PowerPC/AIX Port

The goal of this project was to provide a full-featured and certifiable version of OpenJDK on the Linux/PowerPC and AIX/PowerPC platforms which can be ultimately integrated into the main OpenJDK development branches. This goal has been reached. Now the project maintains these platforms.

Ongoing work

SAP is maintaining the linuxppc64le port in the jdk head repository. Both SAP and Eclipse Adoptium are continuously building and testing the linuxppc64le port in the jdk11u and jdk17(u) code lines to avoid any regressions. Further, IBM is maintaining the AIX port and supporting linuxppc64 (big endian) in 8u and 11u. Likewise IBM and Eclipse Adoptium are continuously building and testing the AIX and linuxppc64 code streams to ensure quality.

SAP has contributed implementations of Shenandoah and ZGC for linuxppc64le and more recently Virtual Threads and the Foreign Function Linker for both, Linux and AIX.

For currently supported compilers see also Supported Build Platforms.

Contributions

Contributions to the port are always welcome. We maintain some issues in the OpenJDK Jira, feel free to address any of these:

PPC: Proposed enhancements
PPC: Bugs and all other issues
AIX: Proposed enhancements
AIX: Bugs and all other issues

Supported features

The table lists in which JDK version the support for the feature was added.

<table>
<thead>
<tr>
<th>Feature</th>
<th>linux big endian</th>
<th>linux little endian</th>
<th>aix big endian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Template interpreter</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>C2 compiler</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>C1 compiler</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Servicability agent</td>
<td>9</td>
<td>9</td>
<td>no</td>
</tr>
<tr>
<td>Class Data Sharing</td>
<td>11</td>
<td>11</td>
<td>no</td>
</tr>
<tr>
<td>Java Flight Recorder</td>
<td>11</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Epsilon GC</td>
<td>11</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>recognizes Power 9</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>JVMCI / graal</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>ZGC / Shenandoah</td>
<td>no</td>
<td>17.0.2, 18</td>
<td>no</td>
</tr>
<tr>
<td>recognizes Power 10</td>
<td>11.0.10, 16</td>
<td>11.0.10, 16</td>
<td>11.0.10, 16</td>
</tr>
<tr>
<td>Loom</td>
<td>21</td>
<td>20 (JEP 436)</td>
<td>21</td>
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<tr>
<td>Panama</td>
<td>22</td>
<td>21</td>
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</table>

Status

In 2023, JDK 20 and 21 have been released. SAP has delivered Panama with JDK 21 for linuxppc64le and the Foreign Linker for the big endian platforms with JDK 22. IBM intensifies its investment in the port.

In 2022, JDK 18 and 19 have been released. SAP has ported loom, generational ZGC and generational Shenandoah to linuxppc64le and was working on Panama for linuxppc64le.

In 2021, JDK 16 and 17, as well as the security updates for 8, 11, 15, 16 and 17 have been released. In head, support for Concurrent Thread Stack processing and similar improvements needed for Shenandoah and ZGC have been implemented. SAP ported Shenandoah and ZGC to linuxppc64le. The Base64 intrinsics have been optimized further.

SAP passes primary responsibility of the aixppc64 port to IBM and discontinues its active support of aixppc64 and linuxppc64 after 8u301, 11.0.12 and 17. The linuxppc64 port is abandoned in head altogether, as it is superseded by the linuxppc64le port. Linuxppc64 in 8u and 11u is now supported by IBM.

In 2020, JDK 14 and 15 as well as the security updates for 8, 11, 13, 14 and 15 have been released for linuxppc64, linuxppc64le and aixppc64. The port has been adapted to ongoing developments in the head revision as the removal of the C2 inline caches. Various problems have been fixed. The new Power 10 processor is recognized and first new instructions are exploited.
SAP does not actively maintain the ports in the long-term-support releases of JDK 13 and 15.

In **2018**, JDK 10 and JDK 11 have been released for linuxppc64, linuxppc64le and aixppc64. Various performance optimizations have been implemented by IBM and SAP. This includes optimizations of the GCs, e.g., cheaper barriers, and various improved or new intrinsics. The linux platforms support Class Data Sharing and Java Flight Recorder since JDK11. Many issues have been fixed. SAP discontinues active support of jdk7u.

In **2019**, JDK 12 and JDK 13 as well as the security updates for 8, 11, 12 and 13 have been released for linuxppc64, linuxppc64le and aixppc64. JDK 13 can be compiled with xC 16 making JEP 347 (C++ 14) possible. A lot has been invested in stability and improving of JDK11. Some new intrinsics and compiler optimizations have been implemented.

In **2020**, the porting team has finished the C1 compiler for jdk9. The VM now utilizes TieredCompilation. It is not planned to downport this to jdk8u or jdk7u.

In **2021**, the PowerPC/AIX Port Integration Plan. HotSpot can now be built on AIX as a result of the integration of the PowerPC/AIX Port into JDK 8, as well as on AIX. The work on Milestone 3.2 “HotSpot changes for the PPC64 C2 Port” is progressing really well and we hope to have a C2 enabled VM by the end of the year.

In **2022**, the JRE 8 port has been integrated into the jdk7u main line. The PowerPC/AIX Port Integration Plan. HotSpot can now be built on AIX as a result of the integration of the PowerPC/AIX Port into JDK 8, as well as on AIX. The work on Milestone 3.2 “HotSpot changes for the PPC64 C2 Port” is progressing really well and we hope to have a C2 enabled VM by the end of the year.

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As of December 2012, the project has reached its second milestone. A mixed-mode VM (with the C++ Interpreter and the C2 "Server" JIT compiler) is available on both Linux/PPC64 and AIX/PPC64. It successfully runs different benchmarks (JVM98, JBB2005 and DaCapo) and is able to bootstrap itself. On our transitional ppc-aix-port project page you can download precompiled binaries of this new version of our port which can be used as a bootstrap JDK during the build process. There’s also a detailed README-ppc.html file available which describes the build process on the two porting platforms. The next steps will be to certify our ports on Linux/PPC64 and AIX/PPC64 and integrate them upstream into the main JDK7/8 repositories. Concurrently we are also working on improving the performance which still lags behind that of our closed implementations.

As of July 2012, the project has reached its first milestone. An interpreter only version of the PowerPC port is available on Linux/PPC64. It successfully runs the JVM98 benchmark and is able to bootstrap itself. There’s a transitional ppc-aix-port project page available which contains the nightly build logs of our project repositories on various platforms and a compiled version of the OpenJDK for Linux/PPC64 which can be used as a bootstrap JDK during the build process. The next steps will be to complete the build on AIX (currently only the HotSpot build is working on AIX) and start the port of the C2 server JIT compiler.

Resources

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<tr>
<th>Port Project</th>
<th>PowerPC/AIX Port</th>
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<tr>
<td>Mailing list:</td>
<td>ppc-aix-port-dev</td>
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<tr>
<td>JEP 175:</td>
<td>PowerPC/AIX Port</td>
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<td>Wiki:</td>
<td>PowerPC/AIX Port OpenJDK Wiki Space</td>
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<tr>
<td>Repos:</td>
<td><a href="https://github.com/openjdk/jdk/">https://github.com/openjdk/jdk/</a></td>
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<tr>
<td></td>
<td><a href="https://github.com/openjdk/jdk11u-dev/">https://github.com/openjdk/jdk11u-dev/</a></td>
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<td></td>
<td><a href="http://hg.openjdk.java.net/jdk8u">http://hg.openjdk.java.net/jdk8u</a></td>
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<td></td>
<td><a href="http://hg.openjdk.java.net/jdk7u">http://hg.openjdk.java.net/jdk7u</a></td>
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Recently Updated

PowerPC/AIX Port
Nov 02, 2023 • updated by Martin Doerr • view change
PowerPC/AIX Port
Jan 13, 2023 • updated by Goetz Lindenmaier • view change
Architecture of the OpenJDK PPC Port
Apr 21, 2021 • updated by Goetz Lindenmaier • view change
JDK 9 & 10 and the PowerPC/AIX port
Jan 14, 2019 • updated by Goetz Lindenmaier • view change
JDK 8 and the PowerPC/AIX port
Jan 09, 2019 • updated by Goetz Lindenmaier • view change
JDK 7 and the PowerPC/AIX port
Jan 09, 2019 • updated by Goetz Lindenmaier • view change
Architecture of the OpenJDK PPC Port
Dec 16, 2015 • updated by Thomas Struef • view change
PowerPC/AIX Port
Dec 17, 2014 • updated by Volker Simonis • view change
C2 compiler extensions and new optimizations
Oct 01, 2014 • updated by Goetz Lindenmaier • view change
PowerPC/AIX Port Integration Plan
Apr 15, 2014 • updated by Volker Simonis • view change
PowerPC/AIX Port Integration Plan
Feb 05, 2014 • updated by Azearn Jiva • view change
PowerPC/AIX Port Integration Plan
Jan 28, 2014 • updated by Goetz Lindenmaier • view change
PowerPC/AIX Port Integration Plan
Jul 15, 2013 • updated by Iris Clark • view change
C++ interpreter features
May 03, 2013 • updated by Goetz Lindenmaier • view change
PowerPC/AIX Port
Apr 19, 2013 • updated by Brian Beck • view change