Consultingwerk
software architecture and development

Implementing **MCP Servers** with OpenEdge

Mike Fechner
Consultingwerk

The full stack modernization framework
SmartComponent Library
by Consultingwerk

Mike Fechner

- 35 years of experience in Progress (from Version 5 to OpenEdge 12)
- Active member of the OpenEdge community and speaker at international conferences
- Expert in software architecture, object-oriented design, and web technologies

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Modernization in Focus

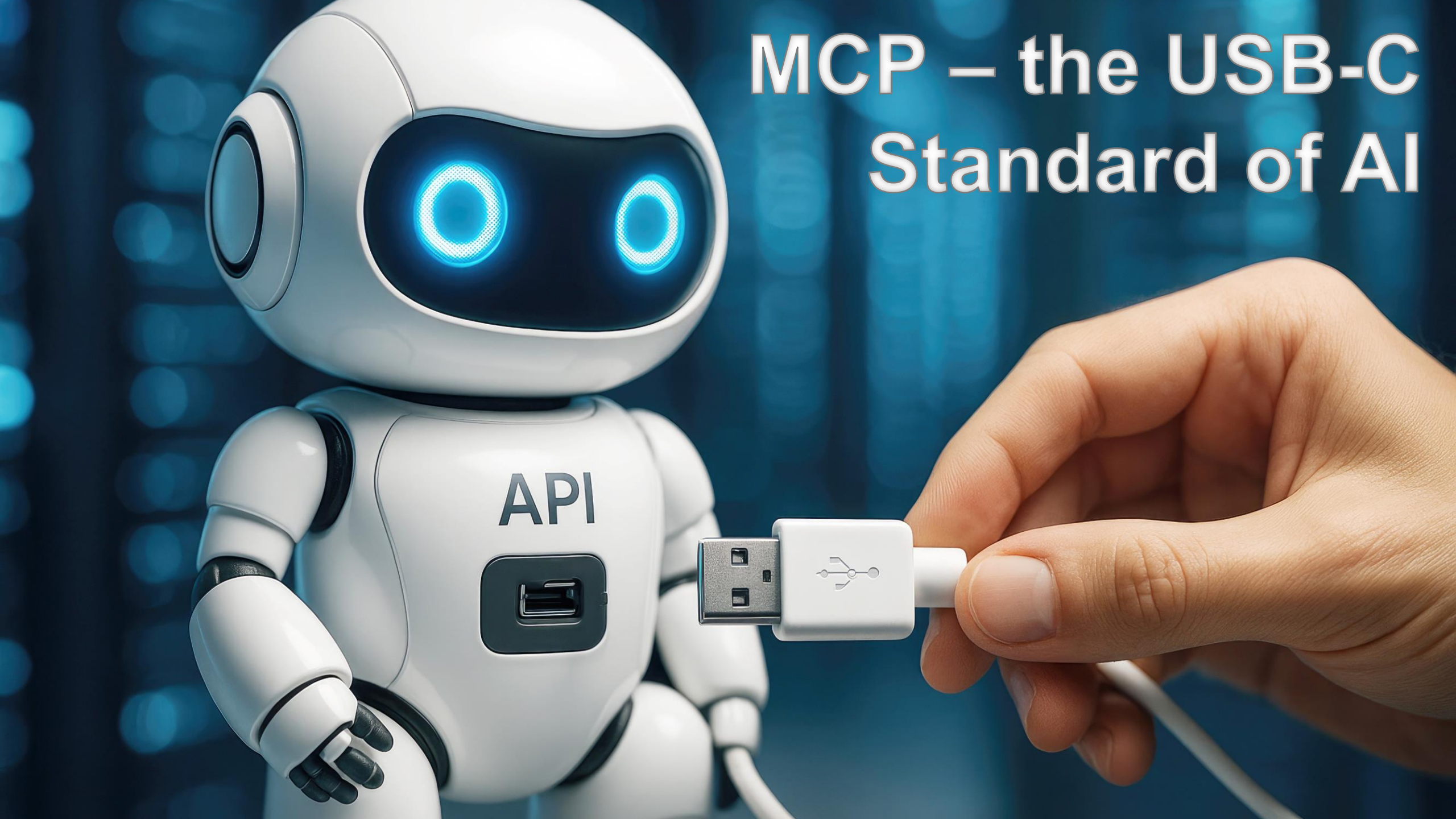
Modernization of Legacy OpenEdge Applications

Deep Technical Expertise

Global IT Partner with Local Presence

More than Consulting – We Deliver Tools & Solutions

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.


MCP – the USB-C Standard of AI
API

OpenAI

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

OpenAI

- California based AI research-company
- Vendor of ChatGPT (initial release November 2022)
- Provider of LLM‘s (e.g. GPT 5)
- Defined basic standard for protocol required to invoke LLM

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

GPT – Generative Pre-Trained Transformer

"A **generative pre-trained transformer** (**GPT**) is a type of large language model (LLM) that is widely used in generative AI chatbots. GPTs are based on a deep learning architecture called the transformer. They are pre-trained on large datasets of unlabeled content, and able to generate novel content." - Wikipedia

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

GPT – Generative Pre-Trained Transformer

“OpenAI was the first to apply generative pre-training (GP) to the transformer architecture, introducing the GPT-1 model in 2018. The company has since released many bigger GPT models. The popular chatbot ChatGPT, released in late 2022 (using GPT-3.5), was followed by many competitor chatbots using their own "GPT" models to generate text, such as Gemini, DeepSeek or Claude.” – Wikipedia

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

GPT – Generative Pre-Trained Transformer

"GPTs are primarily used to generate text, but can be trained to generate other kinds of data. For example, GPT-4o can process and generate text, images and audio. To improve performance on complex tasks, some GPTs, such as OpenAI o3, spend more time analyzing the problem before generating an output and are called reasoning models. In 2025, GPT-5 was released with a router that automatically selects whether to use a faster model or slower reasoning model based on task." - Wikipedia

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

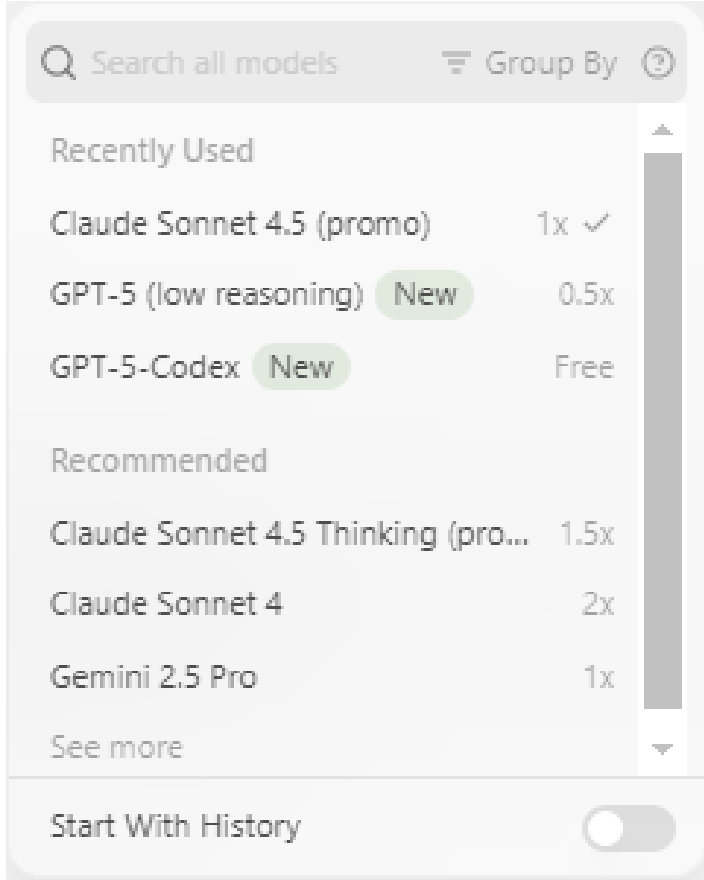
AI Agents and the LLM

- An AI agent is a Program that connects users, tools and the LLM
- LLM receives prompt from agent
  - System prompt “you are a useful developer agent specialized in refactoring existing code”, here are relevant rules …
  - User prompt “write Enum for Weekdays”
- AI agent can provide list of “tools” with prompt
- LLM then analyses the prompt (letter by letter) and returns answer or suggested tools
- AI agent can execute tools and call into LLM again with tool result

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

AI Agents and the LLM

- LLM‘s are stateless services
- LLM accessed via REST protocol
- „Trained“ on data a few weeks or months old
- LLM’s don’t have memory, they don’t remember what they did for you a minute ago
- Agents can add memory, RAG, tools
- LLM API mostly compatible to OpenAI’s GPT API (Chat GPT, 2022+)
- Different LLM’s have different strengths, performance, cost



© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

System Prompt: you are a supportive chatbot supporting users in customer-service….

User Prompt: please lookup the credit limit of Lift Tours

Previous Prompts and Responses

Any other useful context

Tools: Lookup_Customer_Details supports retrieving detailed data about customers by Customer Number or Name

LLM – tools or functions

- LLM may decide that in order to answer request, if returns “callback” into tools function
- Agent then instructed to execute tool function
- After execution of tool the tool output is returned to the LLM with a follow-up request
- Most GPT vendors implemented support for tools in a “similar” way
- Most agents implemented support for tools in a “similar” way
  - Typically interpreting LLM response and programmatically calling into a function (very often in an Agents Python implementation)

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

ANTHROPIC

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Anthropic

- US based AI research company
- Founded by former OpenAI members
- Provider of “Claude” AI Chatbot and Sonnet LLM family (Sonnet 4.5)

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Model Context Protocol

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

MCP – Model Context Protocol

"The **Model Context Protocol** (**MCP**) is an open standard, open-source framework introduced by Anthropic in November 2024 to standardize the way artificial intelligence (AI) systems like large language models (LLMs) integrate and share data with external tools, systems, and data sources. MCP provides a universal interface for reading files, executing functions, and handling contextual prompts. Following its announcement, the protocol was adopted by major AI providers, including OpenAI and Google DeepMind." - Wikipedia

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

MCP – Model Context Protocol

“The protocol was announced by Anthropic in November 2024 as an open standard for connecting AI assistants to data systems such as content repositories, business management tools, and development environments. … Before MCP, developers often had to build custom connectors for each data source or tool, resulting in what Anthropic described as an "N×M" data integration problem.

Earlier stop-gap approaches—such as OpenAI's 2023 "function-calling" API … solved similar problems but required vendor-specific connectors. MCP’s … is transported over JSON-RPC 2.0. MCP formally specifies stdio and HTTP (optionally with SSE) as its standard transport mechanisms.” - Wikipedia

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

MCP vs. RAG

- RAG – Retrieval Augmented Generation
- When using RAG, the Agent determines relevant context before calling into the LLM
  - e.g. determining relevant document parts using an Embedding Model / Text similarity / …
  - Sending Context along with prompt
- MCP: Agent sends tool definitions along with prompt and LLM “decides” to call
- MCP and RAG can be combined

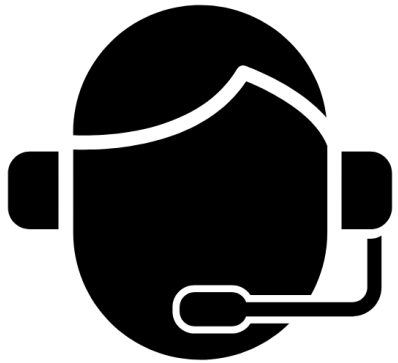
© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

MCP based integration

- **Prompts** are pre-defined templates for the LLM that can be selected by the user through slash commands, menu options, and the like
- **Resources** are structured data, like files, data from a database, or a commit history that provide additional context to the LLM
- **Tools** are functions that allow the model to take action, like interacting with an API or writing something to a file

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

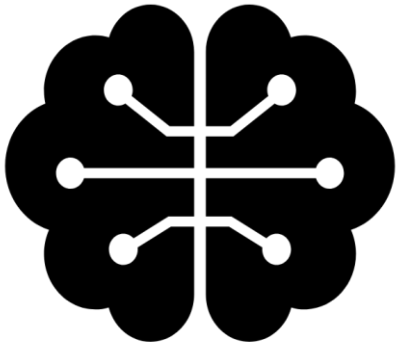
MCP Tool Flow



run get_customer_details.p
(„Lift Tours“)

Progress® OpenEdge®

„Show me the credit limit of customer lift tours, please!“
Available tools: get_customer_details, update_customer, search_customer



Call tool request:
get_customer_details (name: Lift Tours)

„Show me the credit limit of customer lift tours, please!“
Here‘s the reply of the previous get_customer_details tool call:
Custnum: 42, Name: Lift Tours, Country: US Ballance: 20.000, Credit Limit: 12345

„The credit limit of customer Lift Tours is 12.345 US$“

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

MCP Implementation

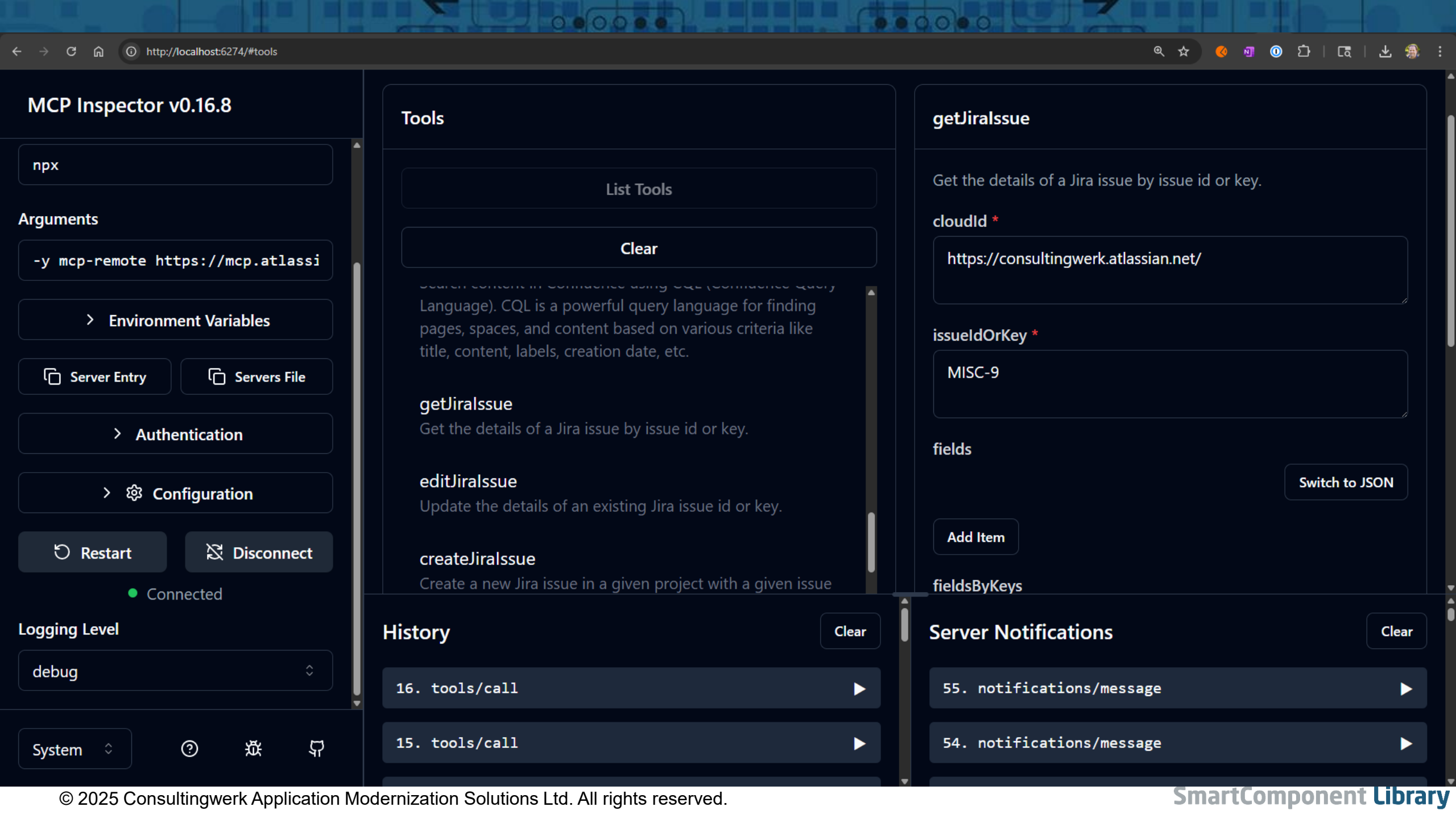
- Client/Server protocol
- “Just another API layer”
- Compared with OpenAPI (Swagger)
- Different protocols: Standard I/O for local servers, HTTP or real-time (Web Sockets)
- Various SDK‘s for developing MCP Servers and MCP Clients
  - Fast MCP – **Python**
  - @modelcontextprotocol/sdk for **Node.js**
  - Microsoft ModelContextProtocol API (**.NET**, C#)
  - **Java**

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

MCP Inspector

- Test Tool for MCP Servers
- “Swagger for MCP”
- Lists tools, resources, prompts provided by MCP Server
- Allows to make requests

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.



© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

MCP Inspector

- https://github.com/modelcontextprotocol/inspector
- npx @modelcontextprotocol/inspector

- **Demo: JIRA MCP Server**
  - Type STDIO
  - Command: npx
  - Arguments: -y mcp-remote https://mcp.atlassian.com/v1/sse

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Implementing an MCP Server using .NET

- Choose your preferred SDK … mine is .NET
- https://learn.microsoft.com/en-us/dotnet/ai/quickstarts/build-mcp-server
- .NET Core, runs on Windows and Linux
- .NET does not require Visual Studio (community edition free for smaller companies)
- “dotnet” CLI tool
- Supports running .NET Applications from source-code

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Implementing an MCP Server with .NET

- Install MCP Server template
  - dotnet new install Microsoft.Extensions.AI.Templates
- Create project
  - dotnet new mcpserver -n mymcpserversample
- Run project
  - dotnet run –project mymcpserversample

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Implementation of MCP Server Tools

- Tools are public methods with input parameters and a string return value
- [McpServerTool] annotation
- [Description] for methods/tools and parameters
- Descriptions exposed to MCP client, support LLM in choosing the right tool

```
public class Sports2000CustomerTools
{
    [McpServerTool]
    [Description("Returns details (Name, Address, City, Country, CreditLimit, Ballance, Salesrep) about custome
    Invoke Windsurf | 0 Verweise
    public string GetCustomerDetails(
        [Description("Customer Number (optional)")] int piCustNum = 0,
        [Description("Customer Name filter (optional)")] string pcName = "")
    {
```

Interacting with OpenEdge

- AppServer (OpenClient on /apsv or /rest or /web)
- _progres –b (batch client sessions)
- AppServer generally the standard Interface for request/response based API, prestarted, preconfigured
- Batch client sessions need to be started on demand, but may provide streaming content

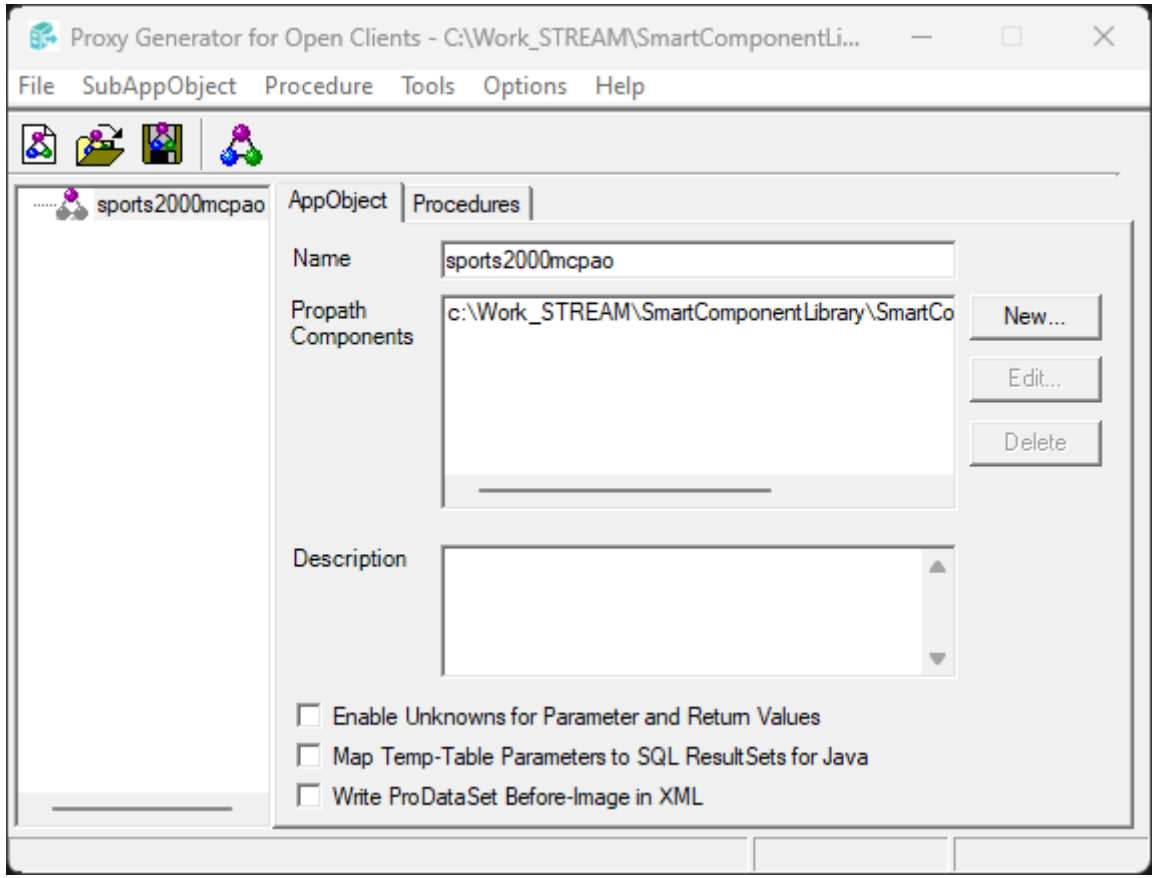
© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

.NET OpenClient Toolkit

- Tool to build .NET Assembly with „knowledge“ for acessing ABL procedures on the AppServer
- Does not translate ABL code into .NET
- Available since OpenEdge 10.0
- .NET Core support since OpenEdge 12.5
- “nice” little Java GUI, command line build tool for build pipelines
- Proxies
- Needs to be regenerated when Interface changes (parameters, additional procedures exposed, new fields in temp-table parameters, …)

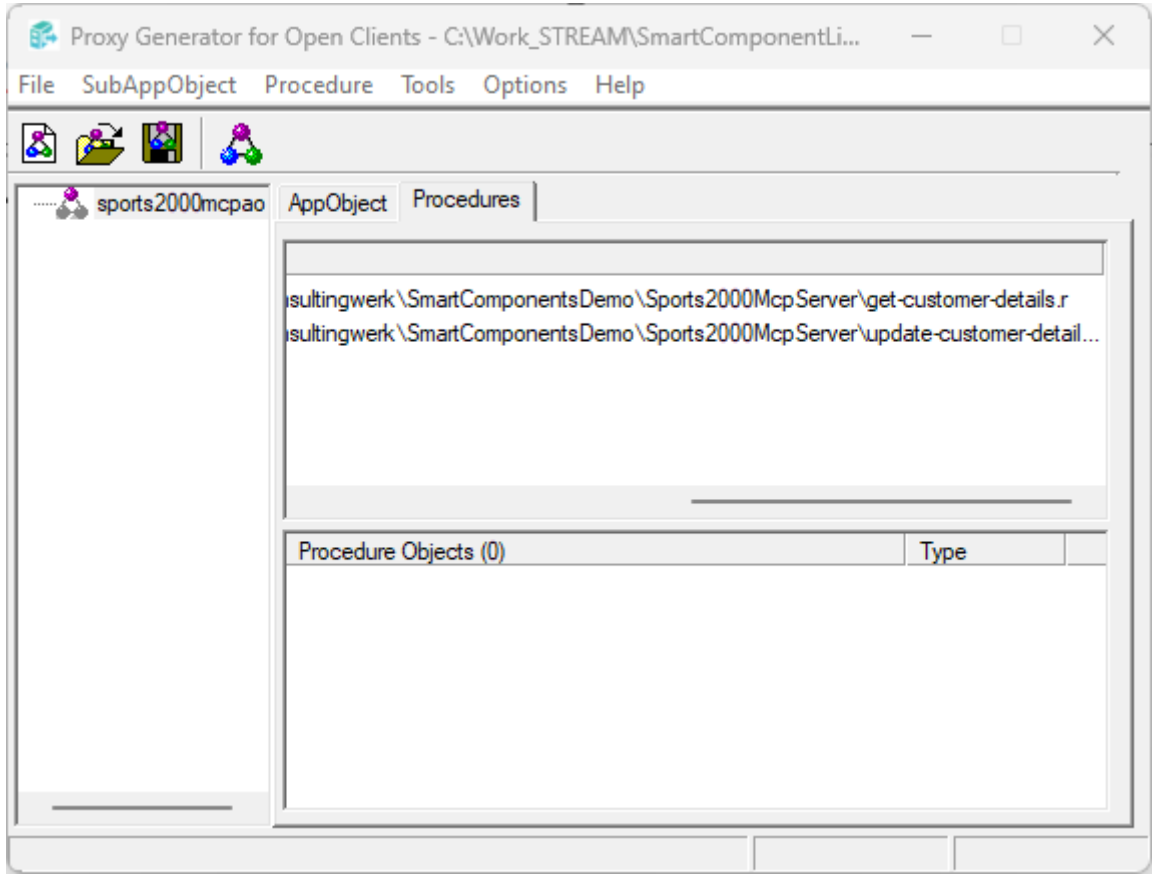
© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

.NET OpenClient Toolkit



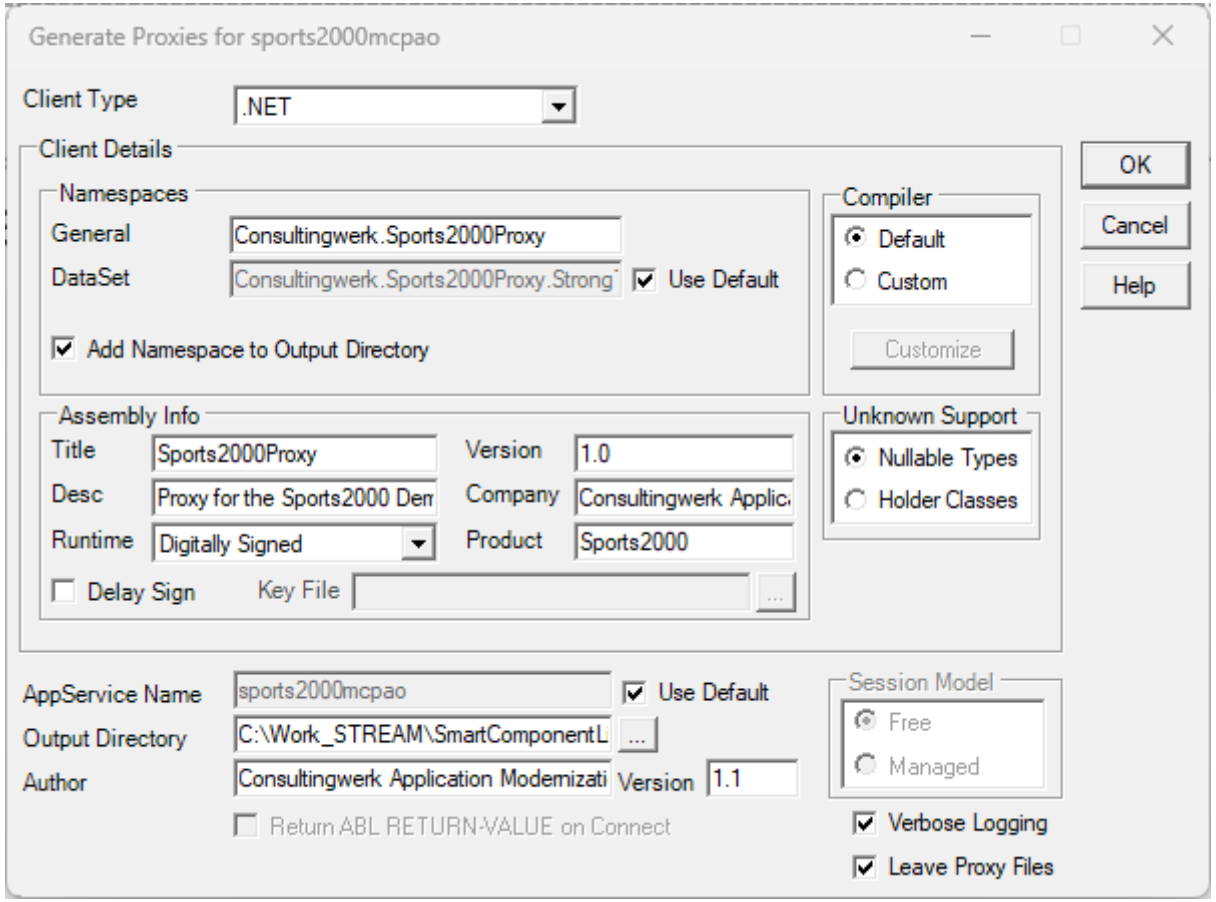
© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

.NET OpenClient Toolkit

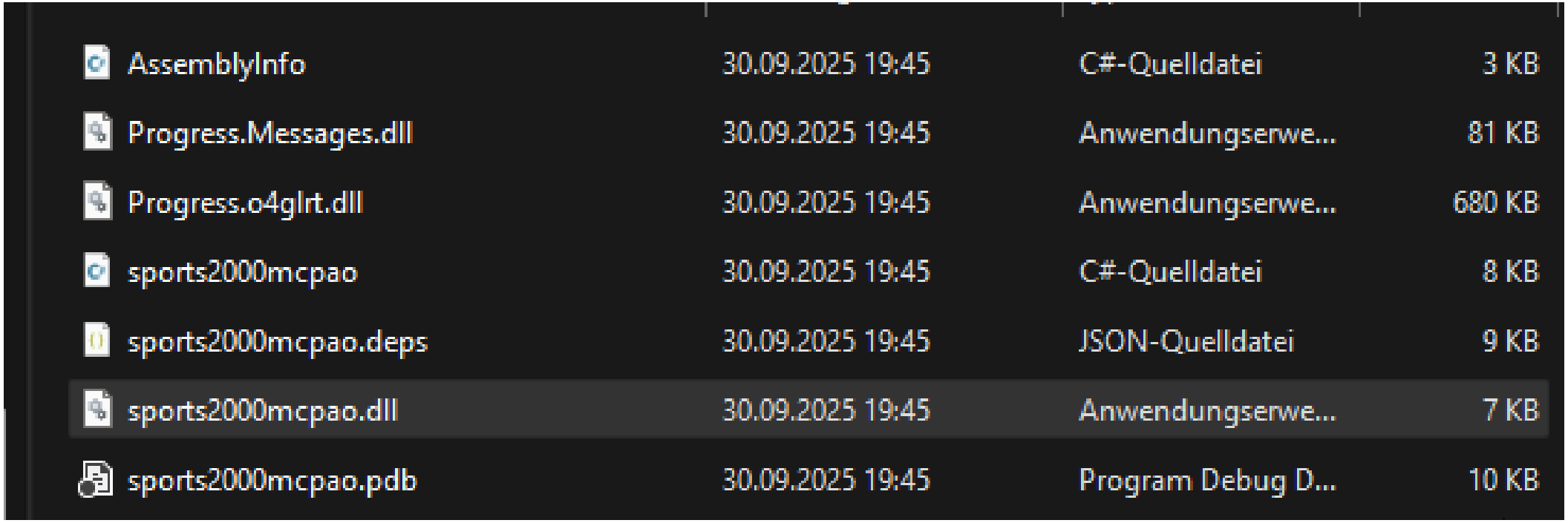


© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

.NET OpenClient Toolkit



© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.



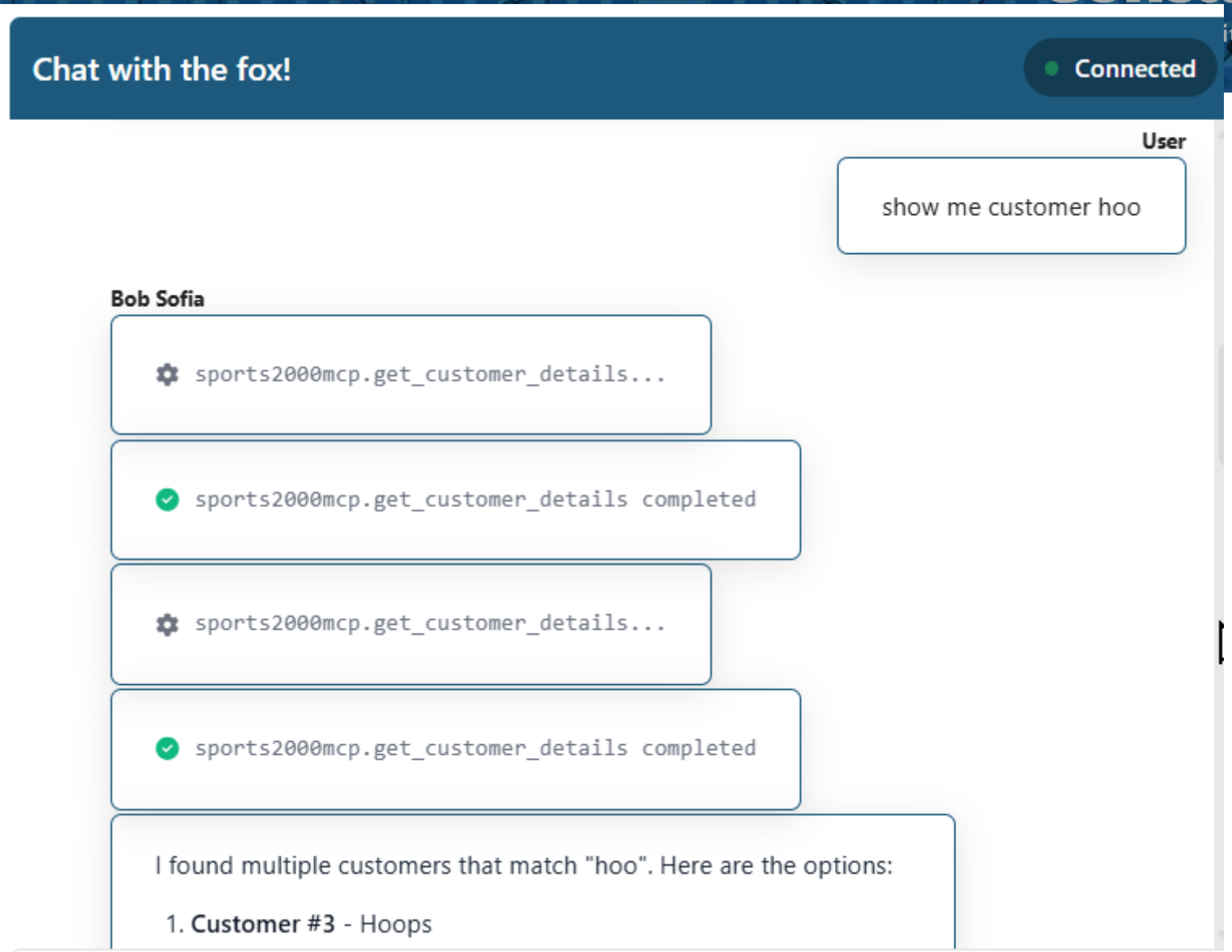
© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Code review

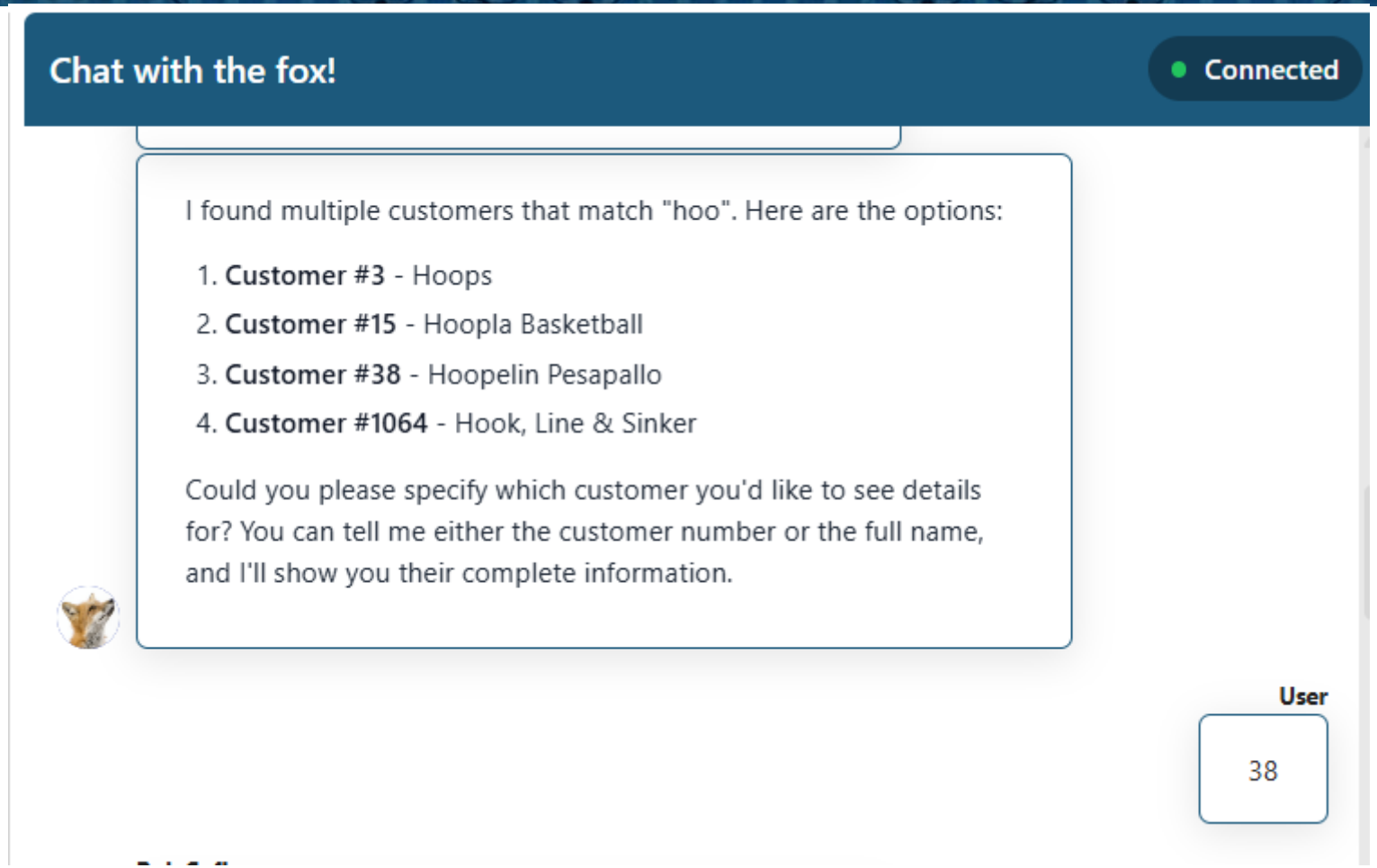
- Review get-customer-details
- Review ABL backend procedures
- Test in MCP Explorer
- Integrate into Claude Desktop
- Test in Claude Desktop
- Test in SmartComponent Library Chatbot

- https://github.com/consultingwerkdev/sports2000demomcp

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.



© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.



© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Chat with the fox!

- **Phone:** (60) 936 7387

Address:

- **Street:** Hameenkatu 16
- **City:** Hyvinkaa
- **State:** Uusimaa
- **Postal Code:** 5800
- **Country:** FI (Finland)

Financial Information:

- **Credit Limit:** $5,800.00
- **Current Balance:** $1,240.00
- **Terms:** Net30
- **Discount:** 10%
- **Sales Rep:** DKP

Status: ⚠️ **This customer is currently ON credit hold.**

The customer is based in Finland and has a significant credit limit, though they currently have a balance of $1,240 and are on credit hold status.

Type a message...

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Authentication

Authentication

- Requires some work …
- HTTP/SSE MCP Server may use OAuth2 based authentication
- Can open browser page for user authentication (e.g. Office 365, JIRA)
- JWT Token stored in agent or NPX
- Requests pass this as bearer token
- Can be used for authentication in IIS Server hosting MCP Server (ASP.NET) or within the MCP Server code (.NET, C#)

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Authentication

- AppServer authentication
- When it’s enough to authenticate MCP Client (Chatbot, Agent) pass credentials either with Connect request, Proxy constructor (connect procedure) or every request
- Username, password, login company, …
- Consider encryption of passwords

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Developer Tunnels

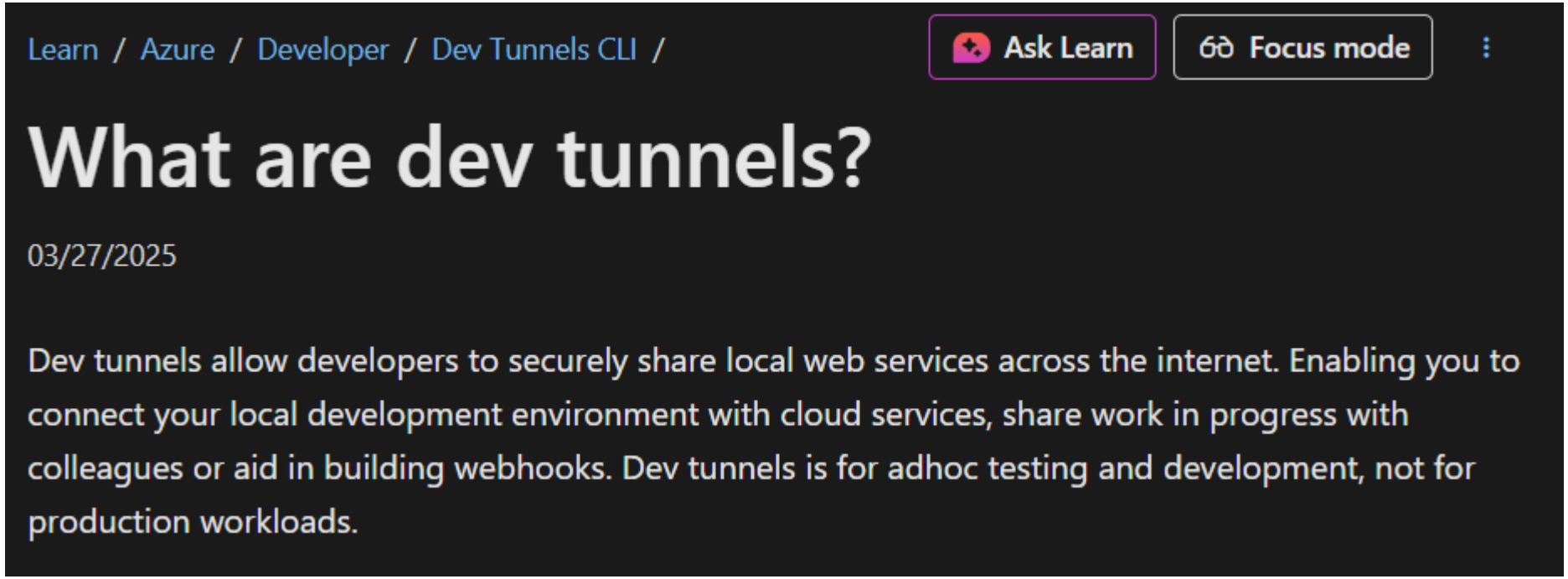
Developer Tunnels

- When working with cloud-based AI Agents, it may be convenient to support calls from the cloud onto the developers desktop
- Alternative: backend in the cloud during development (EC2, Azure, …)
- Developer Tunnels open a VPN form the outside into a private network

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Microsoft devtunnel

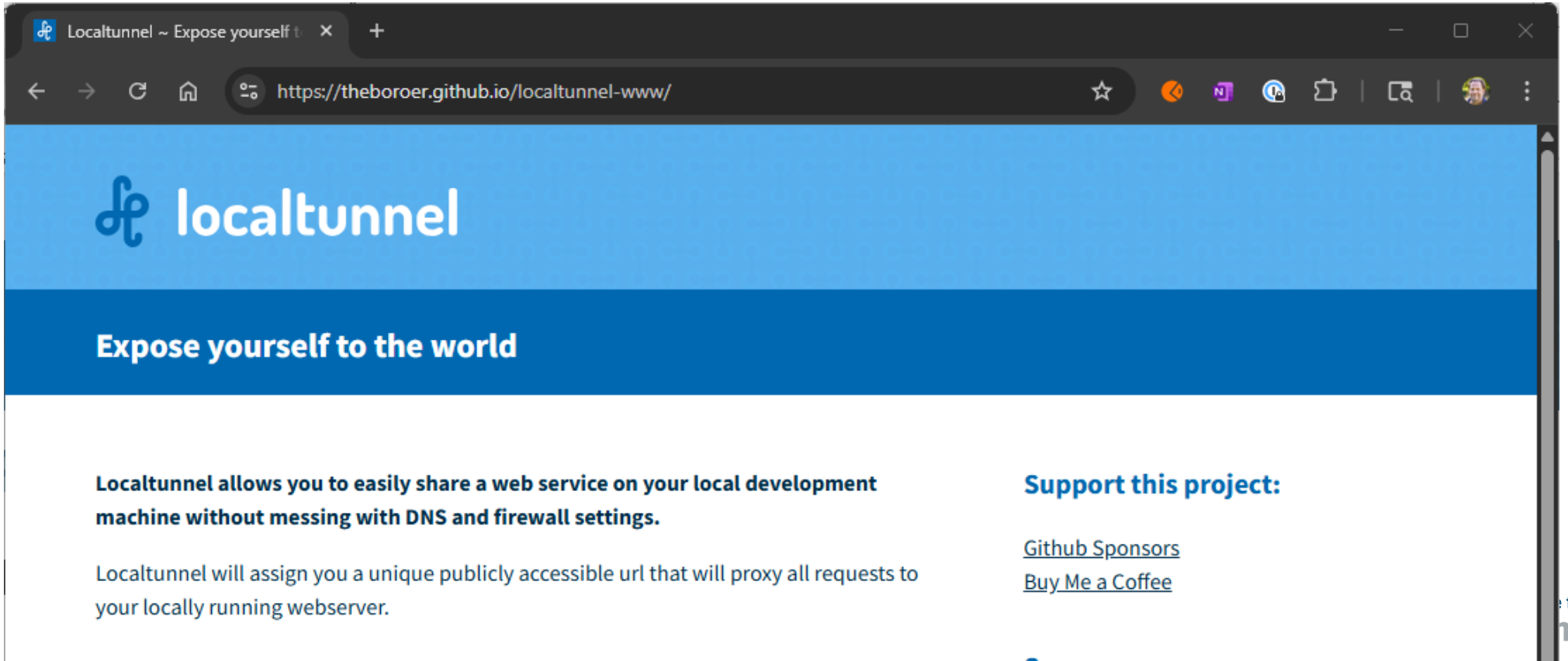
- https://learn.microsoft.com/en-us/azure/developer/dev-tunnels/overview



© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

NPM Localtunnel

- https://theboroer.github.io/localtunnel-www/



Developer Tunnels

- Microsoft Devtunnel supports HTTP 1.x
- Localtunnel also supports HTTP/2
  - HTTP MCP Server requires HTTP/2
- Developer Tunnels may require agreement with IT/network security …
- Microsoft/Azure may be trusted higher
- Only open developer tunnel while doing active dev & test
- For production, consider Cloud or DMZ based deployments
- Some AI Agents support actual VPN clients (Devin)

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Product Announcement

Coming soon … SmartMCP Server Toolkit

- Developer Toolkit to simplify development of OpenEdge based MCP Servers
- For use with and without the SmartComponent Library framework
- Simply annotate ABL procedures or classes and expose as MCP Tool
- Support for authentication and authorization
- Details will be announced later this year

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Subscribe Now to Consultingwerk's Official Newsletter!

www.consultingwerk.com/newsletter

or marketing@consultingwerk.com

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Next Events!

https://pugchallenge.org/#
PUG CHALLENGE
Registration
Boston
Valencia
Sponsors
More
PUG CHALLENGE 2025
The PUG Challenge is the premier event for the Progress OpenEdge community, bringing together over 80 expert speakers, insightful sessions, hands-on workshops, inspiring social events, and the latest OpenEdge advancements
Join us!
GET YOUR TICKETS!
28th September – 1st October in Boston, USA
5th – 7th November in Valencia, Spain

Join Our Next Webinars

Consultingwerk
software architecture and development

- September 18th - AI-Powered Modernization for OpenEdge Applications - **on YouTube**
- October 9th - Implementing MCP Servers With OpenEdge
- End of November - Integrate Chatbots Into OpenEdge Applications
- Using Windsurf IDE As An AI Coding Assistant For OpenEdge

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Questions

© 2025 Consultingwerk Application Modernization Solutions Ltd. All rights reserved.

Consultingwerk

software architecture and development