



EXata 5.1 Release Notes

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EXata Release Notes

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1 EXata 5.1 Release Notes

This section lists release notes for EXata 5.1 and are described in the following tables:

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[Table 1](#) lists the new features in EXata 5.1.

TABLE 1. New Features for EXata 5.1

New Feature	Area Affected	Description
IPv6 Emulation Support	Emulation	Emulation support for IPv6 networks. The Packet Sniffing Interface and Internet gateway also support IPv6.
IGMPv3 Support	Multimedia and Enterprise Model Library	Version 3 of IGMP(RFC 3376) adds support for "source filtering", that is, the ability for a system to report interest in receiving packets only from specific source addresses sent to a particular multicast address to support Source-Specific Multicast (SSM).
DHCP Model	Developer Model Library	Dynamic address allocation for IPv4 is added with support of DHCP (RFC 2131). DHCP is built on a client-server model, where designated DHCP servers allocate network addresses and deliver configuration parameters to DHCP clients. Major features are: <ul style="list-style-type: none"> • Permanent Allocation: DHCP server assigns a permanent IP address to a client. • Dynamic Allocation: DHCP assigns an IP address to a client for a limited period of time. • Manual Allocation: A client's IP address is assigned by the network administrator, and DHCP is used simply to convey the assigned address to the client.
DNS Model	Developer Model Library	Domain Name System adds support for Fully Qualified Domain Names (FQDNs). A hierarchical distributed database can now be configured which is used to store information for mapping Internet hostnames to IP addresses and vice-versa. Major features are: <ul style="list-style-type: none"> • Domain Name Space and Name Servers • DNS Name Resolver • Multiple DNS servers, i.e. primary DNS server and secondary DNS server • DNS Updates

TABLE 1. New Features for EXata 5.1 (Continued)

New Feature	Area Affected	Description
Fully Qualified Domain Names (FQDNs) in Applications	Developer Model Library, Architect	Several application models (CBR, FTP, FTP/Generic, HTTP, Super Application, TELNET, and Traffic Generator) have been enhanced so that the destination/server can be specified by its FQDN. These application models can be used if DNS is enabled. A new toolbar (called Dynamic Address Applications) has been added in Architect for these applications (except HTTP). For HTTP, FQDNs can now be used to specify servers along with node IDs and interface addresses.
IPv6 Autoconfiguration Model	Developer Model Library	The IPv6 hosts using Stateless Address Autoconfiguration can configure the IPv6 (global) addresses automatically. The stateless autoconfiguration requires no special server and only minimal router configuration. Major features are: <ul style="list-style-type: none"> • Creation of link local addresses • Duplicate Address Detection • Address delegation • Creation of global address and site-local addresses • Address categorization into preferred and deprecated address
Channel Names	Cellular, LTE, UMTS, and Wireless Model Libraries	Channels can be given unique names using the <code>PROPAGATION-CHANNEL-NAME</code> parameter. This allows for the listening and listenable to be specified by using channel names. (Channel frequencies can also be used to specify listening and listenable channels). Channel names can also be used to specify channels (in addition to channel indices) in LTE, UMTS, Satellite-RSV, Cellular Abstract, and GSM models.
Extractor	Federation Interfaces Library	Extractor is a GUI-based utility to extract scenario configuration from HLA/DIS federations.
HLA 1516	Federation Interfaces Library	In addition to HLA1.3, HLA1516 protocol (SISO DLC) is also supported.
RPR FOM 2.0017	Federation Interfaces Library	The HLA1.3 and HLA1516 interfaces also support RPR FOM 2.0017 (Draft 17) in addition to RPR 1.0.

[Table 2](#) lists the model library changes for EXata 5.1.

TABLE 2. Model Library Changes for EXata 5.1

Library	Changes
Cyber Model Library	The Cyber Model Library is now made available as an add-on library for EXata.
Standard Interfaces Model Library	The Standard Interfaces Model Library has been renamed the Federation Interfaces Library. It contains the enhanced HLA and DIS interfaces (see Table 3) and the Socket interface.
Satellite Model Library	The Satellite Model Library has been discontinued as a separate library. Models in that library have been moved to the Wireless Model Library and can be used with the base license.
TIREM Model Library	The TIREM Model Library has been discontinued.

Table 3 lists the updated and enhanced features for EXata 5.1.

TABLE 3. Updated and Enhanced Features for EXata 5.1

New Feature	Area Affected	Description
DIS Interface	Federation Interfaces Library	The DIS interface has been re-implemented using MAK's VR-Link. Additionally, 64 bit, parallel (shared memory) and distributed execution is now support for DIS.
HLA Interface	Federation Interfaces Library	The HLA interface has been re-implemented using MAK's VR-Link. Parallel (shared memory) and distributed execution is now supported for HLA.
IP Security (IPSec) Model	Cyber Model Library	The IPSec model is now compliant with RFC 2401, RFC 2403, RFC 2404, RFC 2405, RFC 2406, and RFC 2410.
New Attributes in GUI XML Configuration Files	GUI	Several new attributes have been added in GUI XML configuration files. See Chapter 5 of <i>EXata Programmer's Guide</i> for details.
Architect Design Mode Features	GUI	<p>The major enhancements in Architect are:</p> <ul style="list-style-type: none"> • In device insert mode, the mouse cursor will be the same as the icon of the selected device. • If the user tries to place a new device on top of an existing device, the GUI will switch to selection mode instead of adding a new device. • When in insert mode, right clicking will also switch the GUI to selection mode. • Apply and Save as Default buttons have been added in the Camera Settings wizard. • When adding mobility waypoints for a weather object, after selecting the waypoint tool and clicking on the weather object, a shadow of the weather object follows the mouse pointer to indicate the area that will be covered by the weather object. • Added two new tabs in the Preferences dialog: <ul style="list-style-type: none"> - Terrain: To enable DTED correction for missing or corrupt data. - View: To enable mouse hover effects during visualization.
Architect Visualize Mode Features	GUI	<p>The Play and Pause functionalities are now controlled by a single button which toggles between the two.</p> <p>The Stop button is now used only for stopping the simulation.</p>

Table 4 lists the major configuration changes for EXata 5.1.

TABLE 4. Configuration Changes for EXata 5.1

Feature	Description
VERSION Parameter	The parameter VERSION, which was a required parameter in previous versions, is not required or supported.
HTTPD Application	An HTTP server (HTTPD) can now be explicitly configured in the GUI.
Global ATM Configuration	The ATM Configuration parameter group has been removed from the General tab of the Scenario Properties Editor. These ATM properties are configured at the node level.

TABLE 4. Configuration Changes for EXata 5.1 (Continued)

Feature	Description
LTE Measurement Parameters	The LTE Configuration parameter group has been removed from the General tab of the Scenario Properties Editor. The LTE measurement parameters are now configured at the subnet level.
Trace Parameters	When packet tracing is enabled for a layer in the GUI, all traceable protocols at that layer are displayed.
Disabling Configuration Changes in GUI	If a scenario has parameter <code>GUI-CONFIG-LOCKED</code> set to YES, then the scenario can be opened and run using the GUI, but any changes made to the scenario in Architect's Design Mode can not be saved. (If the scenario is modified, it can be saved under a different name.)
<code>USER-STATUS-START-TIME</code> parameter for the User Behavior Model	The default value of this parameter has been changed to 10 seconds.
UMTS Call Application	The parameter to configure the UMTS Call Application has been changed from <code>PHONE-CALL</code> to <code>UMTS-CALL</code> .

Table 5 lists the bug fixes for EXata 5.1.

TABLE 5. Bug Fixes for EXata 5.1

Bug Fixes	Area Affected	Description
Architect Design Mode	GUI	<ul style="list-style-type: none"> Fixed bugs in IP-addressing configuration for both IPv4 and IPv6. Fixed a bug such that weather component is correctly placed at mouse click location. Nodes can now be placed below the canvas if the node position file is changed manually.
Architect Visualize Mode	GUI	<ul style="list-style-type: none"> Fixed a bug such that when running a simulation for more than 24 hours, the real time clock does not reset itself back to zero every 24 hours. Fixed bugs related to rendering of foliage. Fixed a bug such that dynamic statistics for a model will be included in the list of dynamic statistics that can be selected for display in Visualize mode only if that model is enabled in the scenario.
ARP Model	Developer Model Library	Fixed a bug in collecting interface level statistics.
802.11 PHY and MAC Models	Wireless Model Library	<ul style="list-style-type: none"> Fixed a bug related to the cancellation of the CTS wait timer . The size of FCS in Short Control Frame has been correctly set to 4. If the listening channel mask is set to 11, then listening will start on first channel only as multiple channels are not supported in 802.11 PHY. Fixed a bug in ATIM window in 802.11 MAC.
802.11e MAC Model	Wireless Model Library	<ul style="list-style-type: none"> Fixed a bug in the calculation of TXOP (Transmission opportunity).

TABLE 5. Bug Fixes for EXata 5.1 (Continued)

Bug Fixes	Area Affected	Description
Antenna Models	Wireless Model Library	Fixed a bug in the Antenna Model such that the correct antenna pattern is displayed in the GUI.
Abstract PHY Model	Wireless Model Library	Corrected the calculation of interference power in the Abstract PHY model.
Multicast Protocols	Multimedia and Enterprise Model Library, Wireless Model Library	Fixed a bug such that the parameter MULTICAST-GROUP-FILE is read at global level for all multicast protocols.
VoIP Model	Multimedia and Enterprise Model Library	Fixed a bug in calculation of packetization interval in the VoIP model.
PIM-DM Model	Multimedia and Enterprise Model Library	Fixed a bug in the PIM-DM model in handling of loopback packets at multicast source.
ZigBee PHY and MAC Models	Sensor Networks Model Library	<ul style="list-style-type: none"> Fixed a bug such that in 802.15.4 PHY, channel properties are initialized based on the listening channel and not the first channel. Fixed a bug in disassociation of nodes.
LTE Models	LTE Model Library	<ul style="list-style-type: none"> Fixed a bug in calculation of RA preamble reception power. Fixed a bug in calculation of Transmission power of RA preamble when Random Access process is retried. Fixed a bug that NACK is not sent appropriately in RLC AM entity. Fixed a bug in packet error rate calculation. Fixed a bug in random access preamble transmission/reception power calculation. Fixed a bug in printing statistics related to handover.
Jammer Model	Cyber Model Library	Fixed memory related bugs.
Scenario Statistics	Statistics DataBase	Fixed a bug to update promiscuous mode statistics in the statistics database.
Connection Manager	Statistics DataBase	<ul style="list-style-type: none"> Fixed a bug related to mapping of nodes with multiple interfaces. Fixed a bug with the Restore button. Fixed bugs related to updating the default gateway when the Connection Manager is connected and disconnected. Fixed bugs with the EXata Auto-detection feature.

Table 6 lists the known issues for EXata 5.1.

TABLE 6. Known Issues for EXata 5.1

Issue	Area	Description
Issues with Extractor	Federation Interfaces Library	If EXata is recompiled using VC 9, Extractor will not work. In order to use Extractor, VC 10 must be used if EXata is recompiled. (The pre-compiled executable included in the installation has been built using VC 10.)
Issues with “Run on EXata Node” feature	Connection Manager	<p>On Windows 7 (32-bit) platforms:</p> <ul style="list-style-type: none"> • The FTP client crashes after downloading and saving a file. • lperf client for TCP connections takes additional time to close the running session, thereby calculating the transfer speed incorrectly. <p>On Windows 8 (32-bit and 64-bit) platforms:</p> <ul style="list-style-type: none"> • the FTP “ls” and “dir commands” do not display the file list.
Instability with some graphics cards	GUI	The GUI may exhibit instability when run on some editions of ATI video cards and versions of ATI drivers. If this is the case, it may be advisable to disable 3D acceleration in the operating system or switch to a system with a graphics card from another vendor.
Debugging on MPI platforms	Kernel	The debugging feature is not available for MPI platforms.

2 EXata 4.1 Release Notes

This section lists release notes for EXata 4.1 and are described in the following tables:

- [Table 7, “New Features for EXata 4.1,” on page 8](#)
- [Table 8, “Updated and Enhanced Features for EXata 4.1,” on page 9](#)
- [Table 9, “Features Removed from EXata 4.1,” on page 9](#)
- [Table 10, “Features Changed in EXata 4.1,” on page 10](#)
- [Table 11, “Bug Fixes for EXata 4.1,” on page 10](#)
- [Table 12, “Known Issues for EXata 4.1,” on page 10](#)

[Table 7](#) lists the new features in EXata 4.1.

TABLE 7. New Features for EXata 4.1

New Feature	Area Affected	Description
Socket Interface	Standard Interfaces	Added a new generic socket interface for driving the simulation. The major features are: <ul style="list-style-type: none"> • Create and damage platforms • Platform mobility • Send communication • Logging
Statistics Database	Scenario Statistics	In addition to the statistics file that is created when the simulation ends, scenario statistics are now also logged into a statistics database. Refer to <i>Statistics Database User's Guide</i> for details.
IEEE 802.11n Model	Wireless Model Library	IEEE 802.11n improves the effective throughput of end-user applications on 802.11 devices. The major implemented features are: <ul style="list-style-type: none"> • Aggregate MSDU operation • Aggregate MPDU operation • Block ACK • Reduced Inter-Frame Space (RIFS)
Inter-channel Interference Model	All PHY Models	The Inter-channel Interference model, has been added, which provides the capability to properly estimate both co-channel and inter-channel interference.
LTE Evolved Packet Core (EPC) Model	LTE Model Library	LTE Model Library has been enhanced. The major features implemented are: <ul style="list-style-type: none"> • Mobility Support for UE • X2 Handover including “loss less” handover capability. • Basic MME/SGW models <p>The LTE Model Library now supports UE, eNB, and MME/SGW nodes. It supports basic capabilities of the core network nodes.</p> <p>There is no support for HARQ.</p>
Guaranteed Time Slots (GTS) Support	Sensor Networks Model Library	GTS is a method of achieving QoS in the Zigbee MAC model which allows each device a specific duration of time in each superframe without contention or latency.

TABLE 7. New Features for EXata 4.1 (Continued)

New Feature	Area Affected	Description
Finalization Status Dialog	GUI	A finalization status dialog box is added to show the current simulation status if statistics generation is taking more than 15 seconds. This dialog shows the current status of scenario finalization and remains active until the statistics file is generated.
Network Management Model Library	Documentation	A new document for Network Management models, <i>Network Management Model Library</i> , has been created. The SNMP model description has been moved from <i>EXata User's Guide</i> to this new document.

Table 8 lists the updated and enhanced features in EXata 4.1.

TABLE 8. Updated and Enhanced Features for EXata 4.1

Updated/Enhanced Feature	Area Affected	Description
LTE MAC	LTE Model Library	The following features are now implemented in the LTE MAC model: <ul style="list-style-type: none"> • Mobility support for UEs. • X2 handover including "loss-less" handovers. • Models for basic MME/SGW nodes. HARQ is not supported.
Animation of Node/Interface Faults	GUI	When a scenario is run in Architect's Visualize mode, a symbols appear dynamically next to a node with one or more interface faults. A red circle with a diagonal indicates that all interfaces of the node have failed. An orange circle with a diagonal indicates that at least one of the interfaces of the node (but not all) has failed.
GUI Animation	GUI	Greatly improved the animation speed in the GUI.
Help Menu	GUI	The Documentation command in the GUI's Help menu has been replaced by two commands: <ul style="list-style-type: none"> • Documentation HTML: Launches the product's web help in a browser. • Documentation Folder: Opens the folder where all documentation files (in PDF format) are located.

Table 9 lists the features removed from EXata 4.1.

TABLE 9. Features Removed from EXata 4.1

Removed Feature	Area Affected	Description
ALE Call, ALE MAC, and ASAPS Propagation Models	ALE/ASAPS Advanced Propagation Model Library	The ALE/ASAPS Advanced Propagation Model Library is not supported in EXata 4.1.

Table 10 lists the features changed in EXata 4.1.

TABLE 10. Features Changed in EXata 4.1

Changed Feature	Area Affected	Description
ANESAT and Satellite-RSV Models	Satellite Model Library	The Satellite Model Library is subject to ITAR restrictions and can only be purchased by authorized customers.

Table 11 lists bug fixes for EXata 4.1.

TABLE 11. Bug Fixes for EXata 4.1

Bug Fixes	Area Affected	Description
LTE Model	LTE Model Library	The following bug fixes apply to the LTE Model Library: <ul style="list-style-type: none"> • Descriptions of some parameters on GUI are fixed. • Fixed a bug that LTE model crashes in a Linux environment. • Compiler warnings are fixed. • Existing sample scenarios are modified so that they can run with new LTE model features that were added this time.
Architect	GUI	Fixed bugs in batch experiments, hierarchies, terrain loading, and channel configuration.
VOIP	Multimedia and Enterprise Model Library	Fixed a bug in printing of average jitter statistics.
802.16 MAC	Advanced Wireless Model Library	Fix done to drop an application flow if total rate is greater than 32 Mbps.
802.11 MAC	Wireless Model Library	Size of FCS in short control frames is fixed to conform to the RFC. Fixed bugs in Power Save mode.
IGMP	Developer Model Library	Corrected the behavior of the IGMP model when a node has multiple interfaces.
GUI Output Window	GUI	Limit of 2000 log messages added in GUI output window.

Table 12 lists the known issues for EXata 4.1.

TABLE 12. Known Issues for EXata 4.1

Issue	Area	Description
LTE Models are not backward-compatible	LTE Model Library	LTE scenarios created in the earlier versions of EXata will need to be modified in order to use the latest LTE models.
Instability with some graphics cards	GUI	The GUI may exhibit instability when run on some editions of ATI video cards and versions of ATI drivers. If this is the case, it may be advisable to disable 3D acceleration in the operating system or switch to a system with a graphics card from another vendor.
Debugging on MPI platforms	Kernel	The debugging feature is not available for MPI platforms.

3 EXata 3.1 Release Notes

This section lists release notes for EXata 3.1 and are described in the following tables:

- [Table 13, “New Features for EXata 3.1,” on page 11](#)
- [Table 14, “Updated and Enhanced Features for EXata 3.1,” on page 11](#)
- [Table 15, “Bug Fixes for EXata 3.1,” on page 12](#)
- [Table 16, “Known Issues for EXata 3.1,” on page 12](#)

[Table 13](#) lists the new features in EXata 3.1.

TABLE 13. New Features for EXata 3.1

New Feature	Area Affected	Description
LTE Model	LTE Model Library	<p>A new library, LTE Model Library, has been added. The LTE Model Library models the basic framework of the 3GPP Long Term Evolution network. The major features implemented are:</p> <ul style="list-style-type: none"> • Radio Resource Control • PDCP • RLC • MAC • ARQ and CQI • RR and PF scheduling models • OFDMA/SCFDMA PHY • MIMO model (Open Loop 2x2 MIMO, SFBC) • Channel model for MIMO <p>The LTE Model Library just supports UE and eNodeB nodes and does not support the core network nodes. There is no support for mobility, handover, or HARQ.</p>
SNMPv3 Support	SNMP Interface	<p>The SNMP interface has been updated to support SNMPv3. The major implemented features are:</p> <ul style="list-style-type: none"> • SNMPv3 agent • User-based security model • View-based access control model • DES and AES128 encryption support
Web Help	Documentation	<p>In addition to PDF documents and context-sensitive help, browser-based help is also available. To access the browser-based documentation, go to Tools > Documentation in the GUI.</p>

[Table 14](#) lists the updated and enhanced features in EXata 3.1.

TABLE 14. Updated and Enhanced Features for EXata 3.1

Updated/Enhanced Feature	Area Affected	Description
SNMP Interface	GUI	<p>The SNMP interface parameters are now configurable in the Default Device Properties Editor instead of in the Advanced Emulation Configuration editor.</p>

Table 15 lists bug fixes for EXata 3.1.

TABLE 15. Bug Fixes for EXata 3.1

Bug Fixes	Area Affected	Description
DIS Interface	Standard Interfaces Model Library	<ul style="list-style-type: none"> Fixed a bug that caused the DIS interface to generate an error message if a hierarchy contains a subnet or another hierarchy. Fixed a bug that caused the initial delay of packets to be equal to the initialization time.
HLA Interface	Standard Interfaces Model Library	Fixed a bug that caused the initial delay of packets to be equal to the initialization time.
DTED	GUI	Fixed a bug that caused incorrect altitudes to be calculated and displayed for DTED terrain.
802.15.4 MAC	Sensor Networks Model Library	Acknowledgement packet format and wait for ACK timer have been modified to conform to the specifications.
802.16 MAC	Advanced Wireless Model Library	<ul style="list-style-type: none"> Fixed a bug to correct the inconsistent behavior of the protocol for fragmented and non-fragmented packets. Fixed a bug to properly fragment the first packet for a Subscriber Station when the packet size is greater than the available free space. Fixed a bug to correctly pass message info from the upper layers via 802.16 MAC for TCP-based applications.
Urban Auto-Select Model	Urban Propagation Model Library	Updated the Auto-Select model to correctly use the URBAN_COST_WI_NLoS model instead of the Two-Ray model when the nodes do not have line of sight and neither of them is in a canyon.
Microwave Model	Wireless Model Library	Fixed the incorrect reading of configuration parameters LINK-TX-ANTENNA-POLARIZATION and LINK-RX-ANTENNA-POLARIZATION.
Architect	GUI	<ul style="list-style-type: none"> Fixed a bug that caused the GUI to crash when loading the Firewall model verification scenario. Fixed a bug that sometimes caused the value of NETWORK-PROTOCOL to not be saved properly in the scenario configuration (.config) file.

Table 16 lists the known issues for EXata 3.1.

TABLE 16. Known Issues for EXata 3.1

Issue	Area	Description
Instability with some graphics cards	GUI	The GUI may exhibit instability when run on some editions of ATI video cards and versions of ATI drivers. If this is the case, it may be advisable to disable 3D acceleration in the operating system or switch to a system with a graphics card from another vendor.
Debugging on MPI platforms	Kernel	The debugging feature is not available for MPI platforms.

4 EXata 2.2 Release Notes

This section lists release notes for EXata 2.2 and are described in the following tables:

- [Table 17, “New Features for EXata 2.2,” on page 13](#)
- [Table 18, “Updated and Enhanced Features for EXata 2.2,” on page 14](#)
- [Table 19, “Removed Features for EXata 2.2,” on page 16](#)
- [Table 20, “Bug Fixes for EXata 2.2,” on page 16](#)
- [Table 21, “Configuration File Changes for EXata 2.2,” on page 19](#)
- [Table 22, “API Changes for EXata 2.2,” on page 19](#)
- [Table 23, “Known Issues for EXata 2.2,” on page 19](#)

[Table 17](#) lists the new features in EXata 2.2.

TABLE 17. New Features for EXata 2.2

New Feature	Area Affected	Description
OSPFv2 Demand Circuit	Multimedia and Enterprise Model Library	Extended OSPFv2 to support Demand Circuits. Demand circuits refer to those network segments whose cost depends on either connect time and/or usage (expressed in terms of bytes or packets). Examples include ISDN circuits and X.25 SVCs.
OSPFv2 NSSA	Multimedia and Enterprise Model Library	Extended OSPFv2 to support Not-So-Stubby Area (NSSA) feature. The NSSA feature is a non-proprietary extension of the existing stub area feature that allows the injection of external routes in a limited fashion into the stub area.
MDP Model	Developer Model Library	Multicast Dissemination Protocol (MDP) model has been added.
Fixed Communications Model	Developer Model Library	Fixed Communications model has been added that models transmission of packets with a fixed delay and drop probability.
Automatic Generation of Default Routes for Links	Developer Model Library	Added a new parameter, LINK-GENERATE-AUTOMATIC-DEFAULT-ROUTE, that enables a default route to be added to the IP forwarding table for nodes connected by a link.
Satellite Models	Satellite Model Library	The satellite models have been enhanced to use separate EXata channels for each of the satellite RF link (forward uplink, forward downlink, return uplink and return downlink). This allows separate propagation effects to be considered for each link. This change also allows the RSV satellite model to be used with STK/Connect in bent-pipe mode.
-version option	Kernel	A new way to retrieve the build and version information of the simulator. The format of the command is: exata -version This command will print out the version number, build number, build date, and effective EXATA_HOME.

TABLE 17. New Features for EXata 2.2 (Continued)

New Feature	Area Affected	Description
HITL Configuration File	Kernel	Human-In-The-Loop (HITL) commands can be simulated via an HITL configuration file which specifies the HITL commands and the time when each command is to take effect.
Generate statistics file when simulation is interrupted	Kernel	In earlier releases, a statistics file is generated only if the simulation runs for the configured simulation time (specified by parameter <code>SIMULATION-TIME</code>). In this release, a statistics file is generated even when the simulation is terminated before the configured simulation time (for example, by typing Ctrl+C). The first two lines of the statistics file indicate the configured simulation time and the simulation time when the simulation actually ended. If the simulation is allowed to run for the configured simulation time, then these two entries are identical.
Installation of Acrobat	Installation	The Windows installer will check if Acrobat 9.0 or higher version is installed on the computer where EXata 2.2 is installing. If not, it will install Acrobat 9.0 with user's permission.
Array Editor	GUI	An array editor is used to configure parameters with multiple instances (array parameters). This makes it both easier and faster to configure such parameters.
UMTS Toolbar	GUI	If the UMTS Model Library is activated by the license, a UMTS Toolbar is displayed in the Standard Toolset. The UMTS Toolbar contains icons for the pre-configured UMTS devices.
Satellite Devices	GUI	If the Satellite Model Library is activated by the license, icons for the pre-configured satellite devices are displayed in the Standard Toolset.
Documentation Portfolio	Documentation	A portfolio document is included in the installation. It includes all EXata user documents. This allows users to perform a global search for a string in all user documents.

Table 18 lists the updated and enhanced features in EXata 2.2.

TABLE 18. Updated and Enhanced Features for EXata 2.2

Updated/Enhanced Feature	Area Affected	Description
802.3 MAC	Developer Model Library	Optimized the 802.3 MAC code to allow for larger parallel lookahead, resulting in faster runtime performance.
Antenna Model	Wireless Model Library	QA test. Made it easier to configure. Allow the configuration of patterned antennas in the main configuration file without using Antenna Model file.
BGP	Multimedia and Enterprise Model Library	Updated BGP to be emulation-ready.
ICMP	Developer Model Library	Updated ICMP to be emulation-ready.

TABLE 18. Updated and Enhanced Features for EXata 2.2 (Continued)

Updated/Enhanced Feature	Area Affected	Description
OSPFv2 Host Route	Multimedia and Enterprise Model Library	Updated OSPFv2 to support OSPFv2 routers with hosts attached.
SuperApplication	Developer Model Library	Updated to support more configuration parameters. Updated to support MDP
802.11 MAC	Wireless Model Library	MAC-DOT11-STA-CHANNEL is now configurable for access points as well.
IGMP	Developer Model Library	Updated the IGMP model to be emulation-ready.
PIM-SM	Multimedia and Enterprise Model Library	Updated the PIM-SM model to be emulation-ready.
PIM-DM	Multimedia and Enterprise Model Library	Updated the PIM-DM model to be emulation-ready.
Terrain API	Kernel, Wireless Model Library	Rewrote the terrain API. Made it easy to use and extensible for new terrain format.
IP Fragmentation	Developer Model Library	The IP fragmentation is updated to support different IP fragmentation unit sizes for different interfaces.
AGI Interface	Developer Model Library	Updated to support animation in EXata GUI, especially the node mobility.
Parallel Simulation	Kernel	Optimization of parallel kernel. Parallel performance for large numbers of CPUs on shared memory systems was optimized.
External Interface	Kernel	Updated to support for external interface threads. Each external interface can have one or more threads. These threads must use the "MT" versions of the Message API functions to allocate and schedule their events.
Link Animation	GUI	Corrected a missing feature where a function call to GUI_SetEffect is allowed for setting colors of links added from later function calls to GUI_AddLink.
Super Application	Developer Model Library	Added end-to-end latency statistics for reliable (TCP) statistics.
Automatic Model Selection	Urban Propagation Model Library	Updated the auto-select feature for automatically selecting the most appropriate pathloss model. See section 2.1 of <i>Urban Propagation Model Library</i> for details.
Mobile IP	Wireless Model Library, Multimedia and Enterprise Model Library	The Mobile IP Model has been moved from Wireless Model Library to Multimedia and Enterprise Model Library.
Emulated FTP	Developer Model Library	Added support for the FTP "PWD" command.
Emulation Interface	Interfaces	Extended the runtime statistics displayed during execution.
Loading and Saving Scenarios	GUI	Loading and saving scenarios in the GUI is much faster now.

Table 19 lists the removed features in EXata 2.2.

TABLE 19. Removed Features for EXata 2.2

Removed Feature	Area Affected	Description
OS Support	Kernel	Dropped support for Windows Vista. For a complete list of supported platforms, please refer to the EXata 2.2 System Requirements.
Network Security Models	Network Security Model Library	The Network Security Model Library is not supported in EXata any more. These models are now part of the Cyber Model Library of EXata.
SATTSM PHY Model	Satellite Model Library	The Satellite Technology Support Module Physical layer Model has been removed.
Pedestrian Mobility Model and Pedestrian Node Placement model	Wireless Model Library	The pedestrian node placement and pedestrian mobility model have been removed.
Version.txt file	Kernel	Removed the EXATA_HOME/Version.txt file. The version information is embedded into the binary executable now. One can use the following command to get the build information: exata -version
Animation Filters	GUI	The Node Radio Range and Node Link filters have been removed from the Visualize mode of Architect.

Table 20 lists bug fixes for EXata 2.2.

TABLE 20. Bug Fixes for EXata 2.2

Bug Fixes	Area Affected	Description
802.11s	Wireless Model Library	Corrected an error that caused the beacon timer to be scheduled with a time that has already past, causing a crash.
802.15.4	Sensor Networks Model Library	<ul style="list-style-type: none"> PHY properties are now set after checking the configuration for which channel to use. previously, channel 0 was used by default. Fixed the calculation of BER to conform with the specifications.
802.16	Advanced Wireless Model Library	<ul style="list-style-type: none"> Fixed handling of RTG with respect to frame duration. The scheduling algorithm for DL-subframe was not in synchronization with the building of DL-subframe. This has been fixed.
Switch	Multimedia and Enterprise Model Library	Fixed a bug where inapplicable parameters were being read for a switch.
AODV	Wireless Model Library	Corrected the Lifetime field initialization to correspond to the RFC.
AGI Interface	Developer Model Library	Corrected various API calls that were using phyIndex instead of interfaceIndex.

TABLE 20. Bug Fixes for EXata 2.2 (Continued)

Bug Fixes	Area Affected	Description
Bellman-Ford	Developer Model Library	Fixed a bug where the number of periodic update packets and the number of triggered update packets were being counted as one over all interfaces. Now they are counted separately for each interface.
HTTP	Developer Model Library	Fixed a bug that caused an error to be reported when packets from multiple HTTP sessions are interleaved.
PIM-SM	Multimedia and Enterprise Model Library	If PIM-SM-STATIC-NUMBER-OF-RP is set to 1, then PIM-SM-STATIC-RP-ADDRESS, PIM-SM-STATIC-RP-GROUP-RANGE and PIM-SM-STATIC-RP-PRIORITY are not required to be specified with an instance number.
PIM-SM and PIM-DM	Multimedia and Enterprise Model Library	Fixed a bug where some statistics parameters were not being initialized.
OSPFv2 Host Route Calculation	Multimedia and Enterprise Model Library	Fixed a bug where OSPFv2 routers were not calculating routes to their connected hosts.
PIM-SM Control Packets Being Received on a PIM-DM Interface	Multimedia and Enterprise Model Library	When connected to an external router, it is possible to receive PIM-SM bootstrap packets from that router when configuration is only for PIM-DM. Handling for these PIM-SM packets has been added so that the packets are silently discarded instead of causing an error.
Weather Model	Wireless Model Library	Fixed a bug related to calculating the overlapped distance for 3D weather patterns.
TRACE	Developer Model Library	Fixed a bug where if TRACE-ALL is set to NO, the simulator does not read the layer level TRACE parameters.
IP	Developer Model Library	<ol style="list-style-type: none"> 1. IP fragment set packet length field in the IP header of the fragment as the length of original packet, instead of that of fragment. This is not correct per RFC. 2. IP fragmentation does not properly handle virtual payload for subsequent fragments. It assumes either all real payload or all virtual payload, not mixed.
Pathloss Matrix Model	Wireless Model Library	The pathloss matrix is shared by multiple partitions in shared memory parallel simulation (non-MPI). However, its values are updated on the fly for each time point. Since different partitions have different simulation time, this will cause problems. It is fixed by moving the pathloss matrix to be per partition.
ATM	Developer Model Library	Added error check for the condition where an IP interface is trying to be created for an pure ATM switch.
CELLULAR	Cellular Model Library	The call to PhyCellularStartTransmittingSignal was put in a wrong #ifdef section.
MAC802.16	Advanced Wireless Model Library	<ol style="list-style-type: none"> 1. FTP throughput gets reduced due to corrupted packet in uplink transmission 2. Fragments are not transmitted through ARQ blocks if ARQ is enabled
MAC802.11	Wireless Model Library	Receiving isn't terminated at the event when channel listening is stopped

TABLE 20. Bug Fixes for EXata 2.2 (Continued)

Bug Fixes	Area Affected	Description
VoIP	Multimedia and Enterprise Model Library	<ul style="list-style-type: none"> Fixed a bug where VOIP cannot continue generating packets when generated random number is too small so that talk time becomes equal to packetization interval. Parameter VOIP-LOSS-PROBABILITY is now implemented using double precision for both source and destination. The model can now handle multiple overlapping VOIP sessions from a single source.
Terrain	Wireless Model Library	One potential memory issue in function getElevationArray() API. May access out of range when the number of samples to be taken is larger or equal to the maximum number of samples.
UMTS	UMTS Model Library	Change reading parameter PHY-UMTS-HSDPA-CAPABLE of NodeB and UE from RNC from node level to interface level (default interface) as GUI save PHY layer configuration at subnet or interface level
SuperApplication	Developer Model Library	<ul style="list-style-type: none"> Fixed a bug related to multicast support in SuperApplication. If there are multiple multicast sessions defined between same source and destination nodes, the client side and server side may mismatch each other. Fixed a bug that caused an incorrect application name to be printed to the statistics file when APPLICATION-NMAE is specified in the application configuration file. Fixed a bug that caused SuperApplication to not close TCP connections at the end of a flow.
Human-In-The-Loop (HITL) Interface	GUI	<ul style="list-style-type: none"> User-entered commands may cause receive buffer overflow or other error. This has been fixed. Error-checking has been added to validate the user-entered commands. Bug in the Deactivate command has been fixed.
GUI Usability and Robustness	GUI	Fixed several issues to improve the overall usability and robustness of the GUI.
Parallel Execution	Kernel	<ul style="list-style-type: none"> Fixed issues with new shared memory parallel code. Fixed issues so that parallel execution works correctly on Windows 7. Fixed issues that caused crashes when sending loose remote messages.

Table 21 lists the configuration file changes for EXata 2.2.

TABLE 21. Configuration File Changes for EXata 2.2

Parameter	New/Updated	Description
IP-FRAGMENTATION-UNIT	Updated	This parameter is updated to support interface level configuration.
LINK-GENERATE-AUTOMATIC-DEFAULT-ROUTE	Added	Enables a default route to be added to the IP forwarding table for nodes connected by a link.
HITL-CONFIG-FILE	Added	Specifies the name of the Human-In-The-Loop (HITL) configuration file, which is used to simulate HITL commands.

Table 22 lists the API changes for EXata 2.2.

TABLE 22. API Changes for EXata 2.2

API	Updates/Changes	Description
Terrain APIs	Rewrote as C++ classes.	The terrain APIs are completely rewritten.

Table 23 lists the known issues for EXata 2.2.

TABLE 23. Known Issues for EXata 2.2

Issue	Area	Description
Instability with some graphics cards	GUI	The GUI may exhibit instability when run on some editions of ATI video cards and versions of ATI drivers. If this is the case, it may be advisable to disable 3D acceleration in the operating system or switch to a system with a graphics card from another vendor.
Display of License and Libraries Information	GUI	In the License and Libraries information window: <ul style="list-style-type: none"> License Type is sometimes shown as “unknown”. Expiration Date is sometimes shown as empty or shows an incorrect date. To get the correct expiration date, refer to the expiration date for the Developer Model Library in the library information table.
Debugging on MPI platforms	Kernel	The debugging feature is not available for MPI platforms.

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5 EXata 2.1 Release Notes

This section lists release notes for EXata 2.1 and are described in the following tables:

- [Table 24, “New Features for EXata 2.1,” on page 20](#)
- [Table 25, “Updated and Enhanced Features for EXata 2.1,” on page 24](#)
- [Table 26, “Removed Features for EXata 2.1,” on page 27](#)
- [Table 27, “Bug Fixes for EXata 2.1,” on page 27](#)
- [Table 28, “Configuration File Changes for EXata 2.1,” on page 33](#)
- [Table 29, “API Changes for EXata 2.1,” on page 34](#)
- [Table 30, “Known Issues for EXata 2.1,” on page 35](#)

[Table 24](#) lists the new features in EXata 2.1.

TABLE 24. New Features for EXata 2.1

New Feature	Area Affected	Description
AGI Interface	Developer Library	A new external interface is added for communicating with AGI's STK. This interface enables EXata to use STK to model wireless signal propagation. It also uses STK to get antenna gain and node positions. To be able to use the AGI interface, STK 9.2 must be installed with the EXata Interface module.
Wireless Propagation	Kernel	The wireless propagation kernel is updated to allow users to write a propagation module that calculates the effective received power at receiver nodes, bypassing the wireless propagation models. The API added to facilitate this is <code>PROP_CalculateRxPowerAndPropagationDelay()</code> in <code>EXATA_HOME\libraries\wireless\src\propagation.cpp</code> .
License status	GUI & Kernel	Updated licensing code for node-locked and floating licenses, foreign language licenses, and some satellite models.
Support for new platforms	Kernel	Support has been added for many new platforms. For details, refer to <i>Exata Installation Guide</i> .

TABLE 24. New Features for EXata 2.1 (Continued)

New Feature	Area Affected	Description
New installation packaging scheme	Installation	<p>In EXata 2.1, significant changes have been made to the way model libraries are packaged in the installers. Most libraries are included in the base installer. Separate model library installers are not needed anymore. The base installer includes following libraries (including source code, scenarios and documentation):</p> <ul style="list-style-type: none"> • Developer Library (including STK interface) • Multimedia and Enterprise Library • Wireless Library • Advanced Wireless Library • ALE/ASAPS Advanced Propagation Library • Cellular Library • Network Security Library • Satellite Library • Sensor Networks Library • TIREM Advanced Propagation Library • UMTS Library • Urban Propagation Library • Standard Interface Library (including both HLA and DIS) <p>Note: The Military Radios Model Library must be installed using a separate model library installer.</p> <p>However, in order to use a library, it must be enabled by the user's license. For details, refer to Appendix A of <i>Exata User's Guide</i></p>
Linux Installers	Installation	<p>EXata 2.1 provides Linux installers which are binary executables. The Linux installer provides a GUI interface to guide the installation step by step.</p> <p>For details, refer to <i>Exata Installation Guide</i>.</p>

TABLE 24. New Features for EXata 2.1 (Continued)

New Feature	Area Affected	Description
Precompiled Binary Executables	Installation	<p>All EXata 2.1 base installation packages includes the precompiled binary executables (both simulator and GUI) of EXata for all platforms supported by that installation package. The installer will setup the proper binary executable corresponding to the platform where it is installed during the installation procedure. The precompiled binary executables for platforms other than the one where the package is installed will be deleted after installation. Thus, if users move the installation folder to a different platform, they will need to rebuild the binary executable on that platform themselves. The Linux installer will setup the 32-bit binary executable (both simulator and GUI) for 32-bit Linux platforms and setup 64-bit binary executable (both simulator and GUI) for 64-bit Linux platforms. However, Windows installer always setup the 32-bit binary executable for both 32-bit Windows and 64-bit Windows.</p> <p>The precompiled binary executable with following libraries enabled:</p> <ul style="list-style-type: none"> • Developer Library (except STK interface) • Multimedia and Enterprise Library • Wireless Library • Advanced Wireless Library • Cellular Library • Network Security Library • Satellite Library • Sensor Networks Library • UMTS library • Urban Propagation Library <p>“A library enabled in the binary executable” means users will be able to run scenarios using models belonging to that library with the precompiled binary executable without the need to rebuild EXata. However, they will still need a valid license for that library.</p> <p>Following libraries are not enabled in the precompiled binary executable although the source files of these libraries are included and installed:</p> <ul style="list-style-type: none"> • STK Interface (part of Developer Library) • ALE/ASAPS Advanced Propagation Library • TIREM Advanced Propagation Library • Standard Interface Library (including both HLA and DIS)

TABLE 24. New Features for EXata 2.1 (Continued)

New Feature	Area Affected	Description
Precompiled Binary Executables (cont.)	Installation	<p>These libraries are not enabled in the precompiled binary because they require third-party software to be installed. These third-party software are not provided by SNT. Users have to get/purchase them separately. Once users installed the required third-party software, they have to rebuild EXata binary executable (only simulator) with the model library enabled themselves in order to simulate scenarios using models belonging to that library.</p> <p>Following library is not enabled in the precompiled binary executable and their source files are not included in the base installer. A separated model library installer is provided to qualified customers.</p> <ul style="list-style-type: none"> • Military Radio Library <p>Above information is for the EXata simulator. EXata GUI has support to all libraries. However, only model library with valid license will be available while designing scenarios in GUI.</p> <p>For details, refer to Appendix A of <i>Exata User's Guide</i>.</p>
Modified Parameters Wizard	GUI	<p>The Modified Parameters dialog provides a running list of all modified simulation parameters applied to a scenario.</p> <p>For details, refer to Section 3.4.8 of <i>Exata User's Guide</i>.</p>
Dynamic Parameters	GUI	<p>Support for displaying values of dynamic parameters in a tabular format (in Watch Variables panel).</p> <p>For details, refer to Section 5.5.4 of <i>Exata User's Guide</i>.</p>
Dynamic Parameters	GUI	<p>Support for modifying dynamic parameters during the run time.</p> <p>For details, refer to Section 5.4.4.2 of <i>Exata User's Guide</i>.</p>
Configurable signal propagation speed	Wireless Model Library	<p>Previously, EXata assumed that signal propagation speed is always the speed of light. Now, it allows users to specify the propagation speed for each wireless channel.</p> <p>For details, refer to Section 4.2.7 of <i>Exata User's Guide</i>.</p>
Support for ESRI shapefile	Wireless Model Library	<p>Incorporated ESRI shapefile support for urban terrain and foliage into wireless library. GUI support for these files is also available.</p> <p>For details, refer to Section 10.4 of <i>Wireless Model Library</i>.</p>
shptoxml	Utility Tool	<p>A utility tool called shptoxml is added into EXATA_HOME/bin folder. This utility converts ESRI shapefiles into EXata terrain format XML files.</p> <p>For details, refer to Appendix D of <i>Exata User's Guide</i>.</p>
Print out license and library status at command-line	Kernel	<p>In a command-line window, one can pass the option "-print_libraries" to the simulator executable to print out the license and status of each libraries.</p> <p>Example:</p> <pre>exata.exe -print_libraries</pre> <p>For details, refer to Appendix A of <i>Exata User's Guide</i>.</p>

Table 25 lists the updated and enhanced features in EXata 2.1.

TABLE 25. Updated and Enhanced Features for EXata 2.1

Updated/Enhanced Feature	Area Affected	Description
Propagation code	Kernel	Updated private propagation code to provide more information. A few APIs are changed to allow more parameter, which gives users a chance to implement more complicated propagation models without requiring access to EXata's private code.
IP Optimization	Developer Model Library	Removed unnecessary duplicate/free message when delivering unicast packets.
Parallel switched ethernet, optimizations	Developer Model Library	Added parallel support for switched Ethernet. Also implemented a significant optimization for large subnets.
Animation	GUI	Animation of queues is improved.
Scenario creation	GUI	Scenario creation is supported in both 2D and 3D views.
Node Orientation Display	GUI	Added support for display Node Orientation on two different ways: Icon Orientation and Arrow Orientation.
Human-in-the-loop Interface	GUI	For the human-in-the-loop interface, the option to enable and disable nodes from the canvas is added to the right click menu.
Scenario Components and Parameters	GUI	<p>Components of the scenario are displayed in a tabular form, instead of in a tree view of the old Java-based GUI (in Table View panel). Parameters are set in Properties Editors of the components, which can be accessed from the Table View panel or from the canvas. Parameters of components of the same type can be set to the same value in a Group Properties Editor. Global parameters are set in the Scenario Properties Editor.</p> <p>Many parameters that could be set at the global level in the old Java-based GUI can no longer be set at the global level in the new GUI. These parameters can be set at the node, subnet, or interface levels.</p>
Promiscuous mode in 802.15.4	Sensor Networks Model Library	Updated 802.15.4 to support Promiscuous mode.
Update the configuration of H323-GATEKEEPER and SIP-PROXYLIST; support node level configuration	Multimedia and Enterprise Model Library	Updated H323/SIP to support node level configuration of H323-GATEKEEPER and SIP-PROXYLIST; each client can have different a SIP-PROXY and H323 GATEKEEPER.
Support interface level configuration of OSPFv2 parameters	Multimedia and Enterprise Model Library	Updated OSPFv2 to support interface level configuration of OSPF parameters.
Support interface level configuration of OSPFv3 parameters	Multimedia and Enterprise Model Library	Updated OSPFv3 to support interface level configuration of OSPF parameters.
Support more levels of control for TRACE capability	Developer Model Library	Updated to support multiple levels of control for trace capability.
Urban file format	Wireless Model Library	A Foliage item can be created in the terrain file. This is equivalent in format to a Building tag.

TABLE 25. Updated and Enhanced Features for EXata 2.1 (Continued)

Updated/Enhanced Feature	Area Affected	Description
Support more flexible configuration of pathloss matrix propagation model	Wireless Model Library	Updated to support more flexible configuration of pathloss matrix propagation model.
Batch Experiment	GUI	The files associated with a batch experiment are stored in a sub-folder called BatchRun within the scenario folder. In EXata 2.1 and earlier versions, these files were stored in the EXata user preferences folder (e.g., C:\Documents and Settings\<username>\.exataUserDir\exata_2_1\BatchRun for Windows XP, C:\Users\<username>\.exataUserDir\exata_2_1\BatchRun for Windows Vista, and ~\.exataUserDir\exata_2_1\BatchRun for Linux).

TABLE 25. Updated and Enhanced Features for EXata 2.1 (Continued)

Updated/Enhanced Feature	Area Affected	Description
Moved scenarios in EXATA_HOME/scenarios/gui folder	Model Libraries	<p>The folder EXATA_HOME/scenarios/gui and its sub-folders has been removed. Most of its sub-folders have been moved to proper model library folders. Detailed info is as below:</p> <ol style="list-style-type: none"> 1. Remove the scenarios/gui folder and all its subfolders. 2. Add the following scenarios for ZigBee model: <ul style="list-style-type: none"> * scenarios/sensor_networks/BattlefieldMonitoringwithSensors Description: Demonstrates data collection from ground sensors using mobile vehicles. * scenarios/sensor_networks/ZigBee-AutoHome Shows an application of ZigBee technology for Home Automation. It demonstrates the monitoring and control capability that can be achieved with ZigBee. 3. Added following scenarios for File Based Mobility Model: <ul style="list-style-type: none"> * scenarios/developer/file-mobility/HighSpeedMobility Description: To show how to specify mobility using file based mobility model. 4. Added following scenarios for DEM terrain format: <ul style="list-style-type: none"> * scenarios/wireless/terrain-dem/MobileScenario Description: To show the use of DEM terrain files. 5. Added following scenarios for EXata Terrain Format model: <ul style="list-style-type: none"> * scenarios/wireless/terrain-feature/UrbanEnv Description: To show how to use terrain files which are in EXata terrain format. 6. Added following scenarios for Weather Model <ul style="list-style-type: none"> * scenarios/wireless/weather/WeatherExample Description: To show how to configure the weather model. 7. Added following scenarios for DTED terrain model <ul style="list-style-type: none"> * scenarios/wireless/terrain-dted/dtedtest Description: Demonstrate EXata's support to DTED terrain files. 8. Added following scenarios for TCP model <ul style="list-style-type: none"> * scenarios/developer/tcp/bottleneck-TCP Description: To show multiple TCP flows share the same bottleneck link.

Table 26 lists the removed features in EXata 2.1.

TABLE 26. Removed Features for EXata 2.1

Removed Feature	Area Affected	Description
Some platforms are removed from the supported platforms	Kernel	Some old platforms are not supported any more. We have stopped supporting Visual C++ 2003 and Visual C++ 2005 Express. For a complete list of EXata 2.1 supported platforms, refer to <i>Exata Installation Guide</i> and <i>Exata Programmer's Guide</i> .

Table 27 lists bug fixes for EXata 2.1.

TABLE 27. Bug Fixes for EXata 2.1

Bug Fixes	Area Affected	Description
IP	Developer Model Library, GUI	The following bugs are fixed: <ul style="list-style-type: none"> The implementation of IP packet TTL decreasing functionality was not correct. This has been fixed. The maximum hold time for an IP fragment was not user configurable and used a non-standard value. A configuration file parameter IP-FRAGMENT-HOLD-TIME has been added to make this user configurable.
ATM	GUI	In the GUI, some ATM parameters were configurable even if Adaptation Protocol was set to None. This has been fixed so that these parameters are dependent on Adaptation Protocol being set to AAL5.
ATM and H323/SIP	Developer Model Library, Multimedia and Enterprise Model Library, GUI	Parameter SIGNALING-STATISTICS was used to configure statistics collection for both ATM and H323/SIP models. This has been replaced by two parameters: ATM-SIGNALING-STATISTICS for ATM and VOIP-SIGNALING-STATISTICS for H323/SIP.
Route Map	Multimedia and Enterprise Model Library	Fixed a linked list handling bug.
Zigbee	Sensor Networks Model Library	Fixed a bug that causes failed CBR instantiation in a Zigbee network.
OSPFv2	Multimedia and Enterprise Model Library	Fixed a bug that causes OSPFv2 routes not getting populated in an ATM-IP network.
Message API	Kernel	Fixed a bug that incorrectly fetches the info field size.

TABLE 27. Bug Fixes for EXata 2.1 (Continued)

Bug Fixes	Area Affected	Description
Memory leak in Kernel	Kernel	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed a bug which causes EXata to crash in a parallel simulation when the number of nodes is smaller than the number of partitions. Fixed a bug that causes EXata to crash when invalid values are specified for the SIMULATION-TIME parameter. After the fix, EXata will print out an error message then quit, instead of simply crashing. A small bug where some dynamically allocated memory is not freed during the initialization of the simulation. A minor memory leak in parallel code. A minor memory leak in CalendarQ scheduler. The CalendarQ scheduler was not freed at the end of simulation. Fixed minor bug in the info field code where re-used info fields do not have their size updated in some cases. Fixed a minor bug in MESSAGE_RemoveInfo. It will crash if the specified info field is not found. Fixed a small bug where the 'clean' target would fail on 64-bit Vista platforms.
MAODV	Contributed Models	<p>Change the MAC protocol from Legacy 802.11 to MACDOT11.</p> <ul style="list-style-type: none"> Fixed a bug that allows route pruning even when a repair request is proceeding.
SuperApp	Developer Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Crash when its default interface address is different than the address specified. Updated the method to tell whether a node is a client. Fixed a memory leak occurring when DELIVERY-TYPE is RELIABLE. Fixed a bug during random seed generation process Update the jitter calculation to follow the RFC. Fixed a bug that handles TCP connection close event erroneously. Fixed a bug that causes packets not to be forwarded in certain chain scenario. Fixed a bug that misses checking CHAIN-ID at the forwarder in case of chained super-application.
LINK	Developer Model Library	Fixed a bug which may cause the model to crash in some situations especially when on 64bit platforms. The model tries to use a info field without allocating it.
TrafficGen	Developer Model Library	Fixed a bug that causes Parameter dataLen and dataIntv not to be assigned when traffic generation probability is less than produced random number.

TABLE 27. Bug Fixes for EXata 2.1 (Continued)

Bug Fixes	Area Affected	Description
SATCOM	Developer Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed a bug that causes SATCOM protocol to be able to transmit 1 Mbps traffic on a 200 Kbps link. Fixed a bug that causes FAULT configuration does not work on satellite link.
IPv4	Developer Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed a bug in IP to correctly set IP packet length for fragmentation. Fixed a bug to correctly update parameter originatingNodeid, instanceid, and naturalOrder while fragmentation.
DualIP	Developer Model Library	<p>Fixed a bug which may cause some DualIP scenarios to crash. The number of host bits of a virtual interface (of a tunnel) is set as 0. Due to this, it is returning the interface address of the virtual interface as the broadcast address on that interface. The bug has been fixed by returning 255.255.255.255 as broadcast address of the virtual interface.</p>
802.16	Advanced Wireless Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed a bug to update "TxPowerAdjst" when RSS received at BS from any SS is less than receive sensitivity. Fixed bug to set variable "isMgMsg" to TRUE if the message is received on basic CID while the ranging response is handled at SS. Fixed a bug causing scenario crash when precedence of FTP/Generic is set as 7. Fixed a bug causing scheduler queue size is not updated while the packet is shrunk. Fixed a bug to make MAC802.16 work with IPv6. Changed all calls to MESSAGE_InfoAlloc with info size as 0 to use MESSAGE_RemoveInfo. This is due to an API change. Previously, MESSAGE_InfoAlloc with info size as 0 means to remove the info. This is not supported anymore. One has to use MESSAGE_RemoveInfo. Fixed a bug that caused SS not able to register with BS if RANGING-TYPE was CDMA. Fixed a bug related to Idle mode in IPv6. Fixed a bug related to FTP throughput issues. Improved the Bandwidth allocation procedures in case of ertPs flows. Fixed bugs related to CDMA based Bandwidth request and initial ranging.
Generic MAC	Wireless Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed a memory leak problem in some scenarios. Fixed a bug causing GenericMac to freeze in some scenarios. Fixed a bug leads to Sequence number mismatch in a lossy environment.

TABLE 27. Bug Fixes for EXata 2.1 (Continued)

Bug Fixes	Area Affected	Description
802.11	Wireless Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed a bug that causes an assertion error when a nodes calls function "MacDot11ManagementChangeToChannel()" during the transmission of a packet. Two calls to function "MacDot11StationhasMangementFrameToSend" in both if/else branches are reduced into one call. Fixed a bug parameter MAC-DOT11-SCAN-MAX-CHANNEL-TIME is not configurable by users Fixed a bug that causes a node that keeps sending RTS packets after the retransmission limit has exceeded. Fixed a bug that caused a station (that has missed beacon more than the set limit) to start new scanning only when it has a frame to send. Fixed multiple memory corruption bugs in 802.11 Model. Fixed a bug in 802.11 PS Mode Model Bug regarding an STA CCA before starting the transmission. Fixed a bug in 802.11 PS Mode Model regarding calculation of beaconExpirationTime. Fixed a bug in 802.11 PS Mode Model regarding calculation of beacontimeStamp. Fixed a bug in 802.11PS Mode Model that causes STA to receive more TIM beacons then expected. Fixed a bug to set MoreData Field at AP while transmitting a broadcast or unicast data for STA. Fixed a bug related to calculation of CFP End Time.
TDMA	Wireless Model Library	Fixed a bug that scenarios using TDMA models will crash if the EXata executable is compiled using Visual C++ 2008. The TDMA scenario crash only happens when running in parallel simulation.
AODV	Wireless Model Library	Fixed a bug that AODV buffer checking for pending packets is missing when a RREQ message is received at a node.
Weather model	Wireless Model Library	Fixed a bug in weather model that takes Z direction into consideration.
OLSR	Wireless Model Library	<p>Fixed the bugs in function OlsrForwardMessage().</p> <ul style="list-style-type: none"> the count incremental is not right; OlsrSetDuplicateForward is not executed in some conditions
MICROWAVE Link	Wireless Model Library	Fixed a bug which may cause MICROWAVE link to crash in parallel simulation.

TABLE 27. Bug Fixes for EXata 2.1 (Continued)

Bug Fixes	Area Affected	Description
MobileIP	Wireless Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed Memory corruption in function MobileIPUpdateVisitorList by Updating Agent Advertisement timer timeout value with advMsgTimerVal interval and Resetting solicitation count of host interface structure. Fixed a bug which will cause the model to crash in parallel simulation if the agent node of a node is in different partition than the node itself
802.15.4	Sensor Networks Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed a bug that function "Csma802_15_4CanProceed" may return incorrect CSMA status for a coordinator when BO & SO are different and active periods of sending and receiving superframes are non-overlapping. Fixed a bug where function "convertMacAddrToVariableHWAddress()" uses junk values to set variable lastHopHWAddr Fixed a bug that in scenario with multiple coordinators, no data packets are received at the destination even after routes are established. Fixed a bug that function "Phy802_15_4getChannelNumber()" uses a wrong way to calculate channel number. Fixed a bug that state is not correctly checked before calling function Phy802_15_4SignalEndFromChannel(...) is called, and that the interference power is not correctly calculated. Fixed a bug that some variable is not properly reset in function Mac802_15_4mcps_data_request(...). Fixed a bug due to the wrong sequence of MAC cleanup and a remedy measure. Fixed a bug causing EXata crash in a scenario. Fixed a bug causing CBR server not being able to be established in a scenario. Fixed a bug causing 802.15.4 to send two signals to PHY simultaneously Fixed a bug that use 8 as symbol length for all modulation schemes; after fix the value is set properly based on the modulation scheme. Fixed a bug of 802.15.4 non beacon PAN that causes crash in a user scenario.

TABLE 27. Bug Fixes for EXata 2.1 (Continued)

Bug Fixes	Area Affected	Description
VoIP	Multimedia and Enterprise Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> Fixed a bug to make the jitter calculation follow the RFC. Fixed a bug regarding the initialization of H323 Scenarios using H323 models will crash if the EXata executable is compiled using Visual C++ 2008. This bug has been fixed. Fixed a bug which may cause a second VoIP call unable to start if its start time is same as the end time of a previous VoIP call. Fixed a memory corruption bug in VoIP model.
DiffServ	Multimedia and Enterprise Model Library	Fixed a bug causing a compilation error with debug option DIFFSERV_DEBUG_MARKER enabled.
OSPFv2	Multimedia and Enterprise Model Library	<p>Fixed a bug that put MaxAge LSA into neighbor's database summary list instead of neighbor's link state retransmission list.</p> <p>Replaced parameter OSPFv2_ADVRT_SELF_INTF by OSPFv2-ADVRT-SELF-INTF.</p>
ALE/ASAPS	ALE/ASAPS Advanced Propagation Model Library	Fixed a bug causing ALE verification scenarios to crash.
UMTS	UMTS Model Library	Scenarios using UMTS models will crash if the EXata executable is compiled using Visual C++ 2008. This bug has been fixed.
PIM-SM	Multimedia and Enterprise Model Library	<p>The following bugs have been fixed:</p> <ul style="list-style-type: none"> In function RoutingPimSmHandleExpiryTimerExpiresEvent() grp addr was set to 0 which was incorrect In function "RoutingPimSmHandleDownstreamStateMachine(..)" source address passed in Prune pending timer when downstreamListPtr->joinPruneState == PimSM_JoinPrune_NoInfo was pim->interface[interfaceId].ipAddress instead of src address. Tree state "ROUTING_PIMSM_SGrpt" was not handled in following functions: <ul style="list-style-type: none"> -RoutingPimSmHandleExpiryTimerExpiresEvent(..) -RoutingPimSmHandleJoinTimerExpiresEvent(..) Condition for NULL "treeInfoBaseRowPtr" was not handled in function "RoutingPimSmSendJoinPrunePacket(..)" Fix added to correctly align structure "RoutingPimSmEncodedUnicastAddr". Fix added to support unnumbered interface in wireless environment.

TABLE 27. Bug Fixes for EXata 2.1 (Continued)

Bug Fixes	Area Affected	Description
PIM-SM (cont.)	Multimedia and Enterprise Model Library	<ul style="list-style-type: none"> Fixed the bug to make fragment tag of 2 bytes and BSRPriority of 1 byte in Bootstrap message. Fixed bug to transmit Bootstrap packet periodically. Fixed the bug where the source should broadcast multicast packet to attached broadcast network in place of uncasting to DR. Fixed the bug where the number of Bootstrap Packet Forwarded was incremented even if the message was not forwarded. Fixed the bug if the source node is having multiple interfaces then packet should be broadcasted on all interfaces of node.
PIM-DM	Multimedia and Enterprise Model Library	The upstream neighbor address in join/prune packet in PIM-DM was defined as "NodeAddress", but it should be defined as "Encoded Unicast Format".
Antenna Model	Wireless Model Library	Fixed a Bug for Patterned Antenna Type regarding calculation of azimuth of BoreSight Angle.
Abstract Cellular	Cellular Model Library	Fixed a memory leak bug in the Abstract Cellular Model.
GSM	Cellular Model Library	Fixed a memory corruption bug in the GSM Model.
ANODR	Network Security Model Library	Fixed a memory corruption bug in the ANODR Model.

Table 28 lists the configuration file changes for EXata 2.1.

TABLE 28. Configuration File Changes for EXata 2.1

Parameter	New/Updated	Description
PROPAGATION-SPEED	New	This parameter can be used to specify the signal propagation speed on a specific wireless channel.
LINK-PROPAGATION-SPEED	New	This parameter can be used to specify the signal propagation speed on a wireless point-to-point link or microwave link.
OSPFv2_ADVRT_SELF_INTF	Replaced by OSPFv2-ADVRT-SELF-INTF	OSPFv2_ADVRT_SELF_INTF is changed to OSPFv2-ADVRT-SELF-INTF

TABLE 28. Configuration File Changes for EXata 2.1 (Continued)

Parameter	New/Updated	Description
H323-GATEKEEPER	Changed	H323-GATEKEEPER configuration Change from H323-GATEKEEPER {nodeId1, nodeId2...,nodeIdn} to [nodeId1] H323-GATEKEEPER YES [nodeId2] H323-GATEKEEPER YES [nodeIdn] H323-GATEKEEPER YES
SIP-PROXY	New	[proxyId1] SIP-PROXY YES [proxyId2] SIP-PROXY YES [proxyIdn] SIP-PROXY YES
SIP-PROXYLIST	Removed	Replaced by SIP-PROXY
LINK16-GATEWAY-ENABLED LINK16-GATEWAY-STATISTICS LINK16-GATEWAY-FORWARD-CONFIG-FILE LINK16-STATISTICS	Changed	LINK-16-GATEWAY-ENABLED LINK-16-GATEWAY-STATISTICS LINK-16-GATEWAY-FORWARD-CONFIG-FILE LINK-16-STATISTICS

Table 29 lists the API changes for EXata 2.1.

TABLE 29. API Changes for EXata 2.1

API	Updates/Changes	Description
COORD_ChannelPropagationDelay	Replaced with new API PROP_CalculatePropagationDelay(...)	The COOR_ChannelPropagaton() is replaced by a new API called PROP_CalculatePropagationDelay. The new API passes in more parameters which allow customized users code to calculate propagation delay based on channel, sender and receiver locations, simulation time etc.
COORD_CalcDistanceAndAngle	Removed one parameter	Originally, this function also calculate the propagation delay. However, since we want to pass in more parameters, it is not proper for function to calculate the propagation delay anymore. As the name suggested, this function is mainly for calculating the distance and angle. One should use the API PROP_CalculatePropagationDelay to calculate the propagation delay.
PARALLEL_SendRemoteLinkMessage	Updated the parameters.	Due to the change for configurable signal propagation speed, we need to pass in more parameters into this API to indicate the propagation speed.

TABLE 29. API Changes for EXata 2.1 (Continued)

API	Updates/Changes	Description
struct PropRxInfo	Added some new fields	<p>Added four new fields that give the receiver more information. The four fields are:</p> <ul style="list-style-type: none"> • double pathloss_dB; • float fading_dB; • double channelReal; • double channellmag; <p>pathloss_dB stores the pathloss that the signal experienced from transmitter to this receiver.</p> <p>fading_dB stores the fading value that the signal experienced from transmitter to this receiver.</p> <p>channelReal and channellmag are added for bring some channel properties for cooperative communication models. They are not used in existing EXata code. They are provided as placeholders for some customized propagation models.</p>
PROP_CalculateFading	Updated to pass in more parameters	<p>A few new parameters are added to this function. They are:</p> <ul style="list-style-type: none"> • Message* signalMsg, • double* channelReal, • double* channellmag <p>The "signalMsg" is passed in for customized code to access any info fields that this signal brings from the transmitter. Thus, customized radio models can add some customized info fields at the transmitter and then update this function to utilize them.</p> <p>channelReal and channellmag are passing for this function to return values. The returned values will be copied to the corresponding field of PropRxInfo structure associated with the signal. This gives the customized a chance to calculate and return the values for channelReal and channellImage.</p>
MESSAGE_InfoAlloc	Requires the info size to be larger than 0	<p>Previously, info size as 0 means to free the specified info field if it exists. This is not supported anymore. One needs to use MESSAGE_RemoveInfo instead. If you want to remove the default info field, use MESSAGE_RemoveInfo with info type as INFO_TYPE_DEFAULT.</p>

Table 30 lists the known issues for EXata 2.1.

TABLE 30. Known Issues for EXata 2.1

Issue	Area	Description
GUI configuration of models in the Satellite Model Library	Satellite Model Library	The ANESAT, SATTSM-PHY, and Satellite-RSV models of the Satellite Model Library can not be configured from the GUI. They must be configured using the command line interface.

6 EXata 2.0.1 Release Notes

This section lists release notes for EXata 2.0.1 and are described in the following tables:

- [Table 31, “New Features for EXata 2.0.1,” on page 36](#)
- [Table 32, “Updated and Enhanced Features for EXata 2.0.1,” on page 36](#)
- [Table 33, “Known Issues for EXata 2.0.1,” on page 37](#)

[Table 31](#) lists the new features for EXata 2.0.1

TABLE 31. New Features for EXata 2.0.1

New Feature	Area Affected	Description
New platforms	EXata (GUI and Emulator)	Support for 64-bit Linux systems has been added.
New platforms	EXata Emulator	Support for Microsoft Visual Studio 2008 (VC9)
Multicast applications	EXata Emulation	Multicast application traffic like streaming video or VoIP from external/real applications can be sent over an emulated network in EXata.
Alias Network Interfaces	EXata Emulator	The network interface card used for emulation can be assigned multiple IP addresses, possibly in different subnets, and the EXata Emulator will listen on all these IP addresses. This feature is useful for connecting operational hosts that belong to different subnet addresses.

Emulated ICMP model supports additional error code messages such as ICMP Host unreachable, Network unreachable, Port unreachable, Datagram too big.

[Table 32](#) lists the updated and enhanced features for EXata 2.0.1.

TABLE 32. Updated and Enhanced Features for EXata 2.0.1

Updated/Enhanced Feature	Area Affected	Description
Memory consumption	EXata Emulator	Performance optimization to decrease memory consumption and improve performance.
Scalability to support multiple physical subnets	EXata Emulator	This will assist EXata in handling connections from operational hosts on multiple subnets, all connecting through one interface, boosting the scalability of the emulation environment with respect to the number of incoming connections from physical host machines.
Compatibility with (QualNet 4.5.1) legacy IPNE	EXata Emulator	Improved implementation for packets moving in and out of the EXata emulator for legacy IPNE operations.
Indication of real traffic within the EXata GUI	EXata Connection Manager and EXata GUI	EXata GUI displays all traffic from operational/real world nodes in blue color. Traffic originating and terminating inside EXata itself is shown in green color by default.

TABLE 32. Updated and Enhanced Features for EXata 2.0.1 (Continued)

Updated/Enhanced Feature	Area Affected	Description
Support for ICMP error codes	Developer Library	Emulated ICMP model supports additional error code messages such as ICMP Source Quench and Host unreachable. Emulated ICMP model supports additional error code messages such as ICMP Host unreachable, Network unreachable, Port unreachable, Datagram too big.
Interoperability with real-world OSPF	Multimedia & Enterprise Library	Emulated OSPF model in EXata supports improved interoperability with OSPF running on real world devices/networks.
Configuration of Network Settings with Connection Manager	EXata Connection Manager	Connection Manager upon termination will prompt the user to restore the original network settings.
Indication of emulated nodes in EXata GUI	EXata Connection Manager and EXata GUI	Emulated nodes selected through 'right-clicking' an application icon and selecting from "Run on EXata Node..." will be indicated in the EXata GUI
Compatibility between QualNet and EXata GUI	EXata GUI	Scenarios created with QualNet 4.5 GUI are compliant with EXata GUI
Hardware in the loop	EXata Emulator	Fixed bug where a traffic flow arriving on an emulated external node was incorrectly sent out to the operational host.
Emulation of nodes with multiple interfaces	EXata Emulator	Fixed bug where an external node having multiple network interfaces was not delivering packets to the operational hosts.

Table 33 lists the known issues for EXata 2.0.1.

TABLE 33. Known Issues for EXata 2.0.1

Feature	Area Affected	Description
Resetting network settings on operational hosts	EXata Connection Manager	When EXata Connection Manager running on an operational host exits, it does not reset the network settings of the computer. The user must manually reset their IP configuration to DHCP or static IP address.
Multi-application mapping mode support on Linux operational hosts	EXata Connection Manager	The Linux version of the Connection Manager supports the default mapping mode only; it does not support mapping of multiple applications on one operational host to different EXata nodes.
Limitation in display/indication of operational hosts connected with EXata	EXata Connection Manager and EXata GUI	When an application or operational host is connected using the default mapping mode of Connection Manager, a colored triangle is shown in EXata GUI to indicate the EXata node that is mapped. The colored triangle indicator is not displayed when applications are connected using the multiple-application mapping mode.
Display Settings are the shared by the Design and Visualize mode of Architect	EXata GUI	If the user sets the display/visibility setting of a scenario component (mobility, wired or wireless links, application traffic...) to Off in Visualize mode then it will also not be visible in Design mode.

TABLE 33. Known Issues for EXata 2.0.1 (Continued)

Feature	Area Affected	Description
Windows security warning "Unknown Publisher" during installation of EXata Virtual Ethernet Adapter/Driver	EXata Installer	EXata Virtual Ethernet Adapter, required for Packet Sniffer Interface (PSI), is installed as an unsigned adapter/driver on Microsoft Windows XP.
Running external routing protocols on emulated nodes that have multiple interfaces	EXata Emulator	A emulated node that has multiple interface, one of which is mapped to an operational host cannot run an external routing protocol on the operational host.