CISCO Connect LatAm

AI Meets NetDevOps

MCP-Powered Automation for Modern Networks

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Agenda

01 Introduction

02 NetDevOps as we know it

03 How AI Fits Into NetDevOps

04 What is MCP?

05 Why it Matters?

06 Use Case & Demo

07 Resources & Q&A

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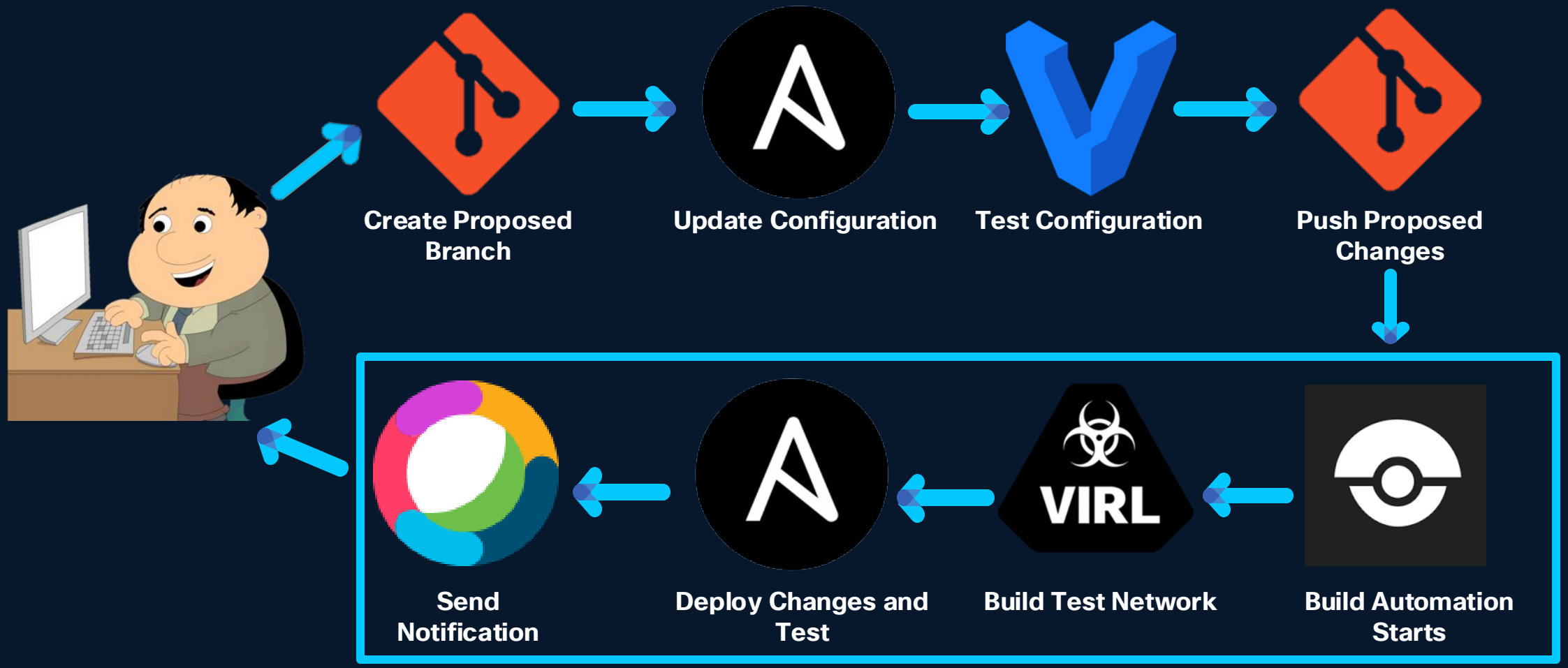
Introduction

From NetDevOps to NetAIOps

Circa 2017



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From NetDevOps to NetAIOps

CLI-only Era

Automation

AI Networking

Networks are changing—and so are how we deploy them

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AI Powered NetDevOps

Today

AI

MCP

Data Sources

Create Proposed Branch

Push Changes

Update Configuration

Deploy Changes and Test

Build Test Network

Send Notification

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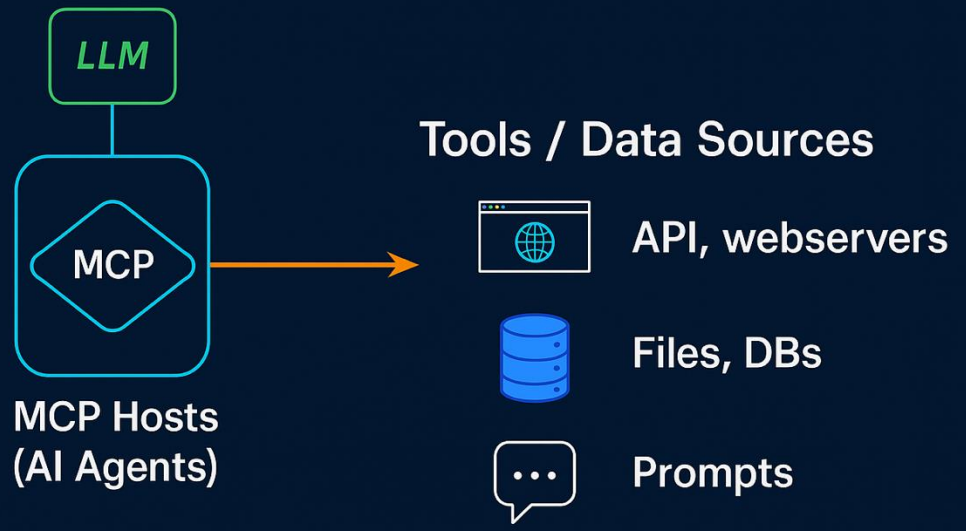
What is MCP?

MCP – The USB-C for AI Agents

- **Model Context Protocol (MCP):**
  - Open standard developed by Anthropic
  - Connects AI Agents with external data & tools
  - Defines a simple **Host–Protocol–Server architecture**
  - Exposes **primitives**: Tools (actions), Resources (data), Prompts (templates)



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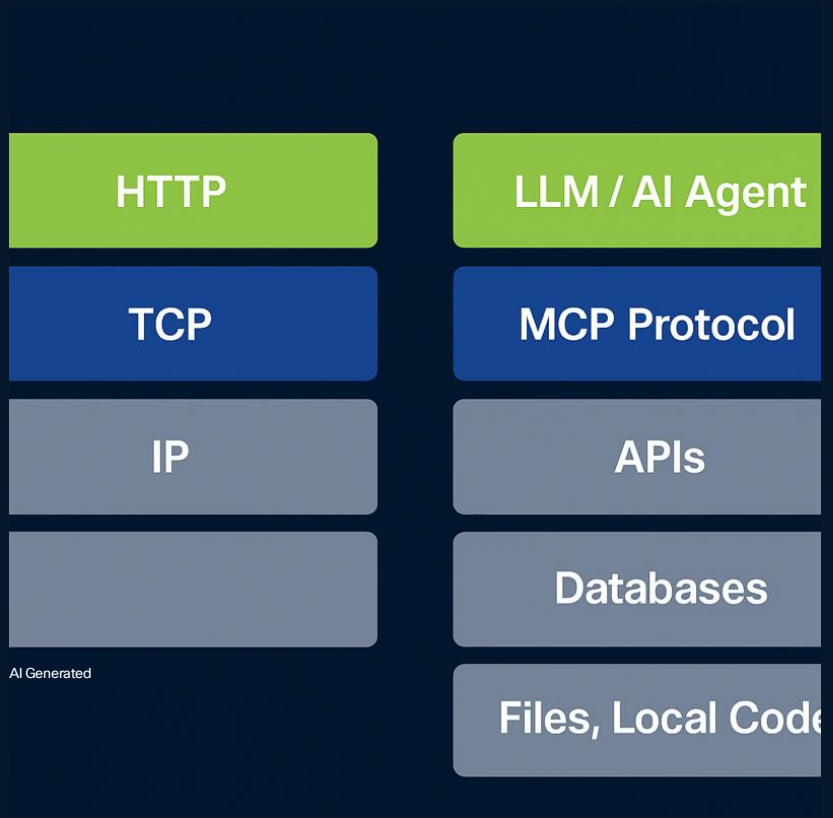
❌ *MCP is not an AI Agent!*
❌ *MCP is not an AI Assistant!*
❌ *MCP is not an LLM!*

✅ *MCP is a Protocol!*
✅ *Just like TCP!*
✅ *Just like UDP!*



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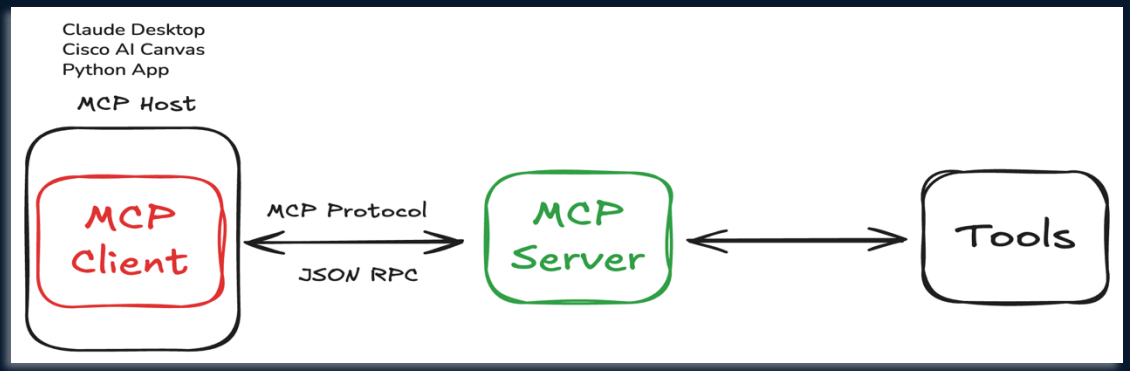
MCP Architecture - Overview

MCP Client

- **Lives inside the MCP Host** (AI app, IDE, or agent platform)
- **Speaks the MCP protocol** to connect with one or more MCP Servers
- **Sends requests / receives responses** between the agent and servers
- **Keeps the agent simple** – it doesn't need custom adapters for every service

MCP Server

- **Acts as the bridge** between AI Agents and real-world services/tools
- **Exposes capabilities** (tools, resources, prompts) in JSON
- **Executes requests** from the MCP Client
- **Hides complexity** provides a uniform MCP interface
- **Maintained by the service/tool provider**



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MCP Architecture - Layers

Data Layer

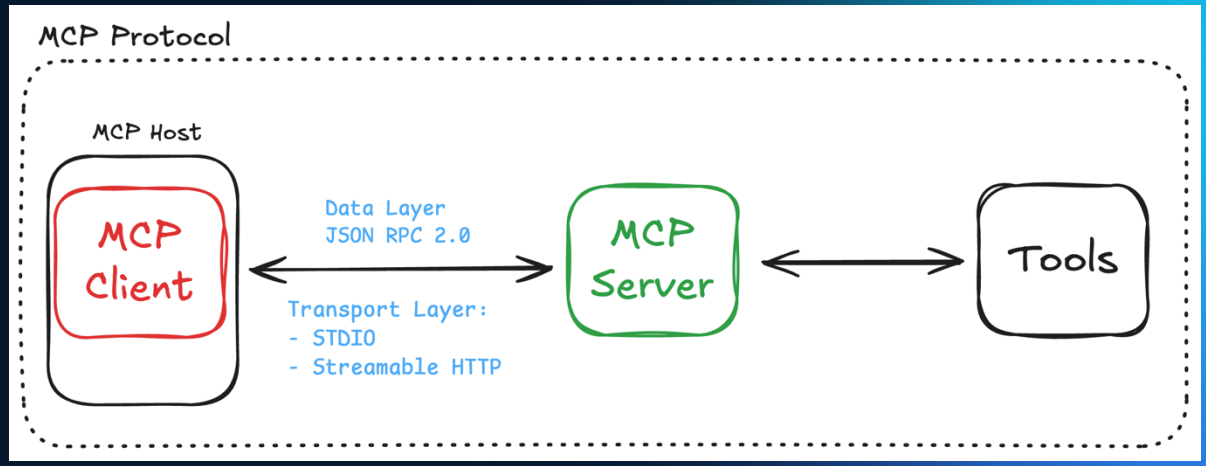
JSON-RPC 2.0 message protocol and semantics

Handles lifecycle (init, capability negotiation, termination)

Core primitives: **tools**, **resources**, **prompts**

Transport Layer

- Manages connection setup, framing, auth between client & server.
- Supported transports:
  - **STDIO** (local, no network)
  - **Streamable HTTP** (remote, SSE for streaming, standard HTTP auth/OAuth)



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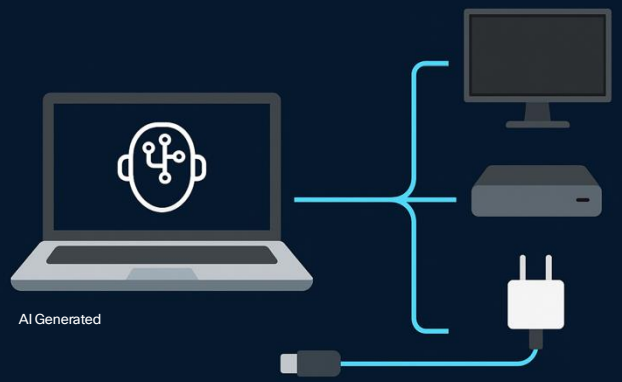
So like … What do I do now?

Get Started with MCP

1. Download a Client – Claude Desktop, Cursor IDE (don't build it)
2. Understand MCP Architecture (we just covered it)
3. Browse existing MCP servers to contextualize your world – https://github.com/punkpeye/awesome-mcp-servers/
4. Build your first MCP server – FastMCP https://gofastmcp.com/getting-started/welcome



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Why it Matters?

MCP - Use Case

Configuration and change-management failures now cause nearly **45% of all network-related outages** – making configuration drift a top threat to uptime and resilience

To Mitigate - We proposed for you to talk to your customers to:

Adopt NetDevOPS

1. Automate your deployment
2. Use Single Source of Truth (document your network and not xls)
3. Add Observability

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MCP - Use Case

So let's say your customer is..

- Managing a 10K+ devices Multi-Site **Meraki Network**
- Maintain **a single source of truth** for the network using NetBox
- Automate config changes and prevent configuration drift using **Webhooks + Python Code**
- Audit log of changes in a Splunk

Source of Truth

Network Controller

Middleware

Observability

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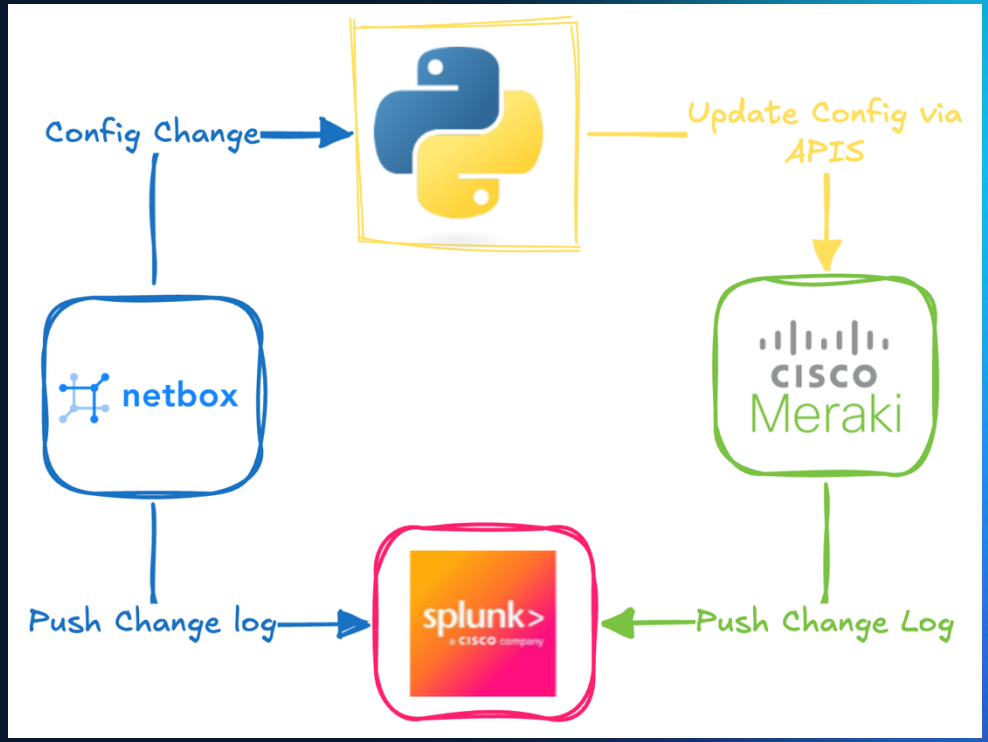
Use Case – Simplified Architecture

In a perfect world ...

- All config changes start in NetBox
- NetBox fires off a Webhook
- Middleware updates config
- Meraki pushes change log
- Splunk stores logs



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Enters Quinn - we all *know* a Quinn

Quinn does not play by the rules

- Logs into Meraki Dashboard
- Changes config
- Saves
- Leaves
- ....
- BGP Down!!!!

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MCP – Why it Matters?

If we look at our use case – a couple of things to pay attention to

1. In Building the automation pipeline we have to build and manage the CRUD
   - Pull a list of Organization
   - Figure out network to updates
   - Pull list of devices
   - Match the serial number of device
   - Apply config changes
2. After the “Quinn Incident” we must investigate what happened
   - Log into Splunk
   - Query logs > traverse log data from Meraki
   - Check Network Documentation to figure out what values to reinstate

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Let AI Just Do It!

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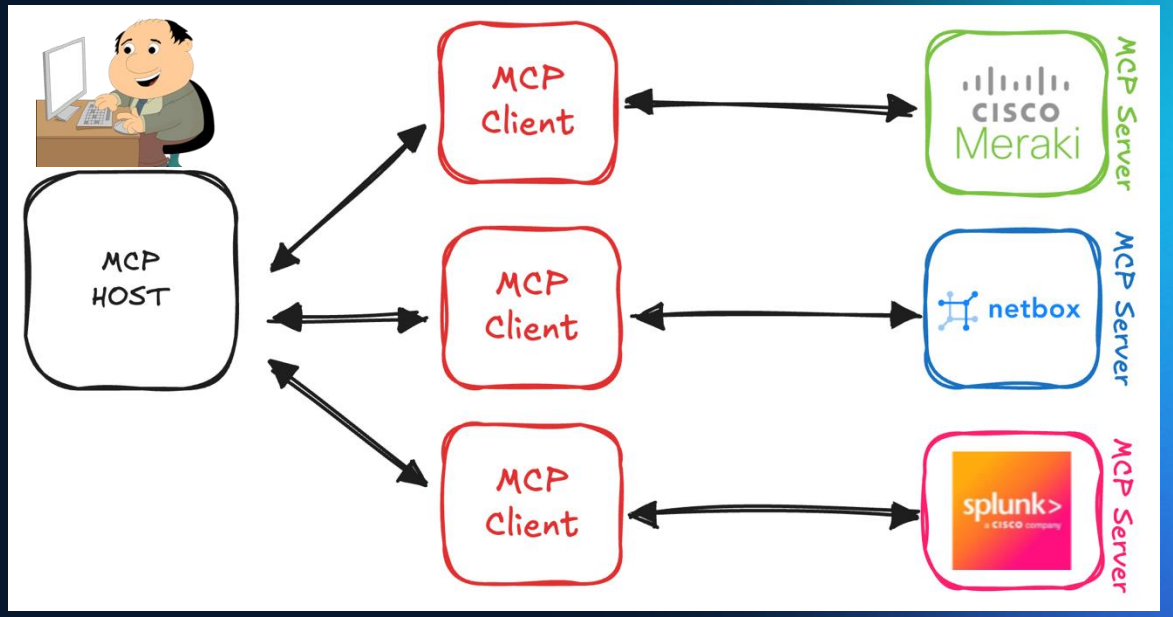
MCP – Why it Matters?

Let the AI Agent Heal the Network

3 MCP Servers – 1 MCP Host

- Expose API Endpoints as MCP Tools
- Let the AI Agent figure out the CRUD
- Let the AI Agent cross examine Config Drift
- Let the AI Agent revert the changes
-
-
- Profit



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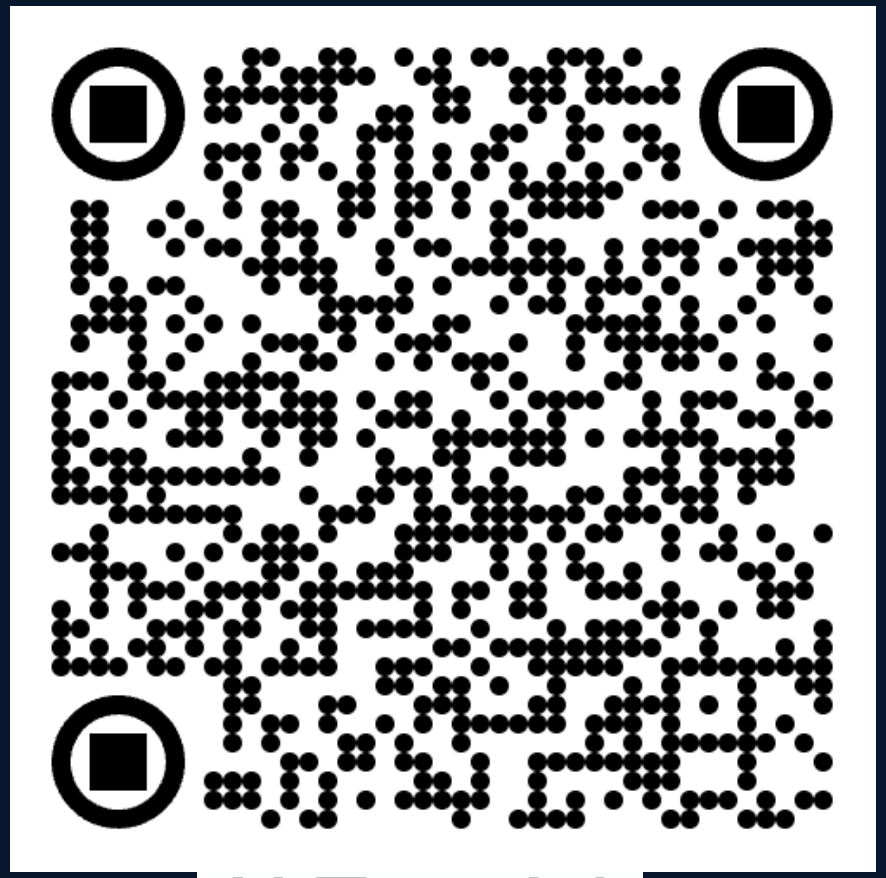
Demo Time!

Resources

Get Started with AI on Cisco U.



AI Tutorials

Tutorials

- Understanding AI and LLMs as a Network Engineer
- Hands-On ChatGPT: Cisco pyATS and Genie
- Hands-On ChatGPT: Generating Documentation from Technical Sources
- Hands-On ChatGPT: A Practical Guide to Networking Prompt Templating
- Hands-On ChatGPT: Exploring the ChatGPT APIs
- Hands-On ChatGPT: Leveling Up Your Network Engineering GPT Prompts
- Hands-On ChatGPT: A Coding Guide for Network Engineers Uncomfortable with Python
- Hands-On ChatGPT: Building Infrastructure as Code
- Run Your Own LLM Locally For Free and with Ease
- Introduction to AI Vulnerabilities

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