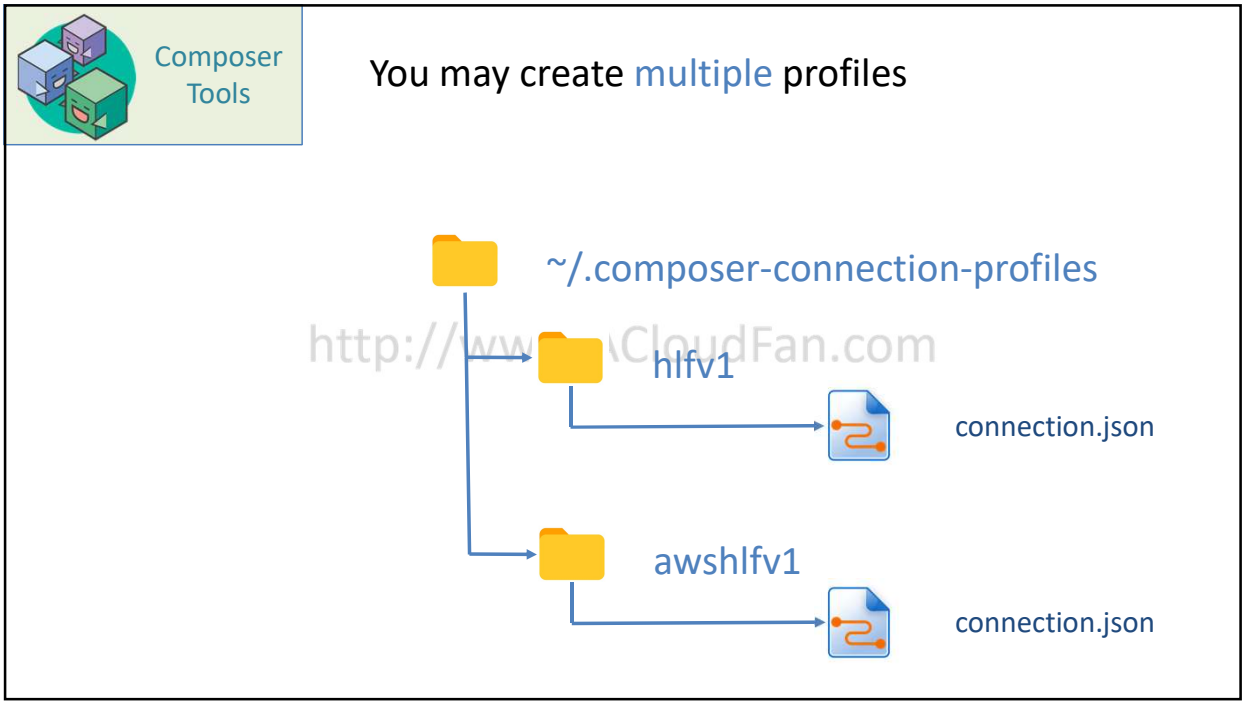
Connection Profile = Config information

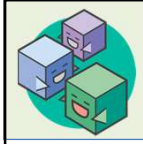
http://www.ACloudFan.com


Composer Tools
Connection Profile = Config information
Mac OS
/Users/raj/.composer-connection-profiles
http://www.CloudFan.com
hlfv1
connection.json


Composer Tools
Connection Profile = Config information
ubuntu
/home/raj/.composer-connection-profiles
http://www.CloudFan.com
hlfv1
connection.json


Composer Tools
Connection Profile = Config information
C:\user\raj\.composer-connection-profiles
hlfv1
connection.json


Composer Tools
You may create multiple profiles
~/.composer-connection-profiles
hlfv1
connection.json
awshlfv1
connection.json



Composer Tools

Multiple connection profiles for development

Local Fabric Installation

Remote Fabric Installation

Unit Testing >> | QA Testing >> | Smoke Testing in Live Environment

Simple Connection Profile for Development

connection.json

```
{
    "type": "hlfv1",
    "orderers": [
        {
            "url": "grpc://192.168.99.100:7050"
        }
    ],
    "ca": {
        "url": "http://192.168.99.100:7054",
        "name": "ca.org1.example.com"
    },
    "peers": [
        {
            "requestURL": "grpc://192.168.99.100:7051",
            "eventURL": "grpc://192.168.99.100:7053"
        }
    ],
    "keyValStore": "/CHANGE THIS PATH/.composer-credentials",
    "channel": "composerchannel",
    "mspID": "Org1MSP",
    "timeout": "300"
}
```

Type and version of the profile

connection.json

```
{
    "type": "hlfv1",
    "orderers": [
        {
            "url": "grpc://192.168.99.100:7050"
        }
    ],
    "ca": {
        "url": "http://192.168.99.100:7054",
        "name": "ca.org1.example.com"
    },
    "peers": [
        {
            "requestURL": "grpc://192.168.99.100:7051",
            "eventURL": "grpc://192.168.99.100:7053"
        }
    ],
    "keyValStore": "/CHANGE THIS PATH/.composer-credentials",
    "channel": "composerchannel",
    "mspID": "Org1MSP",
    "timeout": "300"
}
```

Hyper Ledger Fabric v1.0

Peers and Orderers configuration

connection.json

```
{
    "type": "hlfv1",
    "orderers": [
        {
            "url": "grpc://192.168.99.100:7050"
        }
    ],
    "ca": {
        "url": "http://192.168.99.100:7054",
        "name": "ca.org1.example.com"
    },
    "peers": [
        {
            "requestURL": "grpc://192.168.99.100:7051",
            "eventURL": "grpc://192.168.99.100:7053"
        }
    ],
    "keyValStore": "/CHANGE THIS PATH/.composer-credentials",
    "channel": "composerchannel",
    "mspID": "Org1MSP",
    "timeout": "300"
}
```

Orderers

Peers

Certification Authority

connection.json

```
{
    "type": "hlfv1",
    "orderers": [
        {
            "url": "grpc://192.168.99.100:7050"
        }
    ],
    "ca": {
        "url": "http://192.168.99.100:7054",
        "name": "ca.org1.example.com"
    },
    "peers": [
        {
            "requestURL": "grpc://192.168.99.100:7051",
            "eventURL": "grpc://192.168.99.100:7053"
        }
    ],
    "keyValStore": "/CHANGE THIS PATH/.composer-credentials",
    "channel": "composerchannel",
    "mspID": "Org1MSP",
    "timeout": "300"
}
```

Key Store Location | CA Information |

connection.json

```
{
    "type": "hlfv1",
    "orderers": [
        {
            "url": "grpc://192.168.99.100:7050"
        }
    ],
    "ca": {
        "url": "http://192.168.99.100:7054",
        "name": "ca.org1.example.com"
    },
    "peers": [
        {
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            "eventURL": "grpc://192.168.99.100:7053"
        }
    ],
    "keyValStore": "/CHANGE THIS PATH/.composer-credentials",
    "channel": "composerchannel",
    "mspID": "Org1MSP",
    "timeout": "300"
}
```

Key Store Location

C:\user**\.composer-connection-profiles

http://www.ACloudFan.com

Mac OS /Users/**/.composer-connection-profiles

ubuntu /home/**/.composer-connection-profiles

problem

Docker Toolkit on Windows

- Composer fails to connect

> docker-machine ip default

http://www

```
{
    "type": "hlfv1",
    "orderers": [
       { "url" : "grpc://192.168.99.100:7050" }
    ],
    "ca": { "url": "http://192.168.99.100:7054",
            "name": "ca.org1.example.com"
    },
    "peers": [
        {
            "requestURL": "grpc://192.168.99.100:7051",
            "eventURL": "grpc://192.168.99.100:7053"
        }
    ],
    "keyValStore": "c:/Users/Rajeev/.composer-credentials",
    "channel": "composerchannel",
    "mspID": "Org1MSP",
    "timeout": "300"
}
```

Update the IP Address in connection Profile

Developing Apps using Remote Fabric Instance

www.ACloudFan.com

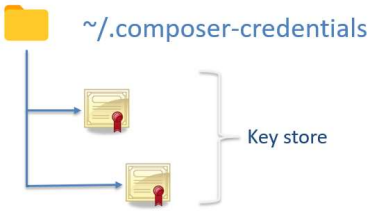
awshlfv1

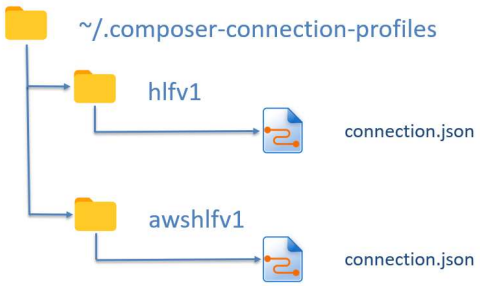
[IP Address of EC2 Instance]

Summary

- Composer tools configuration
  - Credentials
  - Config information

http://www.ACloudFan.com





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http://www.ACloudFan.c

https://www.udemy.com/ethereum-dapp/?couponCode=DKETH1099

https://www.udemy.com/rest-api/?couponCode=DKRST1099

mentoring, seeking Blockchain part time work, project guidance, advice … …
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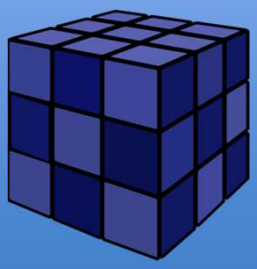


CLI : Deploying a Network App

raj@acloudfan.com

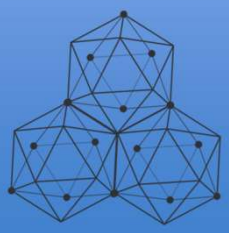
@acloudfan

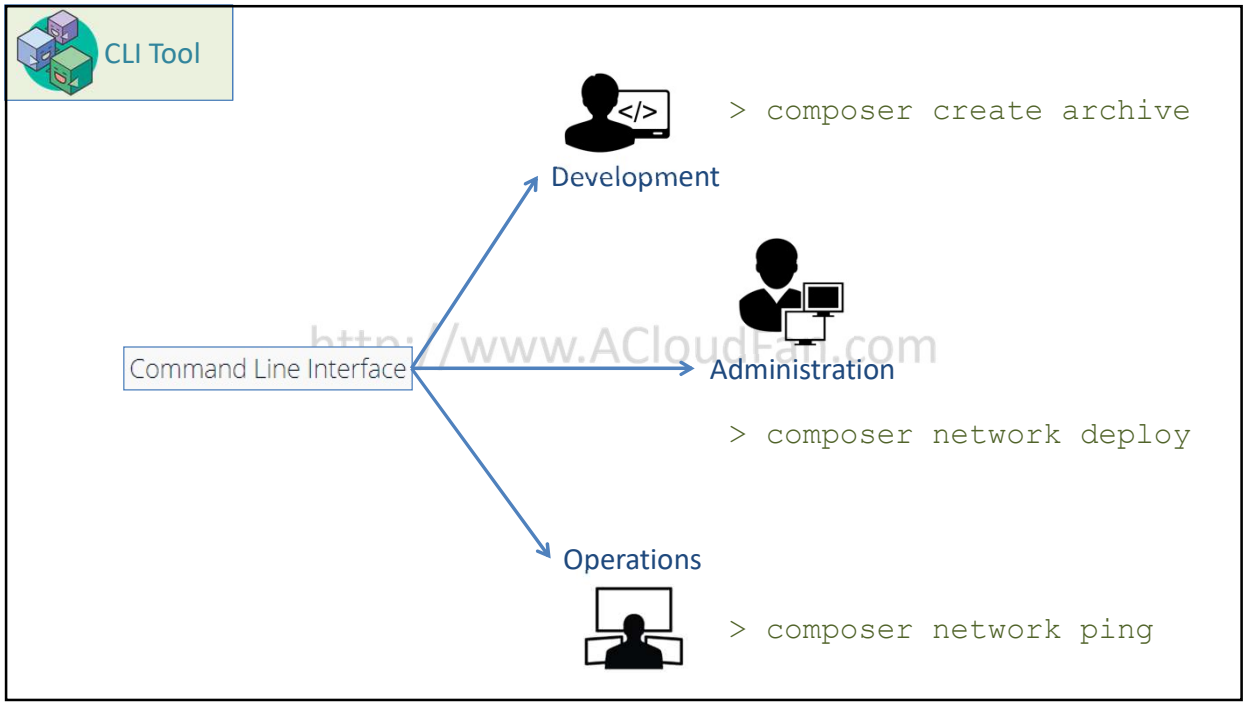
http://ACloudFan.com

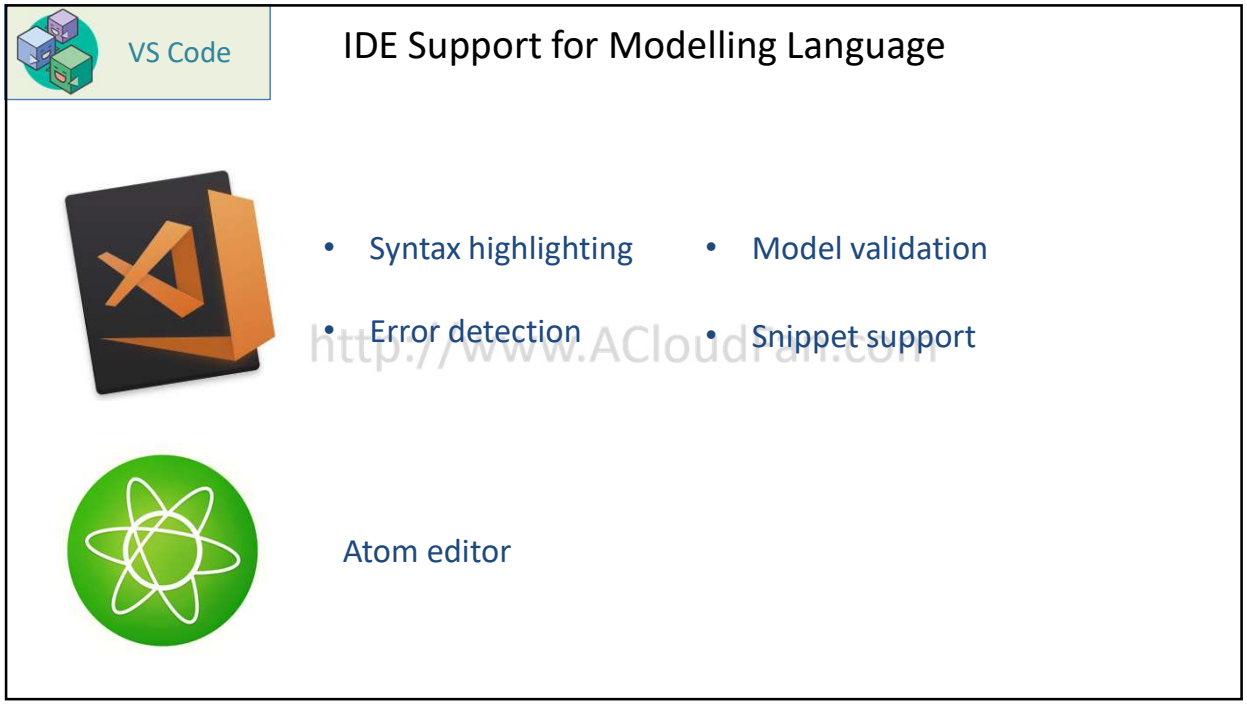
Learning Objectives:

http://www.ACloudFan.c

- CLI Commands Overview
- Walkthrough of CLI deployment commands




CLI Tool
> composer create archive
Development
Command Line Interface
Administration
> composer network deploy
Operations
> composer network ping


VS Code
IDE Support for Modelling Language
Syntax highlighting
Model validation
Error detection
Snippet support
Atom editor

```
> composer  --help
```

```
Commands:
  archive <subcommand>      Composer archive command
  generator <subcommand>    Composer generator command to convert a Business Network Definition to code
  identity <subcommand>     Composer identity command
  network <subcommand>      Composer network command
  participant <subcommand>  Composer participant command
  runtime <subcommand>      Composer runtime command
  transaction <subcommand>  Composer transaction command
  shell                     Interactive shell  [aliases: shell, i]

Options:
  --help        Show help  [boolean]
  -v, --version  Show version number  [boolean]

Examples:
  composer archive create
  composer identity issue
  composer network deploy
  composer participant add
  composer transaction submit
```

https://www.npmjs.com/package/composer-cli

```
> composer  network --help
```

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```
download [options]  Downloads a business network from the Hyperledger Fabric,
install [options]   Installs a business network archive to Hyperledger Fabric
list [options]      List the contents of a business network
loglevel [options]  Change the logging level of a business network
ping [options]      Test a connection to a business network
reset [options]     Resets a business network
start [options]     Starts a specific version of a business network that is a
upgrade [options]   Upgrades to a specific version of a business network that
```

Composer command failure due to mismatch of version of runtime environment for the network application and the composer tool:

Error: Error trying to ping. Error: Composer runtime (0.13.2) is not compatible with client (0.14.0)

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Hyperledger Composer Runtime Version = 0.13.2

Composer CLI Version = 0.14

Downgrade the Composer CLI to version of the Runtime

```
> npm install -g composer-cli@0.13.2
```

On running the > composer shell command you may run into an error indicating that figlet package is missing!!!

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Install the figlet npm package

```
> npm install -g figlet
```

Deploying a BNA to Hyperledger Fabric

STEP 1
- Launch your Fabric network

STEP 2
- Verify | Create the Peer Admin Card

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STEP 3
- Install the network application to fabric

STEP 4
- Start BNA on fabric

problem

Docker Toolkit on Windows

- Composer fails to connect

> docker-machine ip default

c:\Users\USER-NAME\.composer\cards\PeerAdmin@hlfv1\connection.json

```
{
    "type": "hlfv1",
    "orderers": [
       { "url" : "grpc://192.168.99.100:7050" }
    ],
    "ca": { "url": "http://192.168.99.100:7054",
            "name": "ca.org1.example.com"
    },
    "peers": [
        {
            "requestURL": "grpc://192.168.99.100:7051",
            "eventURL": "grpc://192.168.99.100:7053"
        }
    ],
    "keyValStore": "c:/Users/Rajeev/.composer-credentials",
    "channel": "composerchannel",
    "mspID": "Org1MSP",
    "timeout": "300"
}
```

CLI Tool

Install the archive file to Fabric

- Install the network application to fabric

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```
>_  composer network install …
```

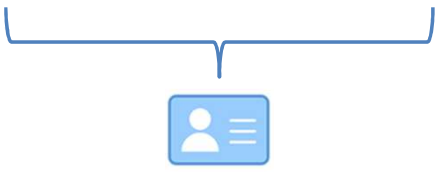
CLI Tool

Start the BNA on Hyperledger Fabric

- Start BNA on fabric

http://www.ACloudFan.com

```
>_  composer network start …
```



Network Admin Card

Validate the BNA on Fabric

STEP 1

- Network Admin Card import

STEP 2

- Use Network Ping

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```
>_  composer  network ping ..
```

STEP 3

- List the network application

```
>_  composer  network list ..
```

Check availability of the application

http://www.ACloudFan.com

```
>_  composer  network ping --help
```

Import the Network Administrator's card

```
>_  composer  card import --help
```

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```
>_  composer  card list --help
```

Summary

```
> composer   [command]   [sub-command]   [options]
```

```
>_  composer  archive create … …
>_  composer  network install … …
>_  composer  network start … …
```

```
>_  composer  card import …
>_  composer  card list
```

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Dev Machine Setup

Discount Coupon Links to UDEMY courses:

https://www.udemy.com/hyperledger/?couponCode=DKHLF1099

http://www.ACloudFan.c

https://www.udemy.com/ethereum-dapp/?couponCode=DKETH1099

https://www.udemy.com/rest-api/?couponCode=DKRST1099

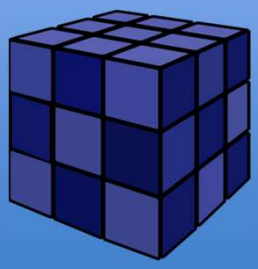
mentoring, seeking Blockchain part time work, project guidance, advice … …
http://www.bcmentors.com

This deck is part of a online course on "Hyperledger Fabric Development with Composer"

raj@acloudfan.com

@acloudfan

http://ACloudFan.com



CLI : Network Command

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@acloudfan

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Learning Objectives:

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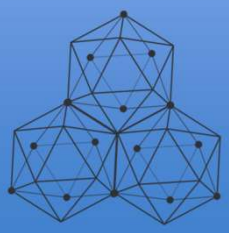
- App's availability & Details
- Updating the application



Administration using network command

```
>_   composer  network [subcommand]
```

```
deploy [options]     Deploys a business network to the Hyperledger Fabric
download [options]   Downloads a business network from the Hyperledger Fabric, does not undeploy
list [options]       List the contents of a business network
loglevel [options]   Change the logging level of a business network
ping [options]       Test a connection to a business network
reset [options]      Resets a business network
start [options]      Starts a business network
undeploy [options]   Undeploys a BusinessNetworkDefinition from the Hyperledger Fabric.
update [options]     Update a business network
upgrade [options]    Upgrades the Hyperledger Composer runtime of a business network
```

Checking availability of the network application

```
>_   composer  network ping --help
```

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Requires the card for the Network Administrator

Getting details of the network application

```
composer  network list --help
```

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- Dumps the details of all Registries from Composer Runtime

Requires the card for the Network Administrator

Import the network Card for Network Admin

```
composer  card  import --help
```

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Left as an exercise for you to do ☺

CLI Tool

Administration using network command

```
>_  composer  network [subcommand]
```

```
download [options]   Downloads a business network from the Hyperledger Fab
install [options]    Installs a business network archive to Hyperledger Fa
list [options]       List the contents of a business network
loglevel [options]   Change the logging level of a business network
ping [options]       Test a connection to a business network
reset [options]      Resets a business network
start [options]      Starts a specific version of a business network that
upgrade [options]    Upgrades to a specific version of a business network
```

http://www.ACloudFan.com

CLI Tool

Upgrading the Business Network Application

STEP 1

- Create Archive for the new version of BNA

STEP 2

- Install the new version of archive

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```
>_  composer  network install ..
```

STEP 3

- List the network application

```
>_  composer  network upgrade ..
```

Dev Machine Setup

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Discount Coupon Links to UDEMY courses:

https://www.udemy.com/hyperledger/?couponCode=DKHLF1099

http://www.ACloudFan.c

https://www.udemy.com/ethereum-dapp/?couponCode=DKETH1099

https://www.udemy.com/rest-api/?couponCode=DKRST1099

mentoring, seeking Blockchain part time work, project guidance, advice … …
http://www.bcmentors.com

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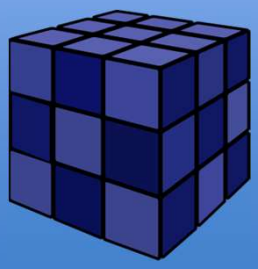

Business Network Cards

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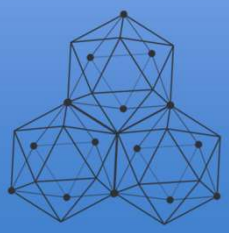
@acloudfan

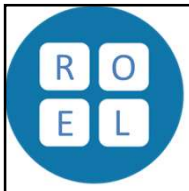
http://ACloudFan.com

Learning Objectives:

http://www.ACloudFan.c

- User Roles
- Business Network Card





Administrators

Peer Administrator

Network Administrator

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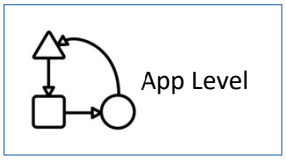
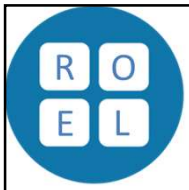
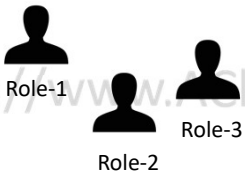


- Part of the environment setup
- Setup by Peer Administrator



Participants



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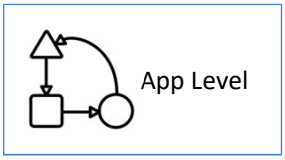
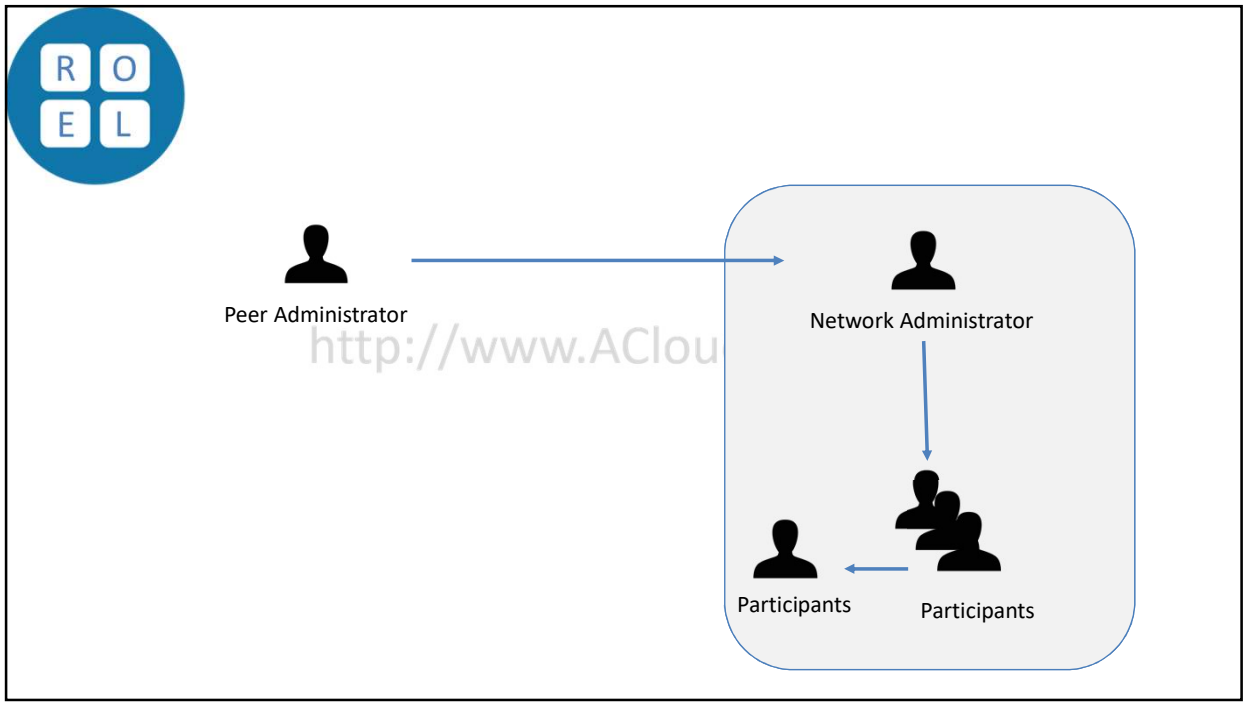
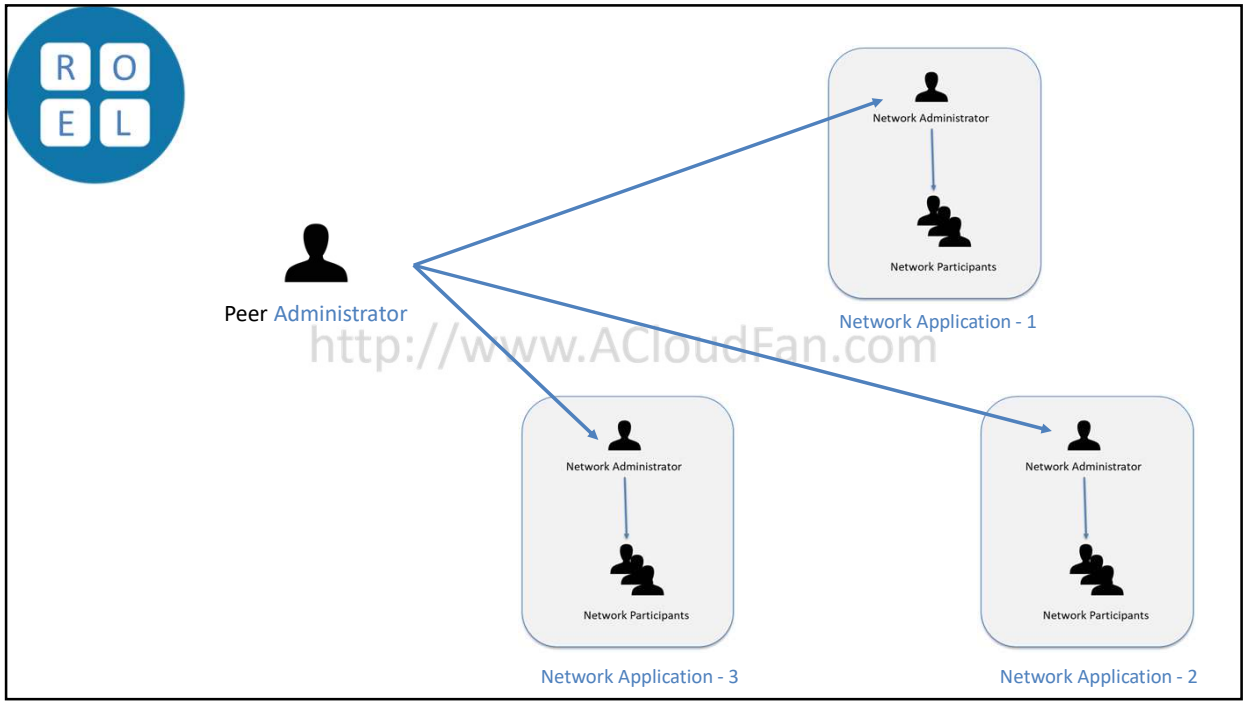
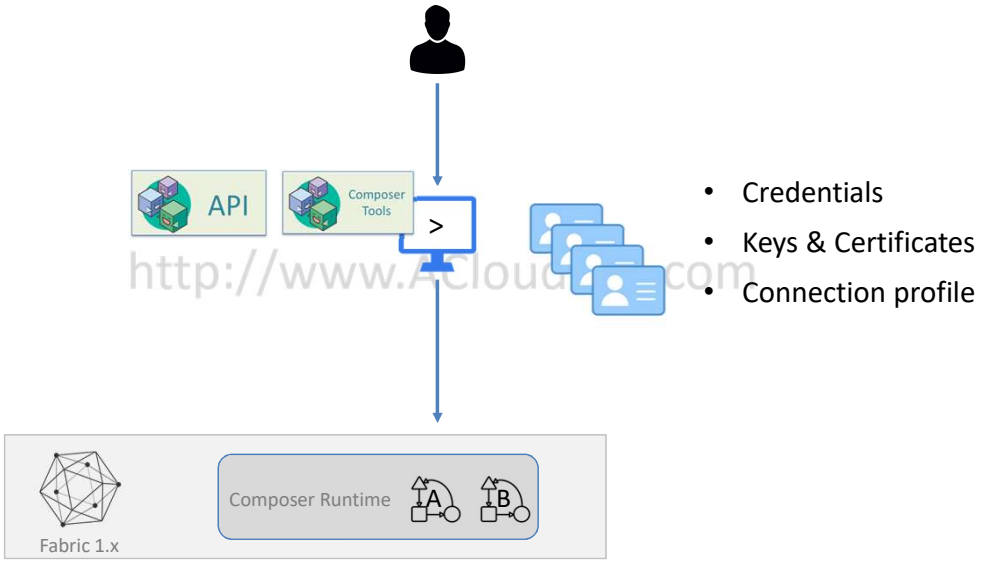


- Defined as part of the model


R O
E L
Peer Administrator
Network Administrator
Participants
Participants


R O
E L
Peer Administrator
Network Administrator
Network Participants
Network Application - 1
Network Administrator
Network Participants
Network Application - 3
Network Administrator
Network Participants
Network Application - 2

Business Network Card



- Credentials
- Keys & Certificates
- Connection profile

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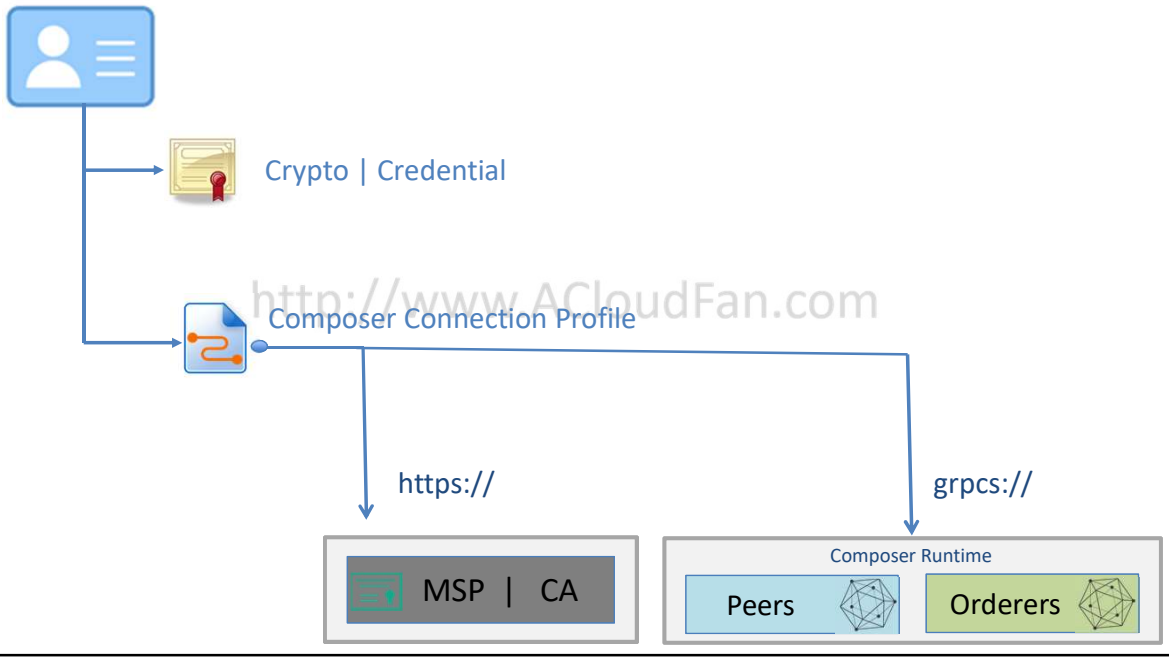

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Stored on file system

~/.composer

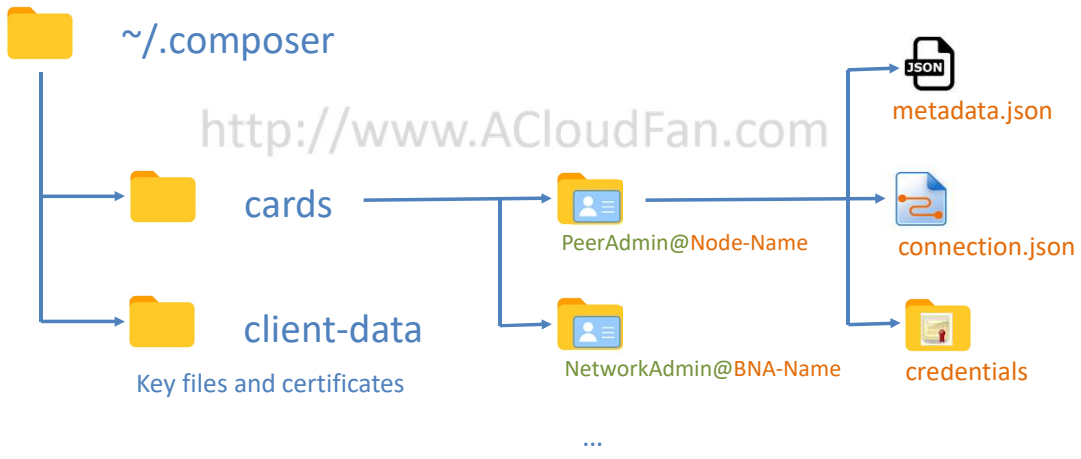
http://www.ACloudF

C:\Users\raj\.composer

/Users/raj/.composer

/home/raj/.composer

Each card is in its own subfolder



Managed by using the Composer Tool

```
composer  card --help
```

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list create delete

export import