## Lab 19: Explore YANG Models

### Case Study

ANGIE, a global leader in low-carbon energy and services, sought to modernize the procedures of its IT department. The company aimed to introduce new features and deliver greater value to its customers as quickly as possible, without disrupting ongoing services. As networks became more dynamic, software-defined, and service-oriented, traditional methods of device configuration and management, often reliant on proprietary interfaces and manual CLI commands, proved to be inefficient and unscalable. The IT team was still using outdated, legacy methods to configure network devices within the data centers.

To address this challenge, the company decided to implement automation within its IT operations. Following the adoption of automation, ANGIE experienced rapid progress, successfully accelerating the delivery of new features and enhancing customer value. The initiative also improved customer engagement and significantly reduced the operational burden associated with manual tasks in the IT department.

### Business Challenge

ANGIE’s IT department sought a vendor-neutral approach to automate network device management. As the data center comprises a wide range of devices from multiple vendors, the solution is needed to support heterogeneous environments. The objective was to enable Infrastructure as Code (IaC) practices while also supporting rollback and transactional configuration features.

To accomplish this task, the IT administrator assigned you an experienced and Certified DevNet Associate the responsibility of exploring a model that meets all these requirements.

### Solution

You have examined numerous models, but only one satisfies all requirements: the YANG model. YANG models define the precise structure, data formats, syntax, and validation criteria for messages exchanged between a managed device and its communicating systems. Handling YANG files can be daunting due to their extensive level of detail.

In this lab, you will learn how to use the free, open-source pyang tool to transform YANG data models into a more readable format. The tree-view transformation will enable you to identify the essential components of the ietf-interfaces YANG model.

1. Explore a YANG Model on GitHub.
2. Explore a YANG Model Using pyang.

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| **// Explore a YANG Model on GitHub**  1. Open any web browser and navigate to the following link: **https://github.com/YangModels/yang**.    2. Under the **master** branch, navigate to the YANG models for the Cisco IOS XE version 16.9.3 by click on the following directories: **vendor > cisco > xe > 1693**.    3. Scroll down below all of the Cisco YANG models to see where the IETF models start. Search for **ietf-interfaces.yang**. Click on the **ietf-interfaces.yang** to open it**.**    4. Scroll through all of the container, leaf, and list nodes. If you are acquainted with the output of the IOS command display interfaces, you should recognize some or all of the nodes. For example, at line **221**, you will notice the leaf is enabled.    5. Open **Visual Studio Code**. Click on the **File.** Then click on the **Open Folder…**    6.Click on the **devnet-src** directory. Then click on the **OK** button to open it.    7. Open the **Terminal** in Visual Studio Code by dragging it up and execute the following command: **mkdir pyang** to create a directory.    8. Return to your web browser tab where the **ietf-interfaces.yang** model is still open. Scroll back to the top, if necessary, and click **Raw** to display just the YANG model data.    9. Select the URL and then copy it.    10. Go back to the **Terminal** window. Execute the **cd pyang** command to go inside the directory. Then execute the **wget** command to save the raw **ietf-interfaces.yang** file. You now have a local version of the ietf-interfaces.yang model that you can alter using Pyang. |

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| **// Explore a YANG Model Using pyang**  1. Execute the **pyang -v** command to verify that pyang is already installed. Your version number may differ from the one listed below. You can also use the following command: **pip3 install pyang --upgrade** to update the pyang package.    2. Execute the **pyang -h | more** command to explore the options for transforming the YANG model. Look for the **-f** option as shown below. You will use the tree formatting option.    3. Execute the following command: **pyang -f tree ietf-interfaces.yang** to transform the **ietf-interfaces.yang** model into a tree format. Notice that the **leaf enabled** is much easier to find and read in this format. |