Local vs. Remote MCPs - Stdio vs. Streamable HTTP

Overview

In this lesson, we explored the differences between **local** and **remote** MCP protocols, focusing on how MCP clients connect to MCP servers using either the `STDIO` or `HTTP` protocols. Here's a breakdown of what we covered:

Local MCPs

- **Protocol**: `STDIO` is used when the MCP server resides on the **same machine** as the client.
- **Setup**:
  - The MCP client uses a configuration script to automatically download, install, and run the MCP server locally.
  - The server runs as a subprocess, meaning each client-server pair operates independently on the same machine.
- **Benefits**:
  - Ideal for tools that require local operations, such as file manipulation or local process automation.
  - Simplifies concerns about **security** and **authentication** since everything happens locally.

Remote MCPs

- **Protocol**: `HTTP` is utilized when the MCP server exists on a **virtual machine** separate from clients.
- **Setup**:
  - Clients connect to the server using a `URL`, negating the need for local installation processes.
  - Facilitates connection from online MCP clients and hosts, such as future desktop applications.
- **Benefits**:
  - **Efficiency**: With only one server on the virtual machine, all logic computation happens remotely, saving local resources.
  - **Up-to-Date**: Ensures all users access the latest code without needing individual updates.
  - **Scalability**: Supports multiple clients connecting to a single remote server, which is better for widespread deployments.

Considerations

- **Local MCPs**:
  - Best for development where local interaction is necessary.
  - Simpler to set up and manage for in-house applications.
- **Remote MCPs**:
  - Essential for integrating with online applications and environments.

    - Provides a centralized, updated, and consistent server logic, making it ideal for robust applications needing regular updates.

Future Outlook

- While local MCPs are currently prevalent, the trend is shifting towards **remote MCPs** due to their scalability and ease of maintenance.
- As MCP support grows, the ability to leverage remote MCPs using `HTTP` will enhance connectivity and integration with online services.

In conclusion, choosing between local and remote MCPs depends on your specific needs—whether you require local operations or remote efficiency and scalability.