

Cosminexus

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Further evolved with trusted and proven technologies

uCosminexus

Application Server



In this era of cloud computing, system development requires flexibility.

The Cosminexus application platform brings efficiency and stability to flexible system development.

Cloud-computing environments are rapidly expanding. Businesses today require open systems that can easily connect to a variety of environments and services, and flexible application development that can quickly respond to sudden business change.

Furthermore, diverse environments and services are now being integrated into one system based on virtualization technologies. Interruption of such integrated systems, however, can have a greater adverse impact than before. Therefore, stability of system operation is becoming increasingly important.

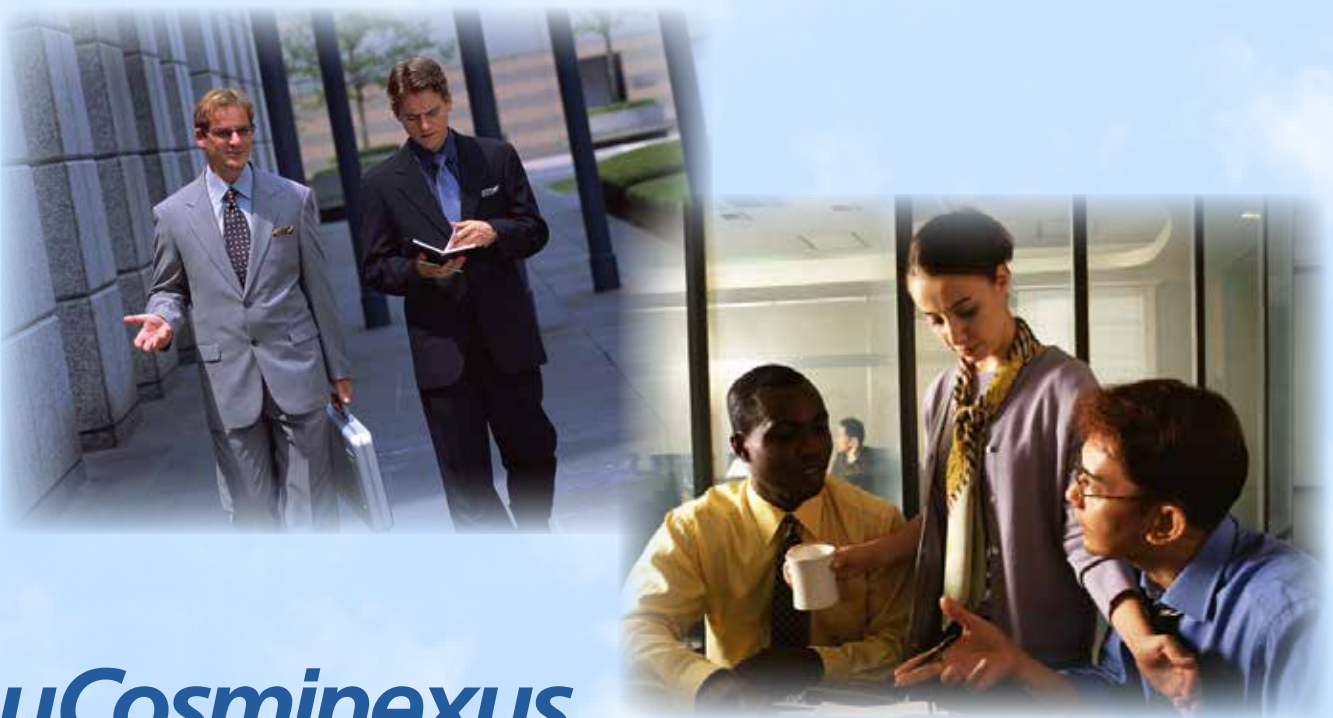
uCosminexus Application Server is a core product for online processing that brings higher productivity and stability to system.

uCosminexus Application Server totally support web application development, web application execution environments, and server operation.

uCosminexus Application Server uses a high-performance Java VM that enables rapid development of high-quality systems. In addition, text processing speed has been improved in Japanese environments and several types of performance have been optimized, allowing the provision of stable service even under heavy load.

Since resources are efficiently used, data-intensive processing, such as big-data processing, can be executed faster and with more stability than before.

uCosminexus Application Server's efficiency and stability ensure the safe system environment that is required in the cloud computing era.



uCosminexus

Application Server

Advantages

Compliance with standards

uCosminexus Application Server complies with Java EE 6 specifications (JSF 2.1, JSTL 1.2, Servlet 3.0, EL 2.2, Common Annotations 1.1, EJB 3.1, Interceptors 1.1, CDI 1.0, Bean Validation 1.0, DI 1.0, JAX-WS 2.2, and JAX-RS 1.1). By using annotation for servlet classes and supporting REST development, efficiency of development can be further improved.

Robust platform

uCosminexus Application Server can, without modifying applications, store objects that trigger full garbage collection (Full GC)[#] in an area outside the Java heap (explicit heap). As a result, the incidence of Full GC can be reduced, and interruption of online business processing can be prevented.

Fine-grained flow and priority control functions ensure stable system operation even when the number of requests or the system load suddenly increases.

Combining the failure monitor and operation manager of uCosminexus Application Server enables prevention of failures, minimization of locations affected by failures, and self-recovery from failures.

[#]: Full GC: Java memory-management processing that releases all reusable memory areas in Java VM processes to increase the amount of free memory.



Easy and efficient system construction and operation

uCosminexus Application Server helps users efficiently perform system construction, application replacement, and other tasks that require time and effort. Its parameter export and import functions allow easy environment migration. By linking uCosminexus Application Server with Job Management Partner 1, the integrated system operation manager, system operations can be monitored centrally or performed automatically.

More efficient troubleshooting

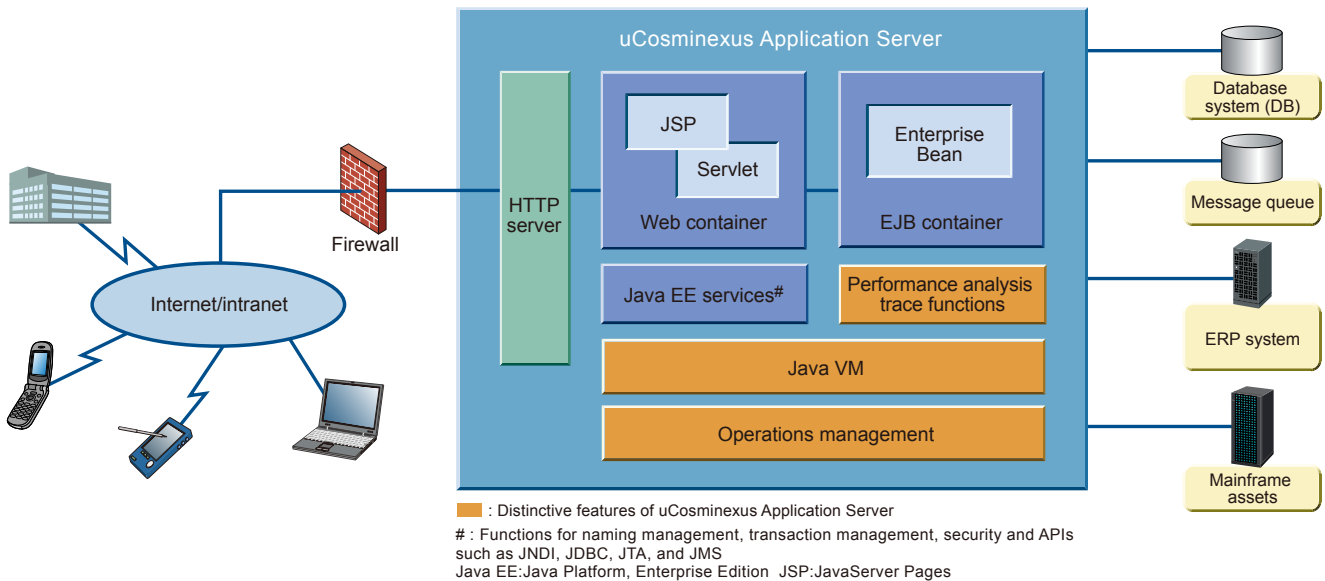
uCosminexus Application Server provides a Java VM that has enhanced troubleshooting functionality. If a failure occurs, its cause can be determined quickly. uCosminexus Application Server can acquire a trace across multiple servers, and can acquire traces of applications and frameworks. You can use these traces to easily identify performance bottlenecks and requests that triggered failures.

Reliable support service

Hitachi provides a support service that the developers themselves assist users swiftly and accurately in the event of a failure. Our service is highly rated by customers.

Execution Environment : uCosminexus Application Server

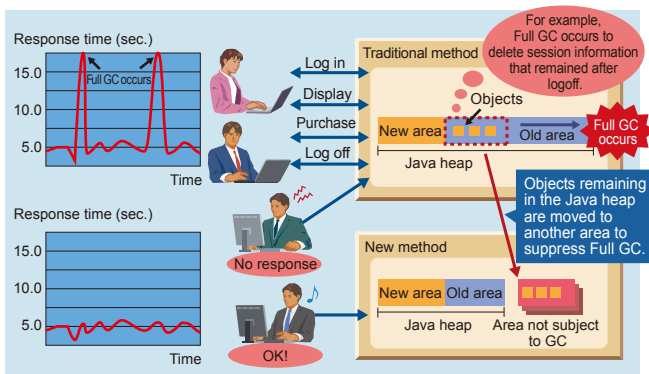
A robust and highly efficient platform that supports the stable operation of mission-critical systems



Robust platform

Preventing interruption to online processing caused by Full GC

Full GC, which deletes used objects from the entire memory area (new and old areas), might interrupt application processing and degrade system response. uCosminexus Application Server can store objects that trigger Full GC in an area outside the Java heap without modifying applications. This prevents an increase of objects stored in the old area and suppresses Full GC, which improves the sustainability of the operations and brings into being a robust web system platform. With a server integrated by, for example, using a virtualization platform, a large amount of memory is available. However, if Full GC occurs, degradation of response is a potential problem. With uCosminexus Application Server, which can suppress Full GC, users can make full use of a large amount of memory.

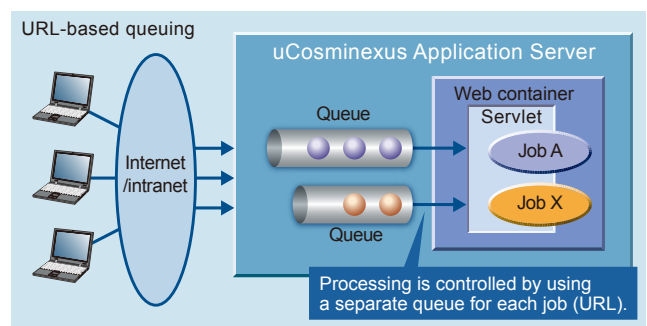


Session failover

If the server on which uCosminexus Application Server is running fails, uCosminexus Application Server can continue business processing on another server by carrying the session information over to the other server. Business processing can continue without requiring clients to log in again.

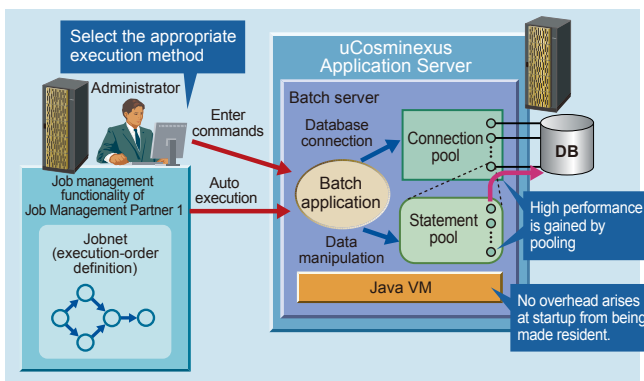
Stable operation under heavy loads

Most performance problems with web systems occur in the following two cases: when a resource shortage occurs due to a sudden increase in load, and when the CPU is being used exclusively to handle accesses that are concentrated on specific tasks. uCosminexus Application Server ensures stable system operation by using flow control function, which limits the number of applications that can run concurrently, and priority control function, which guarantees execution of high-priority applications. Processing execution can be controlled by using a queue for each unit of business logic (URL). Therefore, processing execution can be controlled by each job, even in a configuration that handles multiple jobs with one application by using Struts or some other frameworks.



Provides a high-speed batch application execution platform

uCosminexus Application Server implements a resident Java VM to provide a high-performance batch-application execution environment. Since standalone Java applications are able to run in this environment, all existing Java batch applications can be used without modification. The use of a connection pool and a statement pool allows databases to be accessed at high speed. Job execution can also be automated by linking uCosminexus Application Server with the job-management functionality of Job Management Partner 1.



Self-recovery from failures

Since uCosminexus Application Server monitors failures from various perspectives, uCosminexus Application Server can perform error notification, reconnection, re-execution, and script execution in response to failure detection. For example, uCosminexus Application Server can report an error when the application server does not respond, and can prevent itself from hanging by automatically restarting before all resources are exhausted. In addition, it can detect timeouts in individual methods. As execution of problematic methods can be canceled, the influence of a failure can be minimized, and failure recovery can be performed automatically.

Support for web services and XML

uCosminexus Application Server provides development and execution environments for applications based on web service specifications such as SOAP and WSDL.

Easy and efficient system construction and operation

Easy environment migration

uCosminexus Application Server has import and export functions that can transfer parameter settings between environments. For example, the parameter settings tuned in a test environment can be quickly applied to a production environment by using these functions.

Easy system construction

uCosminexus Application Server provides a wizard that can be used to construct a basic system, that one machine contains development-environment and execution-environment, in an interactive manner. The wizard leads the user through steps to specify all the necessary settings. If the user wants to construct a system with an execution environment consisting of multiple machines, the user can use a definition file to construct the entire system at one time. A more complicated system can also be constructed. For example, it is possible to construct a system that has session failover capability. In such a system, a backup server replaces the active server, inheriting session information if the active server fails.

Efficient application replacement

uCosminexus Application Server provides an efficient means of replacing applications. Applications can be easily deployed from a file located in any directory. If file in the directory is replaced, the application server automatically reloads the contents of the directory to replace the applications.

Integrated monitoring and automated operation made feasible by linkage with Job Management Partner 1

Job Management Partner 1 can be used to monitor the system-wide operating status. A special agent that monitors uCosminexus Application Server activities is also available. This agent allows you to understand the status of uCosminexus Application Server in real time, and to find problems early. Linking with Job Management Partner 1 also enables automation of operations. With this function, starting and stopping of the application server and applications, and other routine tasks can be automatically executed according to a schedule.

Note: This function is supported only in Japanese edition.

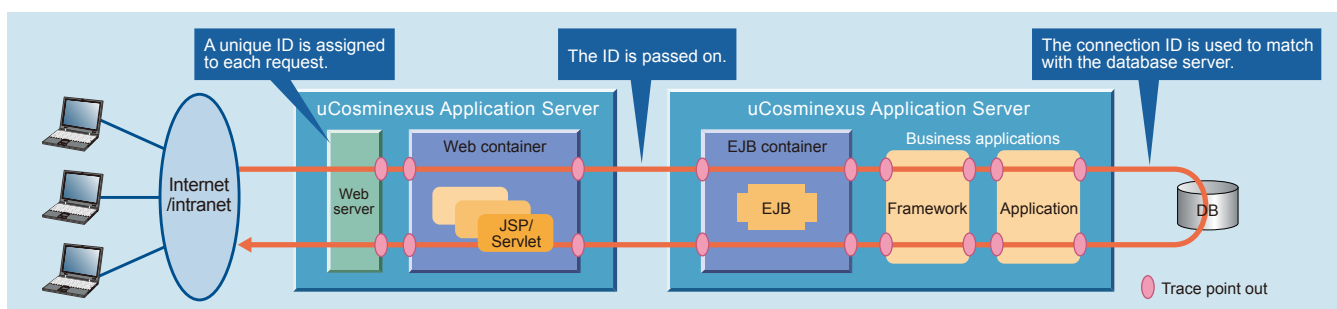
Efficient troubleshooting

Trace functions allow easy failure and performance analysis

uCosminexus Application Server provides functions that visualize the processing status executed on the application server. A unique identifier is assigned to each request, and a trace data can be acquired at specific points on the application server. Since requests can be traced with its identifier, the user can easily analyze logs when tuning performance or troubleshooting a failure. Database-connection# ID can also be output, allowing the user to easily understand the processing sequence from the web server to

the database. In addition, a definition file can be configured to allow tracing of user applications and frameworks. With these traces, the location of bottlenecks or failures in application and framework can be determined. As processing of these functions is executed at high speed, and does not affect online performance, log data can be constantly output while the system is running.

#: Oracle® and HiRDB are supported.



Enhanced Java VM troubleshooting functions

The troubleshooting functions of the Java VM that uCosminexus Application Server provides have been enhanced. For example, the contents of local variables in methods are now output in thread dump stack traces. These contents can be used to trace processing details to the point at which the failure occurred, and to determine the cause of the failure. In addition, you can use the contents to determine how long each thread used CPU and how many times each thread waited. This information can be used to easily investigate performance problems, such as CPU overload and slowdowns.

Early resolution of memory leak problems

Memory leaks—situations in which memory cannot be released—are difficult to investigate because they are hard to reproduce in a test environment. uCosminexus Application Server can display the ranking of classes by memory usage. This ranking can be used to identify the most suspicious class. By checking the reference relationships of that class, the cause of the memory leak can be found. Since users can determine the memory usage without restarting the server, users can quickly resolve memory leak problems that are hard to reproduce in the test environment.

Reliable support service

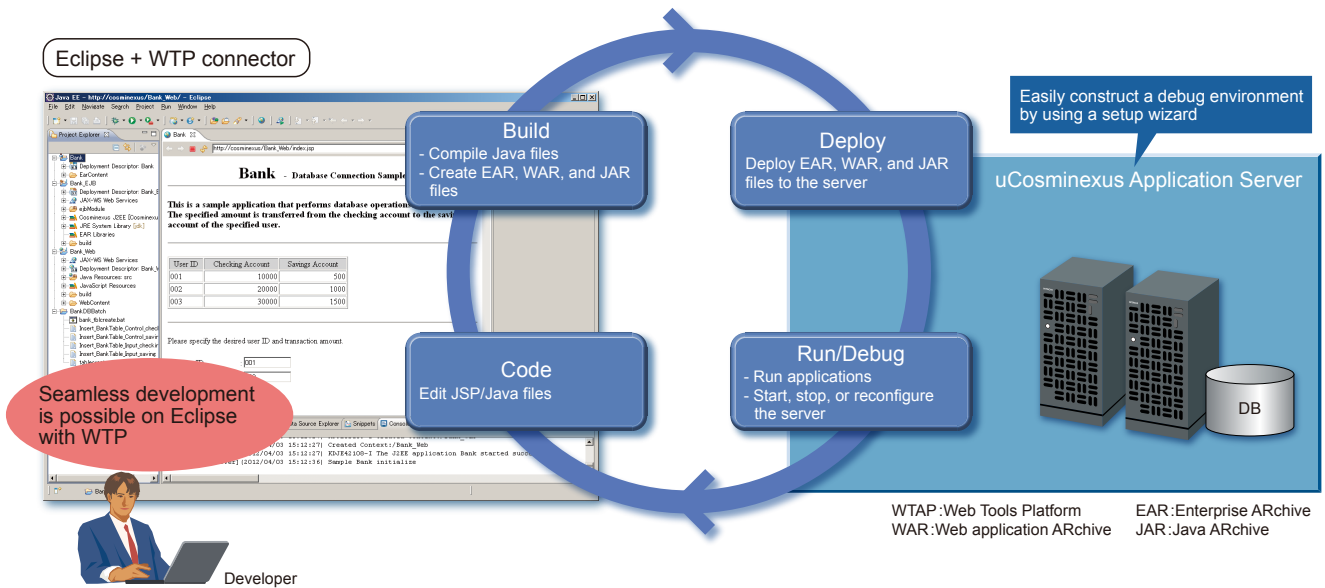
Prompt problem solution

Given that Cosminexus is a product developed by Hitachi, and that Hitachi maintains the Cosminexus source code, Hitachi takes pride in the high serviceability of Cosminexus. In addition, Hitachi has accumulated a wealth of expertise through its extensive experience in system construction and operation. Should a failure occur, Hitachi professional engineers make use of this expertise to handle

the situation, enabling a prompt solution to the problem. Hitachi's support service is highly regarded by customers. Hitachi is also preparing a query and service structure to support the stable operation of mission-critical systems. Support engineers and software developers are collaborating on efforts towards the early resolution of problems.

Development Environment : uCosminexus Developer

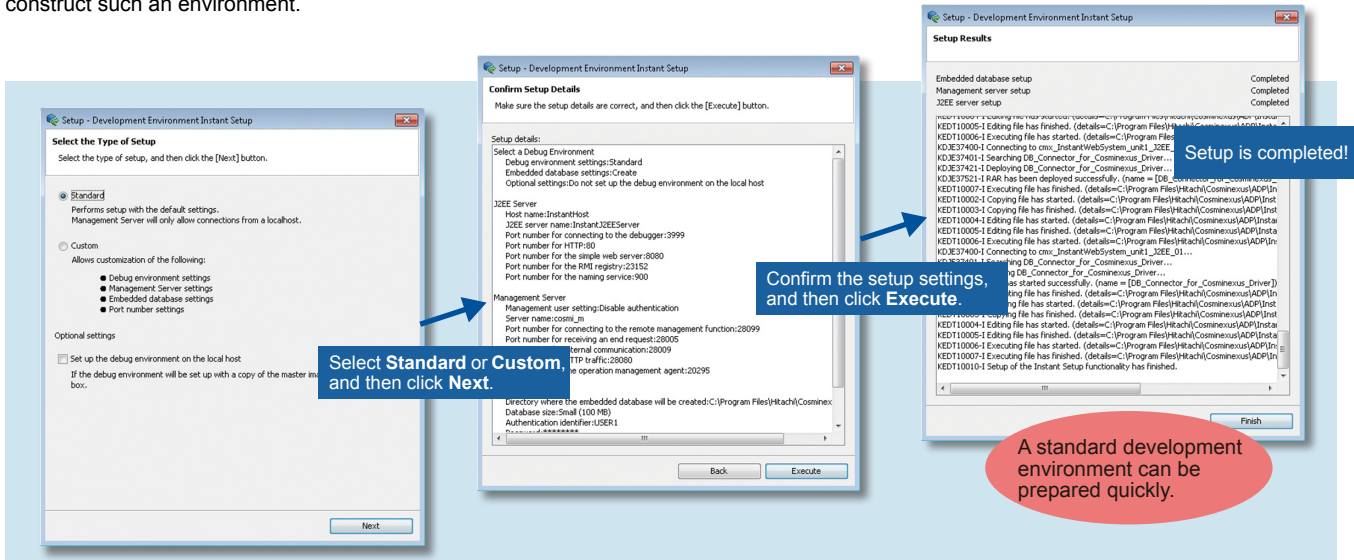
A development environment that provides total support, from coding to debugging of web applications



Efficient development in an Eclipse-based integrated environment

Reduced time and effort required to construct an environment

A setup wizard allows the user to set up Eclipse environment and to construct a debug environment consisting of uCosminexus Application Server, test and debug database, and other components, by simply clicking buttons. This wizard can reduce the time and effort required to construct such an environment.



Seamless development

You can seamlessly perform the Code–Build–Deploy–Debug sequence of application development steps in the Eclipse development environment. uCosminexus Application Server can be started and stopped, and server settings can be changed from Eclipse. In addition, remote deploy, remote debug, and other operations on a remote server can be performed from Eclipse.

Improved efficiency of development, testing, and debugging

uCosminexus Developer provides a wizard for creating the files that define the own information of uCosminexus Application Server, and a GUI-based editor for editing these files. The graphical interface of the editor allows the user to efficiently edit XML based definition files. If an application source code is modified, it will automatically be deployed on the application server—the developer does not need to manually replace the applications. This improves the efficiency of testing and debugging applications.

Function overview

Product type and name		Overview of functionality
Execution environment	uCosminexus Application Server	Provides functions for executing and operating web applications and batch applications, centered around a web application execution platform that is compliant with Java EE specifications: <ul style="list-style-type: none"> - Flow control for JSP and Servlet applications - Trace for performance analysis - Batch application execution
Development environment	uCosminexus Developer	Provides total support from developing to debugging applications that run on uCosminexus Application Server: <ul style="list-style-type: none"> - Developing, deploying, and debugging web applications and batch applications - Profiling applications

Operating environment

Product type and name		Supported OSs
Execution environment	uCosminexus Application Server	Windows Server 2008 x64 Windows Server 2008 R2 Windows Server 2012 Red Hat Enterprise Linux 5 (AMD/Intel 64) Red Hat Enterprise Linux 6 (AMD/Intel 64)
Development environment	uCosminexus Developer	Windows XP Windows Vista Windows 7 x86 Windows 7 x64 Windows 8 x86 Windows 8 x64

Note: For more details about the supported OSs, please contact Hitachi.

Standards that products comply with

Internet- and SSL-related standards	HTML,HTTP/HTTPS #1,IPv6 #2
Java™-related standards	- Java™ SE 6 API specifications #3 - The following Java EE 6 specifications: Servlet 2.3/2.4/2.5/3.0, JSF 2.1, JSP 1.2/2.0/2.1, JSP Debugging 1.0, EJB 3.1,JSTL 1.2, EL 2.2, Common Annotations 1.1, JTA 1.1,Interceptors 1.1, CDI 1.0,Bean Validation 1.0, DI 1.0, JAX-WS 2.2, JAX-RS 1.1, JAXB 2.2, StAX 1.0, JavaMail 1.4
XML- and Web service-related standards	JAX-RS 1.1, JAX-WS 2.2, JAXB 2.2, JAXP 1.4 (including StAX), JAXR 1.0, SAAJ 1.2/1.3, SOAP 1.1/1.2, WSDL 1.1, WS-RM 1.1/1.2, UDDI 2.0/3.0, WS-I BASIC Profile 1.1, WS-Security 1.1, XML Signature/Encryption Syntax and Processing
CORBA-related standards	CORBA 2.5, CORBA Object Transaction Service 1.3

#1: SSL v3, TYLS v1, TLS v1.1, and TLS v1.2 are supported for HTTPS communication on Cosminexus HTTP Server (some OS versions excepted).

#2: IPv6 is supported for HTTP communication on Cosminexus HTTP Server (some OS versions excepted).

#3: Support for TLSv1.2 is added for HTTPS communication via the Java API.

- **uCosminexus Application Server and uCosminexus Developer incorporate technology developed through the Business Grid Computing Project, which was a three-year project launched in 2003 by the Ministry of Economy, Trade and Industry.**

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