.NET 7.0

Release Notes for .NET 7.0 RPM packages

Last Updated: 2024-02-14

Legal Notice

Abstract

The Release Notes for .NET 7.0 RPM packages provide high-level coverage of the features and functionality that comprise the .NET 7.0 platform and document known problems in this release.

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MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code, documentation, and web properties. We are beginning with these four terms: master, slave, blacklist, and whitelist. Because of the enormity of this endeavor, these changes will be implemented gradually over several upcoming releases. For more details, see our CTO Chris Wright's message.

PROVIDING FEEDBACK ON RED HAT DOCUMENTATION

We appreciate your feedback on our documentation. Let us know how we can improve it.

Submitting comments on specific passages

1. View the documentation in the **Multi-page HTML** format and ensure that you see the **Feedback** button in the upper right corner after the page fully loads.
2. Use your cursor to highlight the part of the text that you want to comment on.
3. Click the **Add Feedback** button that appears near the highlighted text.
4. Add your feedback and click **Submit**.

Submitting feedback through Bugzilla (account required)

1. Log in to the Bugzilla website.
2. Select the correct version from the **Version** menu.
3. Enter a descriptive title in the **Summary** field.
4. Enter your suggestion for improvement in the **Description** field. Include links to the relevant parts of the documentation.
5. Click **Submit Bug**.

CHAPTER 1. AVAILABILITY

Red Hat provides a distribution of .NET that enables developers to create applications using the C#, Visual Basic, and F# languages and then deploy them on Red Hat Enterprise Linux (RHEL), Red Hat OpenShift Container Platform, or other platforms. A no-cost Red Hat Enterprise Linux Developer Subscription is available, including a full suite of tools for container development.

- For RHEL 8.7 and later and RHEL 9.1 and later, .NET 7.0 is available as the following RPMs in the AppStream repositories:

  dotnet-sdk-7.0

  Includes the .NET 7.0 Software Development Kit (SDK) and all the runtimes.

  aspnetcore-runtime-7.0

  The ASP .NET Core runtime. This includes the .NET runtime and the ASP .NET Core runtime. Install this package to run ASP .NET Core-based applications.

  dotnet-runtime-7.0

  Only the .NET 7.0 Runtime. Install this to just use the Runtime without the SDK.

The AppStream repositories are enabled by default in RHEL 8 and RHEL 9.

- .NET 7.0 is available for **aarch64**, **ppc64le**, **s390x**, and **x86_64** architectures on RHEL 8, RHEL 9, and OpenShift Container Platform.
  Full instructions for installing .NET 7.0 on RHEL 8 are available in the Getting started with .NET on RHEL 8 guide.

  Full instructions for installing .NET 7.0 on RHEL 9 are available in the Getting started with .NET on RHEL 9 guide.

CHAPTER 2. OVERVIEW

.NET is a general purpose, modular, cross-platform, and open source implementation of .NET that features automatic memory management and modern programming languages. It allows users to build high-quality applications efficiently.

.NET 7.0 is available on RHEL 8.7 and later, RHEL 9.1 and later.

.NET 7.0 is a Standard Term Support (STS) release. STS releases receive the same fixes and are updated with the same features as Long Term Support (LTS) releases. STS releases reach End of Support after around 18 months. For more information, see the Life Cycle and Support Policies for the .NET Program.

.NET offers:

- The ability to follow a microservices-based approach, where some components are built with .NET and others with Java or JavaScript, but all can run on a common, supported platform in RHEL.
- The capacity to more easily develop new .NET workloads on Microsoft Windows. You can deploy and run on either RHEL or Windows Server.
- A heterogeneous data center, where the underlying infrastructure is capable of running .NET applications without having to rely solely on Windows Server.

CHAPTER 3. FEATURES AND BENEFITS

3.1. CURRENT FEATURES AND BENEFITS

.NET 7.0 offers the following features and benefits.

- Runtime and framework libraries
  .NET consists of the runtime and the framework libraries as well as compilers, build tools, tools to fetch NuGet packages, and a command-line interface to tie everything together. Benefits include:
  - Automatic memory management
  - Type safety
  - Delegates and lambdas
  - Generic types
  - Language Integrated Query (LINQ)
  - Async programming
  - Native interoperability
  - Source generators
- .NET 7.0 supports developing applications using ASP.NET Core 7.0 and EF Core 7.0, which bring benefits such as:
  - Lightweight and modular HTTP request pipeline
  - Ability to host on a web server or self-host in your own process
  - Built on .NET, which supports true side-by-side app versioning
  - Integrated support for creating and using NuGet packages
  - Single aligned web stack for web UI and web APIs
  - Cloud-ready environment-based configuration
  - Built-in support for dependency injection
  - Tools that simplify modern web development

3.2. NEW FEATURES AND BENEFITS

.NET 7.0 continues to broaden its support and tools for application development in an open source environment. The latest version of .NET includes the following improvements:

- **IBM Power support**: In addition to the **x64_64** (64-bit Intel/AMD), **aarch64** (64-bit ARM) and **s390x** (64-bit IBM Z) architectures, .NET 7.0 introduces support for the **ppc64le** (64-bit IBM Power) architecture on RHEL 8.7 and later and RHEL 9.1 and later.
- **C# updated to C#11** Includes new language versions C# 11.

- **Support for building completely native console applications**
- **Performance improvements**: Many performance improvements were made throughout the base libraries, GC, and JIT. A new source generator for regular expressions eliminates the cost of compiling (or interpreting) regular expressions at run-time.
- **New APIs and improved monitoring** Improved support for OpenTelemetry. .NET 7.0 comes with new APIs for working with tar files and Unix file permissions.
- **Generic Math**: Allows writing generic algorithms that work against any of the built-in numeric types, and enables building your own numeric types.
- **ASP.NET Core 7 improvements** Improves the performance of HTTP/2 and HTTP/3. Also extends the minimal APIs, introduced in .NET 6, with additional OpenAPI support, endpoint filters, and route groups.

CHAPTER 4. SUPPORTED OPERATING SYSTEMS AND ARCHITECTURES

.NET 7.0 is available for Red Hat Enterprise Linux 8.7 and later and Red Hat Enterprise Linux 9.1 and later. .NET 7.0 is also available for Red Hat Enterprise Atomic Host and OpenShift Container Platform.

.NET 7.0 is available on the **x64_64** (64-bit Intel/AMD), **aarch64** (64-bit ARM), **ppc64le** (64-bit IBM Power), and **s390x** (64-bit IBM Z) architectures.

Table 4.1. Supported deployment environments for .NET 7.0

Platform	Architecture	RPM	Repository
Red Hat Enterprise Linux 8	AMD64 and Intel 64 (**x86_64**) IBM Z and LinuxONE (**s390x**) 64-bit ARM (**aarch64**) IBM Power (**ppc64le**)	dotnet-sdk-7.0	Appstream NOTE: The AppStream repositories are enabled by default in Red Hat Enterprise Linux 8.
Red Hat Enterprise Linux 9	AMD64 and Intel 64 (**x86_64**) IBM Z and LinuxONE (**s390x**) 64-bit ARM (**aarch64**) IBM Power (**ppc64le**)	dotnet-sdk-7.0	Appstream
Red Hat Enterprise Atomic Host	AMD64 and Intel 64 (**x86_64**)		
OpenShift Container Platform 3.11 and later	AMD64 and Intel 64 (**x86_64**)		
OpenShift Container Platform 4.2 and later	IBM Z and LinuxONE (**s390x**)		
OpenShift Container Platform 4.10 and later	IBM Power (**ppc64le**)		

CHAPTER 5. CUSTOMER PRIVACY

Various Microsoft products have a feature that reports usage statistics, analytics, and various other metrics to Microsoft over the network. Microsoft calls this Telemetry. Red Hat is disabling telemetry because we do not recommend sending customer data to anyone without explicit permission.

CHAPTER 6. SUPPORT

Red Hat and Microsoft are committed to providing excellent support for .NET and are working together to resolve any problems that occur on Red Hat supported platforms. At a high level, Red Hat supports the installation, configuration, and running of the .NET component in Red Hat Enterprise Linux (RHEL). Red Hat can also provide "commercially reasonable" support for issues we can help with, for instance, NuGet access problems, permissions issues, firewalls, and application questions. If the issue is a defect or vulnerability in .NET, we actively work with Microsoft to resolve it.

.NET 7.0 is supported on RHEL 8.7 and later, RHEL 9.1 and later, and currently supported versions of Red Hat OpenShift Container Platform.

See the Life Cycle and Support Policies for the .NET Program for information about the .NET support policy. See the Red Hat OpenShift Container Platform Life Cycle Policy for information about the Red Hat OpenShift Container Platform support policy.

6.1. CONTACT OPTIONS

There are a couple of ways you can get support, depending on how you are using .NET.

- If you are using .NET on-premises, you can contact either Red Hat Support or Microsoft directly.
- If you are using .NET in Microsoft Azure, you can contact either Red Hat Support or Azure Support to receive Integrated Support.

Integrated Support is a collaborative support agreement between Red Hat and Microsoft. Customers using Red Hat products in Microsoft Azure are mutual customers, so both companies are united to provide the best troubleshooting and support experience possible.

- If you are using .NET on IBM Z, IBM LinuxONE, or IBM Power, you can contact Red Hat Support. If the Red Hat Support Engineer assigned to your case needs assistance from IBM, the Red Hat Support Engineer will collaborate with IBM directly without any action required from you.

6.2. FREQUENTLY ASKED QUESTIONS

Here are four of the most common support questions for Integrated Support.

1. When do I access Integrated Support?
   You can engage Red Hat Support directly. If the Red Hat Support Engineer assigned to your case needs assistance from Microsoft, the Red Hat Support Engineer will collaborate with Microsoft directly without any action required from you. Likewise on the Microsoft side, they have a process for directly collaborating with Red Hat Support Engineers.

2. What happens after I file a support case?
   Once the Red Hat support case has been created, a Red Hat Support Engineer will be assigned to the case and begin collaborating on the issue with you and your Microsoft Support Engineer. You should expect a response to the issue based on Red Hat's Production Support Service Level Agreement.

3. What if I need further assistance?
   Contact Red Hat Support for assistance in creating your case or with any questions related to this process. You can view any of your open cases here.

4. How do I engage Microsoft for support for an Azure platform issue?

If you have support from Microsoft, you can open a case using whatever process you typically would follow. If you do not have support with Microsoft, you can always get support from Microsoft Support.

6.3. ADDITIONAL SUPPORT RESOURCES

The Resources page at Red Hat Developers provides a wealth of information, including:

- Getting started documents
- Knowledgebase articles and solutions
- Blog posts

.NET documentation is hosted on a Microsoft website. Here are some additional topics to explore:

- .NET
- ASP.NET Core
- C#
- F#
- Visual Basic

You can also see more support policy information at Red Hat and Microsoft Azure Certified Cloud & Service Provider Support Policies.

CHAPTER 7. KNOWN ISSUES

The known issues for running .NET on Red Hat Enterprise Linux (RHEL) include the following:

1. **dotnet dev-certs https --trust** does not work on RHEL.
   .NET supports the creation of HTTPS certificates through **dotnet dev-certs https**, but it does not support trusting them through **dotnet dev-certs https --trust**. The client that connects to the ASP.NET Core application, such as **curl** or Firefox, will warn about the untrusted self-signed certificate. To work around this in a browser such as Firefox, ignore the warning and trust the certificate explicitly when the warning about the untrusted certificate comes up. Command-line tools support flags to ignore untrusted certificates. For **curl**, use the **--insecure** flag. For **wget**, use the **--no-check-certificate** flag.

2. There are no NuGet packages for **ppc64le** and **s390x** on nuget.org.
   Using the **rhel.8-s390x**, **linux-s390x**, **rhel.8-ppc64le**, or **linux-ppc64le** runtime identifier can cause some **dotnet** commands to fail when they try to obtain these packages. These commands are either not fully supported on **ppc64le** and **s390x** as described in the other known issues, or the issue can be fixed by not specifying the runtime identifier.

3. Single file applications are not supported on **ppc64le** or **s390x**.

4. PublishReadyToRun/crossgen is not supported on **ppc64le** or **s390x**.

5. The default version of the **Microsoft.NET.Test.Sdk** package in the test project templates (**xunit**, **nunit**, **mstest**) is unusable on **ppc64le**. Trying to build/run tests will fail with a "System.NotSupportedException: Specified method is not supported" exception.
   If you are trying to run tests on **ppc64le**, update the version of the **Microsoft.NET.Test.Sdk** package to at least 17.4.0.

6. OmniSharp, the language server used by IDEs like Visual Studio Code, is not available on **ppc64le** and **s390x**.