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From OpenAPI to Copilot – Auto-Generating MCP Tools for VS Code

4PS & COSMO CONSULT
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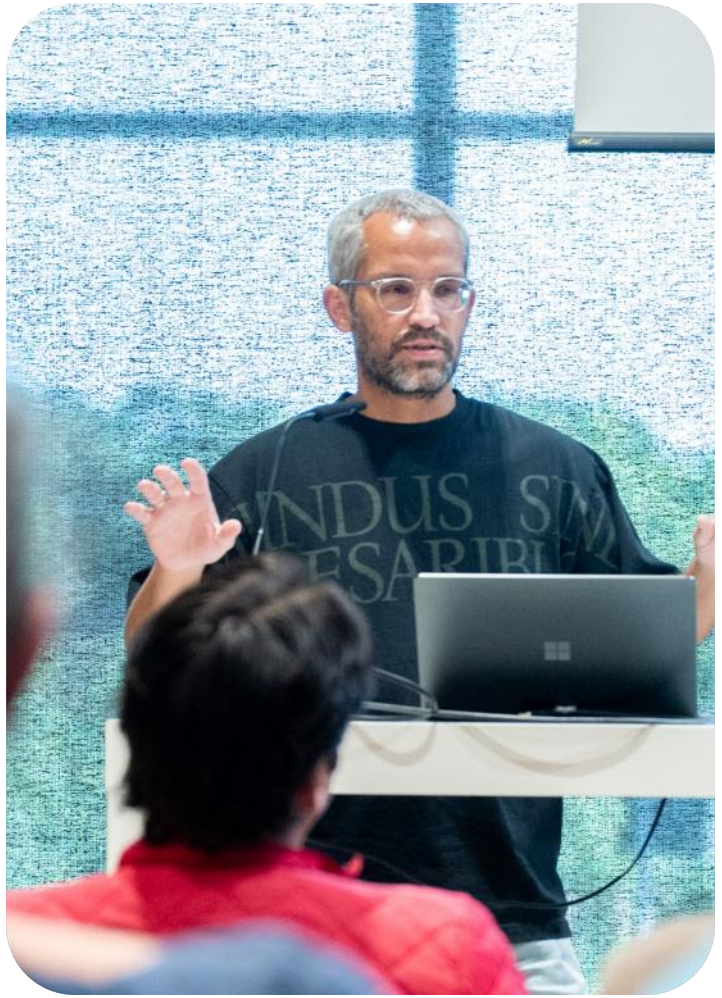

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Agenda

- Intro & Motivation
- Basics of OpenAPI & MCP
- Live Demo
- Tips & Tricks
- Wrap-Up

Why do we need this anyway

- LLMs are smart, but they can't talk to your systems out of the box

Why do we need this anyway

- MCP helps to integrate existing systems, lots of them have MCP Servers by now
- A lot of AI tools can use MCP Servers
- But what about your own systems or systems without MCP Servers?

- Goal of this session: connect any REST API with (OpenAPI) spec to Copilot, step by step

How does MCP actually work?

- MCP = Model Context Protocol — a standard for giving AI more context, including tools to call
- Tools have a name, description, and input schema → Copilot picks the right one
- In VS Code: tools show up in Copilot chat, Copilot decides when to call them

Using MCP tools in VS Code

- Option A: **Standalone / Remote MCP server** — separate process or remote endpoint, registered via mcp.json
  - Good for language-agnostic setups, shared across editors
  - Not the focus of this session

- Option B: **VS Code extension with LanguageModelTools API** (https://code.visualstudio.com/api/extension-guides/ai/tools)
  - Tools live inside a VS Code extension
  - Tighter integration, easier to distribute via marketplace
  - TypeScript-based, uses the VS Code extension API
  - Our focus today

Using MCP tools in VS Code

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```
export function registerTools(context: vscode.ExtensionContext, credentialStore: CredentialStore, repositoriesManager: RepositoriesManager) {
    registerFetchingTools(context, credentialStore, repositoriesManager);
    registerSearchTools(context, credentialStore, repositoriesManager);
    context.subscriptions.push(vscode.lm.registerTool(ActivePullRequestTool.toolId, new ActivePullRequestTool(repositoriesManager)));
    context.subscriptions.push(vscode.lm.registerTool(OpenPullRequestTool.toolId, new OpenPullRequestTool(repositoriesManager)));
    context.subscriptions.push(vscode.lm.registerTool(PullRequestStatusChecksTool.toolId, new PullRequestStatusChecksTool(credentialStore, repositoriesManager)));
    context.subscriptions.push(vscode.lm.registerTool(CreatePullRequestTool.toolId, new CreatePullRequestTool(credentialStore, repositoriesManager)));
    context.subscriptions.push(vscode.lm.registerTool(ResolveReviewThreadTool.toolId, new ResolveReviewThreadTool(repositoriesManager)));
}

function registerFetchingTools(context: vscode.ExtensionContext, credentialStore: CredentialStore, repositoriesManager: RepositoriesManager) {
    context.subscriptions.push(vscode.lm.registerTool(FetchIssueTool.toolId, new FetchIssueTool(credentialStore, repositoriesManager)));
    context.subscriptions.push(vscode.lm.registerTool(FetchLabelsTool.toolId, new FetchLabelsTool(credentialStore, repositoriesManager)));
    context.subscriptions.push(vscode.lm.registerTool(FetchNotificationTool.toolId, new FetchNotificationTool(credentialStore, repositoriesManager)));
}

function registerSearchTools(context: vscode.ExtensionContext, credentialStore: CredentialStore, repositoriesManager: RepositoriesManager) {
    context.subscriptions.push(vscode.lm.registerTool(SearchTool.toolId, new SearchTool(credentialStore, repositoriesManager)));
}
```

A quick excurse: OpenAPI

- A standard way to describe REST APIs (endpoints, parameters, responses)
- Why it matters: if your API has a spec, we can auto-generate from it
- Example Tic Tac Toe (https://learn.openapis.org/examples/v3.1/tictactoe.html)

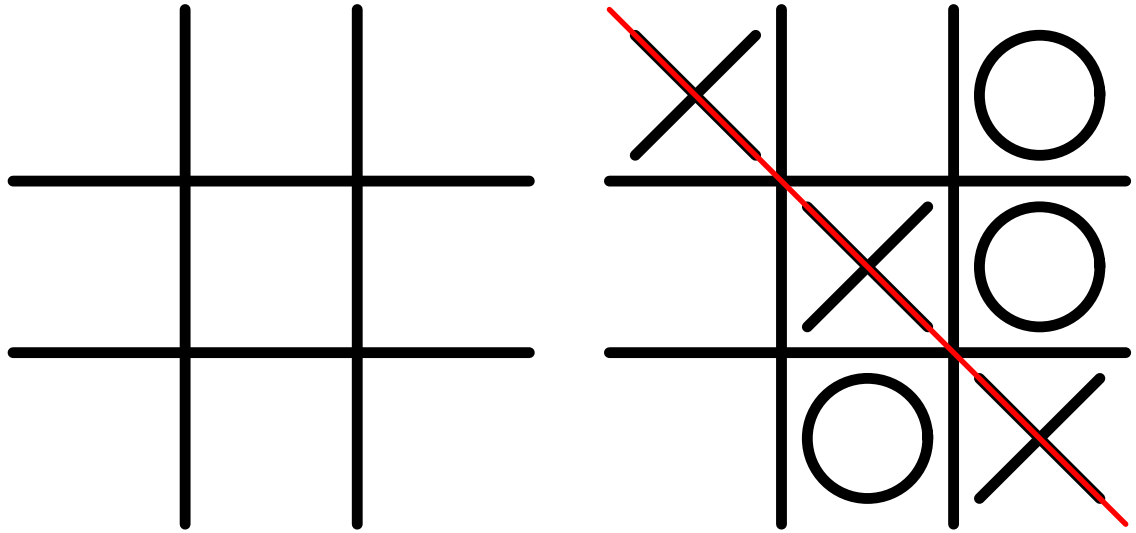

Image source: https://mathworld.wolfram.com/Tic-Tac-Toe.html

A quick excurse: OpenAPI

Metadata

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```
{
  "openapi": "3.1.0",
  "info": {
    "title": "Tic Tac Toe",
    "description": "This API allows writing down marks on a Tic Tac Toe board\nand requesting the state of
    "version": "1.0.0"
  },
  "tags": [
    {
      "name": "Gameplay"
    }
  ],
```

A quick excurse: OpenAPI

Get data with response types

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```
"paths": {
  "/board": {
    "get": {
      "summary": "Get the whole board",
      "description": "Retrieves the current state of the board and the winner.",
      "tags": ["Gameplay"],
      "operationId": "get-board",
      "responses": {
        "200": {
          "description": "OK",
          "content": {
            "application/json": {
              "schema": {
                "$ref": "#/components/schemas/status"
```

A quick excurse: OpenAPI

Define types

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```
"winner": {
  "type": "string",
  "enum": [".", "X", "O"],
  "description": "Winner of the game. `.` means nobody has won yet.",
  "example": "."
},
"status": {
  "type": "object",
  "properties": {
    "winner": {
      "$ref": "#/components/schemas/winner"
    },
```

A quick excurse: OpenAPI

Get data with parameters, also error responses


```
"/board/{row}/{column}": {
  "parameters": [
    {
      "$ref": "#/components/parameters/rowParam"
    },
    {
      "$ref": "#/components/parameters/columnParam"
    }
  ],
  "get": {
    "summary": "Get a single board square",
    "description": "Retrieves the requested square.",
    "tags": ["Gameplay"],
    "operationId": "get-square",
```

```
"responses": {
  "200": {
    "description": "OK",
    "content": {
      "application/json": {
        "schema": {
          "$ref": "#/components/schemas/mark"
        }
      }
    }
  },
  "400": {
    "description": "The provided parameters are incorrect",
    "content": {
      "text/html": {
```

A quick excurse: OpenAPI

Parameters are also typed


```
"components": {
  "parameters": {
    "rowParam": {
      "description": "Board row (vertical coordinate)",
      "name": "row",
      "in": "path",
      "required": true,
      "schema": {
        "$ref": "#/components/schemas/coordinate"
      }
    },
    "columnParam": {
      "description": "Board column (horizontal coordinate)",
      "name": "column",
      "in": "path",
```

Scope summary

- LLMs need something to talk to your systems, MCPs are often used
- Not every system has an MCP
- But if it has an API, ideally specified via OpenAPI, creating one is easy
- Having it as part of a VS Code extension makes it more powerful

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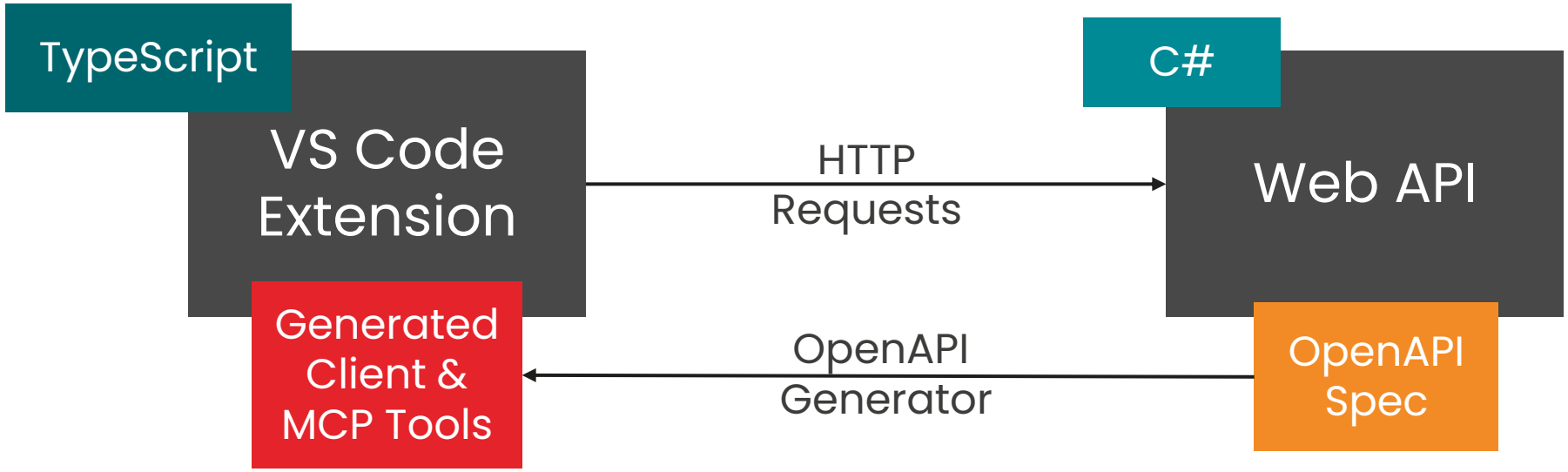
Live Demo

Architecture Overview



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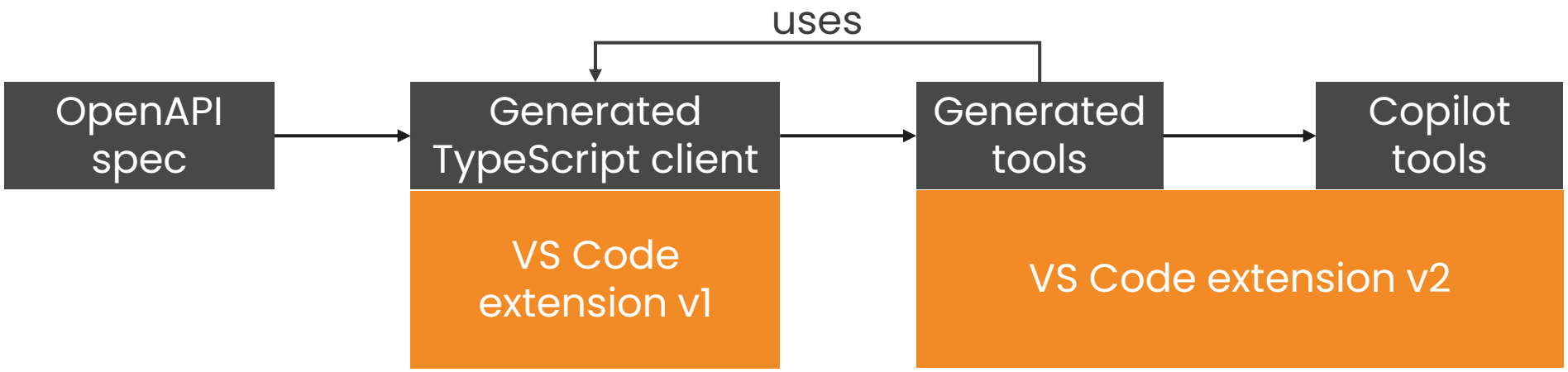
Live Demo

Architecture Overview



Tips for Real-World Use

- Not every endpoint should be a tool – use a configuration file to in- or exclude
- OpenAPI spec matters
  - Good endpoint descriptions improve automatic tool selection
  - Param descriptions helps Copilot to call tools correctly
  - Documented errors allow unattended troubleshooting by Copilot
  - 3rd party API specs could be enriched with good descriptions in an intermediate step
- Generated clients should handle auth - keep secrets out of the chat
- Make regeneration as easy as possible and run whenever the API changes

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Real World Example

from COSMO Alpaca

- Existing C# API with OpenAPI spec & existing VS Code extension
- VS Code extension already used openapi-generator to generate commands
- Lot's of actions & features that can be manually invoked
- Many VS Code actions are invoked together regularly and benefit from usage via Copilot
  - Example Flow (manually calling 5 actions): Create Repo ➔ Assign customer ➔ Create App ➔ Create Test App ➔ Create Dev Container
  - Example Prompt: *„Create a new Alpaca PTE repo for customer X with app Y and test app Z and setup a dev environment"*

➔ Quick win: All API endpoints are available to Copilot without much effort, just a few excluded

Limitations

- Generated tools only work in VS Code - MCP servers work anywhere where MCP is supported

- Many extensions with many active tools can cause issues
  - Context window pollution is not a big problem with newest models nowadays
  - Many tools make tool selection for Copilot harder
  - MCP servers often support dynamic tool discovery to overcome this
  - VS Code handles this with virtual tool clustering and pre-selecting likely tools

Wrap Up

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- Good API docs = good AI tools — invest in your OpenAPI specs and use AI to document them
- Not every API endpoint is a good fit for a tool
- Communication between AI and other systems is key for using AI productively

➔ Try it out with one of your APIs!

https://github.com/lippertmarkus/demo-dok-central-2026

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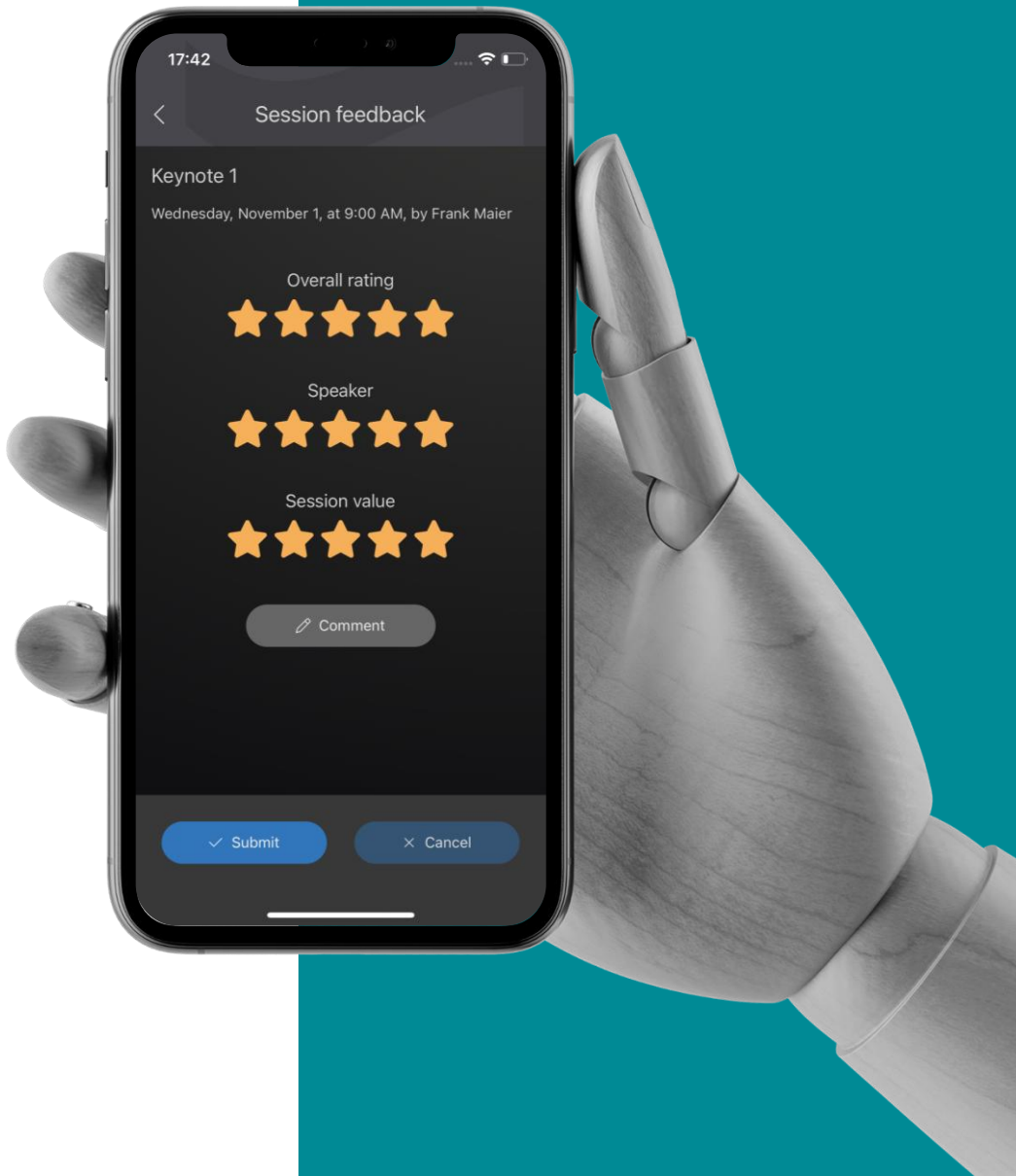
Give us Feedback!

and help us improve!

Please rate out session in the Conference App!

and leave a constructive comment.



Thank you !