Network Automation In Baby Steps!

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Who am I?

- NTT DATA - AS2914
  - Positions:
    - Network Operations Center
      - Network Analyst
      - Senior Network Analyst
      - NOC Engineer
    - Network Operations Engineer
- Currently specializing in automation of operational processes
  - Python
  - Ansible

Operational Data Collection Project

- Problem being solved
  - Needed new and interesting operational data
- Python based scripts collecting various operational data from the network
  - Route table counts
  - Router disk space
  - Router config size
  - Customer prefix list config size
  - etc…
- Data sent to large data store via Kafka

Project Changes – Version 1

- Data collection via screen scraping
  - TextFSM
  - Netmiko
  - Confluent Kafka
- UI Access via Pivot
  - Druid database administration via the Druid panel
- Crontab initiation

Project Changes – Version 2

- Data collection switched to Netconf
- Gitlab continuous integration/continuous deployment pipeline to package scripts for deployment
- Scripts deployed to server using Puppet

Project Changes - Version 3

- Asynchronous data collection
  - Async IO Python module
- Split up shared functions into their own files
- Gitlab CI/CD initiation
  - Created custom docker image
  - Created pipeline and runner
  - Pipeline were not the best place for this after all

Skills Gained

- Python Modules
  - Netmiko
  - TextFSM
  - BeautifulSoup
  - Confluent Kafka
  - Asyncio
- Netconf
  - Deployed Netconf
  - Learned Netconf in Python
- Large Data Storage
  - Sending data
  - Druid DB administration
  - Pivot administration

Skills Gained

- GitLab CI/CD
  - Working with repositories
  - Working with pipelines
    - Building Debian packages
    - Pipeline and runner security
    - Still learning!
  - Building Docker images
    - Storing in Gitlab project container registry

Lessons Learned

- **Start Small and Iterate**:
  - The "baby steps" approach shows we can start with simple scripts to solve specific problems.
  - Incrementally we can build our knowledge and solutions, focusing on practical needs rather than over-engineering.
  - This method allows us to build confidence and avoid being overwhelmed by complexity.

Lessons Learned

- **Understand the Core Tools and Their Capabilities**
  - Choose the right tools for the job and invest time in understanding their strengths and limitations.
  - Explore and experiment with tools that suit your network's requirements, and don't hesitate to learn new ones as needs evolve.

Lessons Learned

- **Overcome Initial Challenges with Persistence**
  - Network automation often involves trial and error. Be patient with initial setbacks and view them as learning opportunities.
  - Allocate time for experimentation and iteration when adopting new tools or methods.

Lessons Learned

- **Prioritize Structured Data and Avoid Scraping Where Possible** :
  - Transitioning from CLI scraping to structured data formats like Netconf can save time and reduce errors.
  - Evaluate your network equipment's capabilities and implement modern APIs or protocols for data collection.

Lessons Learned

- **Learn from Failures and Adjust:**
  - Not every experiment will succeed. Be prepared to pivot or return to previous methods when necessary.
  - Treat setbacks as learning experiences and refine your approach based on results.

Lessons Learned

- **Expand Knowledge Beyond Programming**
  - Broaden your skills to include data storage, visualization, and deployment tools.
  - Explore the full ecosystem around network automation, from data collection to visualization and deployment.

Lessons Learned

- **Focus on Long-Term Value**:
  - Automation is an investment in operational excellence and network reliability.
  - Identify areas where automation can bring long-term benefits and prioritize them in your projects.

In Closing….

<Insert quote to make me sound smarter here>

Questions?