

14 Network Automation

14.1 Automation Overview

14.2 Data Formats

- HTML, XML, JSON, YAML

14.3 APIs

- Availability
 - Open/Public APIs: publicly available
 - Internal APIs: used within an organization
 - Partner APIs: between company and business partner
- Types of Web Service APIs
 - SOAP
 - REST
 - XML-RPC
 - JSON-RPC

14.4 REST (Representational State Transfer)

- RESTful API
 - Client-Server
 - Stateless
 - Cacheable
- CRUD
 - POST
 - GET
 - PUT/PATCH
 - DELETE
- Web resources
 - URN (Uniform Resource Name)
 - * eindeutig in Zeit + Raum
 - * laut Cisco: `www.example.com/author/book.html`
 - URL (Uniform Resource Locator): `https://www.example.com/author/book.html`
 - * Wo befindet sich Resource?
 - * laut Cisco: `https://www.example.com/author/book.html`
 - Fragment: `#page155`
 - URI (Uniform Resource Identifier):
 - * Überbegriff, URL und URN sind URIs, nicht eindeutig
 - * laut Cisco: `https://www.example.com/author/book.html#page155`
- API Request
 - API Server: `https://www.mapquestapi.com/`

- Resources: directions/v2/route
- Query: ?outFormat=JSON&key=KEY&from=San+Jose,Ca&to=Monterey,Ca
- Format: outFormat=JSON
- Key: key=KEY
- Parameters: from=San+Jose,Ca&to=Monterey,Ca
- RESTful API Applications
 - Developer Website
 - Postman
 - Python
 - Network Operation Systems (z.B. NETCONF)

14.5 Configuration Management

- Traditional: CLI, SNMP
- Network Automation: tool performs task on a device, e.g configuring an interface
- Orchestration: arranging of the automated tasks
- Configuration Management Tools

Tool	Programmiersprache	Agent (pull) / -less (push)	Controller	set of instructions
Ansible	Python, YAML	Agentless	any device	Playbook
Chef	Ruby	Agent-based	Chef Master	Cookbook
Puppet	Ruby	both	Puppet Master	Manifest
SaltStack	Python	both	Salt Master	Pillar

- Network Operation Systems (z.B. NETCONF)

14.6 IBN and Cisco DNA Center

- IBN (Intent-Based Networking): software-centric and fully automated
 - Assurance: Monitoring, Überwachung der Infrastruktur
 - Translation: Ist-Zustand und business-Intent in Soll-Zustand (Policies) übersetzen
 - Activation: Übertragung der Policies auf die Infrastruktur (Orchestration)
 - fabric: Network Infrastructure
 - * overlay: logical topology
 - * underlay network: physical topology
- Cisco DNA: Cisco Digital Network Architecture
 - Continuous Implementation of Business Intent
 - **DNA Center**: controller and analytics platform \leftrightarrow Intent-based Network Infrastructure
 - **SD-Access**: single network fabric across LAN and WLAN
 - **SD-WAN**: cloud-delivered architecture to centrally manage WAN connections
 - **Cisco DNA Assurance**: advanced analytics and machine learning
 - **Cisco DNA Security**
 - Videos
 - * 14.6.6: DNA Center Overview and Platform APIs (4:20)
 - * 14.6.7: DNA Center Design and Provision (3:00)
 - * 14.6.8: DNA Center Policy and Assurance (3:03)
 - * 14.6.9: DNA Center Troubleshooting User Connectivity (7:02)