aws INNOVATE

MODERN APPLICATIONS EDITION

27&28 October 2021

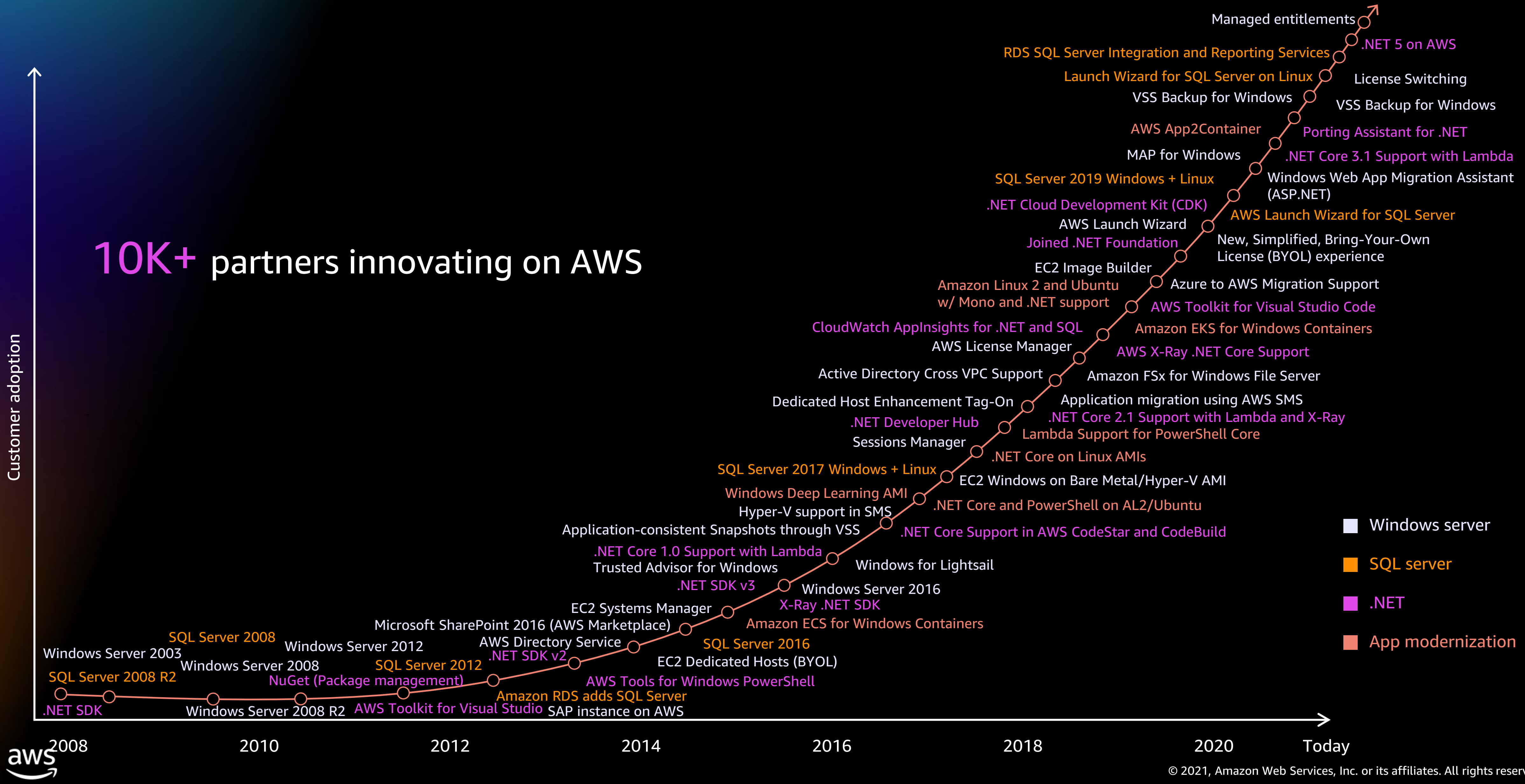
Rapidly modernize your Microsoft .NET applications on AWS

Sriwantha Attanayake

Senior Partner Solutions Architect
Amazon Web Services

Innovations for AWS customers

10K+ partners innovating on AWS



Agenda

- AWS App2Container
- AWS .NET porting assistant
- Babelfish

AWS App2Container

Why customers adopt containers

Reduced risk

Uniform security across environment, maintained with automation

Operational efficiency

Reduced operational burden by removing undifferentiated heavy lifting

Speed

Consistent environment that improves developer velocity

Agility

Automation that increases speed and ease of testing and iterating

Containerization of legacy applications

- Challenges
  - Manual or custom scripts-based build and deployment processes
  - Lack of domain knowledge on legacy applications
  - Lack of expertise in containers/cloud technologies
  - Busy with day-to-day operations – not a priority

Customer:

“I want to containerize my application with minimal effort!”

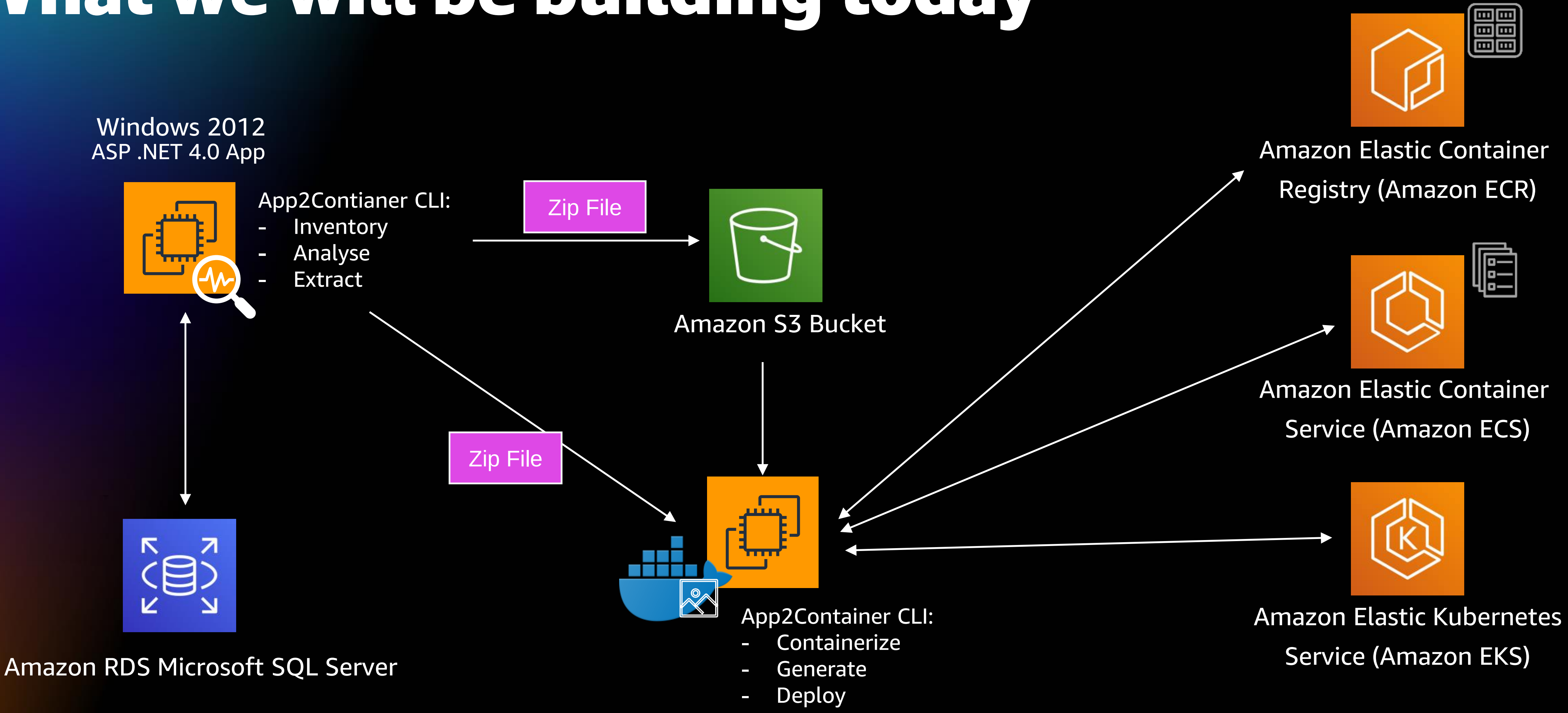
AWS App2Container accelerates application containerization

App2Container helps customers to transform their applications running in virtual machines into containers and easily deploy them to Amazon ECS or Amazon EKS with minimal effort

Benefits

- Legacy app containerization with minimal efforts
- Containerization at scale
- Best practices for containerization
- Opinionated AWS Deployment artifacts

What we will be building today



Windows 2012
ASP .NET 4.0 App

App2Contianer CLI:

- Inventory
- Analyse
- Extract

Zip File

Amazon S3 Bucket

Zip File

Amazon RDS Microsoft SQL Server

App2Container CLI:

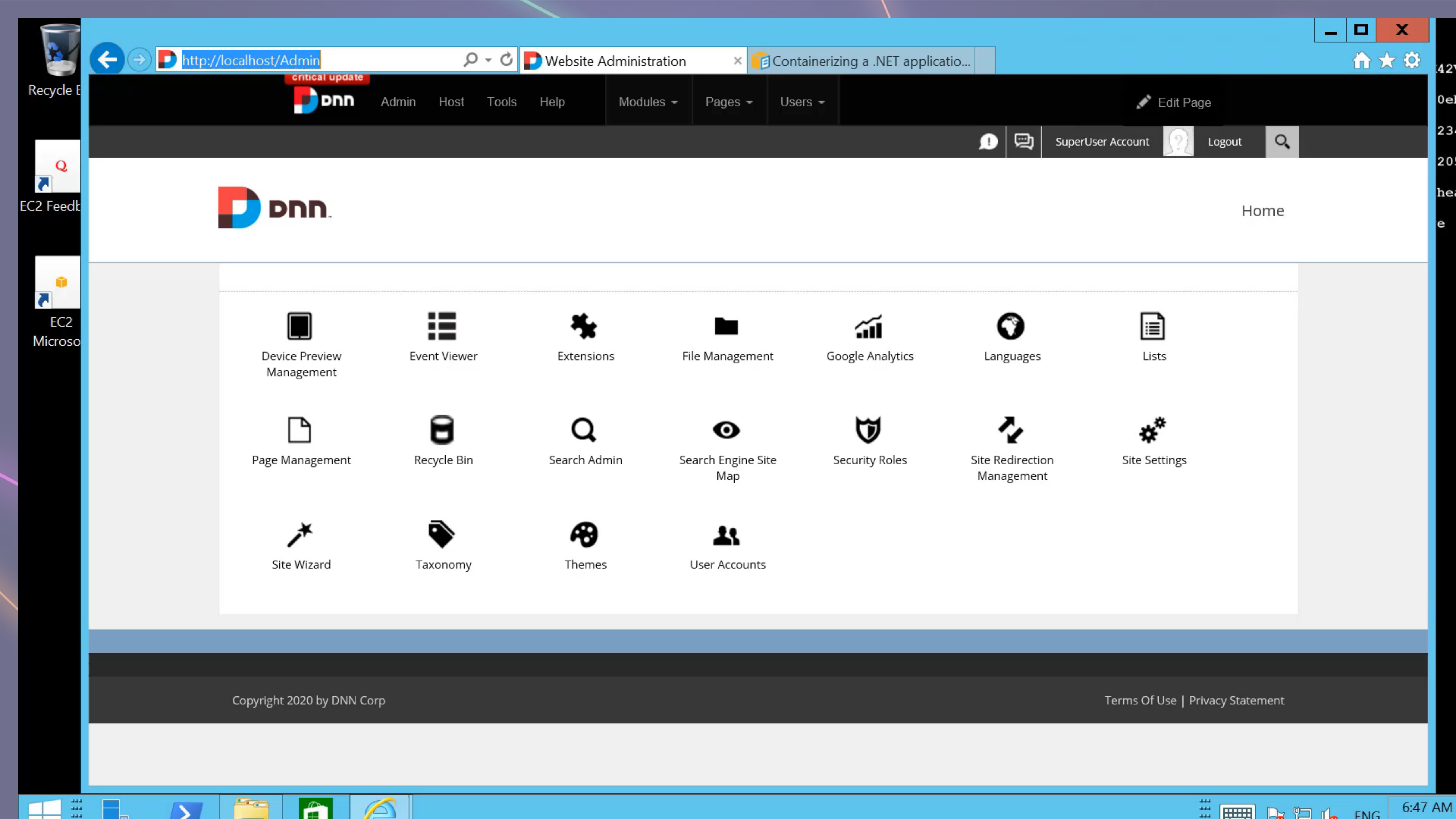
- Containerize
- Generate
- Deploy

Amazon Elastic Container Registry (Amazon ECR)

Amazon Elastic Container Service (Amazon ECS)

Amazon Elastic Kubernetes Service (Amazon EKS)

Demo



http://localhost/Admin

Porting Assistant for .NET

Re-factor: Port .NET framework to .NET Core

Why are customers looking to pursue this strategy?

- Microsoft license freedom: >30% saving on similar Linux instances
- Containerize .NET Core app and deploy using mature cloud-native tooling
- Performance improvement: 20-30% improvement in .NET Core on Linux

.NET 4.8 is the final full framework version of .NET

Client

Windows 7 SP1
Windows 8.1 Update
Windows 10 version 1607
Windows 10 version 1703
Windows 10 version 1709
Windows 10 version 1803
Windows 10 version 1809
Windows 10 version 1903

Server

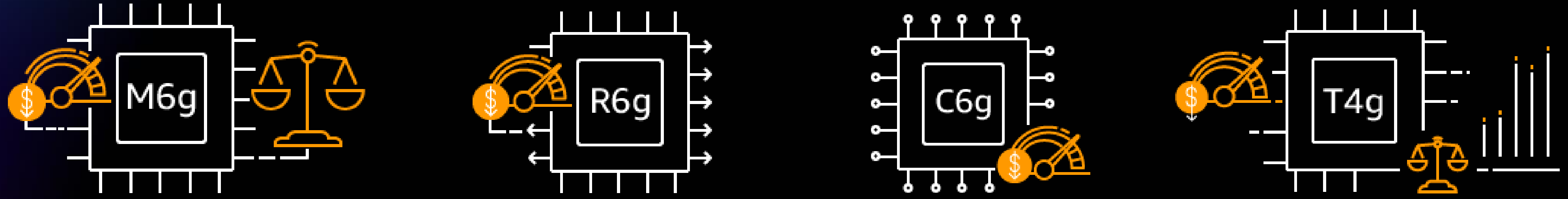
Windows Server 2008 R2 SP1
Windows Server 2012/R2
Windows Server 2016
Windows Server version 1803
Windows Server 2019
Windows Server version 1903

Support for .NET Framework 4, 4.5, and 4.5.1 ended on January 12, 2016. Customers and developers must have completed the in-place update to .NET Framework 4.5.2 by January 12, 2016 to continue receiving technical support and security updates.

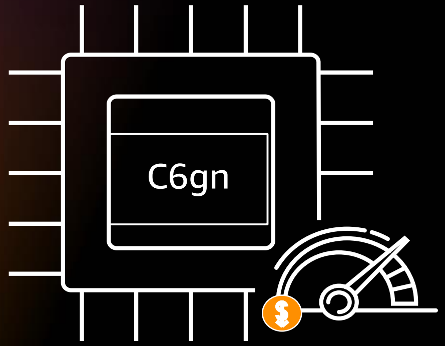
Beginning with version 4.5.2 and later, .NET Framework is defined as a component of the Windows operating system (OS). Components receive the same support as their parent products, therefore, .NET Framework 4.5.2 and later follows the lifecycle policy of the underlying Windows OS on which it is installed.

.NET Core ♡ ARM processors

New 6th Generation Amazon EC2 instances



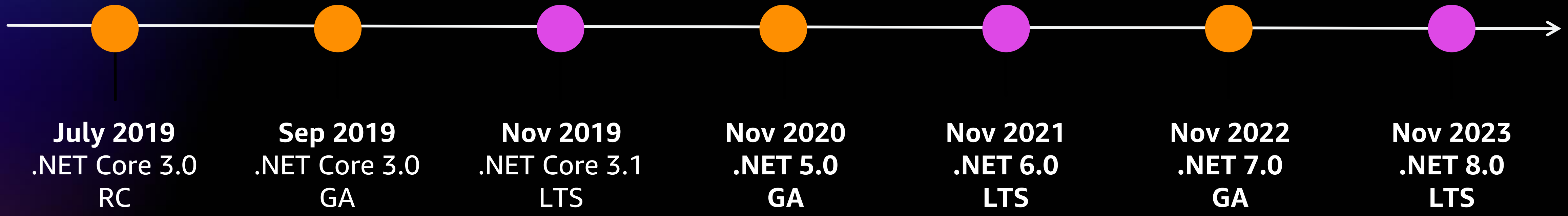
General purpose | **Memory optimized** | **Compute optimized** | **Burstable**



Powered by AWS Graviton2 Processors

Up to 40% better price performance over comparable current gen x86 instances

ARM64 Performance in .NET 5



July 2019
.NET Core 3.0
RC

Sep 2019
.NET Core 3.0
GA

Nov 2019
.NET Core 3.1
LTS

Nov 2020
.NET 5.0
GA

Nov 2021
.NET 6.0
LTS

Nov 2022
.NET 7.0
GA

Nov 2023
.NET 8.0
LTS

Porting Assistant for .NET

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

Scan

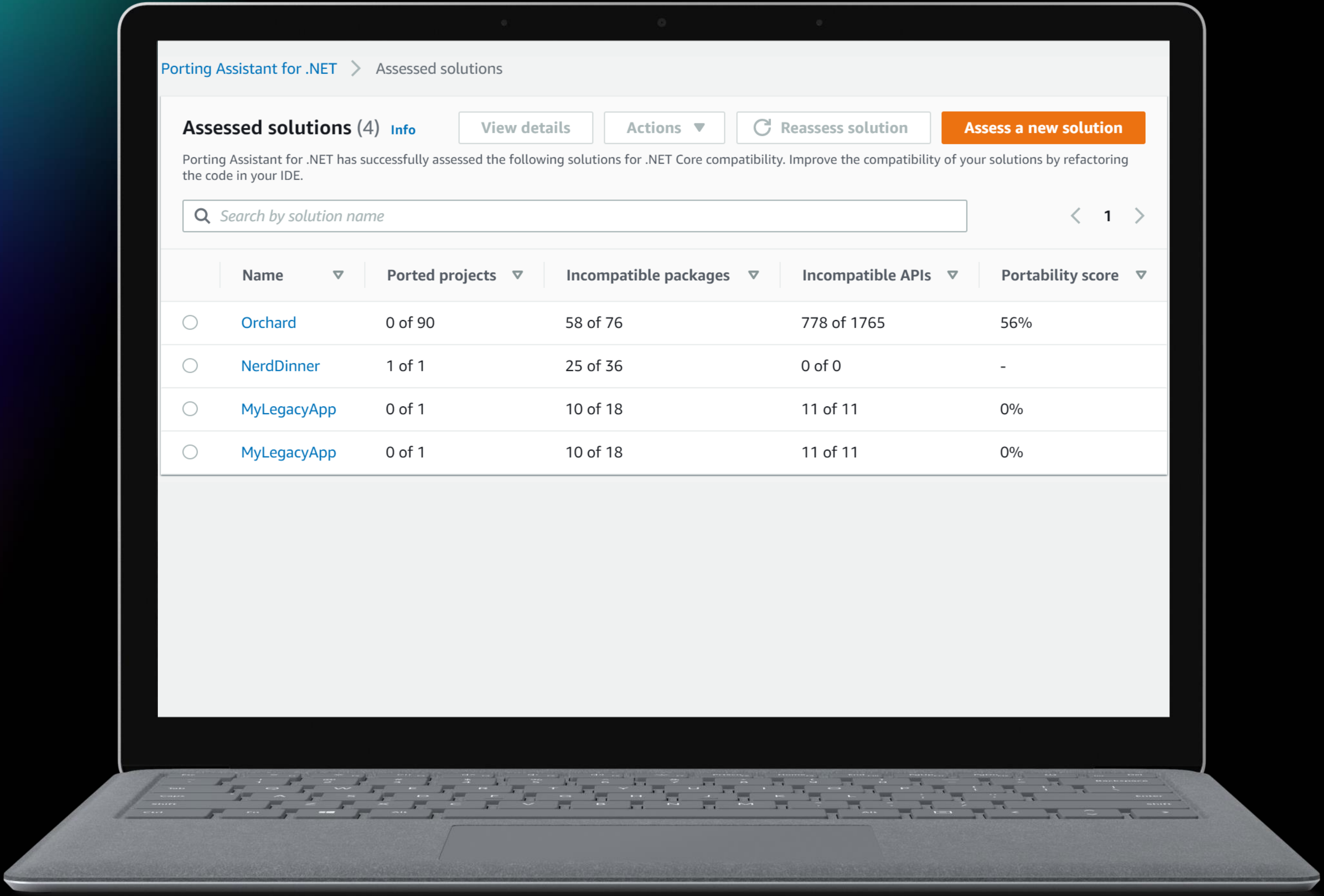
Scans .NET Framework applications to find APIs and NuGet Packages that are incompatible with .NET Core

Assessment report

Generates compatibility assessment and suggests available replacements

Assisted porting

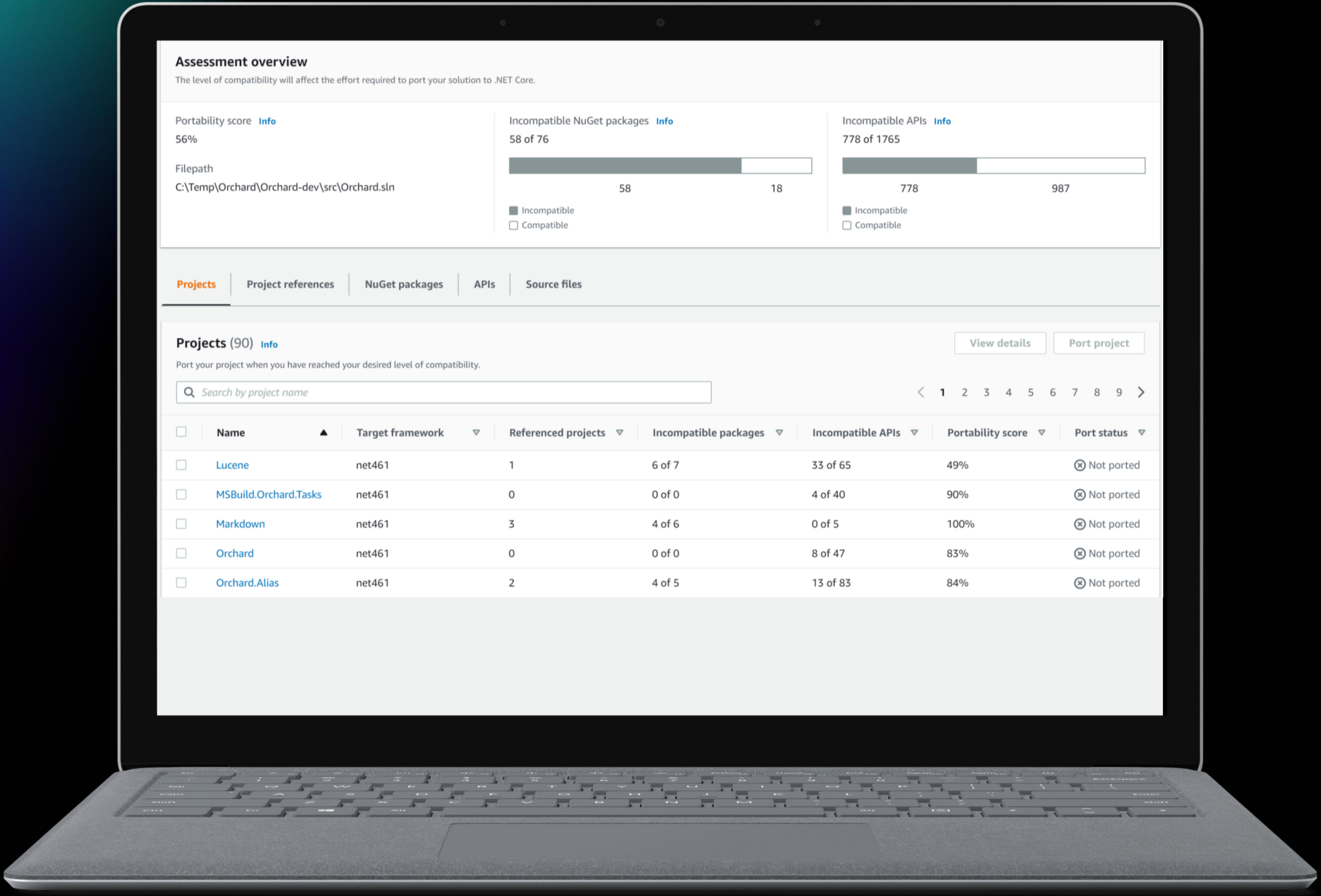
Updates packages and changes project reference files for you to start porting



Assessed solutions (4) Info

Porting Assistant for .NET has successfully assessed the following solutions for .NET Core compatibility. Improve the compatibility of your solutions by refactoring the code in your IDE.

	Name	Ported projects	Incompatible packages	Incompatible APIs	Portability score
○	Orchard	0 of 90	58 of 76	778 of 1765	56%
○	NerdDinner	1 of 1	25 of 36	0 of 0	-
○	MyLegacyApp	0 of 1	10 of 18	11 of 11	0%
○	MyLegacyApp	0 of 1	10 of 18	11 of 11	0%



Assessment overview

The level of compatibility will affect the effort required to port your solution to .NET Core.

Portability score Info
56%

Filepath
C:\Temp\Orchard\Orchard-dev\src\Orchard.sln

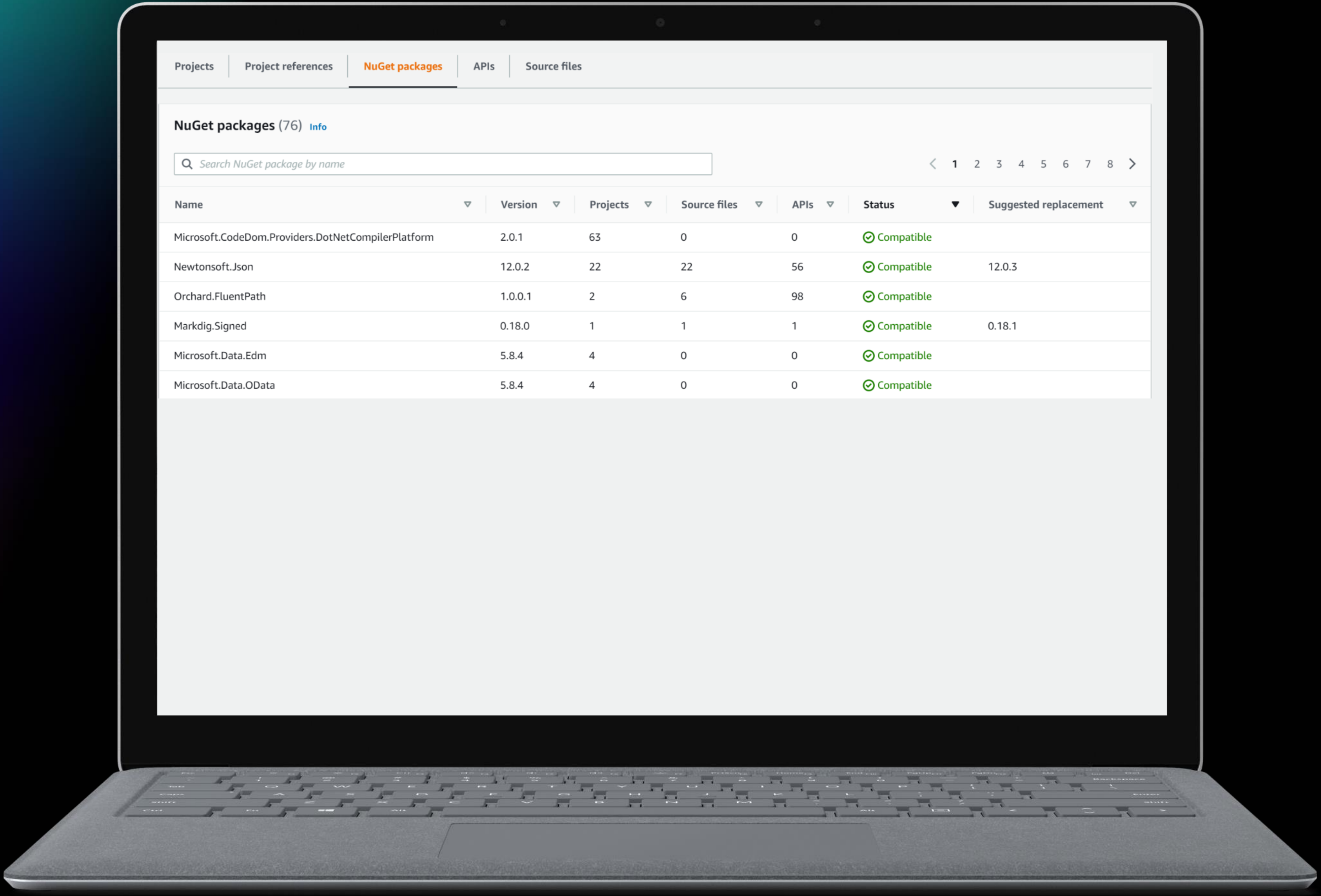
Incompatible NuGet packages Info
58 of 76

Incompatible APIs Info
778 of 1765

Projects (90) Info

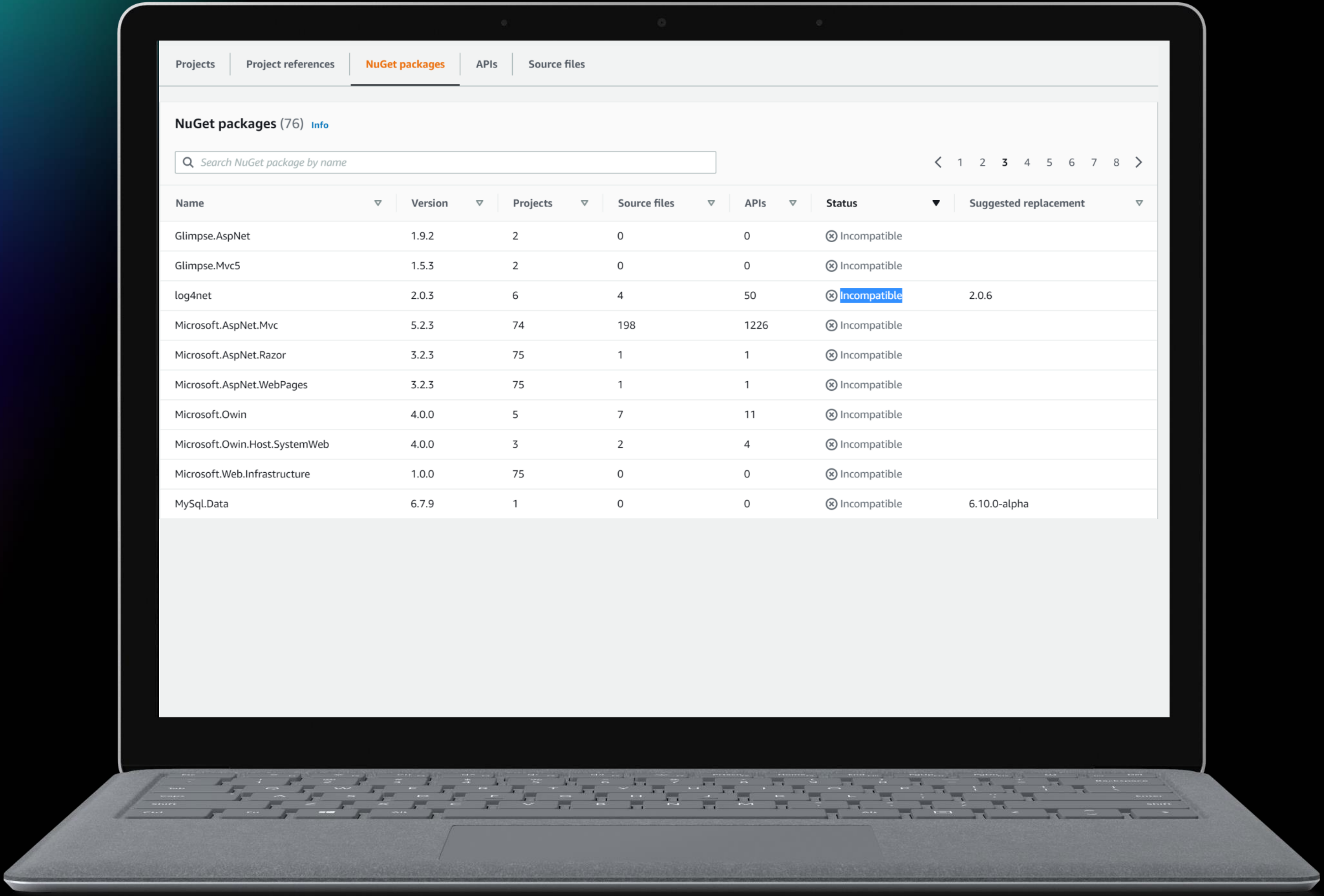
Port your project when you have reached your desired level of compatibility.

□	Name ▲	Target framework ▽	Referenced projects ▽	Incompatible packages ▽	Incompatible APIs ▽	Portability score ▽	Port status ▽
□	Lucene	net461	1	6 of 7	33 of 65	49%	⊗ Not ported
□	MSBuild.Orchard.Tasks	net461	0	0 of 0	4 of 40	90%	⊗ Not ported
□	Markdown	net461	3	4 of 6	0 of 5	100%	⊗ Not ported
□	Orchard	net461	0	0 of 0	8 of 47	83%	⊗ Not ported
□	Orchard.Alias	net461	2	4 of 5	13 of 83	84%	⊗ Not ported



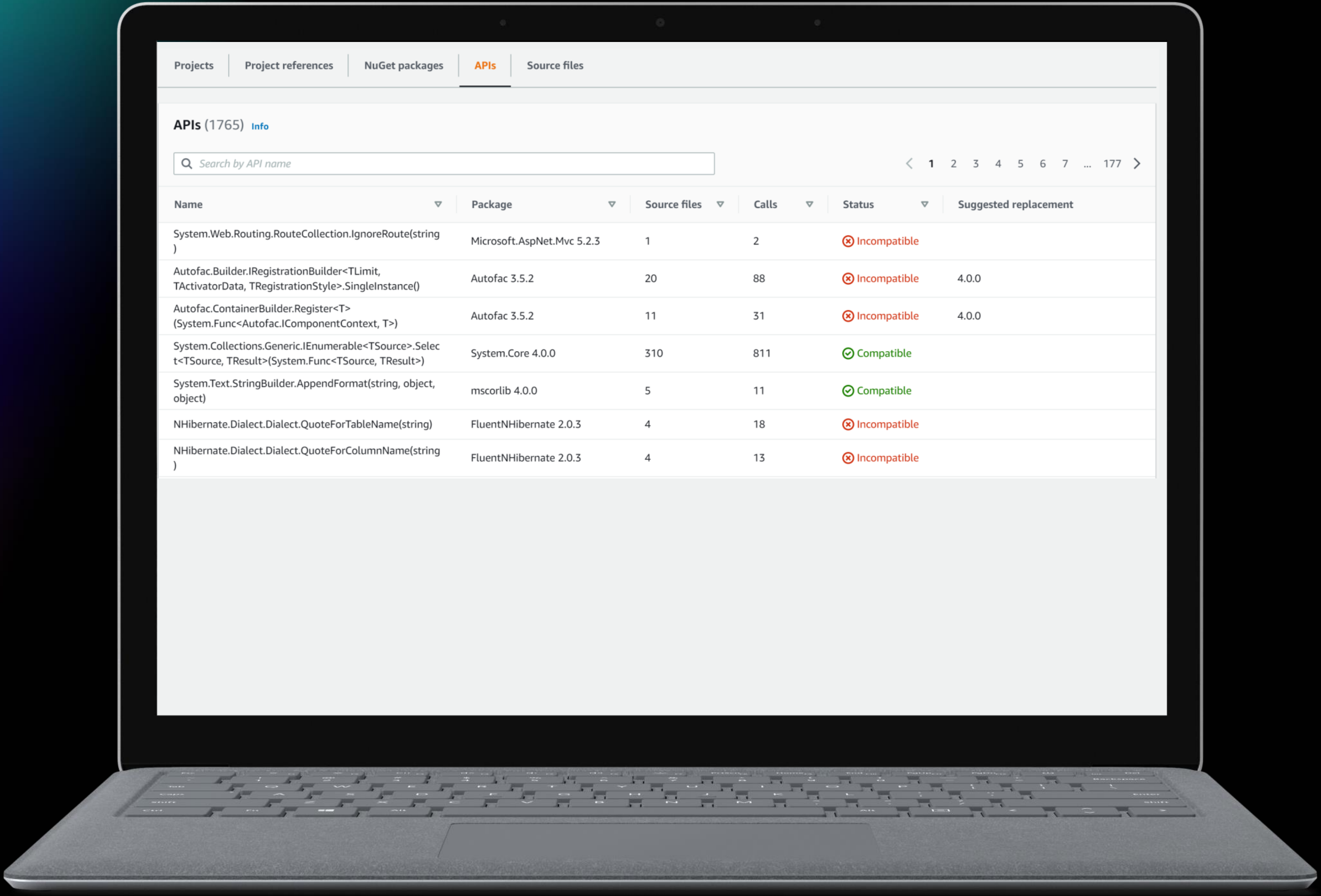
NuGet packages (76) Info

Name	Version	Projects	Source files	APIs	Status	Suggested replacement
Microsoft.CodeDom.Providers.DotNetCompilerPlatform	2.0.1	63	0	0	✓ Compatible	
Newtonsoft.Json	12.0.2	22	22	56	✓ Compatible	12.0.3
Orchard.FluentPath	1.0.0.1	2	6	98	✓ Compatible	
Markdig.Signed	0.18.0	1	1	1	✓ Compatible	0.18.1
Microsoft.Data.Edm	5.8.4	4	0	0	✓ Compatible	
Microsoft.Data.OData	5.8.4	4	0	0	✓ Compatible	



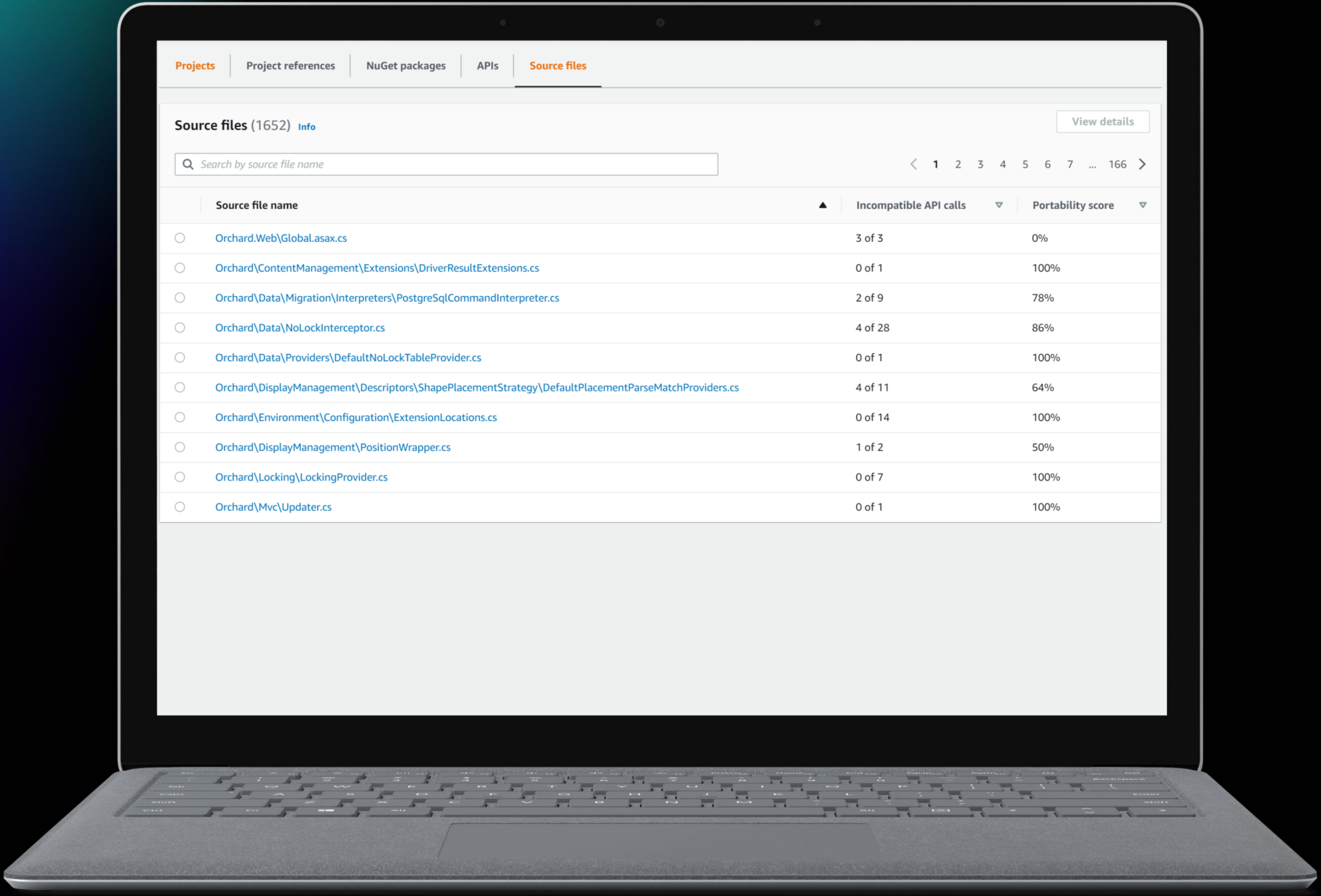
NuGet packages (76)

Name	Version	Projects	Source files	APIs	Status	Suggested replacement
Glimpse.AspNet	1.9.2	2	0	0	⊗ Incompatible	
Glimpse.Mvc5	1.5.3	2	0	0	⊗ Incompatible	
log4net	2.0.3	6	4	50	⊗ Incompatible	2.0.6
Microsoft.AspNet.Mvc	5.2.3	74	198	1226	⊗ Incompatible	
Microsoft.AspNet.Razor	3.2.3	75	1	1	⊗ Incompatible	
Microsoft.AspNet.WebPages	3.2.3	75	1	1	⊗ Incompatible	
Microsoft.Owin	4.0.0	5	7	11	⊗ Incompatible	
Microsoft.Owin.Host.SystemWeb	4.0.0	3	2	4	⊗ Incompatible	
Microsoft.Web.Infrastructure	1.0.0	75	0	0	⊗ Incompatible	
MySql.Data	6.7.9	1	0	0	⊗ Incompatible	6.10.0-alpha



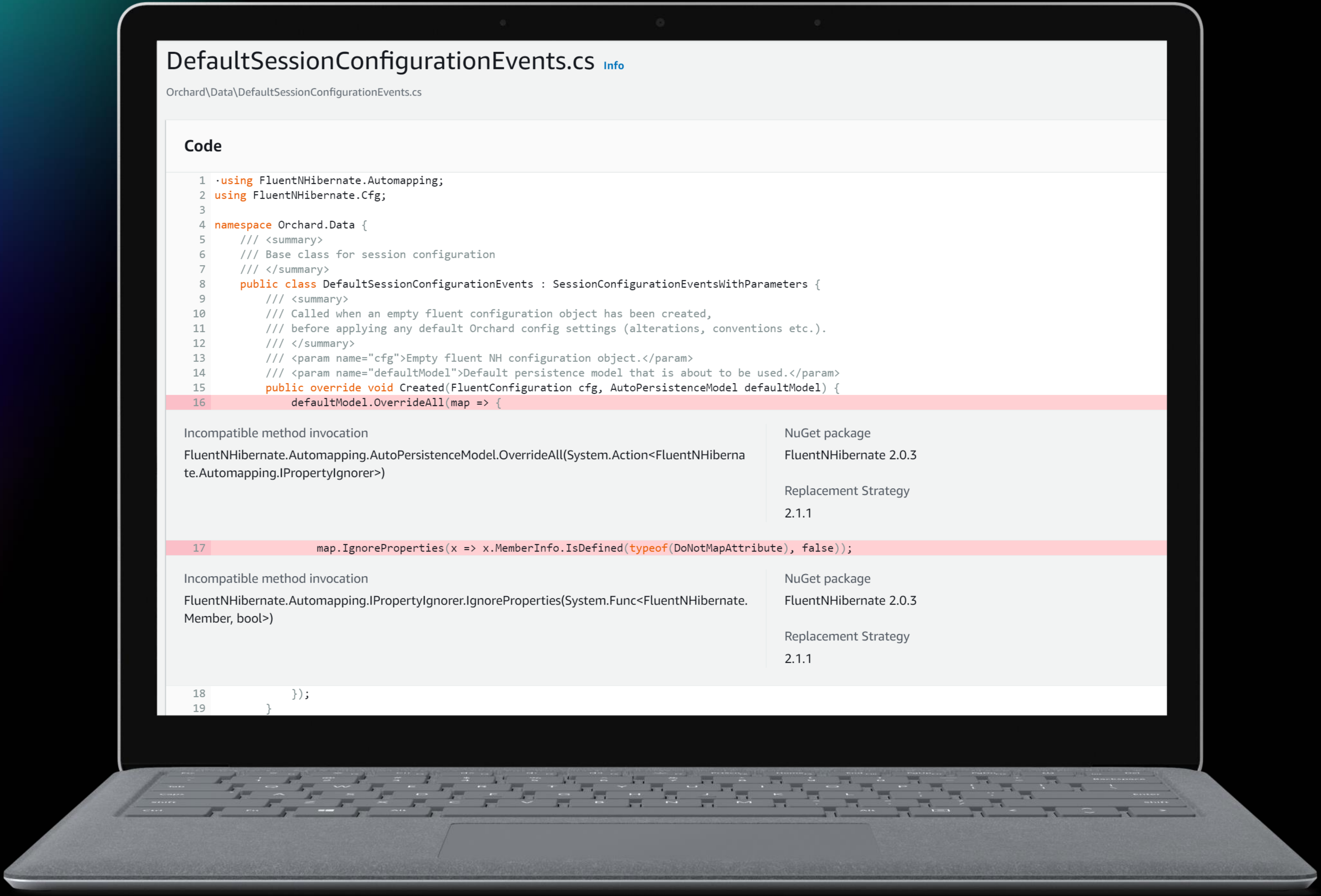
APIs (1765) Info

Name	Package	Source files	Calls	Status	Suggested replacement
System.Web.Routing.RouteCollection.IgnoreRoute(string)	Microsoft.AspNet.Mvc 5.2.3	1	2	⊗ Incompatible	
Autofac.Builder.IRegistrationBuilder<TLimit, TActivatorData, TRegistrationStyle>.SingleInstance()	Autofac 3.5.2	20	88	⊗ Incompatible	4.0.0
Autofac.ContainerBuilder.Register<T>(System.Func<Autofac.IComponentContext, T>)	Autofac 3.5.2	11	31	⊗ Incompatible	4.0.0
System.Collections.Generic.IEnumerable<TSource>.Select<TSource, TResult>(System.Func<TSource, TResult>)	System.Core 4.0.0	310	811	✓ Compatible	
System.Text.StringBuilder.AppendFormat(string, object, object)	mscorlib 4.0.0	5	11	✓ Compatible	
NHibernate.Dialect.Dialect.QuoteForTableName(string)	FluentNHibernate 2.0.3	4	18	⊗ Incompatible	
NHibernate.Dialect.Dialect.QuoteForColumnName(string)	FluentNHibernate 2.0.3	4	13	⊗ Incompatible	



Source files (1652) Info

	Source file name ▲	Incompatible API calls ▽	Portability score ▽
○	Orchard.Web\Global.asax.cs	3 of 3	0%
○	Orchard\ContentManagement\Extensions\DriverResultExtensions.cs	0 of 1	100%
○	Orchard\Data\Migration\Interpreters\PostgreSqlCommandInterpreter.cs	2 of 9	78%
○	Orchard\Data\NoLockInterceptor.cs	4 of 28	86%
○	Orchard\Data\Providers\DefaultNoLockTableProvider.cs	0 of 1	100%
○	Orchard\DisplayManagement\Descriptors\ShapePlacementStrategy\DefaultPlacementParseMatchProviders.cs	4 of 11	64%
○	Orchard\Environment\Configuration\ExtensionLocations.cs	0 of 14	100%
○	Orchard\DisplayManagement\PositionWrapper.cs	1 of 2	50%
○	Orchard\Locking\LockingProvider.cs	0 of 7	100%
○	Orchard\Mvc\Updater.cs	0 of 1	100%



DefaultSessionConfigurationEvents.cs

Orchard\Data\DefaultSessionConfigurationEvents.cs

Code

```
using FluentNHibernate.Automapping;
using FluentNHibernate.Cfg;

namespace Orchard.Data {
    /// <summary>
    /// Base class for session configuration
    /// </summary>
    public class DefaultSessionConfigurationEvents : SessionConfigurationEventsWithParameters {
        /// <summary>
        /// Called when an empty fluent configuration object has been created,
        /// before applying any default Orchard config settings (alterations, conventions etc.).
        /// </summary>
        /// <param name="cfg">Empty fluent NH configuration object.</param>
        /// <param name="defaultModel">Default persistence model that is about to be used.</param>
        public override void Created(FluentConfiguration cfg, AutoPersistenceModel defaultModel) {
            defaultModel.OverrideAll(map => {
```

Incompatible method invocation

FluentNHibernate.Automapping.AutoPersistenceModel.OverrideAll(System.Action<FluentNHibernate.Automapping.IPropertyIgnorer>)

NuGet package

FluentNHibernate 2.0.3

Replacement Strategy

2.1.1

```
                map.IgnoreProperties(x => x.MemberInfo.IsDefined(typeof(DoNotMapAttribute), false));
```

Incompatible method invocation

FluentNHibernate.Automapping.IPropertyIgnorer.IgnoreProperties(System.Func<FluentNHibernate.Member, bool>)

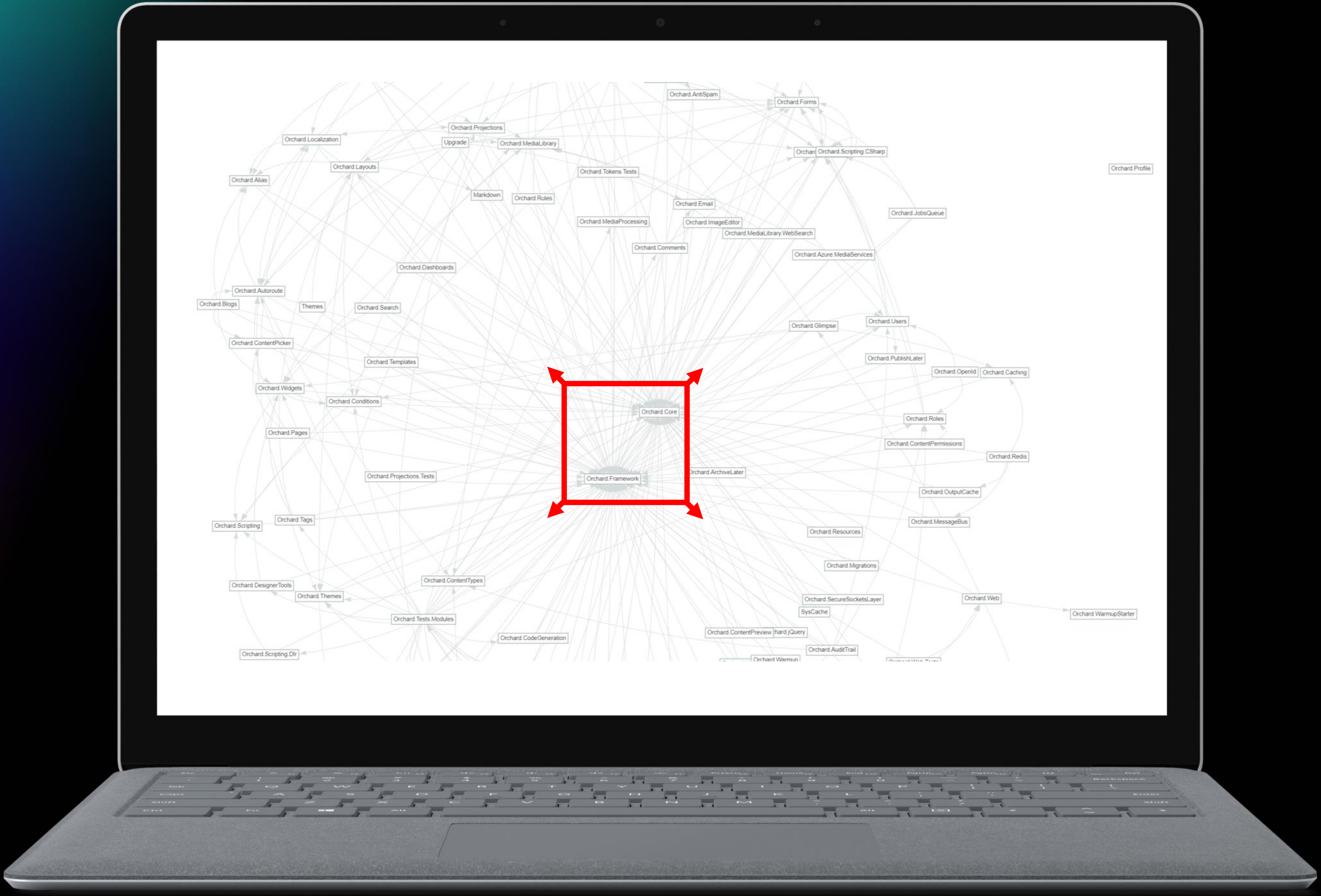
NuGet package

FluentNHibernate 2.0.3

Replacement Strategy

2.1.1

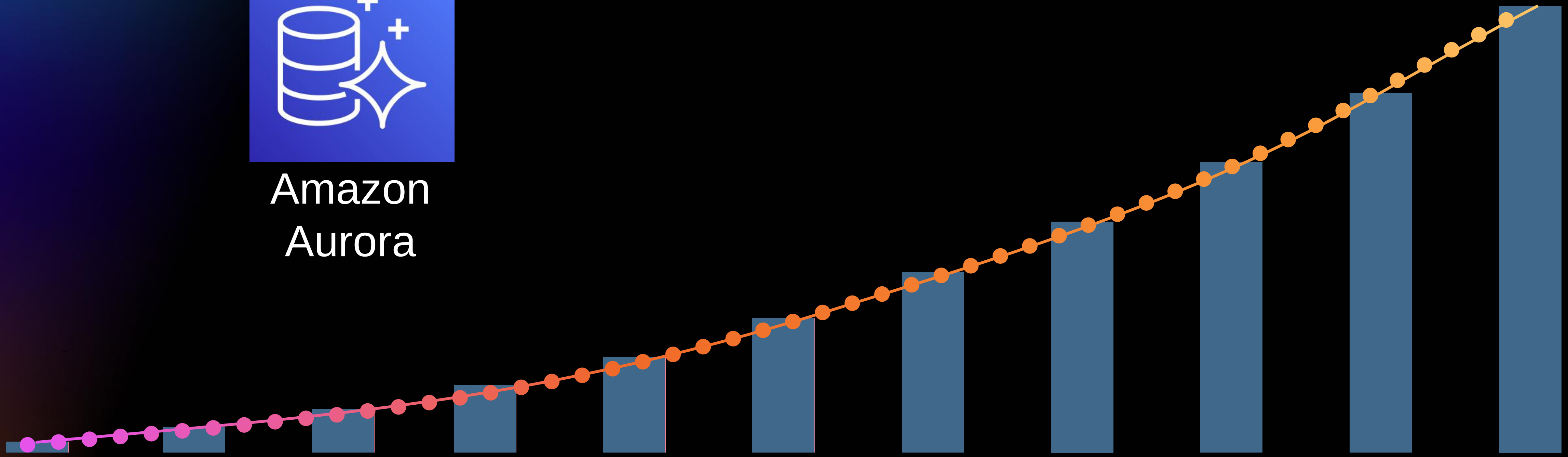
```
            });
        }
```


Orchard.AntiSpam
Orchard.Forms
Orchard.Projections
Orchard.Localization
Upgrade
Orchard.MediaLibrary
Orchard Orchard.Scripting.CSharp
Orchard.Profile
Orchard.Layouts
Orchard.Alias
Orchard.Tokens.Tests
Markdown
Orchard.Rules
Orchard.Email
Orchard.JobsQueue
Orchard.MediaProcessing
Orchard.ImageEditor
Orchard.MediaLibrary.WebSearch
Orchard.Comments
Orchard.Azure.MediaServices
Orchard.Dashboards
Orchard.Autoroute
Orchard.Blogs
Themes
Orchard.Search
Orchard.Glimpse
Orchard.Users
Orchard.ContentPicker
Orchard.PublishLater
Orchard.Templates
Orchard.OpenId
Orchard.Caching
Orchard.Widgets
Orchard.Conditions
Orchard.Core
Orchard.Roles
Orchard.Pages
Orchard.ContentPermissions
Orchard.Redis
Orchard.Projections.Tests
Orchard.Framework
Orchard.ArchiveLater
Orchard.OutputCache
Orchard.Tags
Orchard.Scripting
Orchard.MessageBus
Orchard.Resources
Orchard.Migrations
Orchard.ContentTypes
Orchard.DesignerTools
Orchard.Themes
Orchard.SecureSocketsLayer
Orchard.Web
SysCache
Orchard.WarmupStarter
Orchard.Tests.Modules
Orchard.CodeGeneration
Orchard.ContentPreview
Orchard.jQuery
Orchard.AuditTrail
Orchard.Scripting.Dlr
Orchard.Warmup

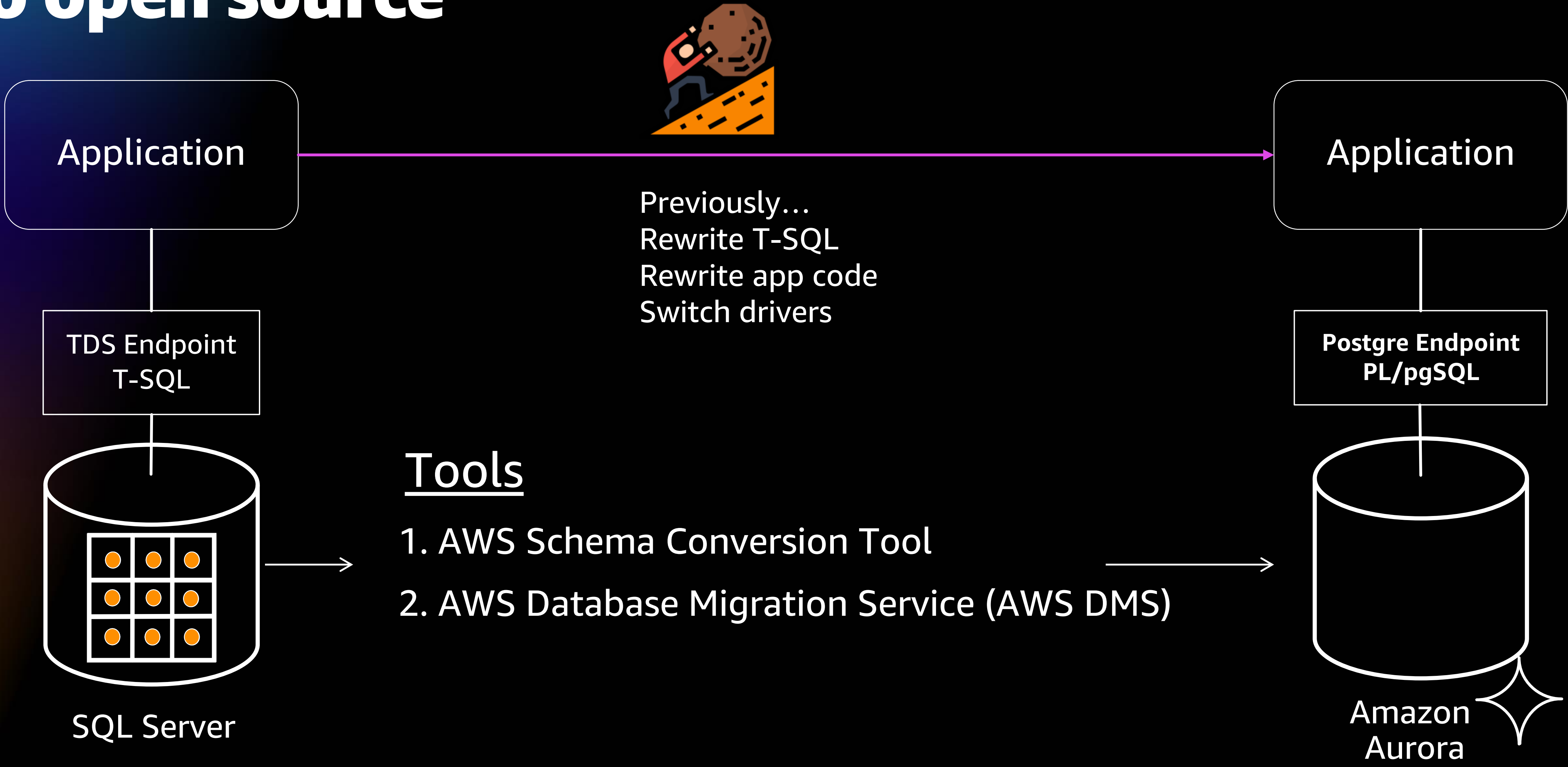
Amazon Babelfish

Databases moving to the cloud

Amazon Aurora



Challenges in migrating from commercial to open source

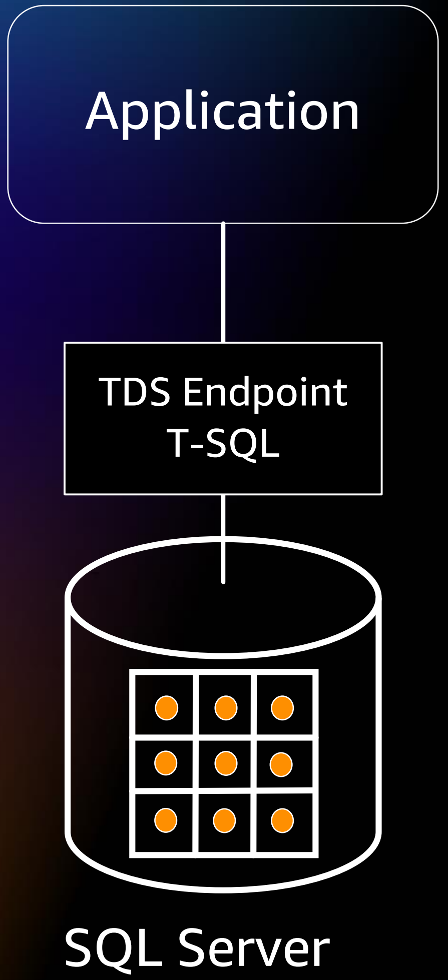


Previously…
Rewrite T-SQL
Rewrite app code
Switch drivers

Tools

1. AWS Schema Conversion Tool
2. AWS Database Migration Service (AWS DMS)

Application basics



```
--example T-SQL application syntax

CREATE TABLE dbo.Products
    (ProductID INT PRIMARY KEY NOT NULL,
    ProductName VARCHAR(25) NOT NULL,
    Price MONEY NULL)
```

```
INSERT dbo.Products
    (ProductID, ProductName, Price)
    VALUES (1, ‘Clamp’, 12.8182)
```

ProductID	ProductName	Price
1	Clamp	12.8182

Application correctness

```
--example T-SQL application syntax

SELECT ProductID, ProductName, Price
    FROM dbo.Products
    WHERE Price < 30
```

ProductID	ProductName	Price
1	Clamp	$12.8182

SQL Server

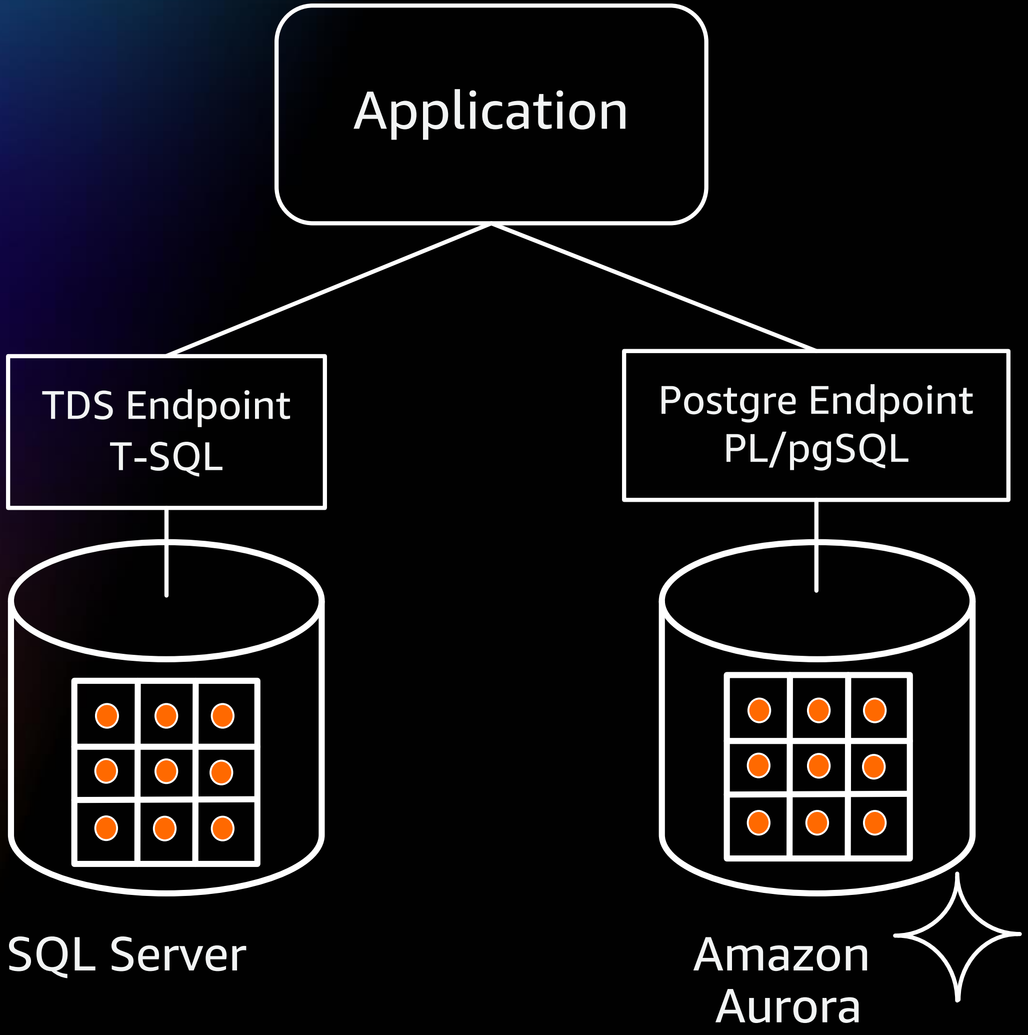
```
--example PGSQL application syntax

SELECT ProductID, ProductName, Price
    FROM Products
    WHERE Price < 30
```

ProductID	ProductName	Price
1	Clamp	$12.82

Amazon Aurora

Imagine if you could…



Legacy application code remains written for SQL Server

Client drivers do not need to change

New application code written directly to PostgreSQL

Introducing Babelfish for Amazon Aurora PostgreSQL

NEW

PREVIEW

Run SQL Server applications on PostgreSQL with little to no code changes

Keep existing queries

Translation layer enables Amazon Aurora PostgreSQL to understand Microsoft SQL Server’s proprietary T-SQL

Accelerate migrations

Lower risk and complete migrations faster, saving you months to years of work

Freedom to innovate

Run T-SQL code side-by-side with new open source functionality and continue developing with familiar tools

Babelfish for PostgreSQL (Open-Source Project)

NEW

PREVIEW

Coming in 2021, an open-source project for Babelfish source code

Customize and add new features

Contribute to help steer the direction of Babelfish

Apache 2.0 license

Use it for any purpose, innovate and distribute your modifications with confidence

Available on GitHub in 2021

Is community-driven and provides transparency into the feature roadmap

Babelfish for PostgreSQL design tenets

GUIDING PRINCIPLES

No compromises on correctness
Database calls either work or return an error

Wire protocol compatibility
Applications work without changing database drivers

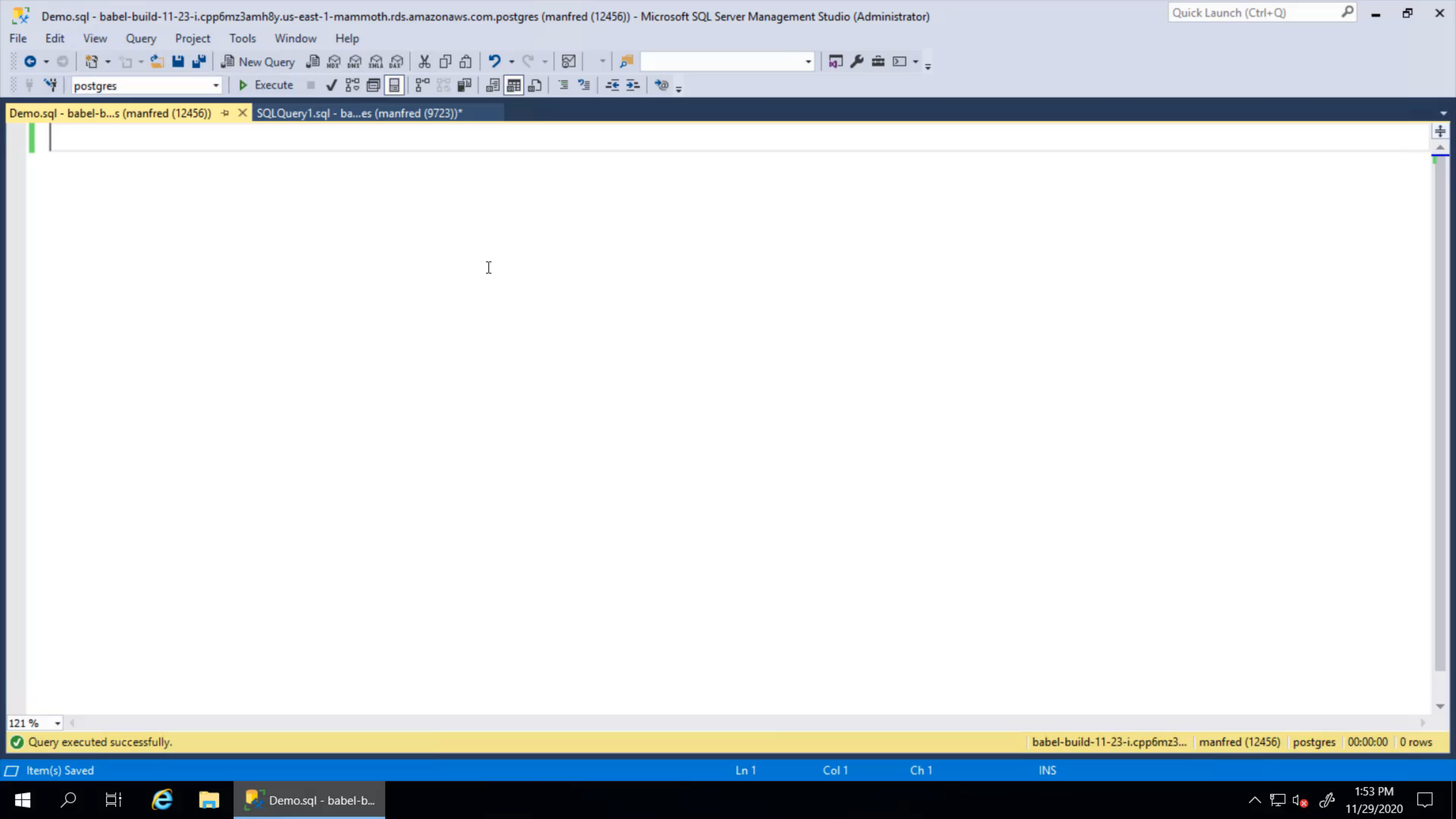
Interoperability
Use PostgreSQL functionality from T-SQL and
T-SQL functionality from PostgreSQL code

What about…

SQL SERVER-SPECIFIC FEATURES?

- Triggers and stored procedures?
- Cursors?
- Nested transaction?
- Table valued functions?
- Data types (money, SQL variant)?

Demo



Demo.sql - babel-build-11-23-i.cpp6mz3amh8y.us-east-1-mammoth.rds.amazonaws.com.postgres (manfred (12456)) - Microsoft SQL Server Management Studio (Administrator)

Query executed successfully.

babel-build-11-23-i.cpp6mz3... manfred (12456) postgres 00:00:00 0 rows

Item(s) Saved

Partner funding

Assess	Migrate	Modernize	MAP Integration
Optimization and License Assessment (OLA)	Windows Rapid Migration Program (WRMP)	Windows Modernization Program (WMP)	Migration Acceleration Program (MAP) for Windows

What did we learn today?

- AWS App2Container
- AWS .NET porting assistant
- Babelfish

Visit the Modern Applications Resource Hub for more resources

Dive deeper with these resources to help you develop an effective plan for your modernization journey.

- Build modern applications on AWS e-book
- Build mobile and web apps faster e-book
- Modernize today with containers on AWS e-book
- Adopting a modern Dev+Ops model e-book
- Modern apps need modern ops e-book
- Determining the total cost of ownership: Comparing Serverless and Server-based technologies paper
- Continuous learning, continuous modernization e-book
- … and more!

https://bit.ly/3yfOvbK

Visit resource hub »

AWS Training and Certification

Accelerate modernization with continuous learning

Free digital courses, including:
Architecting serverless solutions
Getting started with DevOps on AWS

Earn an industry-recognized credential:
AWS Certified Developer – Associate
AWS Certified DevOps – Professional

Hands-on classroom training (available virtually) including:
Running containers on Amazon Elastic Kubernetes Service (Amazon EKS)
Advanced developing on AWS

Create a self-paced learning roadmap
AWS ramp-up guide - Developer
AWS ramp-up guide - DevOps

Take Developer and DevOps training today

Learn more about Modernization training for you and your team

Thank you for attending AWS Innovate Modern Applications Edition

We hope you found it interesting! A kind reminder to **complete the survey.**
Let us know what you thought of today's event and how we can improve the event experience for you in the future.

- aws-apj-marketing@amazon.com
- twitter.com/AWSCloud
- facebook.com/AmazonWebServices
- youtube.com/user/AmazonWebServices
- slideshare.net/AmazonWebServices
- twitch.tv/aws

Thank you!

https://www.linkedin.com/in/sriwantha