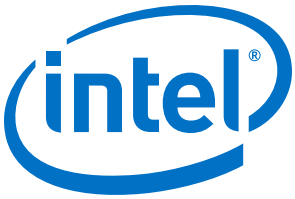

Intel® Quartus® Prime Pro Edition

Version 20.4 Software and Device Support Release Notes

Updated for Intel® Quartus® Prime Design Suite: **20.4**

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Contents

1. Intel® Quartus® Prime Pro Edition Version 20.4 Software and Device Support Release Notes

This document provides late-breaking information about Intel® Quartus® Prime Pro Edition Version 20.4.

For additional information about this software release, refer to the Intel Quartus Prime Pro Edition README file in the following location:<*installation directory*>/quartus/readme.txt

For information about operating system support, refer to the following web page: Intel FPGA Operating System Support.

Related Information

Intel Quartus Prime Standard Edition Software and Device Support Release Notes

1.1. New Features and Enhancements

Intel Quartus Prime Pro Edition Software Version 20.4 includes functional and security updates. Keep your software up-to-date and follow the technical recommendations that help improve the security of your Intel Quartus Prime installation.

Intel Quartus Prime Pro Edition Software Version 20.4 includes the following new features and enhancements:

- For Intel Stratix® 10 devices, enabled partial reconfiguration and encrypted partial reconfiguration bitstream support.
- Enhanced handling of designs with large inferred RAM requirements.
- Enhanced Platform Designer as follows:
  - Added support for system HDL parameters. You can pass parameter values from parent systems to subsystems and from system to instantiated IP blocks by adding HDL parameters to systems and assigning values to instance HDL parameters that are exposed
  - Added new interconnect parameter: **Enable all pipeline stages**.
  - Added **Add All Pipelines** and **Remove All Pipelines** buttons to **Memory-Mapped Interconnect** tab.

Intel Quartus Prime Pro Edition Software Version 20.4 also includes bug fixes. Review Software Issues Resolved on page 13 and Software Patches Included in this Release on page 14 to see if this version contains fixes for or otherwise resolves any of your customer service requests.

1.2. Changes to Software Behavior

This section documents instances in which the behavior and default settings of the Intel Quartus Prime Pro Edition software have been changed from earlier releases of the Intel Quartus Prime Pro Edition software.

- For Intel Agilex™ devices, the following active serial configuration clock (AS_CLK) frequencies is added:
  - 166 MHz

  For Intel Agilex devices, the following AS_CLK frequencies are removed:
  - 133 MHz
  - 108 MHz
- Intel Quartus Prime Pro Edition software now requires processors with one of the following microarchitectures:
  - Intel Nethalem (2008) or later
  - AMD Bulldozer (2011) or later

  Processors must support SSE4.2 or later.
- Starting with the Intel Agilex device family, the EDA netlist writer does not support IBIS model generation. The EDA netlist writer continues to support IBIS model generation for earlier device families.

  You can download IBIS models for all device families from the following web page: IBIS Models for Intel Devices. This page is updated as IBIS models for devices become available.
- Intel FPGA IP cores are transitioning to a new version number scheme. Previously, IP core version numbers aligned with Intel Quartus Prime version numbers.

  Under the new scheme, IP core version numbers move to a three-part version numbering scheme (*X*.*Y*.*Z*) that is independent of Intel Quartus Prime version numbers. Changes in the parts of an IP core version number indicate different things and might require actions on your part:
  - *X*: A change in *X* indicates a major revision of the IP. You must regenerate the IP.
  - *Y*: A change in *Y* indicates that the IP includes new features, but retains backwards compatible behavior, ports, and parameters with all *X* level IP cores. Regenerate the IP to include these new features.
  - *Z*: A change in *Z* indicates that the IP includes bug fixes and minor improvements, but retains backwards compatible behavior, ports, and parameters with all *X* level IP cores. Regenerate the IP to include the fixes and improvements.

  In addition, new IP cores start their version numbering at 1.0.0. Existing IP cores adopt the new numbering scheme but increment the version number from their current version number.

  Review your IP core release notes to confirm the versioning scheme for your IP core.

Refer to the Intel Quartus Prime Default Settings File (`.qdf`), `<Quartus Prime installation directory>/quartus/bin/assignment_defaults.qdf`, for a list of all the default assignment settings for the latest version of the Intel Quartus Prime software.

1.2.1. Deprecated Features and Functions

The functions and features listed in this section have been deprecated but not removed from Intel Quartus Prime Pro Edition Version 20.4 or earlier. Migrate your tools and processes to use the replacement or alternate features and functions before the deprecated features and functions are removed.

Features and Functions Deprecated as of Intel Quartus Prime Pro Edition Version 20.4

No features or functions have been deprecated in Intel Quartus Prime Pro Edition Version 20.4.

Features and Functions Deprecated as of Intel Quartus Prime Pro Edition Version 20.3

The following features and functions are deprecated as of Intel Quartus Prime Pro Edition Version 20.3:

- Support for Cadence* Incisive* Enterprise Simulator (IES).

  Use Cadence Xcelium* Parallel Logic Simulation or another supported simulation tool instead. For a list of supported simulation tools, see EDA Interface Information on page 11.
- Rapid Recompile compile flow

  Use ECO compile flow instead.
- **Report Timing Closure Recommendations** command

  Use the **Report DRC** command in Design Assistant instead. The design rule check (DRC) include rules used to report timing closure recommendations.
- Intel Hyperflex™ Retimer Rules (HRR) category in Design Assistant.

  The rules in the HRR category have been moved into the Timing Closure Rules (TMC) category and the Reset Rules (RR) category.

1.2.2. Removed Features and Functions

The functions and features listed in this section have been removed from Intel Quartus Prime Pro Edition Version 20.4 or earlier.

Features and Functions Removed from Intel Quartus Prime Pro Edition Version 20.4

No features or functions have been removed from Intel Quartus Prime Pro Edition Version 20.4.

Features and Functions Removed from Intel Quartus Prime Pro Edition Version 20.3

As of Intel Quartus Prime Version 20.3, the components that comprised the Intel SoC Embedded Development Suite (EDS) are available only through GitHub.

For details, see the Intel Download Center for FPGAs: https://fpgasoftware.intel.com/soceds/.

1.3. Operating System Support

Information about operating system support for the Intel Quartus Prime Design Suite is available on the Operating System Support page of the Intel FPGA website.

Intel Quartus Prime Pro Edition Version 20.3 added support for the following operating systems:

- CentOS* 8.0
- Red Hat* Enterprise Linux* 8
- SUSE* Linux Enterprise Server 15
- Ubuntu* Linux 20 LTS
- Windows Server* 2019

Intel Quartus Prime Pro Edition Version 20.3 removed support for the following operating systems:

- Red Hat Enterprise Linux 6
- Ubuntu Linux 14 LTS

Related Information

- Operating System Support
- Download Center for FPGAs

1.4. Memory Recommendations

A full installation of the Intel Quartus Prime Pro Edition software requires up to 75 GB of available disk space.

Intel recommends that your system be configured to provide virtual memory equal to the recommended physical RAM that is required to process your design.

Note: Peak virtual memory might exceed these recommendations. These recommendations are based on the amount of physical memory required to achieve runtime within 10% of that achieved on hardware with an infinite amount of RAM.

Table 1. Memory Requirements for Processing Designs

These requirements are the same for both Windows and Linux installations.

Family	Device	Recommended Physical RAM
Intel Agilex	AGFA022, AGFB022, AGFA027, AGFB027	72 GB
	AGFA012, AGFB012, AGFA014, AGFA014-R0, AGFB014, AGFB014-R0	64 GB
Intel Arria® 10	10AT115, 10AX115	48 GB
	10AT090, 10AX090	44 GB
	10AS066, 10AX066	32 GB
	10AS057, 10AX057	30 GB
	10AS048, 10AX048	28 GB
	10AS032, 10AX032	24 GB

continued...

Family	Device	Recommended Physical RAM
	10AS027, 10AX027	22 GB
	10AS022, 10AX022	20 GB
	10AS016, 10AX016	18 GB
Intel Cyclone® 10 GX	10CX85, 10CX105, 10CX150, 10CX220	18 GB
Intel Stratix 10	1SD21BP, 1SD280P, 1SG10MH, 1SG210H, 1SG211H, 1SG250H, 1SG250L, 1SG280H, 1SG280L, 1SM21BE, 1SM21BH, 1SM21CH, 1ST210E, 1ST250E, 1ST280E, 1SX210H, 1SX250H, 1SX250L, 1SX280H, 1SX280L	64 GB
	1SG165H, 1SG166H, 1SM16BE, 1SM16BH, 1SM16CH, 1ST165E, 1SX165H	48 GB
	1SD110P, 1SG040H, 1SG065H, 1SG085H, 1SG110H, 1ST040E, 1ST085E, 1ST110E, 1SX065H, 1SX085H,1SX110H, 1SX040H	32 GB

1.5. Device Support and Pin-Out Status

Table 2. Final Device Support

Final compilation, simulation, timing analysis, and programming support is available for the devices listed in this table. These devices have finalized device models, bitstream, and firmware.

Device Family	Devices
Intel Arria 10	10AS016, 10AS022, 10AS027, 10AS032, 10AS048, 10AS057,10AS066, 10AT090, 10AT115, 10AX016, 10AX022, 10AX027, 10AX032, 10AX048, 10AX057, 10AX066, 10AX090, 10AX115
Intel Cyclone 10 GX	10CX085, 10CX105, 10CX150, 10CX220
Intel Stratix 10	1SD110P, 1SD21BP, 1SD280P, 1SG085H, 1SG10MH, 1SG110H, 1SG165H, 1SG166H, 1SG210H, 1SG211H, 1SG250H, 1SG250L, 1SG280H, 1SG280L, 1SM16BE, 1SM16BH, 1SM16CH, 1SM21BE, 1SM21BH, 1SM21CH, 1ST040E, 1ST085E, 1ST110E, 1ST165E, 1ST210E, 1ST250E, 1ST280E, 1SX085H, 1SX110H, 1SX165H, 1SX210H, 1SX250H, 1SX250L, 1SX280H, 1SX280L

Table 3. Preliminary Device Support

Full compilation, simulation, timing analysis, and programming support is available for the devices listed in this table.

Device Family	Devices
Intel Agilex	AGFA014-R0, AGFB014-R0
Intel Stratix 10	1SD110P-S1, 1SD280P-S1, 1SG040H, 1SG110H-S1, 1SG280H-S2, 1SG280H-S3, 1SG280L-S2, 1SG280L-S3, 1SM21BH-S1, 1SM21CH-S1, 1SX040H, 1SX110H-S1, 1SX280H-S3, 1SX280L-S3

Table 4. Advance Device Support

Compilation, simulation, and timing analysis support is provided for these devices. The compiler generates pinout information for these devices in this release, but does not generate programming files.

Device Family	Devices
Intel Agilex	AGFA012, AGFA014, AGFA022, AGFA027, AGFB012, AGFB014, AGFB022, AGFB027
Intel Stratix 10	1SG065H, 1SX065H

Table 5. Initial Device Support

Compilation, simulation, and timing analysis support is provided for these devices. Programming files and pinout information are not generated for these devices in this release.

Device Family	Devices
No devices with this status in Intel Quartus Prime Pro Edition Version 20.4.	

1.5.1. Changes in Device Support

Starting with Intel Quartus Prime Version 20.1, a new device support level was introduced: ***Preliminary*** device support.

For devices with ***Preliminary*** device support, Intel Quartus Prime provides full compilation, simulation, timing analysis, and programming support but the device models, bitstreams, and firmware for the devices are not finalized.

Devices with ***Final*** device support (previously *Full*) have finalized device models, bitstreams, and firmware.

The definitions of ***Initial*** and ***Advance*** device support levels are unchanged.

For information about known device issues and workarounds, refer to the following web page: Intel FPGA Knowledge Base.

1.6. Timing Model, Power Model, and Device Status

Only devices with a timing model, power model, and device status of **Final** are suitable for production systems.

Table 6. Timing Model, Power Model, and Device Status

Device Family	Device	Timing Model Status	Power Model Status	Device Status
Intel Agilex	AGFA014-R0, AGFB014-R0	Preliminary	Preliminary	Preliminary
	AGFA012, AGFA014, AGFA022, AGFA027, AGFB012, AGFB014, AGFB022, AGFB027	Preliminary	Preliminary	Preliminary
Intel Arria 10	10AX016, 10AS016, 10AX022, 10AS022, 10AX027, 10AS027, 10AX032, 10AS032	Final – 16.1 (1) (2)	Final – 17.0	Final – 17.0
	10AX048, 10AS048	Final – 16.0.2 (2)		
	10AX057, 10AS057, 10AX066, 10AS066, 10AT090, 10AX090	Final – 16.0.1 (2)	Final – 16.0.1	Final – 16.0.1
	10AX115, 10AT115	Final – 16.0 (2)	Final – 16.0	Final – 16.0
Intel Cyclone 10 GX	10CX085, 10CX105, 10CX150, 10CX220	Final – 17.0	Final – 18.0	Final – 18.0
Intel Stratix 10	1SG280L, 1SX280L, 1SG250L, 1SX250L	Final – 18.0.1	Final – 18.1.1	Final – 18.1.1
	1SG280H, 1SX280H, 1SG250H, 1SX250H, 1SG210H, 1SX210H, 1SG165H, 1SX165H, 1SG110H, 1SX110H, 1SG085H, 1SX085H	Final – 18.1.1	Final – 18.1.1	Final – 18.1.1
	1ST280E, 1ST250E	Final – 18.1.1	Final – 19.4	Final – 19.4
	1SM21BH, 1SM21CH, 1SM16BH, 1SM16CH	Final – 19.1	Final – 19.1	Final – 19.1
	1SG10MH, 1SG166H, 1SG211H	Final – 19.1	Final – 19.3	Final – 19.3
	1ST210E, 1SM21BE, 1ST165E, 1SM16BE	Final – 19.2	Final – 19.4	Final – 19.4
	1SD280P, 1ST040E, 1ST085E, 1ST110E	Final – 20.1	Final – 20.1	Final – 20.1
	1SD110P	Final – 20.2	Final – 20.2	Final – 20.2
	1SD21BP	Final - 20.3	Final -20.3	Final - 20.3
	1SG040H, 1SX040H	Final -20.3	Final -20.3	Preliminary
	1SG065H, 1SX065H	Preliminary	Preliminary	Preliminary

Related Information

System Design with Advance FPGA Timing Models

(1) Devices with a -1 speed grade were finalized in Intel Quartus Prime software version 17.0

(2) All military grade devices were finalized in Intel Quartus Prime software version 18.0.1.

1.7. IBIS Models

Table 7. IBIS Model Status for the Intel Quartus Prime Pro Edition Software Release Version 20.4

Device families have IBIS model statuses that are either Advance, Preliminary, or Final.

Device Family	IBIS Model Status
Intel Agilex	Refer to IBIS Models for Intel Devices.
Intel Arria 10	Final – 16.1.2
Intel Cyclone 10 GX	Final – 17.0
Intel Stratix 10	Final – 18.1

Starting with the Intel Agilex device family, IBIS models are available only online at the following web page: IBIS Models for Intel Devices. This page is updated as IBIS models for devices become available or are updated.

1.8. EDA Interface Information

Table 8. Synthesis Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 20.4

Synthesis Tools	Version
Mentor Graphics* Precision*	Mentor Graphics Precision versions that support the Intel Quartus Prime software are typically released after the release of the Intel Quartus Prime software. Contact Mentor Graphics for versions of Mentor Graphics* Precision that support Intel Quartus Prime Pro Edition Software Version 20.4.
Synopsys* Synplify*, Synplify Pro*, and Synplify Premier	Synopsys Synplify, Synplify Pro, and Synplify Premier versions that support the Intel Quartus Prime software are typically released after the release of the Intel Quartus Prime software. Contact Synopsys for versions of Synopsys Synplify, Synplify Pro, and Synplify Premier that support Intel Quartus Prime Pro Edition Software Version 20.4.

Table 9. Simulation Tools Supporting the Intel Quartus Prime Pro Edition Software Release Version 20.4

The following simulation tools support RTL and functional gate-level simulation.

Simulation Tools	Version
Aldec* Active-HDL*	11.1 (Windows 32-bit only)
Aldec Riviera-PRO*	2019.10 (64-bit only)
Cadence Incisive Enterprise Simulator (IES) As of Intel Quartus Prime Pro Edition Version 20.3, support for IES is deprecated.	15.20 (64-bit Linux only)
Cadence Xcelium Parallel Logic Simulation	20.03 (64-bit Linux only)
Mentor Graphics ModelSim* PE	2020.3 (Windows 32-bit only)
Mentor Graphics ModelSim SE	2020.2 (64-bit only)
Mentor Graphics ModelSim-Intel FPGA Edition*	2020.3 (32-bit only)
Mentor Graphics Questa* Advanced Simulator	2020.2 (64-bit only)
Synopsys VCS* and VCS MX	P-2019.06 (64-bit Linux only)

Mentor Graphics ModelSim-Intel FPGA Edition requires licensing daemon version 11.16.4.0 (or later). You can obtain the licensing daemon from the Intel FPGA License Daemon Downloads web page.

Operating System Support for Mentor Graphics ModelSim-Intel FPGA Edition version 2020.2 (requires 32-bit libraries)

- Red Hat Enterprise Linux 7 (64-bit)
- Red Hat Enterprise Linux 8 (64-bit)
- SUSE Linux Enterprise Server 12 (64-bit)
- Windows* 10 (64-bit)

1.9. Antivirus Verification

The Intel Quartus Prime software release version 20.4 has been verified virus free with the following software:

Antivirus Verification Software

McAfee VirusScan Command Line for Linux64 Version: 6.1.3.242
AV Engine version: 6010.8670 for Linux64.
Dat set version: 9825 created Dec 4 2020

1.10. Software Issues Resolved

The following customer service requests were fixed or otherwise resolved in Intel Quartus Prime Pro Edition Version 20.4:

Table 10. Issues Resolved in the Intel Quartus Prime Pro Edition Version 20.4

Customer Service Request Numbers							
00055679	00486450	00491101	00495374	00496796	00502941	00505988	00512297
00513730	00514454	00517761	00520401	00521462	00522286	00525469	00525621
00527233	00527980	00528244	00528606	00534428	00537322	00537558	00538217
00538514	00541253	00545245	00550737	00550956	00551113	00551195	00552252
00552264	00552614	00553084	00556061	00557347	00558503	04620704	04838932

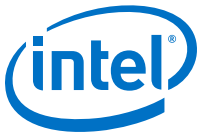
1.11. Software Patches Included in this Release

Intel Quartus Prime Pro Edition Version 20.4 contains the following patches for previous versions of Intel Quartus Prime Pro Edition software:

Table 11. Software Patches included in Intel Quartus Prime Pro Edition Version 20.4

Software Version	Patch	Customer Service Request Number
Intel Quartus Prime Version 20.3	0.35	00055679
Intel Quartus Prime Version 20.3	0.31	–
Intel Quartus Prime Version 20.3	0.28	00553084, 00551113
Intel Quartus Prime Version 20.3	0.24	–
Intel Quartus Prime Version 20.3	0.19	–
Intel Quartus Prime Version 20.3	0.18	–
Intel Quartus Prime Version 20.3	0.17	–
Intel Quartus Prime Version 20.3	0.15	–
Intel Quartus Prime Version 20.3	0.14	00552614
Intel Quartus Prime Version 20.3	0.12	–
Intel Quartus Prime Version 20.3	0.10	–
Intel Quartus Prime Version 20.3	0.09	–
Intel Quartus Prime Version 20.3	0.08fw	–
Intel Quartus Prime Version 20.3	0.07	–
Intel Quartus Prime Version 20.3	0.06	00528606
Intel Quartus Prime Version 20.3	0.05fw	–
Intel Quartus Prime Version 20.3	0.03	–
Intel Quartus Prime Version 20.3	0.02	–
Intel Quartus Prime Version 20.3	0.01	–
Intel Quartus Prime Version 20.2	0.49	00550737
Intel Quartus Prime Version 20.2	0.48	–
Intel Quartus Prime Version 20.2	0.47fw	–
Intel Quartus Prime Version 20.2	0.37	00541971
Intel Quartus Prime Version 20.1	0.53fw	–
Intel Quartus Prime Version 20.1	0.51	00522286
Intel Quartus Prime Version 20.1	0.50	–
Intel Quartus Prime Version 20.1	0.49	–
Intel Quartus Prime Version 20.1	0.48	–
Intel Quartus Prime Version 20.1	0.46fw	–
Intel Quartus Prime Version 20.1	0.39	–
Intel Quartus Prime Version 20.1	0.37	00538514

continued...



Software Version	Patch	Customer Service Request Number
Intel Quartus Prime Version 19.4	0.40	–
Intel Quartus Prime Version 19.4	0.38	–
Intel Quartus Prime Version 19.4	0.37	00492904
Intel Quartus Prime Version 19.3	0.70	00548799
Intel Quartus Prime Version 19.3	0.68	–
Intel Quartus Prime Version 19.3	0.62	00539404
Intel Quartus Prime Version 19.2	0.29	–
Intel Quartus Prime Version 19.2	0.28	00543139
Intel Quartus Prime Version 19.2	0.22	00522286
Intel Quartus Prime Version 19.1	0.56	00537322

1.12. Latest Known Intel Quartus Prime Software Issues

Information about known issues that affect Intel Quartus Prime Pro Edition Version 20.4 is available in the Intel Programmable Solutions Knowledge Base.

Table 12. Important Known Issues Affecting Intel Quartus Prime Pro Edition Version 20.4

Description	Workaround
For Intel Agilex AGFA012 and AGFA014 devices, programming your device with an SRAM object files (SOFs) generated by Intel Quartus Prime Version 20.3 or earlier causes the output of the Reset Release Intel FPGA IP to behave abnormally. When you try to program your device the the SOF, you receive the following critical warning message: `Critical Warning: The SOF provided is generated using Quartus 20.3 or older. Kindly recompile the design on Quartus 20.4 or newer. Using SOF generated in 20.3 or older version on Quartus 20.4 or newer version will cause the output of the Reset Release Intel FPGA IP to behave abnormally.`	Recompile your designs with Intel Quartus Prime Pro Edition Version 20.4 or later. For details about this issue and the availability of any fixes, refer to the following article in the Intel Programmable Solutions Knowledge Base: Why is the nINIT_DONE signal always stuck in a HIGH state when using the Reset Release Intel FPGA IP in Intel Agilex devices?
For Intel Agilex SoC Engineering Sample (ES) devices, Intel Quartus Prime configures the FPGA to SoC bridge incorrectly which causes the bridge to not function in hardware.	For details about this issue and the availability of any fixes, refer to the following article in the Intel Programmable Solutions Knowledge Base: Why does the FPGA to SoC Bridge not work in my Intel Agilex SoC Design?

You can find known issue information for previous versions of the Quartus Prime software on the Intel FPGA Knowledge Base web page.

Information about known software issues that affect previous versions of the Quartus II software is available on the Intel Quartus Prime and Quartus II Software Support web page.

Information about issues affecting the Intel FPGA IP Library is available in the release notes for each IP. You can find the IP release notes on the *Intel FPGAs and Programmable Devices Release Notes* web page.

Related Information

- Intel FPGA Knowledge Base
- Intel Quartus Prime and Quartus II Software Support
- Intel FPGAs and Programmable Devices Release Notes

1.13. Intel Quartus Prime Pro Edition Version 20.4 Software and Device Support Release Notes Archives

Intel Quartus Prime Pro Edition	Publication
20.3	Intel Quartus Prime Pro Edition Version 20.3 Software and Device Support Release Notes
20.2	Intel Quartus Prime Pro Edition Version 20.2 Software and Device Support Release Notes
20.1	Intel Quartus Prime Pro Edition Version 20.1 Software and Device Support Release Notes
19.4	Intel Quartus Prime Pro Edition Version 19.4 Software and Device Support Release Notes
19.3	Intel Quartus Prime Pro Edition Version 19.3 Software and Device Support Release Notes
19.2	Intel Quartus Prime Pro Edition Version 19.2 Software and Device Support Release Notes
19.1	Intel Quartus Prime Pro Edition Version 19.1 Software and Device Support Release Notes
18.1	Intel Quartus Prime Pro Edition Version 18.1 Software and Device Support Release Notes
18.0	Intel Quartus Prime Pro Edition Software and Devices Support Release Notes
17.1	Intel Quartus Prime Pro Edition Software and Devices Support Release Notes
17.0	Intel Quartus Prime Pro Edition Software and Devices Support Release Notes

1.14. Document Revision History

Table 13. The Intel Quartus Prime Pro Edition Software Release Version 20.4 Document Revision History

Document Version	Intel Quartus Prime Version	Changes
2020.12.14	20.4	• Initial release.