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XNT301

Refactoring strategies for .NET applications as you migrate to the cloud

Tom Moore (He/Him)

Sr. Developer Advocate
AWS

Runeet Vashisht (He/Him)

Principal Microsoft Specialist Solutions Architect
AWS

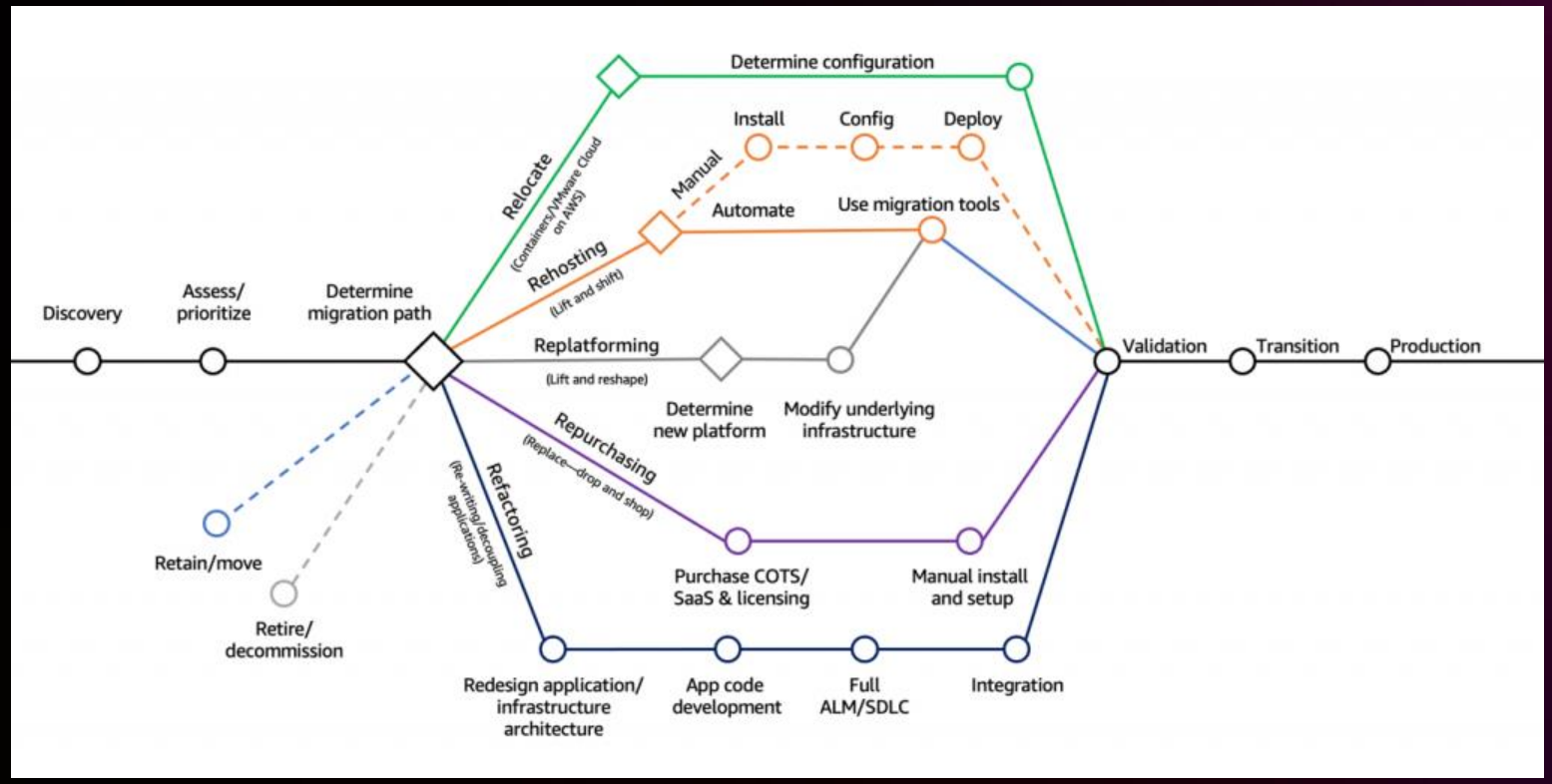
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Agenda

- The 7 R’s of moving to the cloud
- Our app, the Media Catalog
- Refactor: Port to .NET 6
- Refactor: Adopt microservices
- The future state of our application

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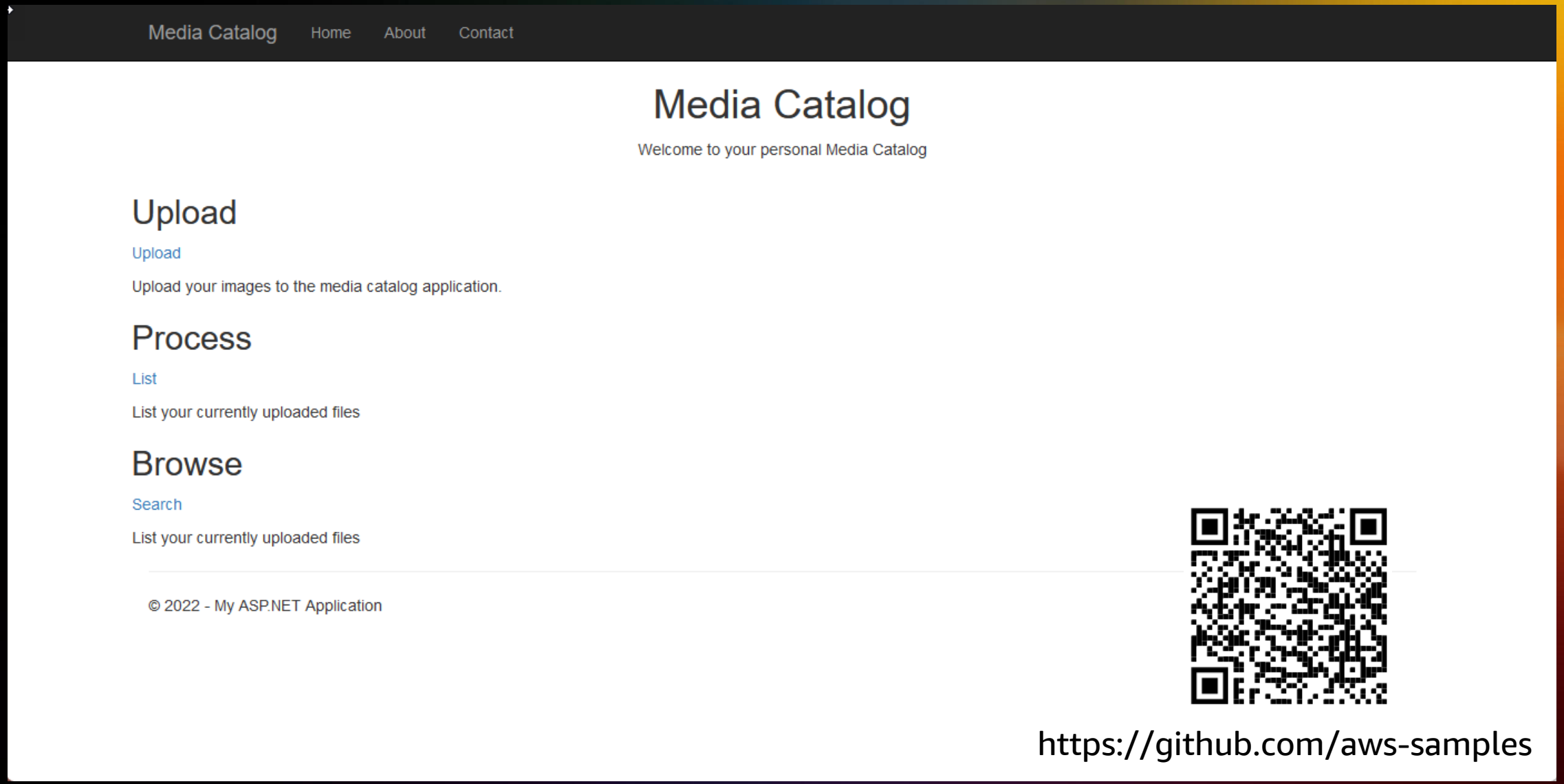
Application migration strategies: “The 7 R’s”



Refactoring/Re-architecting: Reimagining how the application is architected and developed, typically using cloud-native features

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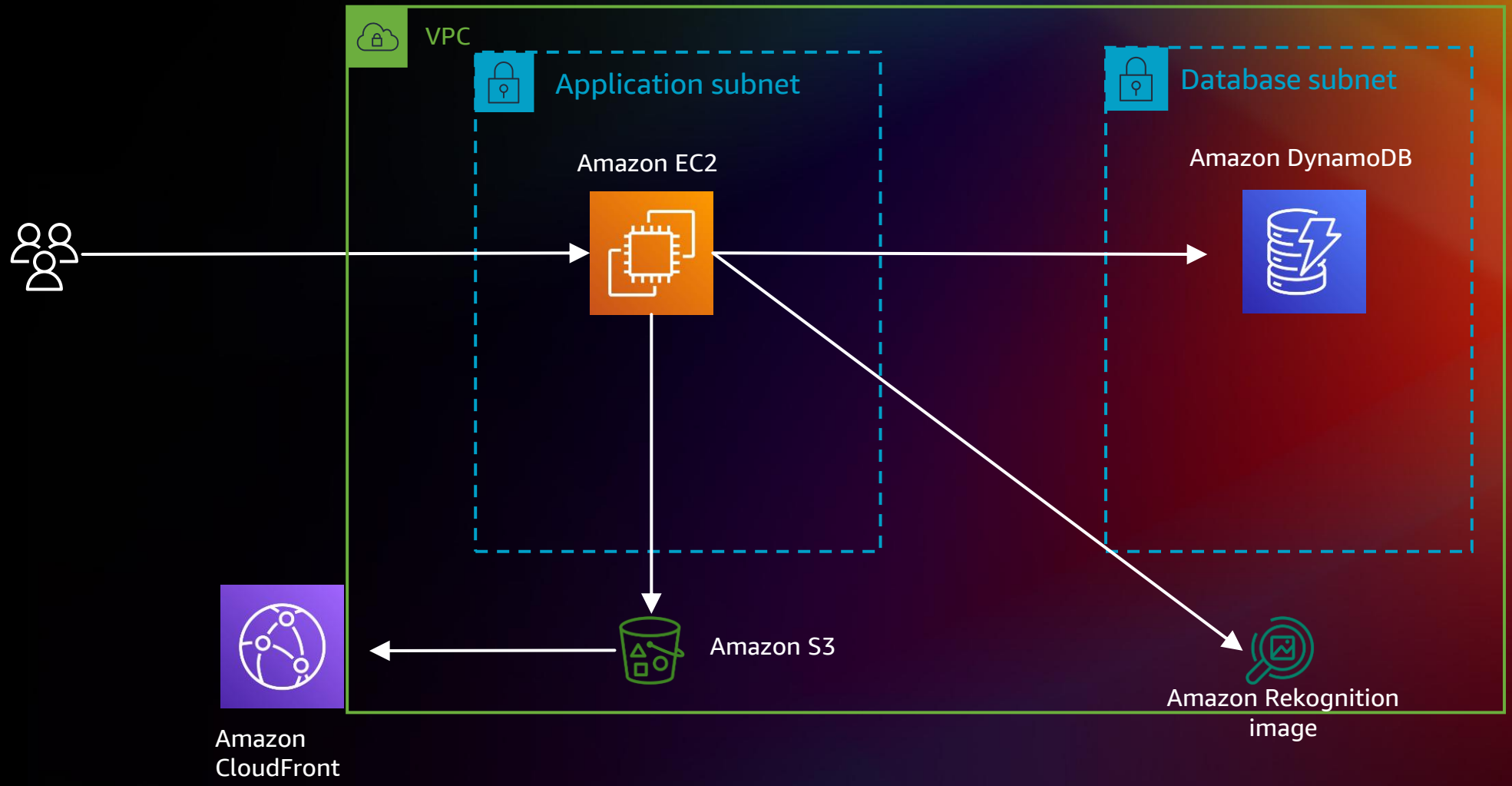
The Media Catalog



https://github.com/aws-samples

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Current state architecture



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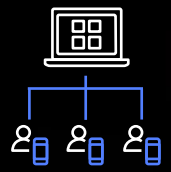
Demo: The Media Catalog

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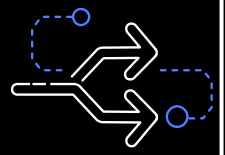
A day in the life of a legacy .NET application

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The Media Catalog: Business challenges



Make application elastic



Adopt modern architecture for scalability



Adopt modern software development and deployment practices

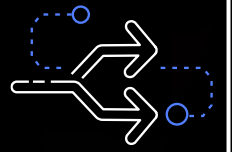


Cost is a big constraint

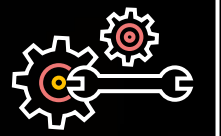
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The Media Catalog: Technical challenges



.NET Framework 4.8 – Windows dependency



Monolith codebase



DevOps adoption



Cost

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Refactor: Port .NET Framework to .NET

Why are customers looking to pursue this strategy?

.NET is the future – .NET Framework 4.8 is the last major framework release

Performance improvement

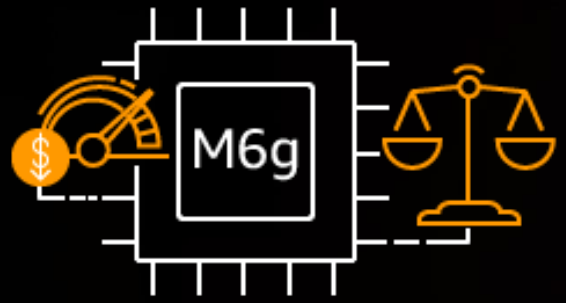
Cross-platform containers using mature cloud-native tooling

Microsoft license freedom – >30% savings on similar Linux instances

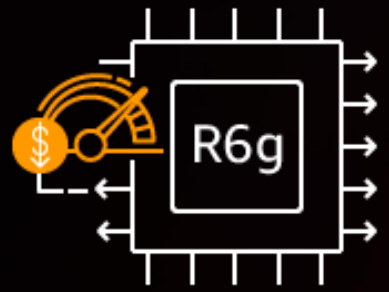
Cost and performance benefits of ARM64 support

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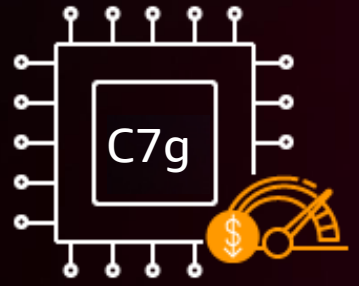
.NET ♥ ARM processors



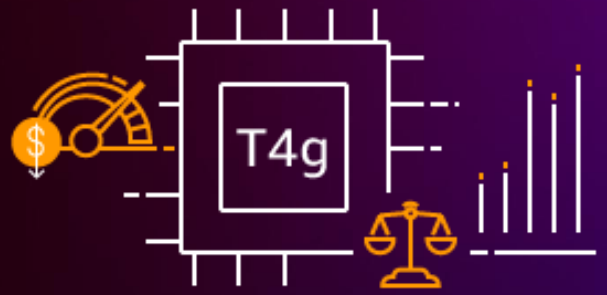
General purpose



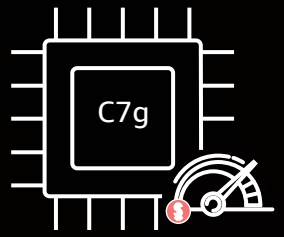
Memory optimized



Compute optimized



Burstable



Powered by AWS Graviton3 processors

Up to 60% better price performance over comparable current gen x86 instances

ARM64 performance in .NET

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Moving from .NET Framework to .NET

- Incompatible .NET API calls
- Incompatible NuGet packages
- Difficulty in assessing .NET Core portability
- Manual work of porting to .NET 6



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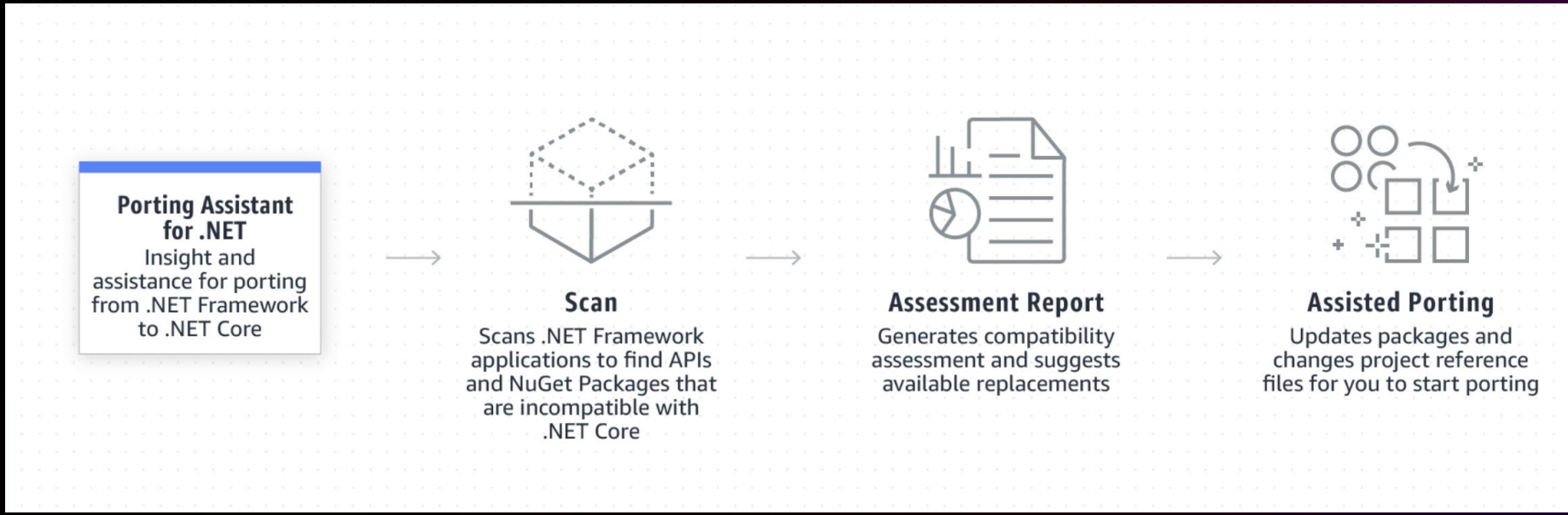
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How does AWS help?

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Porting Assistant for .NET

Porting Assistant for .NET is an open-source analysis tool that scans .NET Framework applications, generates a .NET Core compatibility assessment, and assists with porting, helping our customers move their applications to Linux faster



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Prerequisites

- Legacy .NET application using .NET Framework 3.5 or higher
- Source code and solution file (.sln)
- .NET Core 3.1 SDK, .NET 5 SDK, or .NET 6 SDK



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Supported platforms

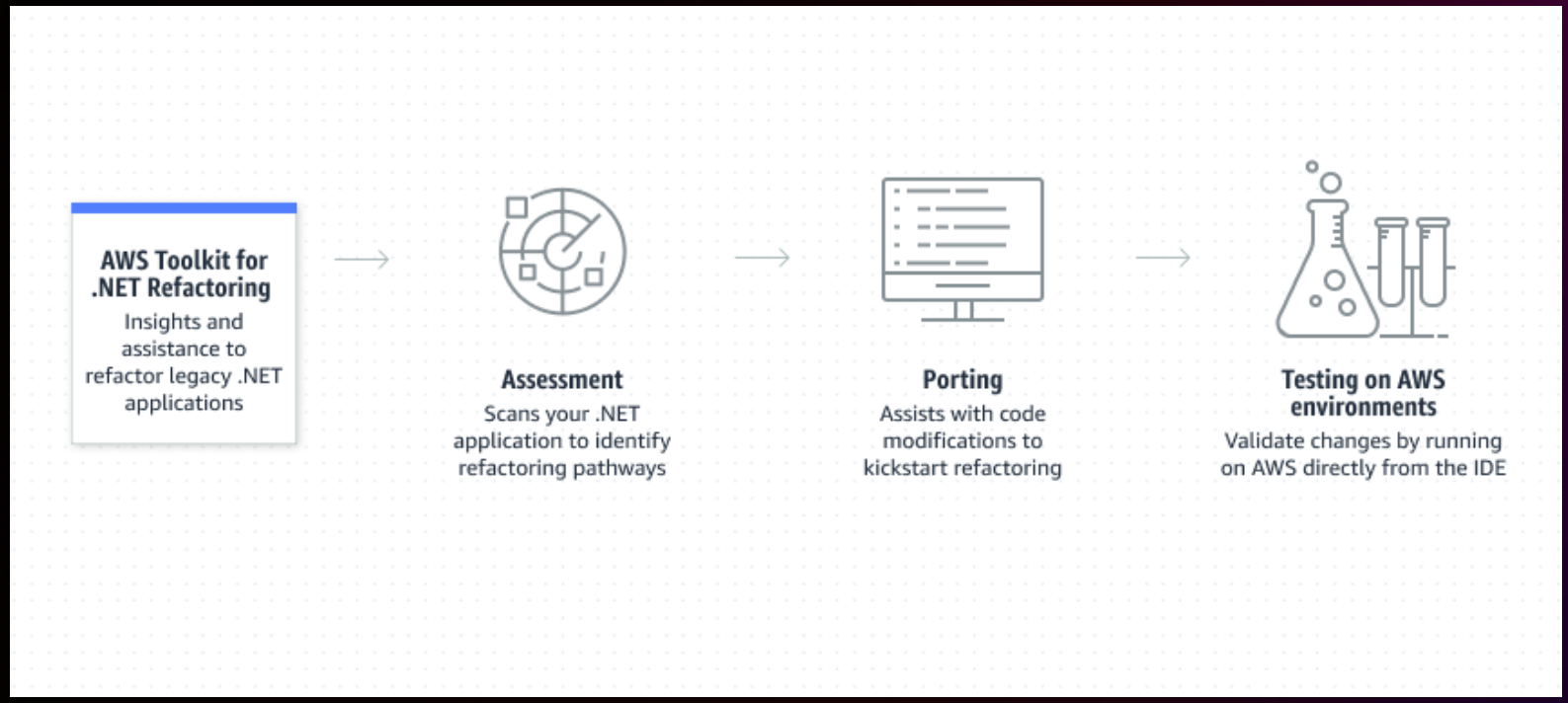
- Port Windows services and ASP.NET applications
- ASP.NET MVC
- ASP.NET Web Forms to ASP.NET Core Blazor
- WCF apps to CoreWCF
- VB.NET Web API, Class Library, or console applications

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AWS Toolkit for .NET Refactoring

AWS Toolkit for .NET Refactoring is an extension for Microsoft Visual Studio that reduces the time and effort that is required to refactor legacy .NET applications to alternatives on AWS Cloud



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What AWS customers say

"The AWS Toolkit for .NET Refactoring extension makes the life of developers easier who are seeking to update their legacy .NET applications by providing useful information and guidance to refactor and validate modernization efforts."

- Derya Sezen, Co-Founder Kloia (Advanced AWS Consulting Partner)

"The AWS Toolkit for .NET extension is a MASSIVE step up from the previous way of dealing with issues when migrating/modernizing .NET codebases. There is zero learning curve for developers or reliance on outside tooling, and our developers can now truly focus on solving issues without leaving the IDE."

- Ananth Deodhar, Sr. Software Technical Architect at SourceFuse

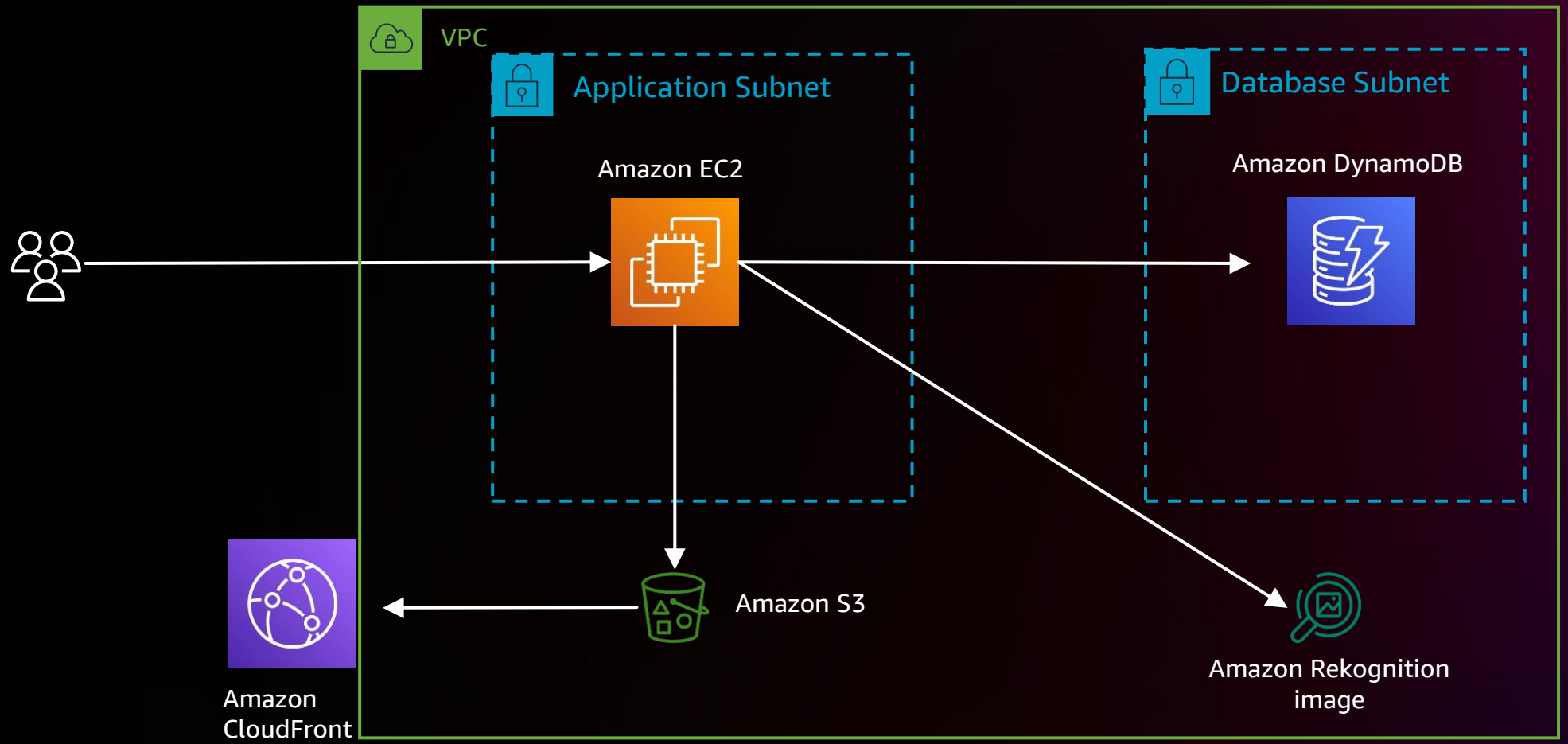
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Demo: Porting to .NET 6

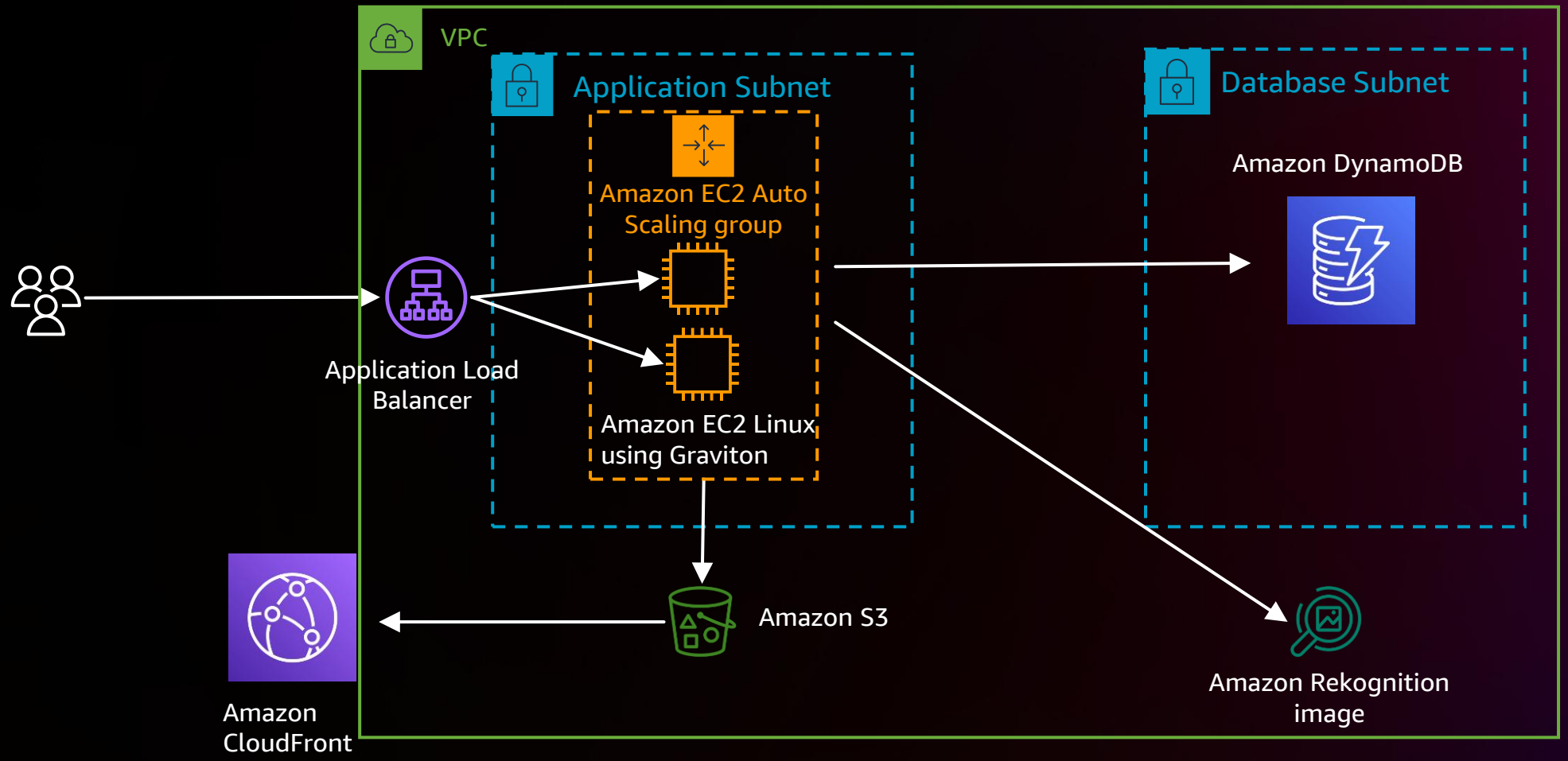
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Architecture before



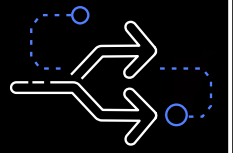
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Architecture after



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The Media Catalog: Issues addressed



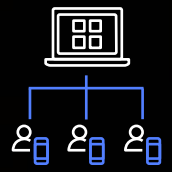
~~.NET Framework 4.8 – Windows dependency~~



~~Licensing cost~~



~~Cost is a big constraint~~

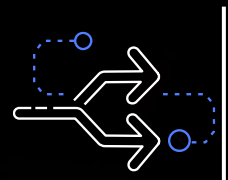


~~Make application elastic~~

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The Media Catalog: Issues remaining



Adopt modern architecture for scalability



Adopt modern software development and deployment practices



Monolith codebase

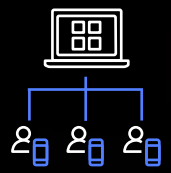


DevOps adoption

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Refactor: Rearchitect to microservices



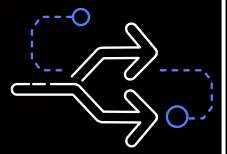
Teams can build, test, and release new functionality without depending on other teams



Catalyzes culture of ownership and autonomy and compartmentalizes complexity



Failures are localized to specific services and don’t risk uptime for the whole application



Granular and resource-efficient scaling without replicating the entire application

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But … microservices are challenging



Difficult to identify parts of the application that need to be extracted as separate services



Difficult to group functionality based on business domains and related processes



Need to use multiple tools to co-relate source code and runtime metrics



Need to perform manual work to carve out functionality and deploy it

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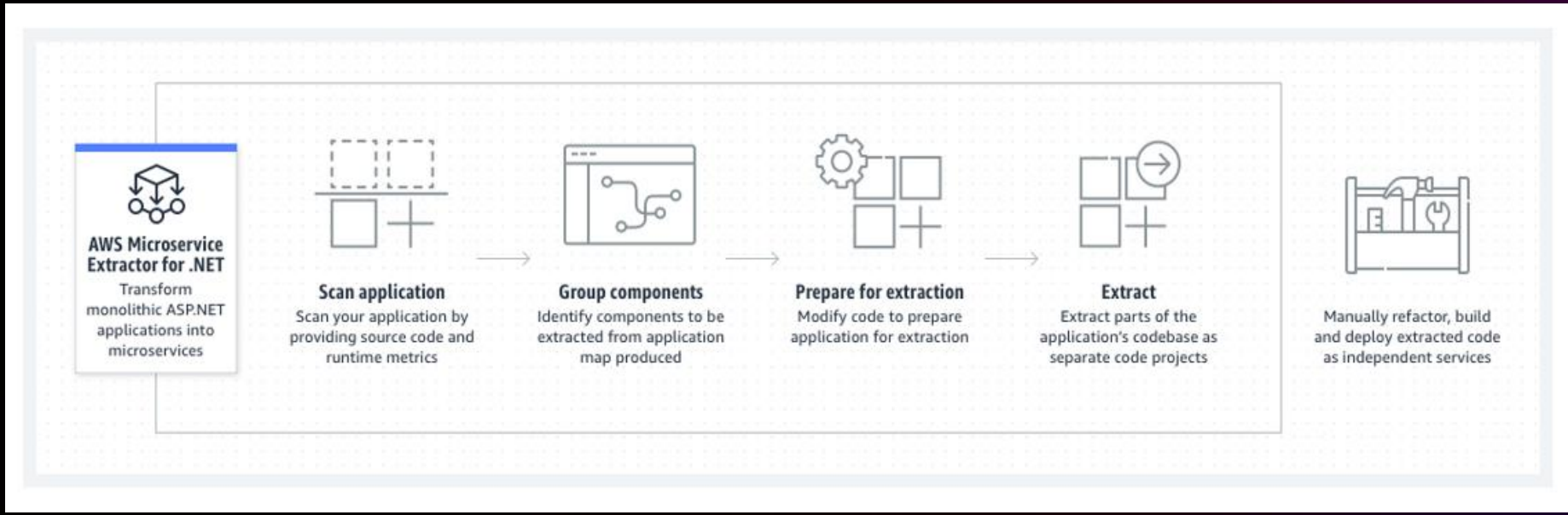
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How does AWS help?

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AWS Microservice Extractor for .NET

Microservice Extractor for .NET simplifies the process of refactoring older monolithic applications into smaller code projects to build a microservices-based architecture. Modernize and transform your applications with an assistive tool that analyzes source code and runtime metrics to create a visual representation of your application and its dependencies.



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Prerequisites

- .NET desktop tool
- Legacy .NET application must be written in C# and target >= .NET Framework 3.5
- .NET 6
- Source code and solution file (.sln)

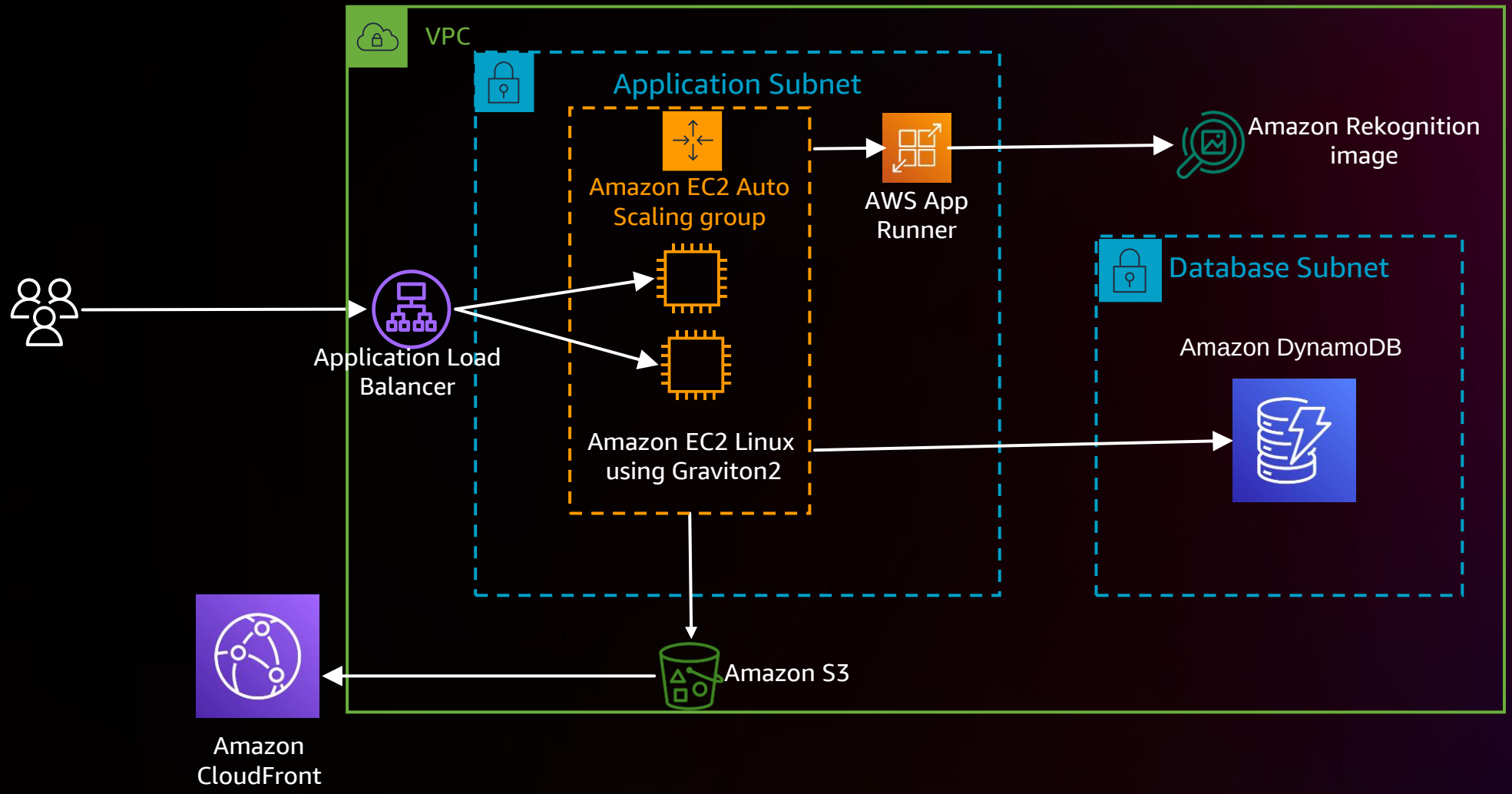


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Demo: Extract a service

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Architecture post microservice



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What's new in AWS Microservice Extractor

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Microservice Extractor enhancements in 2022

- Heuristics based refactoring recommendations
- AI-powered automated refactoring recommendations
- Extraction support for ASP.NET Web Forms and WCF applications
- Extract a microservice and port to cross-platform .NET at the same time
- Visualization support extended to all C# applications
- Faster onboarding (up to 10x faster)
- Support for .NET 7
- Option to extract as a library instead of HTTP Endpoint
- No need to install Porting Assistant
- Region expansion (Service endpoints now available in us-east-1, us-west-2, eu-west-3, af-south-1, ap-south-1, ap-southeast-1)

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Demo: The Media Catalog

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Next steps

- Port remaining .NET Framework code to .NET
- Deploy to containers
- Implement CI/CD pipelines for each microservice
- Break the application up further
- Employ someone to make the app look better

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Take away

- Use Porting Assistant to convert your .NET Framework Apps to .NET 6
- Use AWS Microservice Extractor to refactor to microservices
- Port first then extract for best results
- Use the AWS Toolkit for Visual Studio to deploy your applications
- Visit https://aws.amazon.com/dotnet for more resources

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Additional resources



Porting Assistant for .NET
Insight and assistance for porting from .NET Framework to .NET Core



AWS Microservice Extractor for .NET
Simplify refactoring .NET applications



AWS Toolkit for Visual Studio

Plugin for the Toolkit for Visual Studio IDE that makes it easier for you to develop, debug, and deploy .NET applications that use Amazon Web Services



.NET on AWS
.NET on AWS Developer center – Dive deeper with .NET application development on AWS

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Thank you!

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mooretom@amazon.com
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