Chapter 3: Set up local HyperLedger Fabric V1 development environment

Learning Bluemix & Blockchain

Bob Dill, IBM Distinguished Engineer, CTO Global Technical Sales
David Smits, Senior Certified Architect, IBM Blockchain

The Plan: 30 minute Chapters with an hour or two of practice

Chapter 1:	What is Blockchain? Concept and Architecture overview
Chapter 2:	What's the story we're going to build
Chapter 2.1:	Architecture for the Story
Chapter 3:	Set up local HyperLedger Fabric V1 development environment
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Setting up your development environment - all clients

- You will need Docker installed on your workstation to use the local development environment. To install Docker, please follow the instructions at the following links:
  - OSX: https://docs.docker.com/docker-for-mac/install/#download-docker-for-mac
  - Windows: https://docs.docker.com/docker-for-windows/install/
  - Ubuntu: https://docs.docker.com/engine/installation/linux/docker-ce/ubuntu/
  - Debian: https://docs.docker.com/engine/installation/linux/docker-ce/debian/
  - CentOS: https://docs.docker.com/engine/installation/linux/docker-ce/centos/
  - Fedora: https://docs.docker.com/engine/installation/linux/docker-ce/fedora/
- curl is used to manage the developer set up
  - it's installed as part of current releases of OS X
  - if you don't have it and are on a linux system, use your package manager to install it
    - for example: Ubuntu: **sudo apt-get install curl**
  - If you don't have it and are on Windows, use the following command to install it:
    - **yada yada yada**

Setting up your development environment: OS X

- Open a terminal window on your Mac and enter the following command:

```
curl -H 'Accept: application/vnd.github.v3.raw' https://raw.githubusercontent.com/rddill-IBM/ZeroToBlockchain/master/setup_OSX.sh | bash
```

  - This should be copied and pasted onto a single line in your terminal window. Press enter after copying
- This command will go through the following steps, informing you of each step in the process
  - Check for the presence of the Brew package manager and install it if it's missing. If it's present, execute the brew update and brew upgrade commands, install the dos2unix tool
  - Check for the presence of git and install it if it's missing
  - Install GitHub Desktop V 2.33
  - Check for the presence of nodeJS version 6 (Required for Hyperledger Fabric) and install it if it's missing
  - Install the nodejs SDK for Hyperledger Fabric composer
  - Install the Hyperledger Fabric docker images
  - Install the fabric tools and update your .bash_profile
  - install Hyperledger Fabric composer platform-specific binaries
- If you don't want to automatically install and update all of these tools, then do the following instead:

```
curl -o setup_OSX.sh –H 'Accept: application/vnd.github.v3.raw' https://raw.githubusercontent.com/rddill-IBM/ZeroToBlockchain/master/setup_OSX.sh
```

  sudo chmod +x setup_OSX.sh

  ./setup_OSX.sh -h
- the -h option will list the commands you use to prevent selected installation actions from taking place, for example, to do everything except install git and nodeJS V6, you would type:

  ./setup_OSX.sh -g false -n false

Setting up your development environment: Linux: Ubuntu

- Open a terminal window on your Ubuntu Linux and enter the following command:
  - `sudo apt-get install -y curl`
- After curl has been installed, copy the following as a single line into a terminal window and press enter

  ```
  curl -H 'Accept: application/vnd.github.v3.raw' https://raw.githubusercontent.com/rddill-IBM/ZeroToBlockchain/master/setup_Ubuntu_Part_1.sh | bash
  ```

  - This should be copied and pasted onto a single line in your terminal window. Press enter after copying
- This will install all required software up through docker.
- You will then need to reboot your system prior to executing the following command:

  ```
  curl -H 'Accept: application/vnd.github.v3.raw' https://raw.githubusercontent.com/rddill-IBM/ZeroToBlockchain/master/setup_Ubuntu_Part_2.sh | bash
  ```

  - This will complete the installation of the Hyperledger Fabric images and the supporting tools.
- This command will go through the following steps, informing you of each step in the process
  - Update the apt-get repositories and upgrade current software
  - Ensure that the base development environment is installed
  - Check for the presence of git and install it if it's missing
  - Check for the presence of nodeJS version 6 (Required for Hyperledger Fabric) and install it if it's missing
  - Install the nodejs SDK for Hyperledger Fabric composer
  - Install the Hyperledger Fabric docker images
  - Install the fabric tools and update your .bash_profile
  - install Hyperledger Fabric composer platform-specific binaries

Setting up your development environment: Linux: Ubuntu (Optional)

- If you don't want to automatically install and update all of the tools, then execute the following three commands, instead:

```
curl -H 'Content:application/vnd.github.v3.raw' https://
raw.githubusercontent.com/rddill-IBM/ZeroToBlockchain/master/
setup_Ubuntu_Part_1.sh >> setup_Ubuntu_Part_1.sh

sudo chmod +x setup_Ubuntu_Part_1.sh

./setup_Ubuntu_Part_1.sh -h
```

- the -h option will list the commands you use to prevent selected installation actions from taking place, for example, to do everything except install git and nodeJS V6, you would type:

```
./setup_Ubuntu_Part_1.sh -g false -n false
```


set up your development environment - Windows

- This is a largely manual process; the details are at the end of this presentation. The steps should be followed in order and will take 1-3 hours depending on connectivity. You can do other things while these commands and installations are running.

1. Install the git command line
2. Install GitHub Desktop, if desired
3. Fork the master Git repository and clone it to your local workstation
4. Install Python V2.7
5. Install NodeJS V6 (required for Hyperledger Fabric at this time)

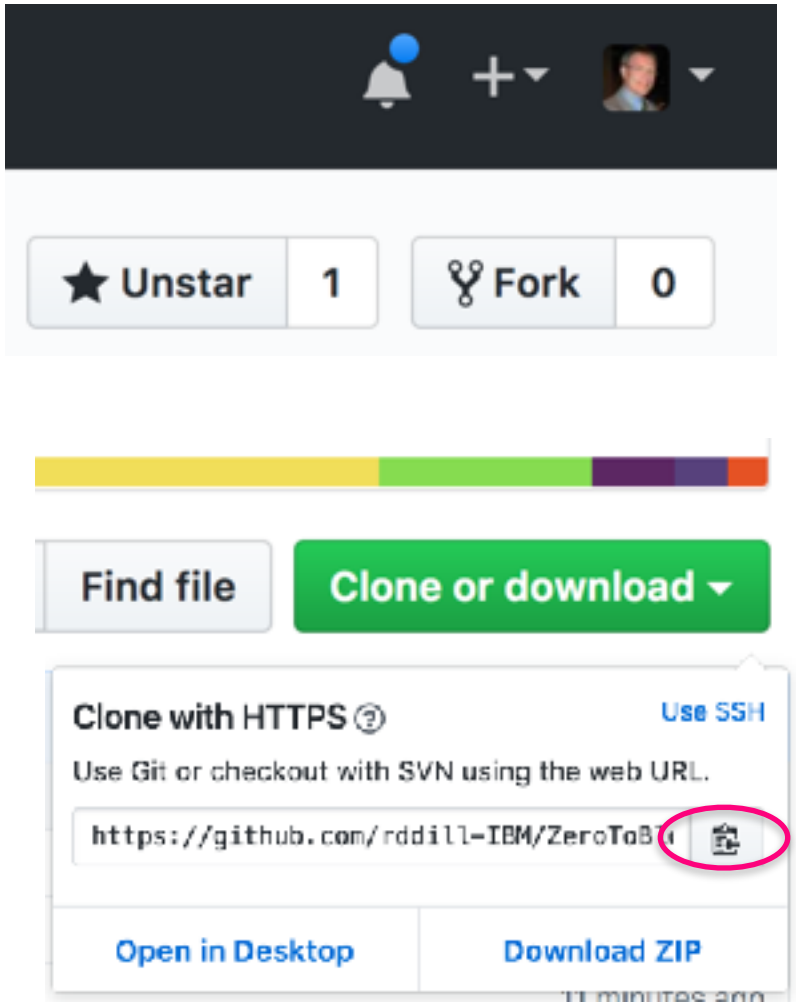
   Open an Administrative Command Prompt and install the pre-reqs

   Open a regular Command Prompt and run the setup_Windows.cmd exec
6. Install the VSCode editor, if desired
7. Install the Windows Docker Toolkit

   Open a Docker Quickstart Terminal and run the setup_Windows.sh exec

Setting up your development environment: Get the Tutorial

- The repository for this tutorial is located here:
  - https://github.com/rddill-IBM/ZeroToBlockchain
  - If you don't yet have a user-id and password for github, go to this link and sign up: https://github.com
- Go to the Zero To Blockchain repository and select "fork"; you'll see it in the top right hand corner of the browser page
- This will create a copy of this repository under your own id.
- Click clone on your version of the repository. It is a (green) button on the right hand side of the browser page
  - When you click the button, it will ask you if you want to copy the link or use github desktop to clone the repository to your computer.
  - If you don't have github desktop, then click on the copy button and
    - open a terminal window on your computer
    - change to the folder where you (want to) store your git repositories (for example: Documents/GitHub)
    - type **`git clone <paste in the url you copied in the previous step>`**
    - and then press enter.



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Chapter 4: Build and Test the Network

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Appendix A: Windows Setup Details

Windows Set up

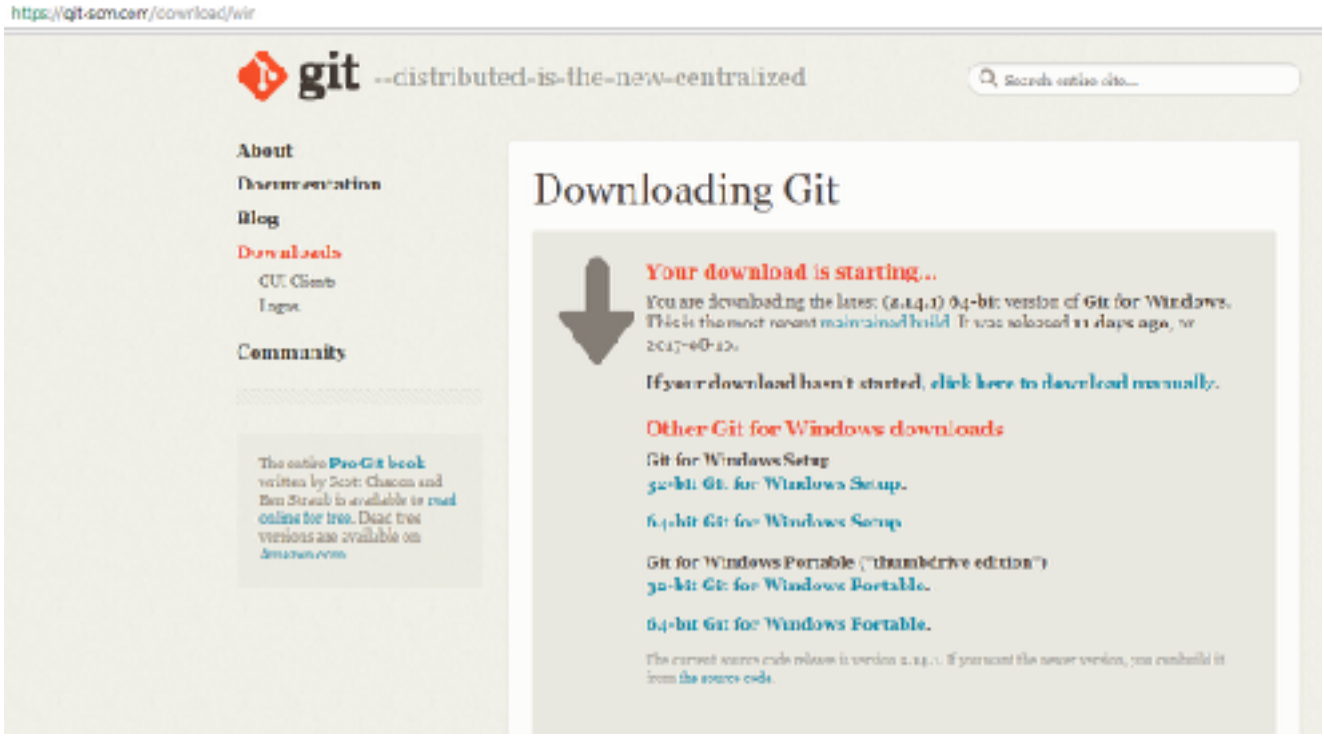
1. Install the git command line
2. Install GitHub Desktop, if desired
3. Fork the master Git repository and clone it to your local workstation
4. Install Python V2.7
5. Install NodeJS V6 (required for Hyperledger Fabric at this time)
    1. Open an Administrative Command Prompt and install the pre-reqs
    2. Open a regular Command Prompt and run the setup_Windows.cmd exec
6. Install the VSCode editor, if desired
7. Install the Windows Docker Toolkit
    1. Open a Docker Quickstart Terminal and run the setup_Windows.sh exec

Please Note that there are two setup_Windows commands. One ends with .cmd, the other ends with .sh

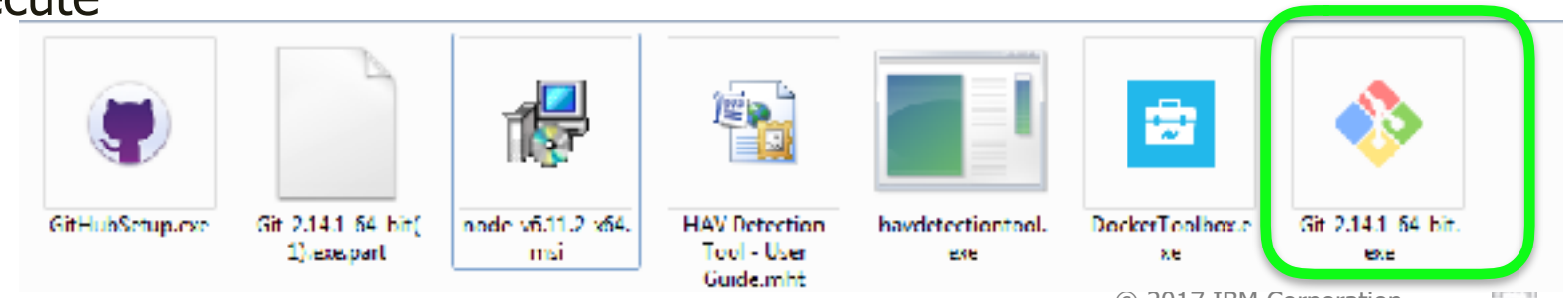
You will use both of these commands at different times during this setup process

Windows: Install Git Command Line Interpreter

- Go to https://gitscm.com/download/win
  - This will retrieve the 64-bit version of git for your system



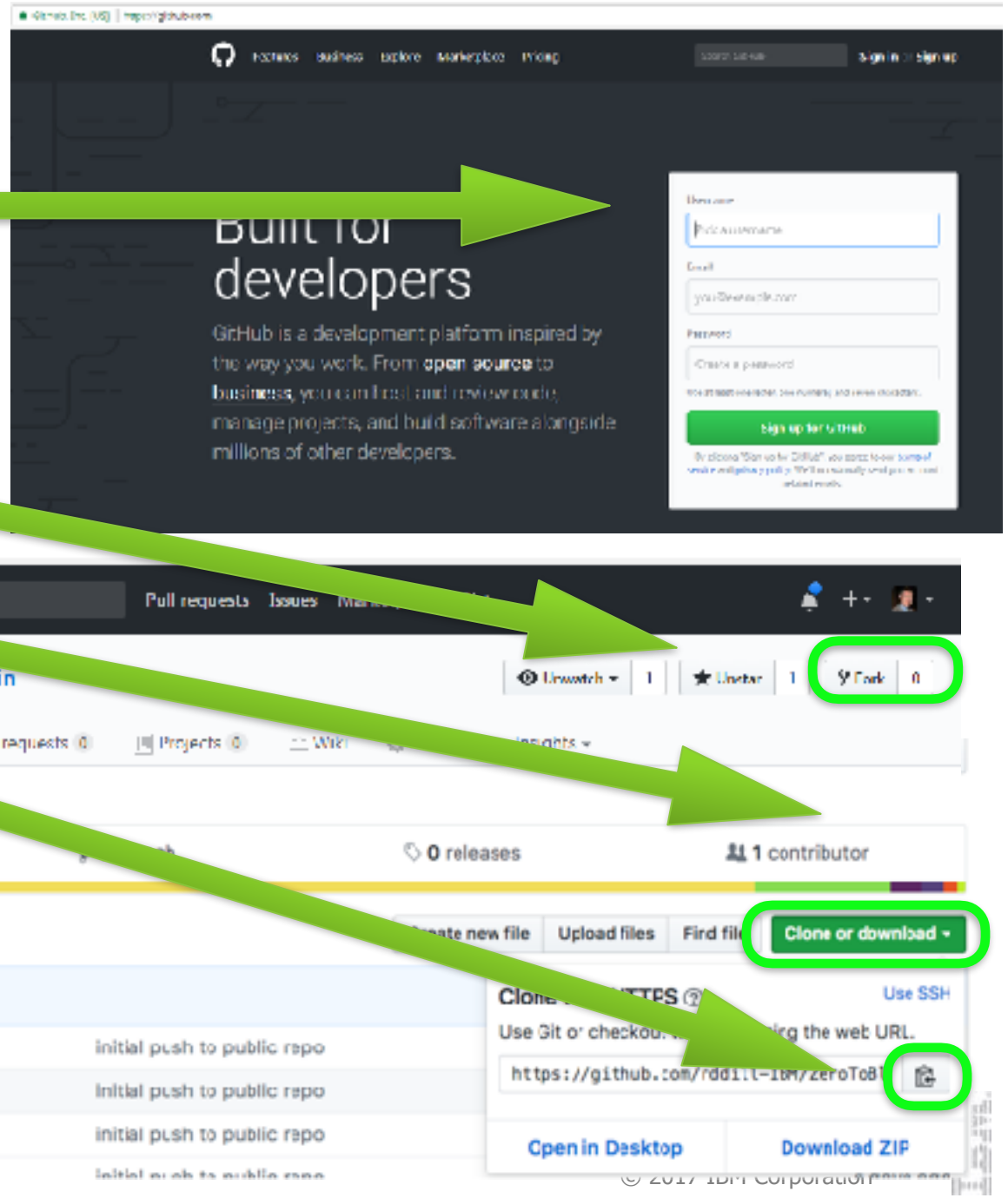
- Go to your downloads folder and execute the installer
  - Take the recommended options



Windows: Get the code

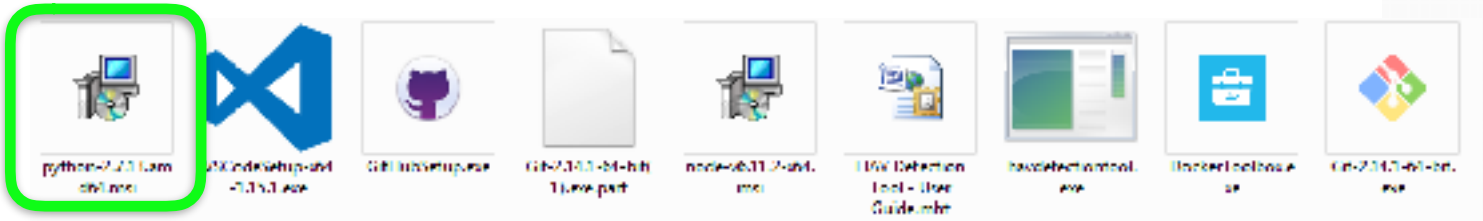
- Go to https://github.com
  - If you don't have an id yet, create one
  - Log in
- Go to https://github.com/rddill-IBM/ZeroToBlockchain
  - Click on Fork
  - Select your git id
- After the fork process completes
  - Click Clone or Download

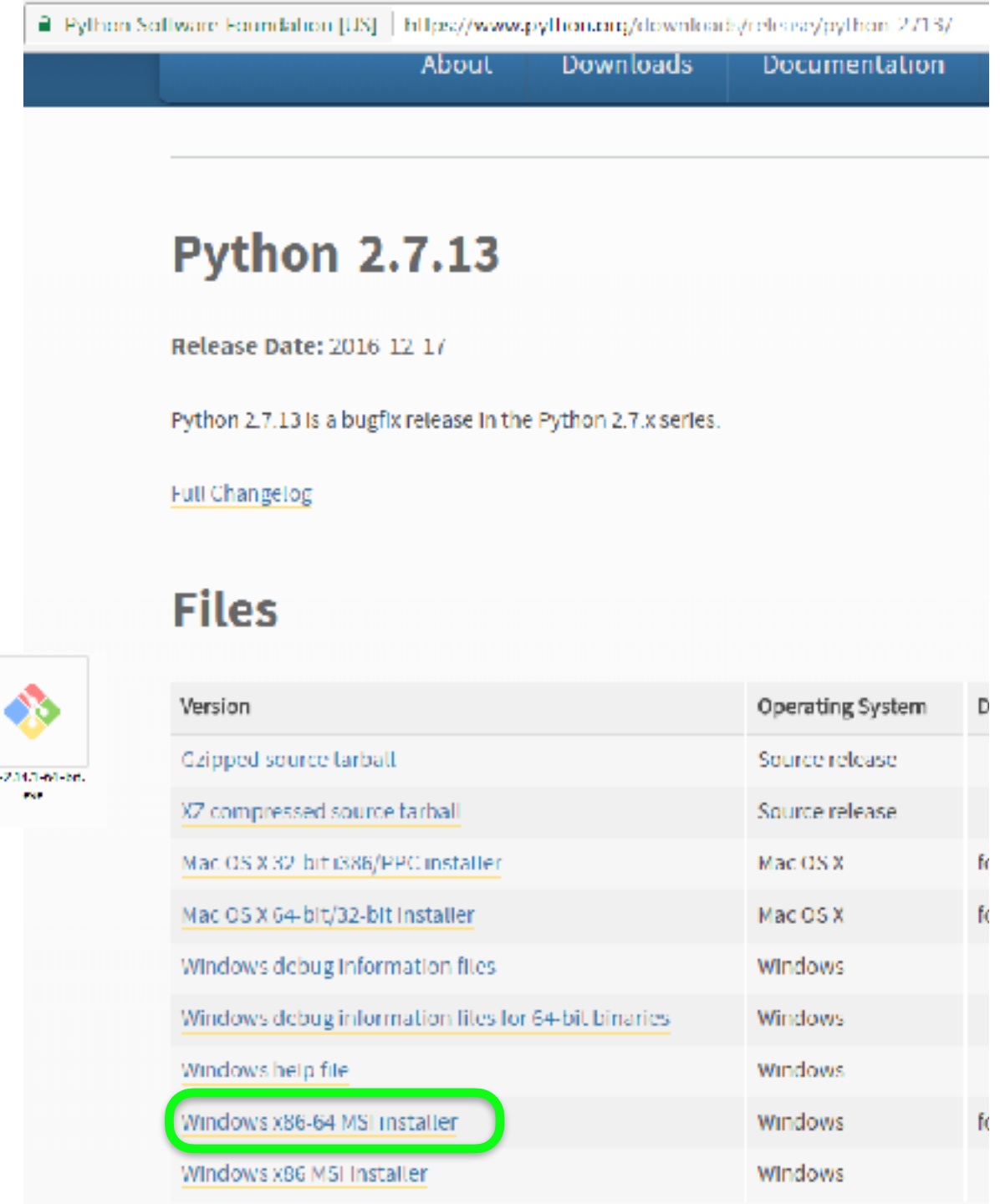
- And then select the copy button
- Open a command prompt and navigate to the folder where you store your git repositories (for example: cd Documents/GitHub)
- Type the words
  - git clone
  - and then paste in the text you copied from the browser
  - Press enter
    - Git will now clone your repository to your local workstation



Windows: Install Python V2.7

- Go to https://www.python.org/downloads/release/python-2713
  - Select the Windows 64 bit MSI installer
- Go to your Downloads folder and execute the Python installer

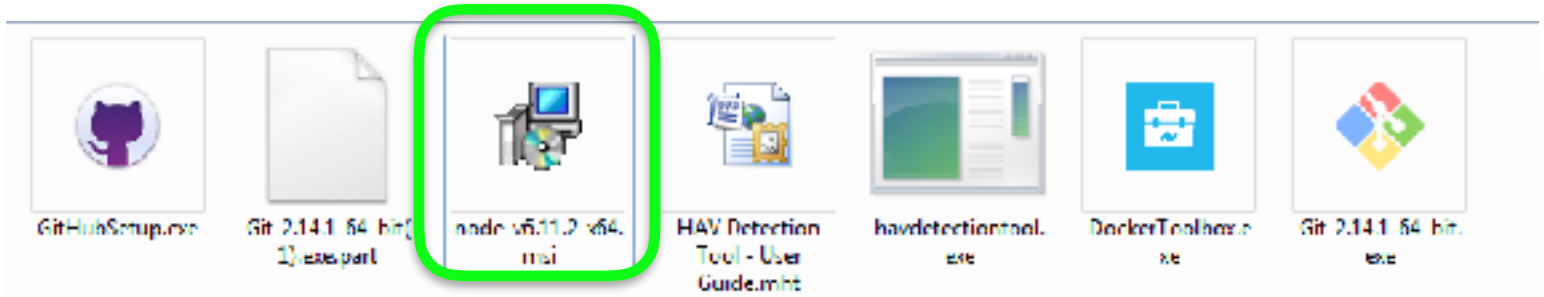


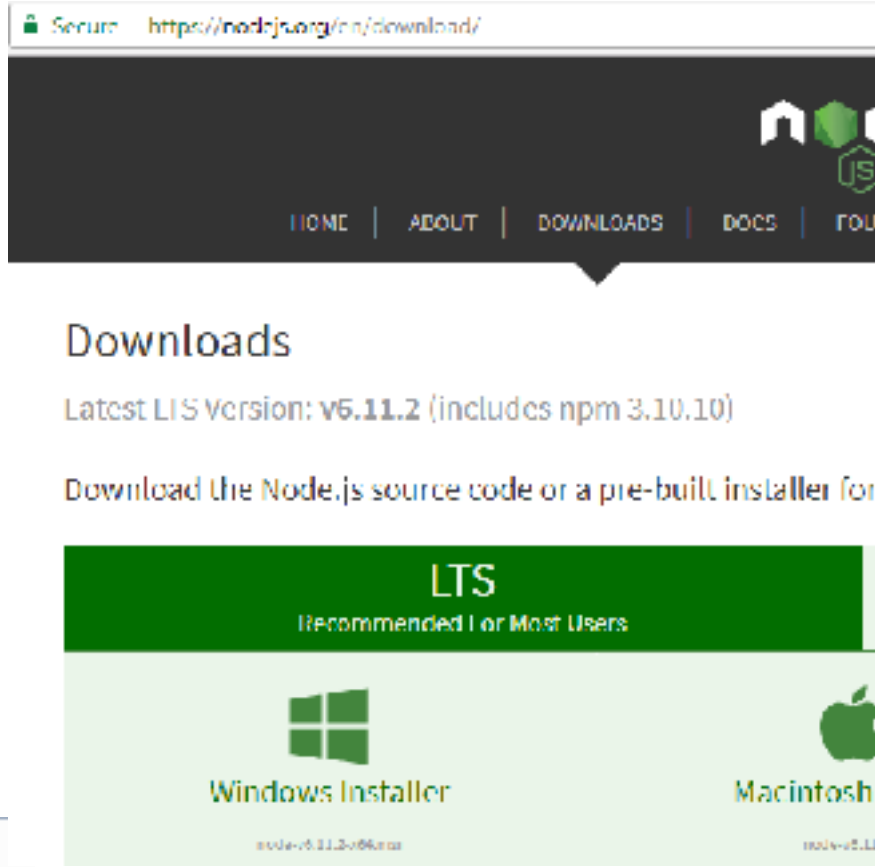


Windows: Install NodeJS V6 Part 1

- Go to https://nodejs.org
- Select Downloads from top nav bar
- Download the V6 LTS (Long Term Support) Nodejs installer

- Execute the downloaded NodeJS installer
  - Take recommended options





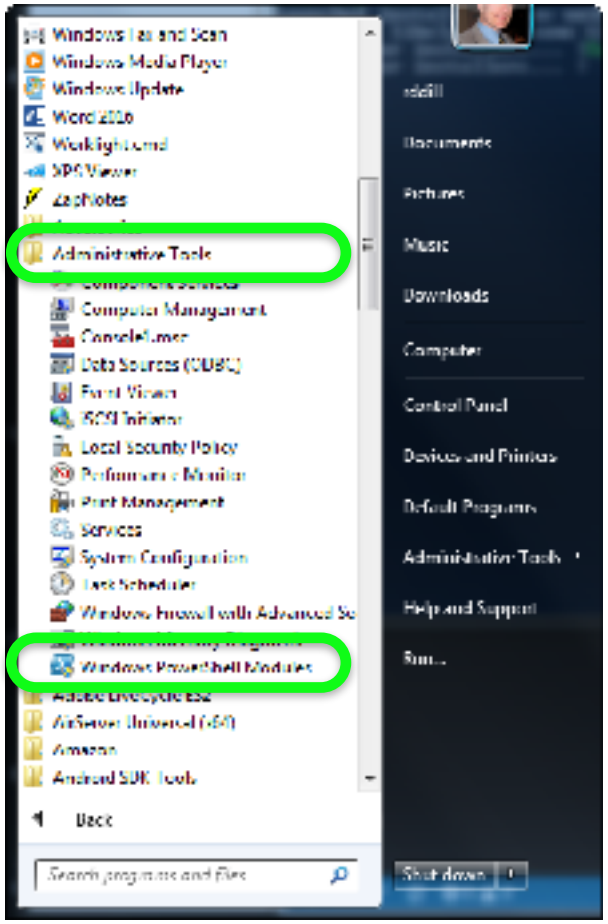
Windows: Install NodeJS V6 Part 2

- Open an Administrative PowerShell
- Execute the following two commands:

```
npm install --global windows-build-tools

npm install --global grpc
```

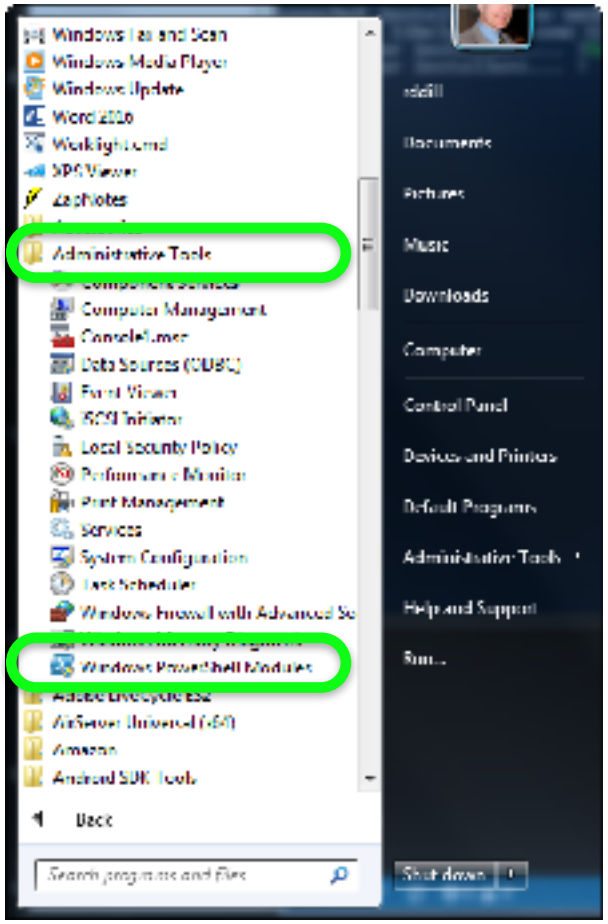
- Close the PowerShell when these commands complete



Windows: Install NodeJS V6
Part 3

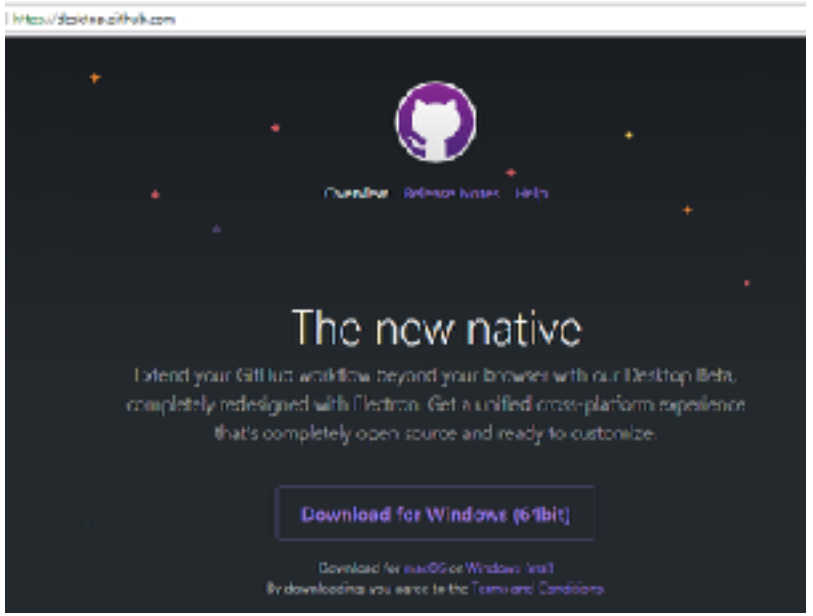
- Open a Command Prompt
- change to the folder where you just cloned the tutorial:
  - cd Documents/GitHub/ZeroToBlockchain
- Execute the following command
  - setup_Windows.cmd

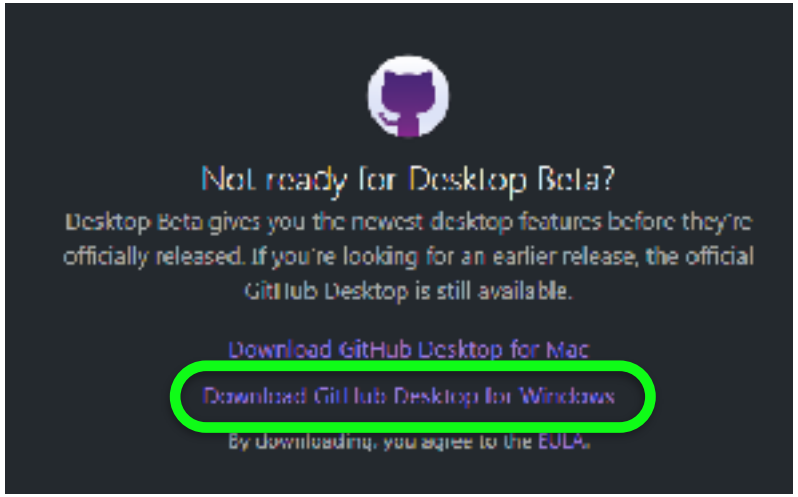
- Close the Command Prompt when this command completes



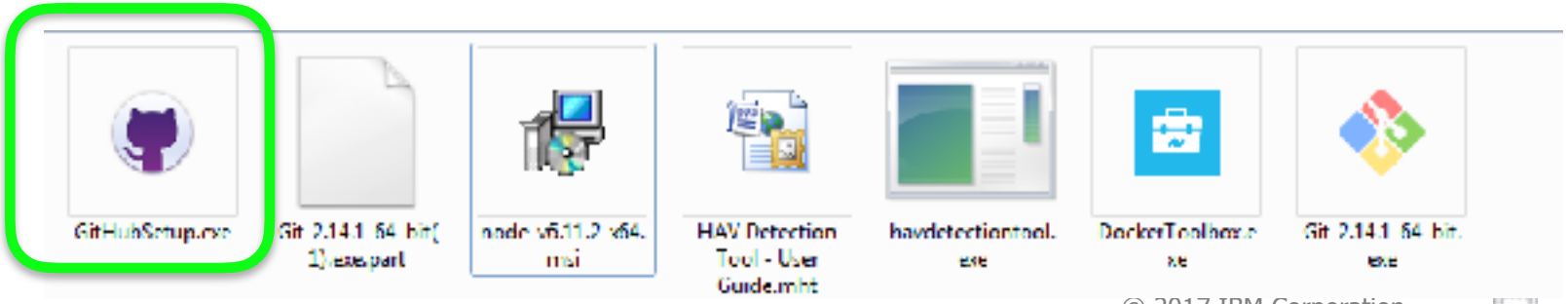
Windows: Install GitHub Desktop (Optional)

- Go to https://desktop.github.com
  - The New Native Beta is not recommended
- Scroll to the bottom of the page
  - Download the Installer





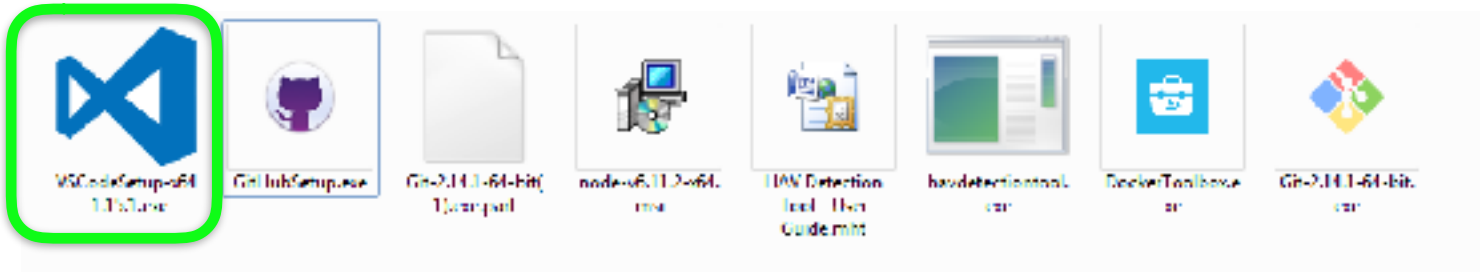
- Execute the GitHubSetup.exe
  - Take recommended options



Windows: Install the VSCode editor (Optional)

- Go to https://code.visualstudio.com/docs?dv=win
  - This will automatically start your download

- Go to your Downloads folder and execute the VSCodeSetup installer

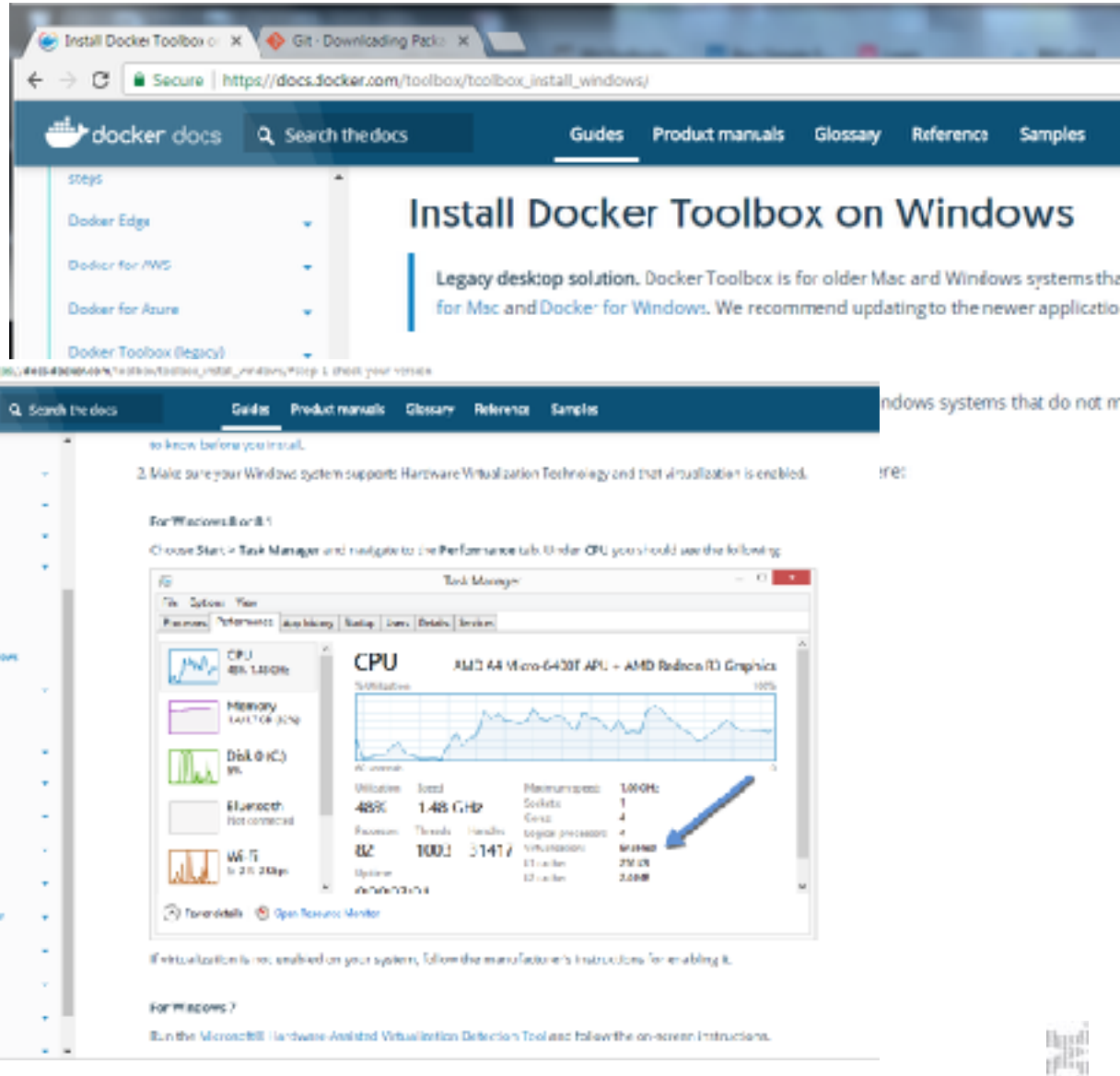


Windows: Install the Docker Toolkit Part 1

- Go to https://docs.docker.com/toolbox/toolbox_install_windows
  - Click on the get docker toolbox for windows
- Follow the "before you install" instructions!
  - Get the virtualization checker tool.

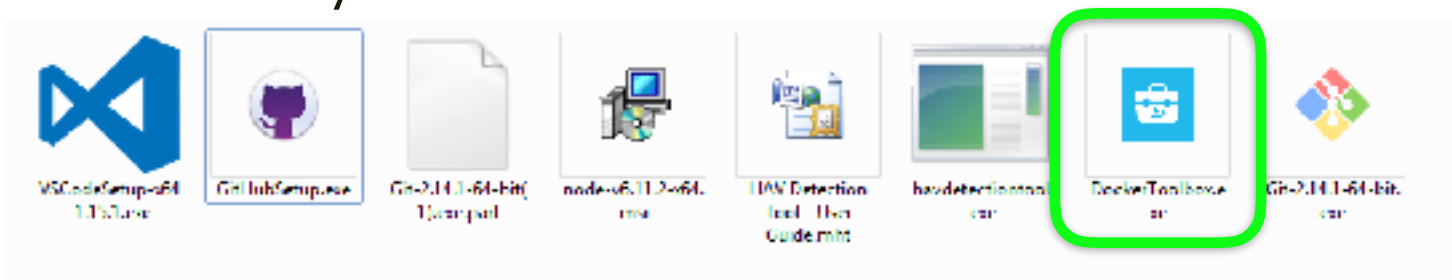
  - Install the tool

  - Follow the instructions
  - On my windows 7 system, this required booting into the bios and changing the configuration to support virtualization - a 5 minute task

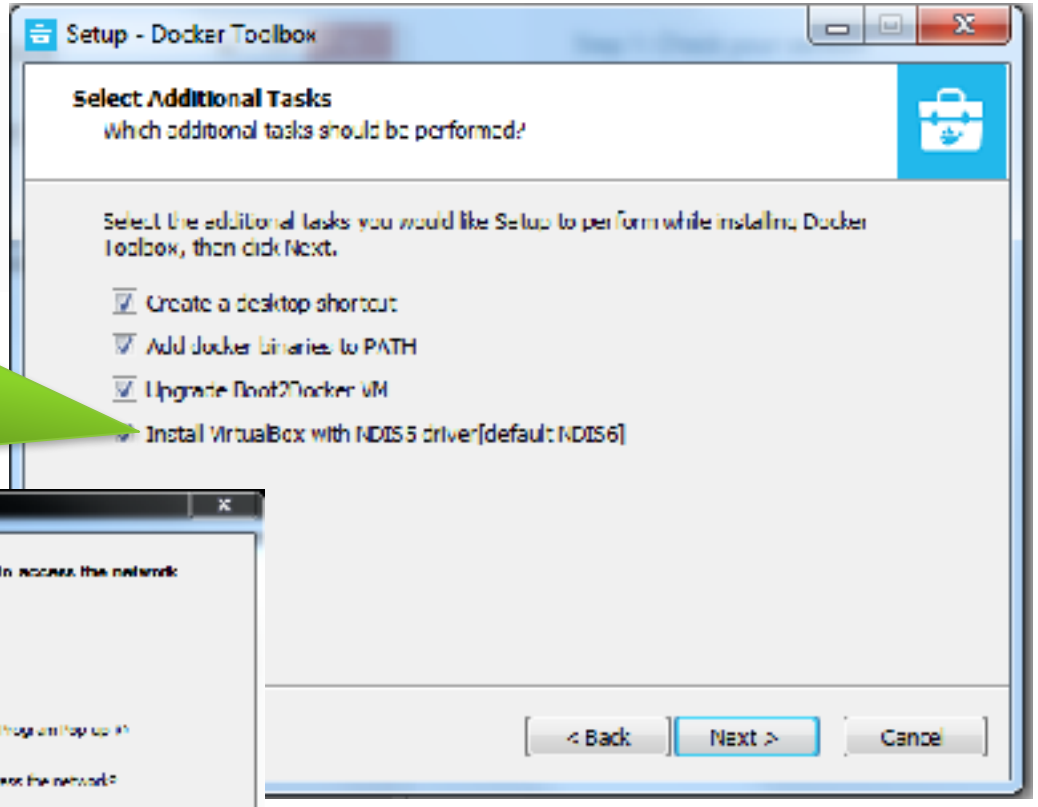


Windows: Install Docker
Part 2

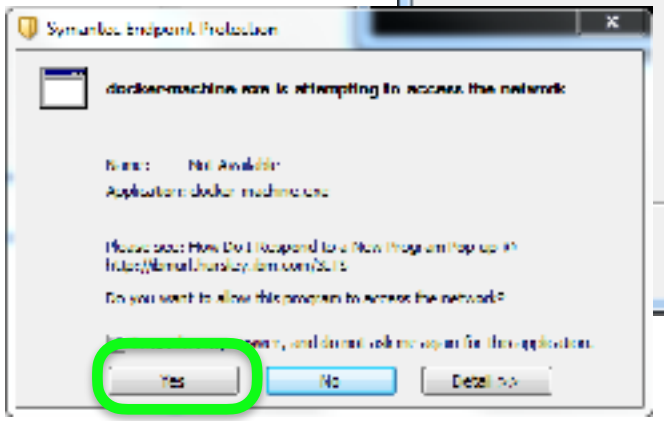
- After following the "Before You Install" instructions,
  - Go to your Downloads folder and run the Docker



  - Do **NOT** select the VirtualBox option!
  - Leave the other options selected



  - Allow Docker to access the network



Windows: Test your Docker installation

- docker completes the installation by loading a docker command line window

- It should look like the upper part of the image to the right
- type in docker run hello-world and press enter
  - You should see the results shown in the lower part of the image to the right
- change to your ZeroToBlockchain folder
  - cd Documents/GitHub/ZeroToBlockchain
- Execute the following command
  - ./setup_Windows.sh
- This will download and initialize your Hyperledger Fabric docker images