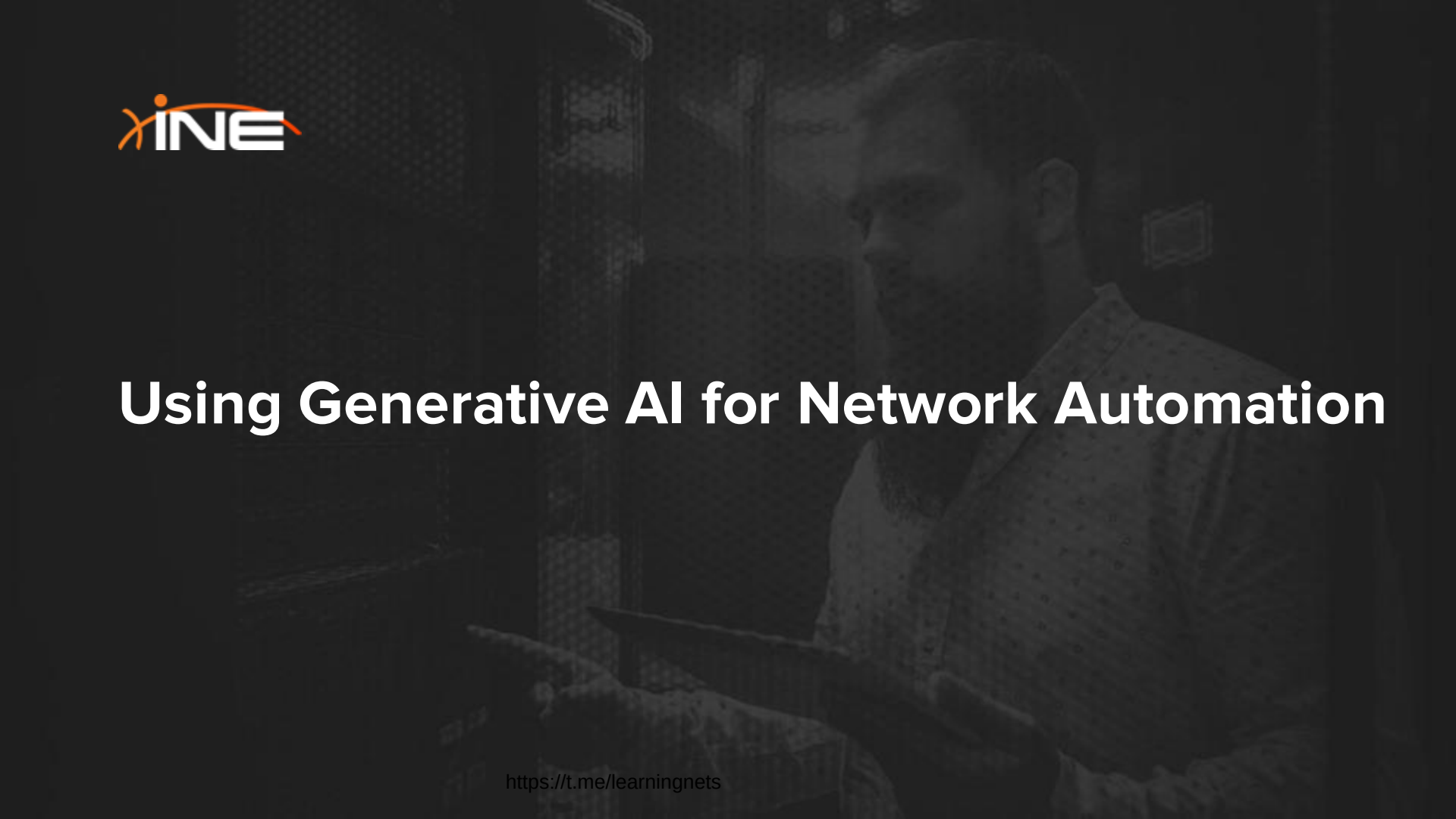

Using Generative AI for Network Automation

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CCIE Routing & Switching
CCIE Security
CCIE Voice
CCIE Service Provider
CCIE Collaboration

What will you learn?

- What is Generative AI
- How to use Generative AI in Network Automation
- Different Generative AI model or tools

Introduction to Network Automation

What is Network Automation?

- **Network automation** refers to the process of automating the configuration, management, testing, deployment, and operations of physical and virtual network devices.
- It leverages software to replace manual processes traditionally performed by network engineers.
- In essence, instead of manually logging into routers, switches, and firewalls to make changes, automation allows these tasks to be scripted and executed consistently across devices.

🔍 Why Network Automation?

- **Scalability:** Manual configuration is slow and error-prone, especially in large-scale networks. Automation enables bulk provisioning across thousands of devices simultaneously.
- **Speed and Efficiency:** Tasks that take hours or days manually can be completed in minutes, freeing up time for higher-value work.
- **Consistency and Reliability:** Scripts and playbooks ensure uniform configuration, reducing misconfigurations and operational downtime.
- **Cost Reduction:** Fewer manual tasks mean reduced labor costs, lower risk of human error, and more efficient use of resources.
- **Faster Troubleshooting and Recovery:** Automated diagnostics and self-healing mechanisms accelerate problem resolution and boost uptime.

Key Components of Network Automation

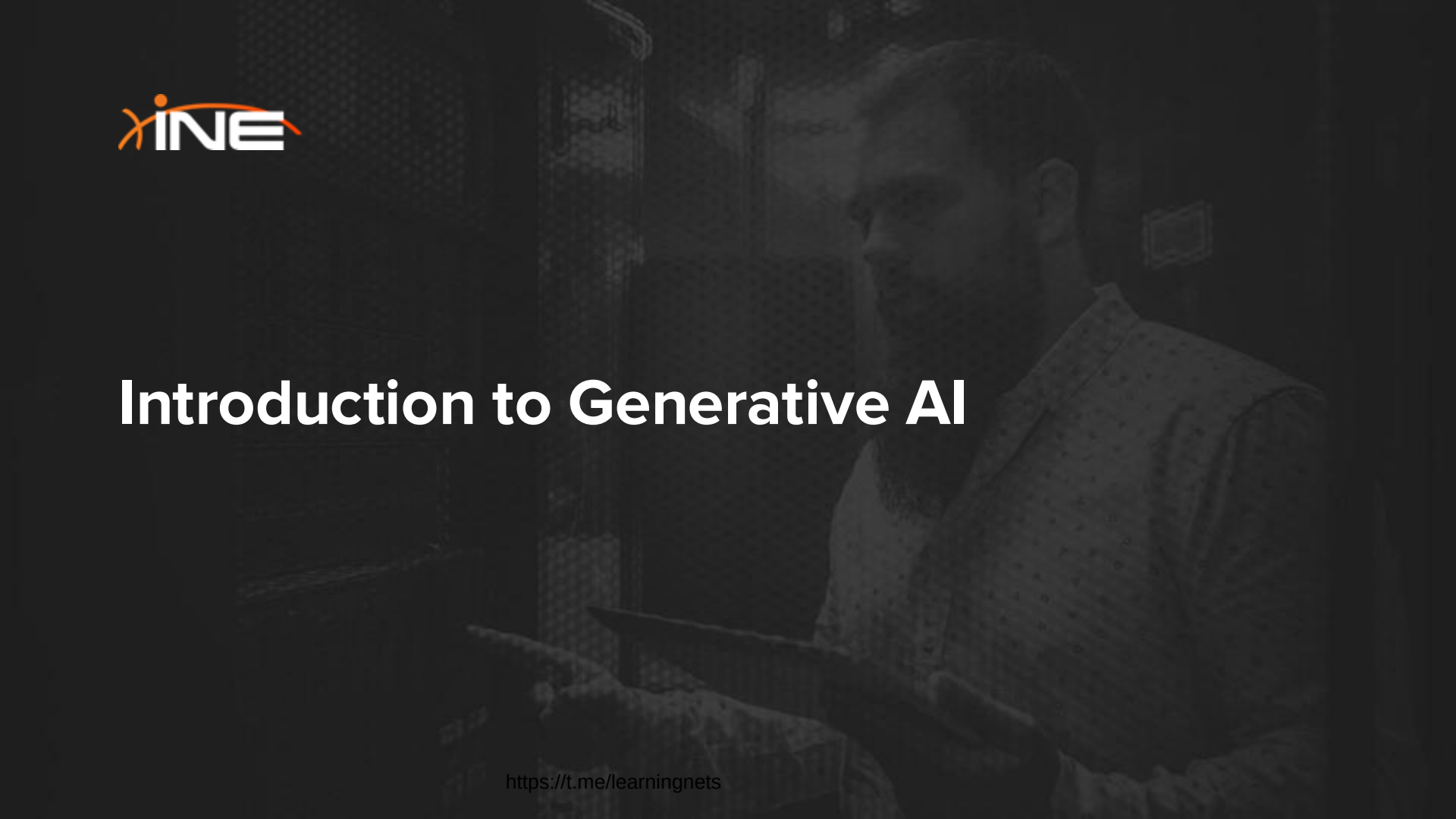
- **Configuration Management:** Automating the deployment of network device settings across the infrastructure.
- **Monitoring and Telemetry:** Real-time data collection and analysis help in proactive management and alerting.
- **Policy Enforcement:** Automation ensures network policies (e.g., security, compliance) are consistently applied.
- **Change Management:** Automated tools handle version control, rollback, and auditing of network changes.

Common Tools and Technologies

- **Automation Platforms:** Ansible, Puppet, Chef, SaltStack
- **Programming Languages:** Python, YAML, Bash
- **Controllers/SDN:** Cisco DNA Center, Juniper Contrail, OpenDaylight
- **Network APIs:** NETCONF, RESTCONF, gNMI, SNMP
- **Orchestration Tools:** Terraform, Nornir, StackStorm

Popular Use Cases

- Bulk configuration of VLANs or routing protocols
- Backup and restore of device configurations
- Software/firmware upgrades
- Real-time compliance auditing
- Network provisioning for cloud workloads
- Zero-touch provisioning (ZTP) of new devices



Introduction to Generative AI

What is Generative AI?

- **Key Characteristics:**
  - Generative AI refers to models that can create new content — text, code, images, etc. — based on training data.
  - Popular Models: GPT (OpenAI), Claude (Anthropic), LLaMA (Meta), Gemini (Google), Mistral, etc.
  - GenAI: Focuses on content generation (config, documentation, code, etc.)
- **Examples for Networking:**
  - Generate router configs from intent
  - Create Ansible playbooks from natural language
  - Auto-generate troubleshooting steps

Traditional AI vs Generative AI

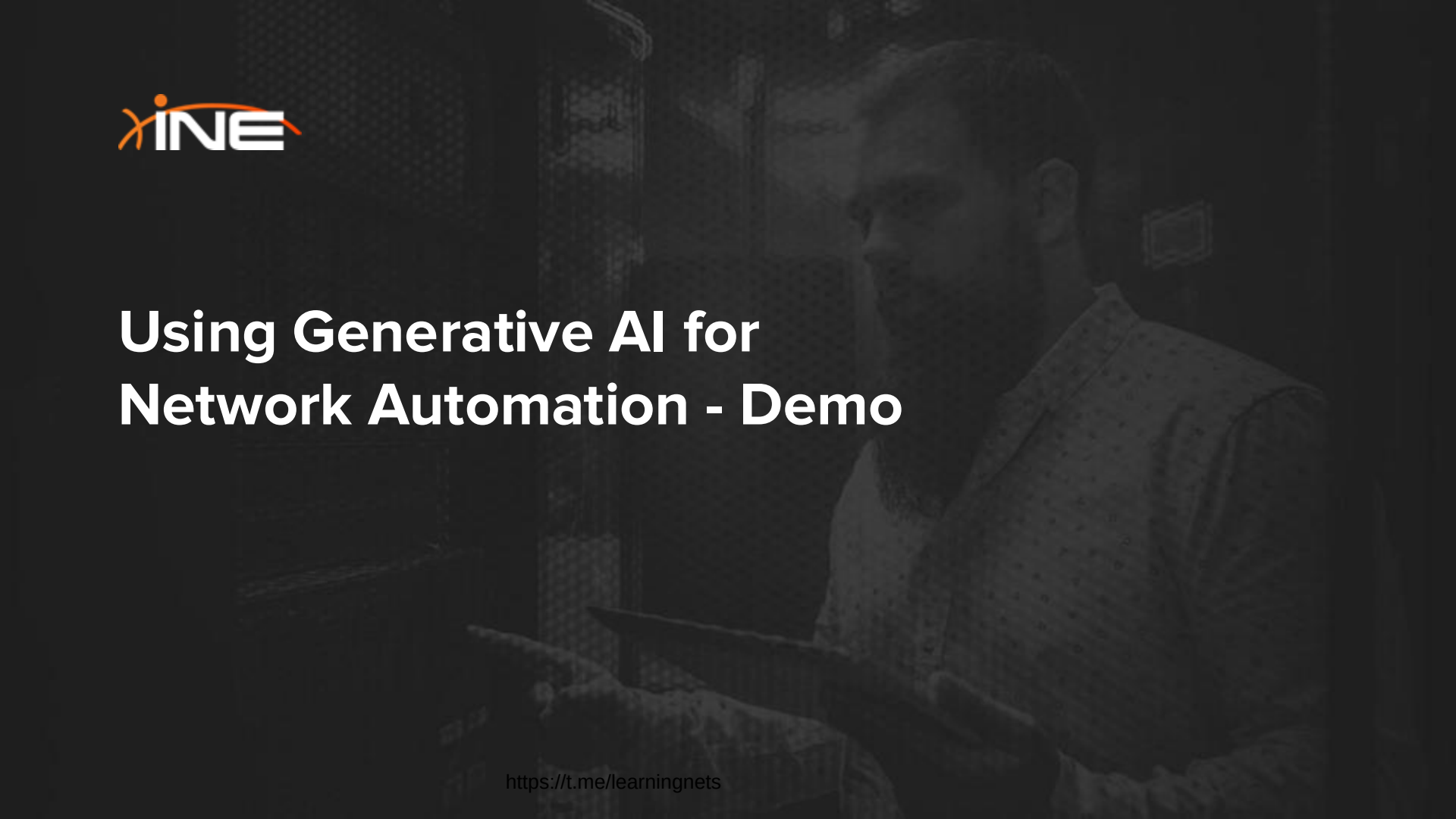
- **Traditional AI:**
  - Detect anomaly
  - Classify traffic
  - Optimize routes
- **Generative AI:**
  - Write remediation script
  - Generate firewall rules
  - Generate intent-based config

Use Cases of GenAI in IT & Networking

- **Configuration:** Generate CLI/JSON/YAML configs from user input
- **Scripting:** Generate Python or Ansible playbooks
- **Documentation:** Auto-create topology diagrams, changelogs
- **Security:** Explain firewall policies, suggest improvements
- **NOC Support:** ChatOps with AI agents on Slack/Team
- **Troubleshooting:** NLP-based symptom analysis and solution generation

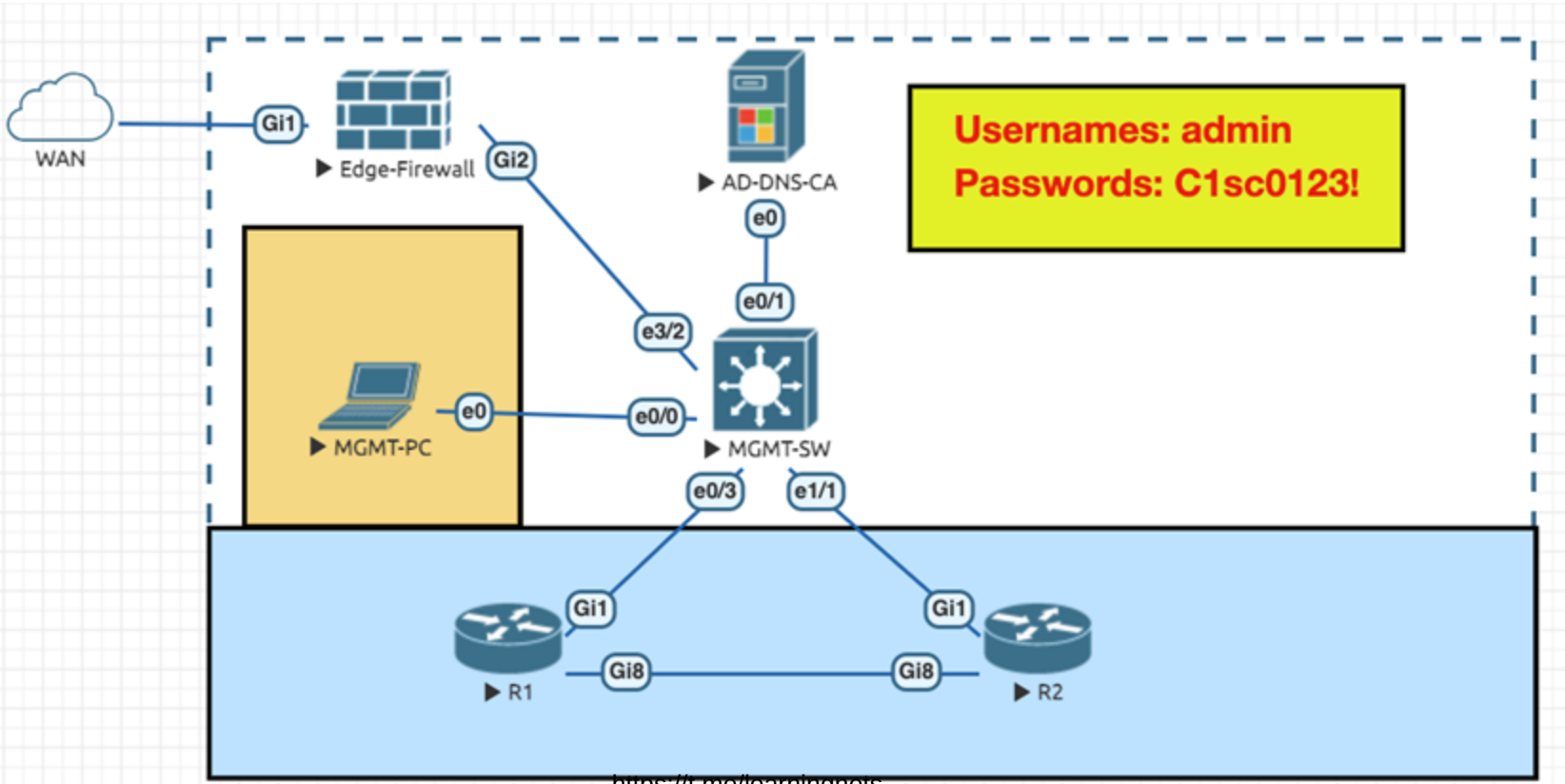
Benefits & Limitations of AI-Driven Network Automation

- **Benefits:**
  - Speed: Rapid generation of configs and scripts
  - Scalability: Handle multiple device types/formats easily
  - Accessibility: Lowers barrier to entry (e.g., junior admins)
  - Contextual Intelligence: LLMs can understand topologies, intents
- **Limitations and Challenges:**
  - Accuracy: Hallucinations in config or command output
  - Security: Prompt injection, leaking sensitive config
  - Explainability: Hard to verify model's reasoning
  - Integration: Needs APIs to actually apply changes



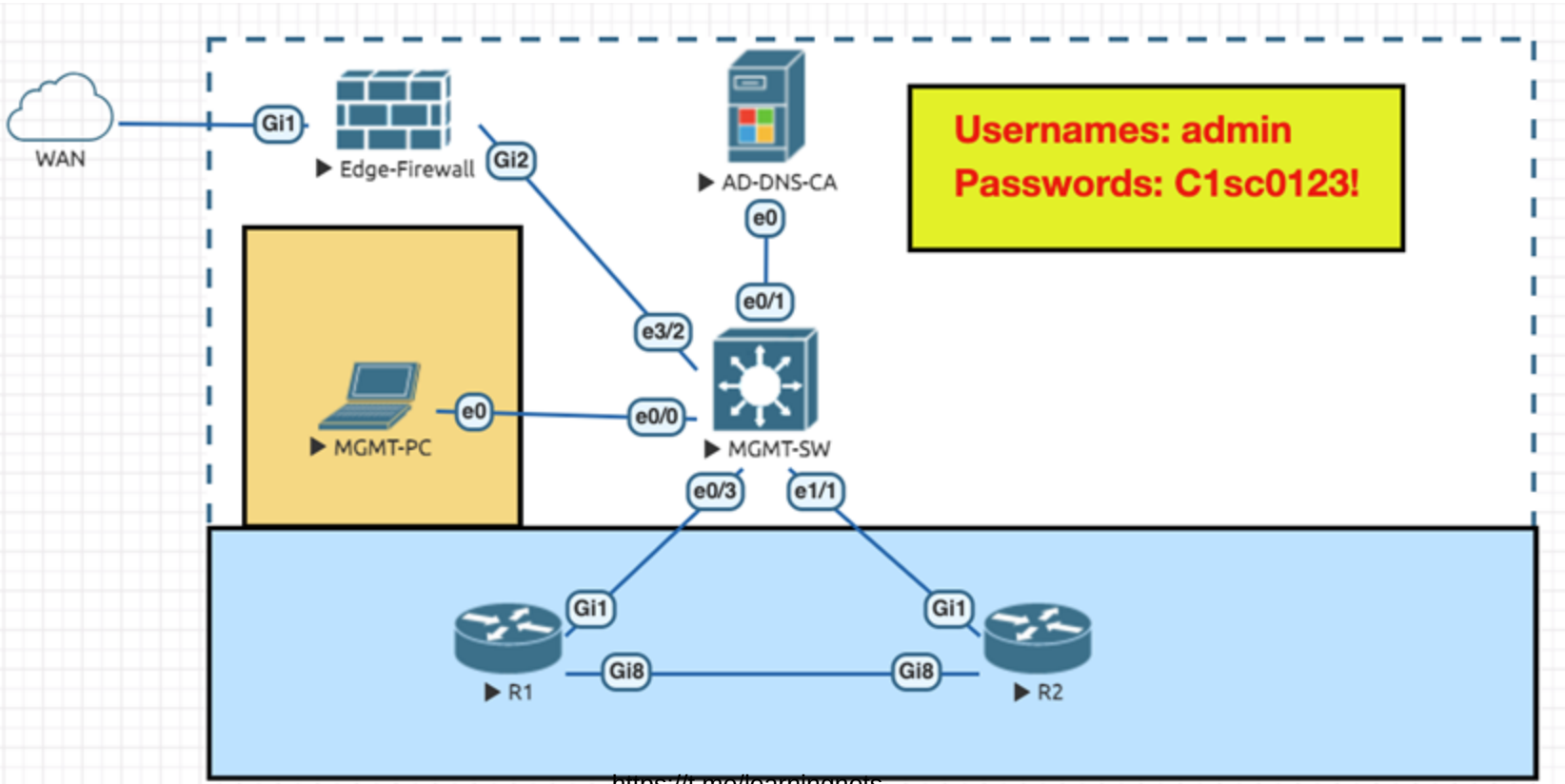
Using Generative AI for Network Automation - Demo

What is Network Automation?



Using Generative AI for Network Automation - Demo 2

What is Network Automation?



Using Generative AI for Network Automation - Summary

EXPERTS AT MAKING YOU AN EXPERT