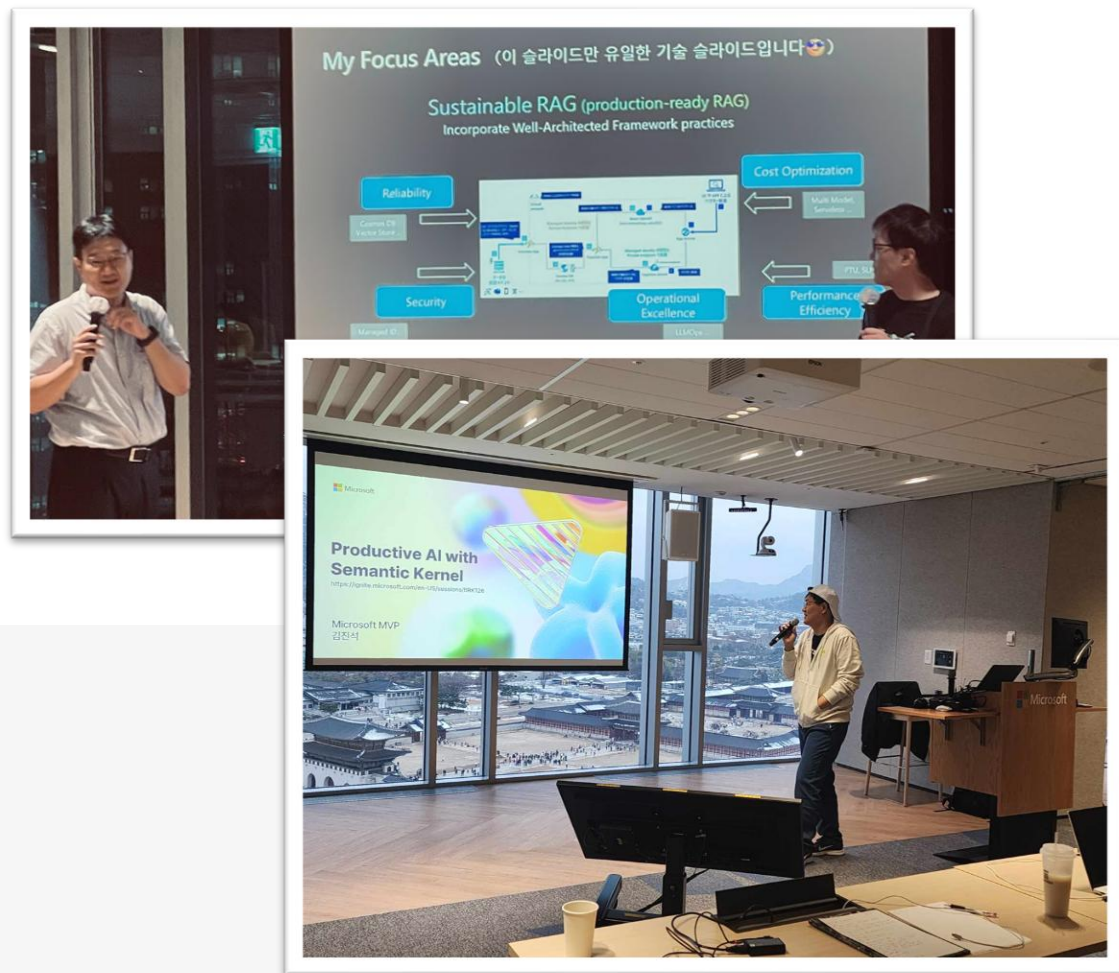




# C#도 AI랑 이야기할 수 있어! Python만 하는 거 아니야

Microsoft MVP 김진석

## 자기 소개



## Speaker

- 👤 김 진석
- 🏢 (주)케이에이치시스템즈 대표이사
- 🏆 Microsoft MVP
- @ 한국블레이저개발자모임 / Blazor Korea
- 📘 facebook.com/iamjinseok.kr

# Semantic Kernel이란?

## Semantic Kernel이란?

### AI의 등장



- AI가 가장 대중에게 어필된 순간
- 구글 딥마인드 챌린지 매치
  - 2016년 3월 9일 - 15일
  - 알파고 4 - 1 이세돌
- 5년 전

# Semantic Kernel이란?

## AI의 등장



- 전세계에서 사회 전반에 엄청난 영향
- Chat + Generative Pre-trained Transformer
- 2022년 11월 30일 출시
  - GPT-3.5
- 2년 전

## Semantic Kernel이란?

**이제는 AI는 만드는 것이 아닌 사용하는 것!!**

# Semantic Kernel이란?

Don't worry!!

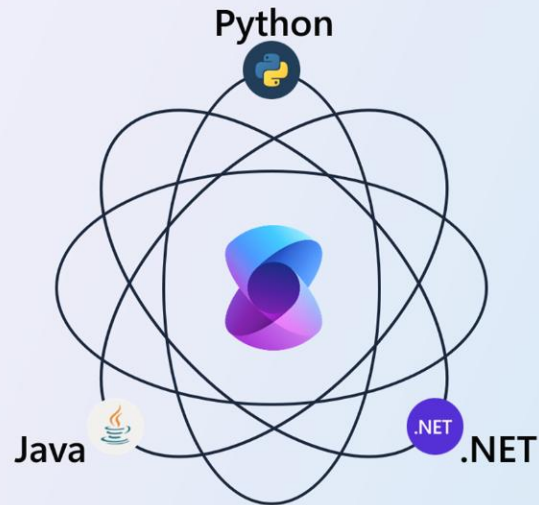


- 우회전이라고 들으면 핸들 틀잖아요?
- 인공지능도 잘 쓰면 됩니다

# Semantic Kernel이란?

## Semantic Kernel???

**Semantic Kernel** is lightweight, open-source, production-ready, orchestration middleware that lets you easily add AI to your apps.

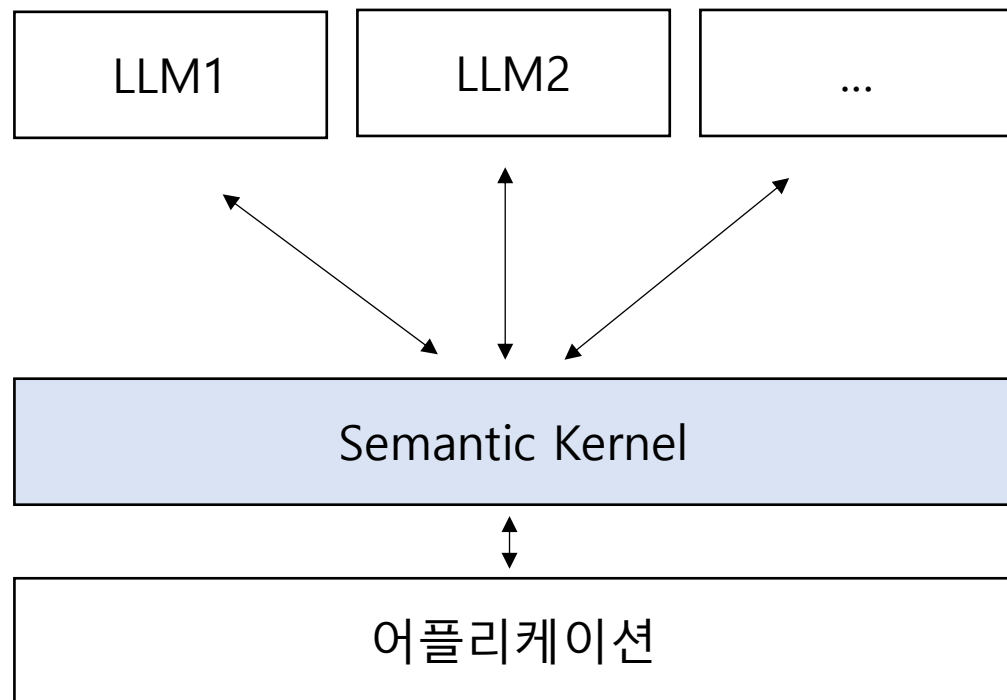


- 어플리케이션에 AI를 쉽게 붙이기 위해
- 상용으로도 손색이 없는
- 오픈소스 프레임워크
- C#, JAVA, Python을 지원



# Semantic Kernel이란?

## Semantic Kernel???

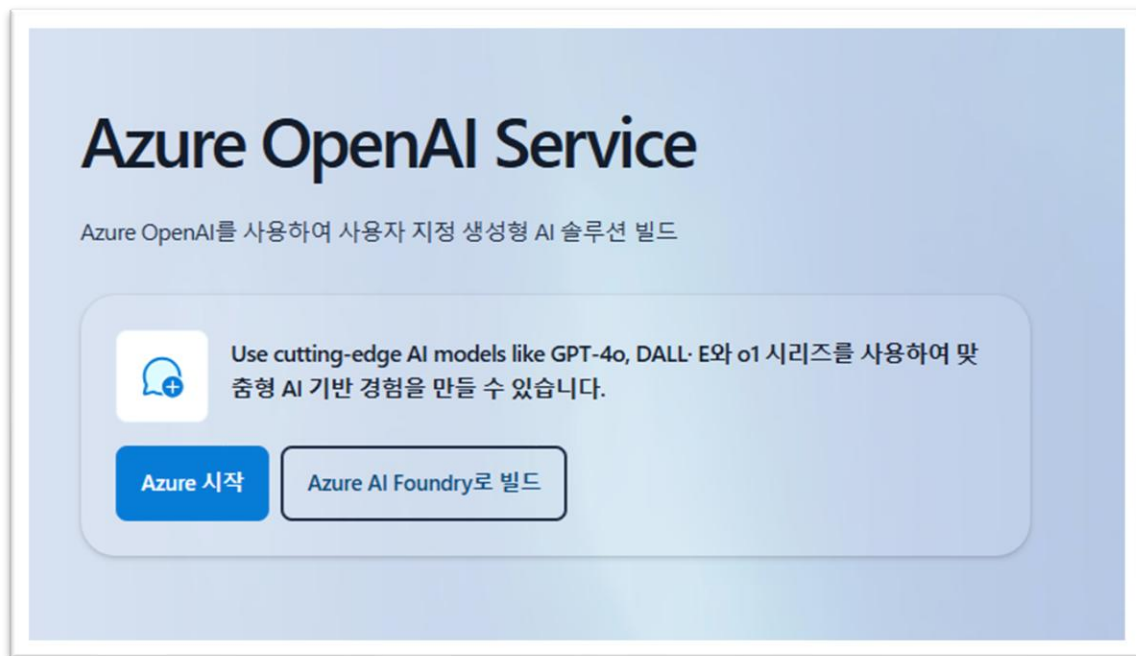


- 어플리케이션과 LLM 사이에 위치

# 기본 사용법

# Semantic Kernel이란?

## 사전 준비! 모델은?



- Azure OpenAI
- OpenAI
- Google Gemini
- Hugging Face
- GitHub Models(MarketPlace)

어디든 Key만 받으시면 되요.

# Semantic Kernel이란?

## 기본 사용법

- 
- The screenshot shows a list of NuGet packages for Semantic Kernel. Each entry includes the package name, version, download count, and a brief description. The packages are:
- Microsoft.SemanticKernel.Abstractions** (version 3.53M, 3.53M downloads): Semantic Kernel interfaces and abstractions. This package is automatically installed by Semantic Kernel packages if needed.
  - Microsoft.SemanticKernel.Core** (version 3.37M, 3.37M downloads): Semantic Kernel core orchestration, runtime and functions. This package is automatically installed by 'Microsoft.SemanticKernel' package with other useful packages.
  - Microsoft.SemanticKernel** (version 2.43M, 2.43M downloads): Semantic Kernel common package collection, including SK Core, OpenAI, Azure OpenAI, DALL-E 2. Empowers app owners to integrate cutting-edge LLM technology quickly and easily into their apps.
  - Microsoft.SemanticKernel.Connectors.OpenAI** (version 2.17M, 2.17M downloads): Semantic Kernel connectors for OpenAI. Contains clients for chat completion, embedding and DALL-E text to image.
  - Microsoft.SemanticKernel.Yaml** (version 357K, 357K downloads): Semantic Kernel Yaml Functions
  - Microsoft.SemanticKernel.PromptTemplates.Handlebars** (version 477K, 477K downloads): Semantic Kernel Handlebars Prompt Template Engine
  - Microsoft.SemanticKernel.Connectors.AzureOpenAI** (version 469K, 469K downloads): Semantic Kernel connectors for Azure OpenAI. Contains clients for chat completion, embedding and DALL-E text to image.

1. Nuget Package 설치
  - Microsoft.SemanticKernel
2. Kernel Build
  - 모델 연결 선택(여러 개도 가능)
3. InvokePrompt
  - 가장 간단한 호출방법

## Code Sample (C#)

```
using Microsoft.SemanticKernel;  
  
var kernel = Kernel.CreateBuilder()  
    .AddAzureOpenAIChatCompletion( ... )  
    .Build();  
  
var prompt = ".NET이 무엇인지 알려줘";  
var response = await kernel.InvokePromptAsync(prompt);
```

# Demo

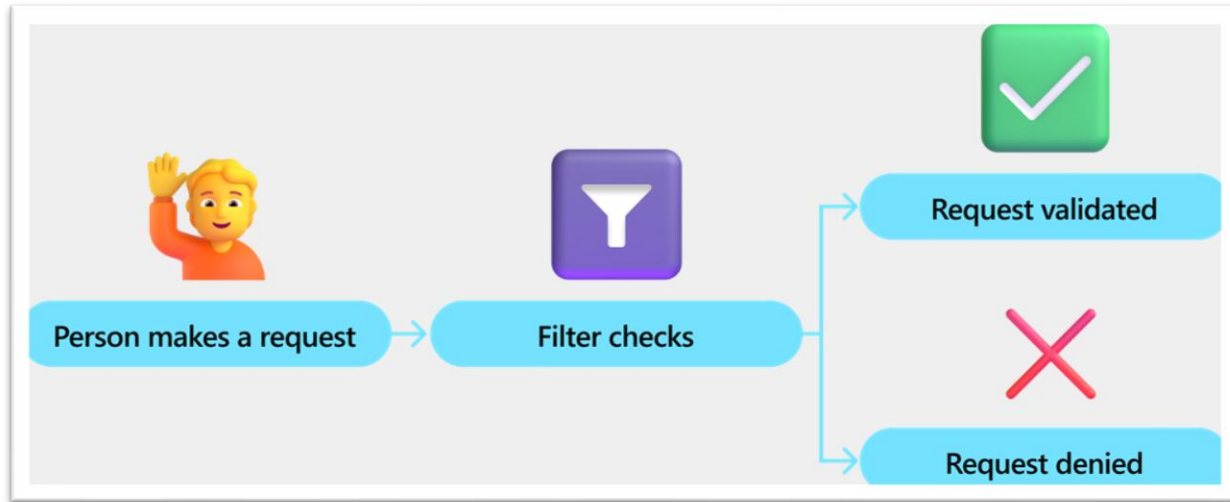
- Kernel Build
- InvokePrompt



# Semantic Kernel Filters

# Semantic Kernel Filters

## Semantic Kernel Filters란?



- 보안적으로 동작 제어와 추적(가시성) 확보
- Prompt와 Function 중간의 BreakPoint
- 데코레이션 패턴처럼 파이프라인으로 사용
- 종류
  - Function Invocation Filter
  - Prompt Render Filter
  - AutoFunction Invocation Filter



## Semantic Kernel Filters

### Function Invocation Filter(C#)

```
public class FunctionFilter : IFunctionInvocationFilter
{
    public async Task OnFunctionInvocationAsync(
        FunctionInvocationContext context,
        Func<FunctionInvocationContext, Task> next)
    {
        await next(context);
        context.Result = new FunctionResult(context.Function,
            value: "G3J를 보는 것이에요!!!");
    }
}
```

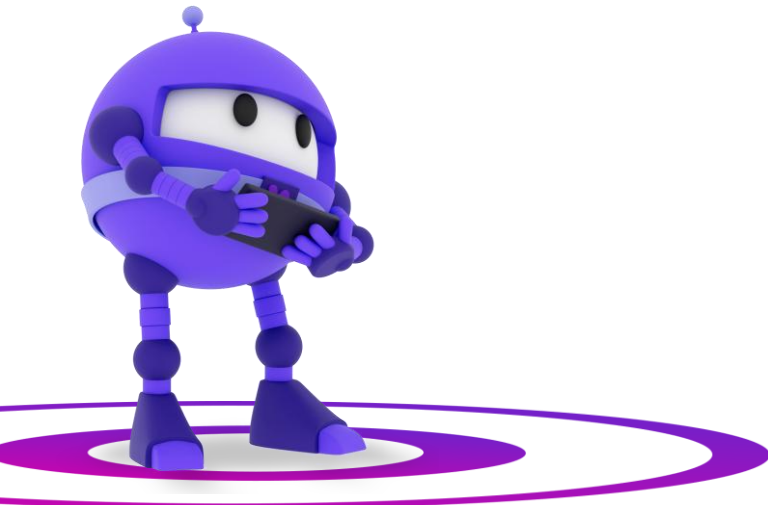
## Semantic Kernel Filters

### Prompt Render Filter(C#)

```
public class PromptFilter : IPromptRenderFilter
{
    public async Task OnPromptRenderAsync(PromptRenderContext context,
                                           Func<PromptRenderContext, Task> next)
    {
        await next(context);
        context.RenderedPrompt = context.RenderedPrompt + "\n 한글로 표현해줘.";
    }
}
```

# Demo

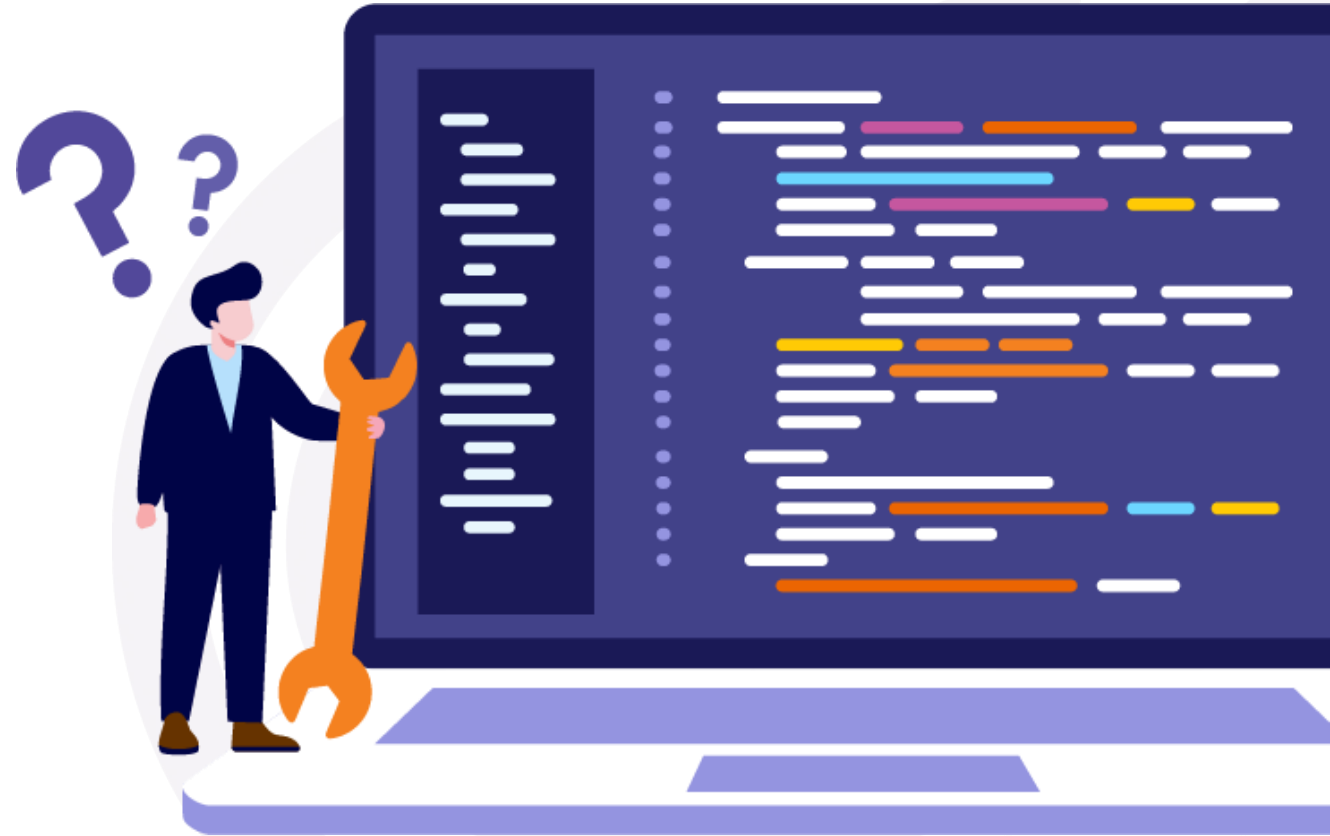
- Prompt Render Filter
- Function Invocation Filter



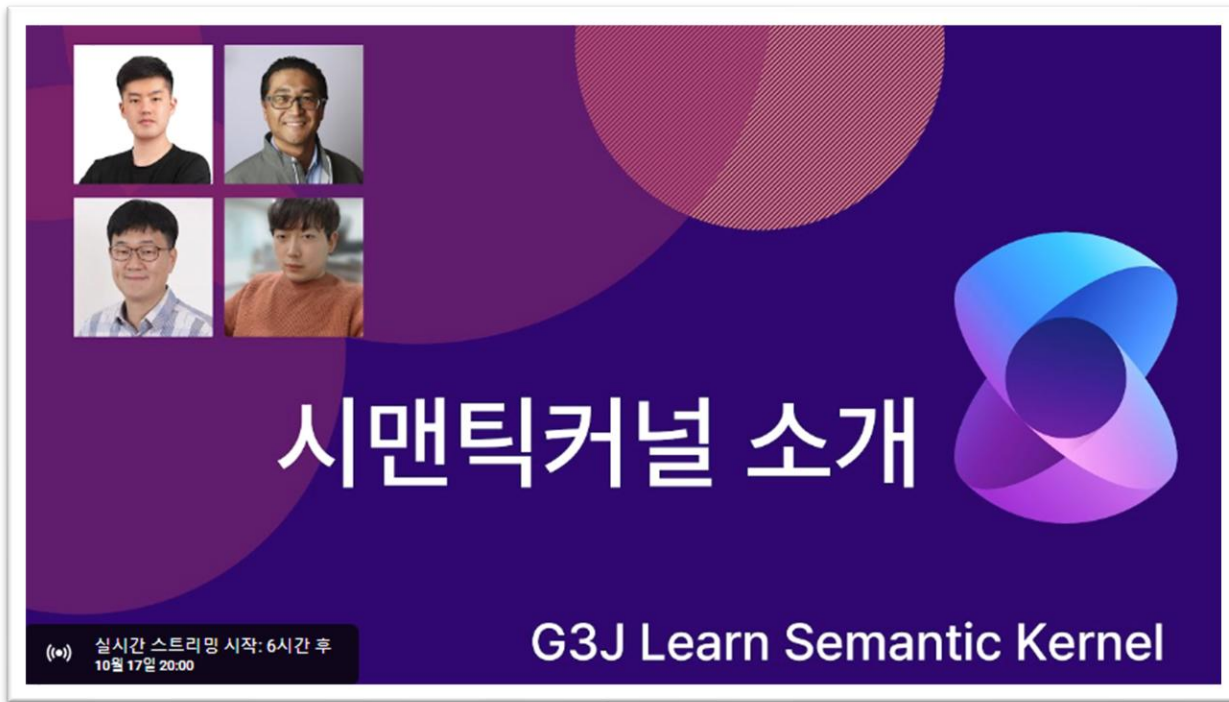
클로징

## Semantic Kernel은

- AI를 붙이기 위한 라이브러리
- `kernel.InvokePrompt`와 같이 쉽게 사용
- Filter를 이용해 중간 혹은 결과를 체크!



## G3J Learn Sematic Kernel



- Semantic Kernel에 대한 유튜브 라이브 방송
  - 13개 에피소드 계획
  - 2024.10 ~ 2025.04
- 10월 17일 스타트(매월 1,3번째 목요일)
- <https://aka.ms/g3jlearnsk>
- <https://aka.ms/g3jlearnsk/playlist>

**THANK YOU**