

Distributed Transaction Processing Facility  
OpenTP1

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# OpenTP1

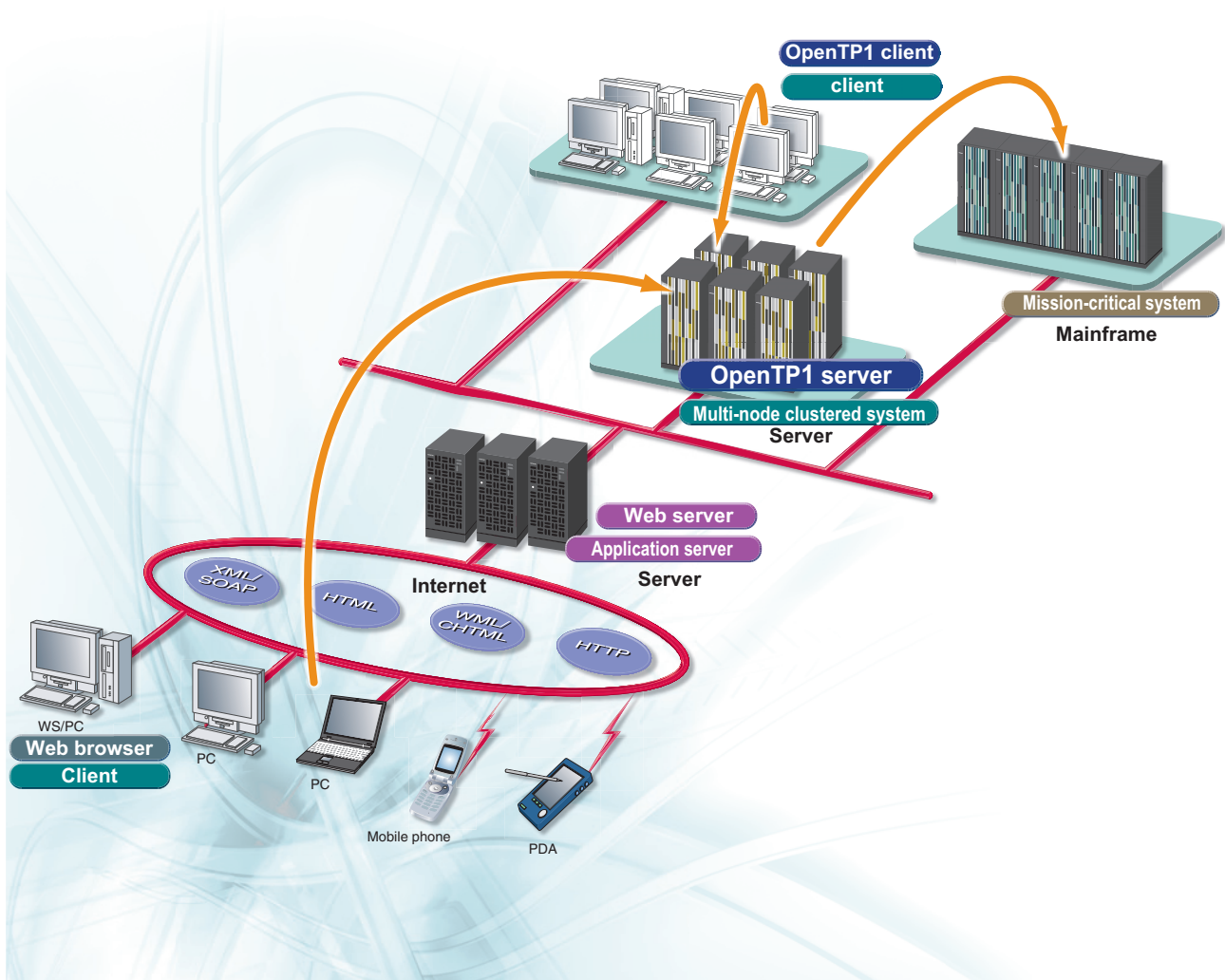
Distributed Transaction Processing Facility



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# Highly reliable, high-performance online transaction processing for next-generation core business

Business operations and institutional services could not function today without computer systems. Keeping the mission-critical systems of such operations in non-stop working order is our greatest challenge. OpenTP1, the distributed transaction manager, realizes field-proven highly reliable OLTP. OpenTP1 powerfully supports mission-critical systems. Systems can be built in various configurations, without compromising the exceptional performance and reliability crucial for a mission-critical system. OpenTP1 enables the provision of services in the configurations that meet the needs of each user. OpenTP1 also provides flexible solutions to the issue of creating a new system while also making use of existing resources. With its proven reliability and success, OpenTP1 assures that your business operations will keep running smoothly.



## **Stable operation of mission-critical systems in every type of situation**

OpenTP1 provides the core functionality of an OLTP system by applying tried and tested mainframe technologies. High reliability is maintained by the recovery function and the journal acquisition, etc.. Scheduling control enables steady quick response even if processing requests increase. The system's operating status can be monitored and analyzed to detect signs of slower response, and operations can be automated to lessen administrative workloads.

## **Support of new technologies for continually evolving system environments**

A variety of system configurations are possible to suit the particular needs of each customer. The OpenTP1 system supports Service Oriented Architecture (SOA). The applications used in OpenTP1 can be made available as services, and available services can be accessed from OpenTP1 applications.

## **Flexible inter-system linkage for effectively applying and integrating legacy systems**

Systems differ according to the environment in which they are used. OpenTP1 lets you build a mission-critical system in a variety of configurations. The wealth of protocols and application interfaces make it possible to link systems and apply legacy systems effectively. Migration from a mainframe system can also be accomplished easily.



# OpenTP1

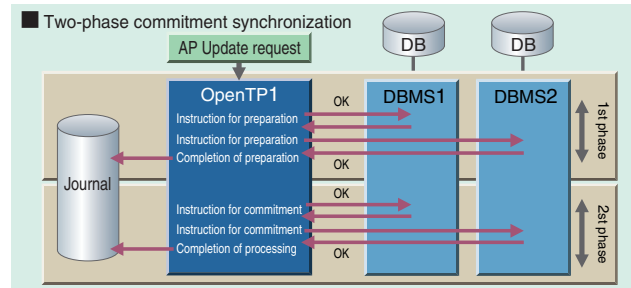
Distributed Transaction Processing Facility

## Mission-Critical

**A highly reliable, highly available, high-performance system is realized for further improving business continuity.**

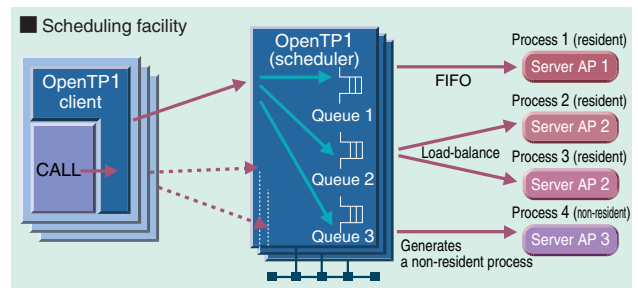
### Transaction control

OpenTP1 provides transaction control based on two-phase commitment to assure data integrity in a distributed computing environment. This enables data updating across multiple resources and global transaction control across multiple servers.



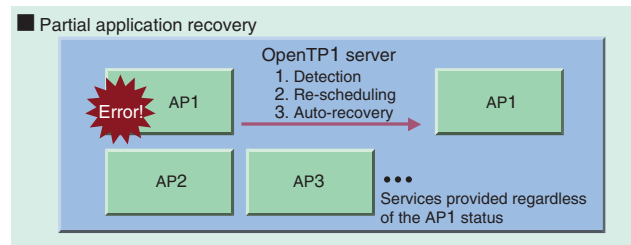
### Scheduling facility

OpenTP1 controls the processes and the schedule to efficiently handle the service requests to applications. OpenTP1 manages the processes of the applications running on OpenTP1 Server and limits the number of processes to be generated, enabling efficient application of resources. OpenTP1 also provides a load balancing scheduling facility and a dynamic process generation facility that efficiently apply the limited number of processes, enabling precise application scheduling. Such features let you build a high-performance system capable of handling high traffic volumes.



### Recovery services

Full or partial recovery can be automatically performed after a system failure. When the OpenTP1 system is linked with a database management system (DBMS) through the XA interface of the DTP model defined by The Open Group (formerly X/Open), recovery instructions are sent to the DBMS when the application is recovered. OpenTP1 collects checkpoint dumps, trace information, and log information, and manages the OpenTP1 end status and the status of the files necessary to restart OpenTP1. This can abridge the recovery time when any error occurs.



### Journal acquisition

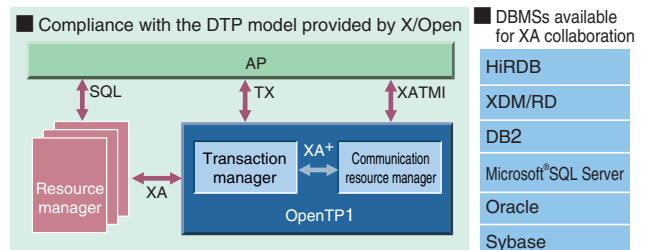
Historical information for system recovery, statistical information for system tuning, and other application logs can be collected in the form of journals, in case of a contingent failure.

#### Type of journals

Type	Description	Category
Synchronization-point journal	Gets information on settled transactions.	History information
Recovery journal	Gets update information of resources.	History information
Statistical journal	Gets statistical information for system tuning.	Statistical information
User journal	Gets user-specified information collected according to AP instructions.	User information

### Database linkage

OpenTP1 conforms to the DTP model of The Open Group (formerly, X/Open) and supports the XA and TX interfaces. DBMS linkage ensures data integrity.



## Mission-Critical

### File system

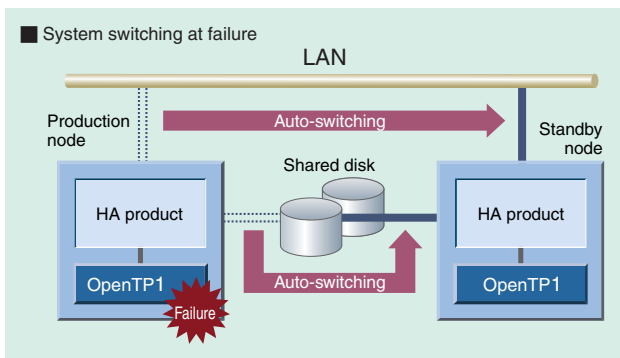
OpenTP1 provides two types of file systems to store the user data used by OpenTP1 application processes; DAM files<sup>\*1</sup> used as dedicated OpenTP1 direct access files, and TAM files<sup>\*2</sup> that can be used as dedicated OpenTP1 direct access files while enabling high speed access by the table access method. Since they are resource managers managed by OpenTP1, OpenTP1 manages their transactions.

<sup>\*1</sup>: Provided by uCosminexus TP1/FS/Direct Access

<sup>\*2</sup>: Provided by uCosminexus TP1/FS/Table Access

### Node switching

The OpenTP1 system environment can be placed on standby on a secondary node as backup for the active node. This enables the system to be quickly switched over to the standby node when a failure occurs on the active node, so that services can continue without interruption. When the active node needs to be shut down for maintenance, for example, you can terminate the active node and switch to the standby node simply by entering a planned switching command on the active node.



#### ■ Linkage with HA Monitor

HA Monitor performs status monitoring on a regular basis to detect whether a slowdown or loop of OpenTP1 has occurred. OpenTP1 also provides functionality for reporting errors to HA Monitor, thus enabling early error detection. Deployment of a hot standby system in which OpenTP1 processes are kept running on the standby node further reduces the time required for failover.

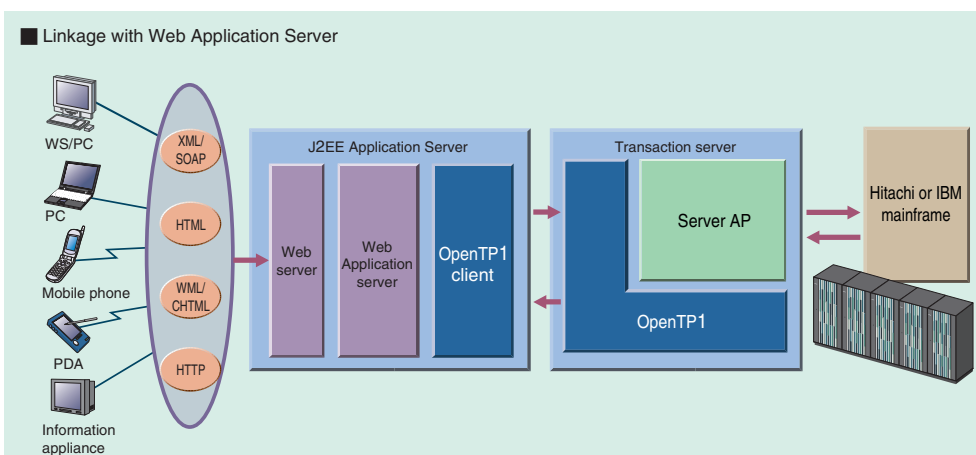
#### ■ HA products for collaboration

AIX®	HA Monitor
	HACMP
HP-UX	HA Monitor
	HA Toolkit Extension
	MC/ServiceGuard
Solaris	HA Toolkit Extension
	SafeCLUSTER
	VERITAS Cluster Server
Linux	HA Monitor
Windows®	HA Toolkit Extension
	Microsoft® Cluster Server (MSCS)

HA: High Availability

### Application server linkage

OpenTP1 can be linked to each type of application server using uCosminexus TP1/Client/J. Linkage with uCosminexus Application Server enables application development based on J2EE Connector Architecture (J2CA), transaction linkage, and connection pooling, etc. By using uCosminexus TP1/Message Queue - Access, you can perform transaction linkage compliant with Java Message Service (JMS), thereby ensuring data consistency between the message queue in OpenTP1 and the database on the application server.



#### ■ Supported application servers

uCosminexus Application Server
WebSphere
WebLogic

<sup>\*</sup>Transaction linkage is supported only with uCosminexus Application Server.

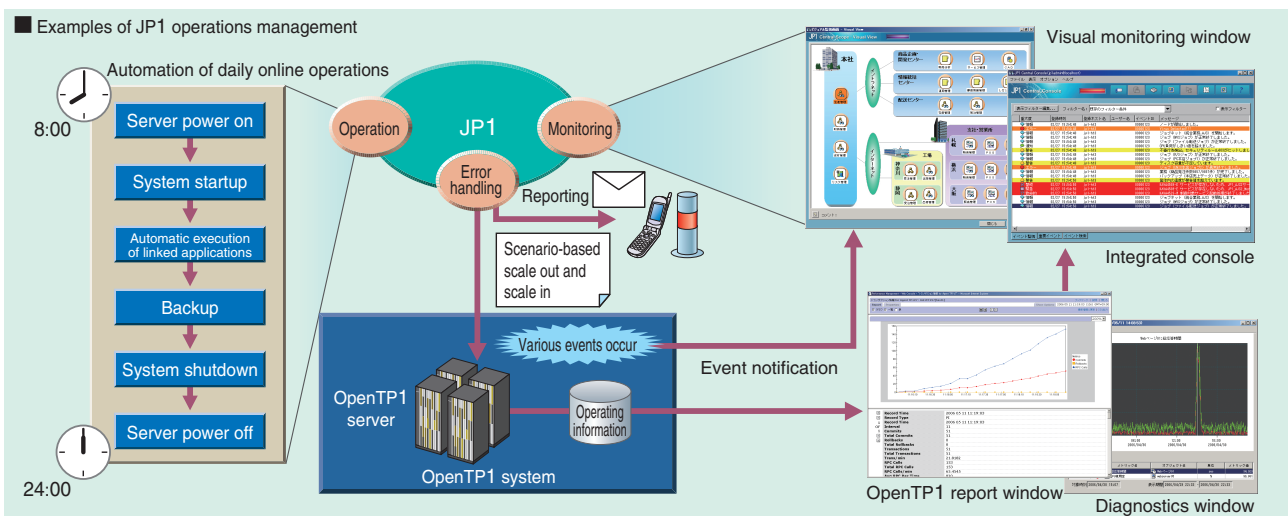


## Operation

Operation support is provided to simplify the usage of complex systems and reduce the burden on our customers.

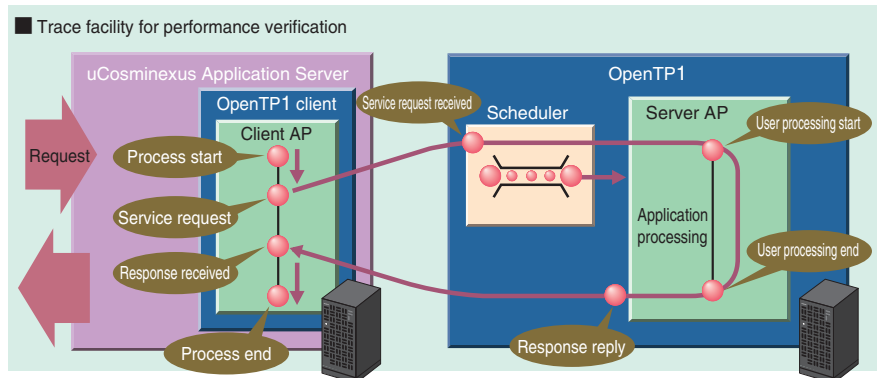
### Management using Job Management Partner (JP1)

Using the linkage with the JP1 integrated operations management software, OpenTP1 provides stable system operation and vastly reduces administrative workloads. As for the operation, JP1 automates a whole range of daily tasks, from powering on/off the server used for OpenTP1-based online processing to starting and stopping the system. As for system monitoring, the integrated console provided by JP1 enables the operator to grasp failure information for the various types of events that occur in OpenTP1 at a glance: in which applications a failure occurred, which applications are affected by the failure, etc.. By monitoring performance information, failures can be prevented in advance. As for error handling, users can be alerted automatically by email, patrol lamp, or mobile phone notification when a problem occurs. If performance deteriorates, users can modify or expand the system by adding servers.



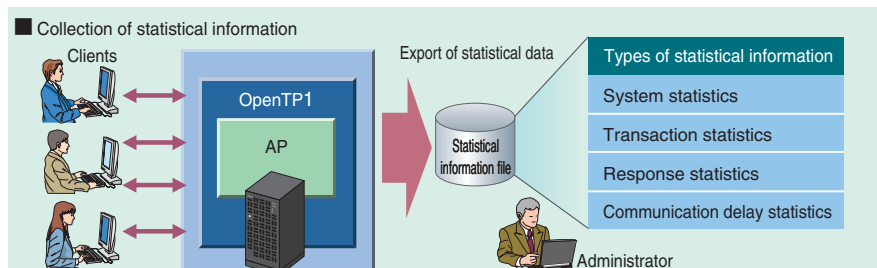
### Trace facility for performance verification

Trace information is collected for major events generated during OpenTP1 operation. This information enables thorough examination of the system's operating status, and can be usefully applied in performance tuning, stable routine operation, and problem diagnostics. Since the same process IDs are used in the trace information of both uCosminexus Application Server and OpenTP1, events can be traced to their source.



### Statistical information

Various statistical information is collected to assist in system tuning and error diagnostics. Real-time collection of statistical information, system performance monitoring, and predictive monitoring of deterioration in performance can all help to increase reliability.



## System Configuration

**A variety of system configurations are supported to flexibly satisfy business requirements.**

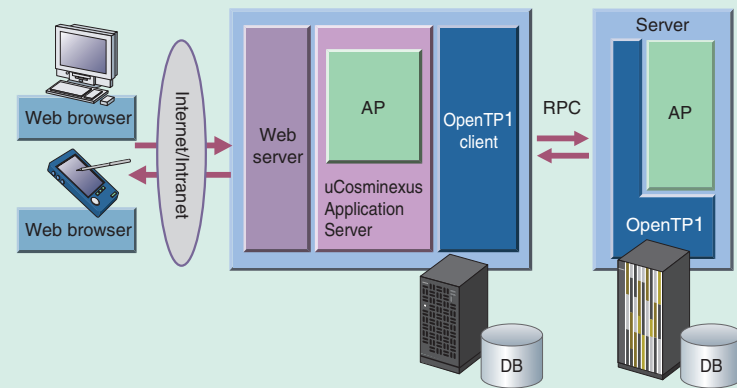
### Web-based systems

As well as creating a new Web-based system, you can bring an existing OpenTP1 system to the Web. The method of making the Web-based system can be chosen to suit your system environment.

#### ■ Configuration with an application server

You can build a Web-based system by linking to an application server product. Especially, uCosminexus Application Server is an excellent choice because the connection pooling facility provided by the application server and the transactions initiated on the application server can be handled by OpenTP1 as they are.

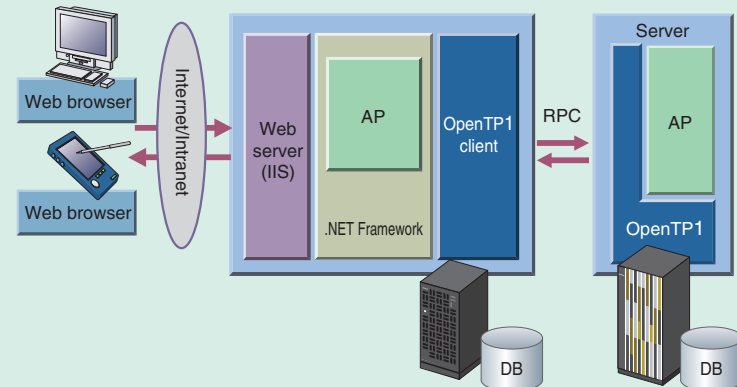
■ Access through J2EE™ (J2CA collaboration)



#### ■ Configuration with .NET Framework

You can build an OLTP system that uses OpenTP1 in a .NET Framework environment. Also, with ASP.NET, you can convert an existing system or an OpenTP1 system not based on .NET Framework to a Web environment.

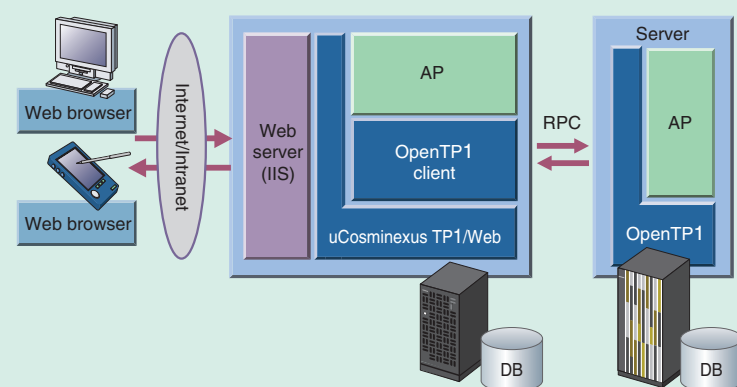
■ Access through .NET Framework



#### ■ Configuration with the OpenTP1 Internet Gateway

uCosminexus TP1/Web converts requests from a Web browser to the OpenTP1 interface. This enables users to access an OpenTP1 system from a Web browser. Also, by deploying XMAP3/Web, a MAP system can be converted to a Web site.

■ Access through OpenTP1 Internet gateway

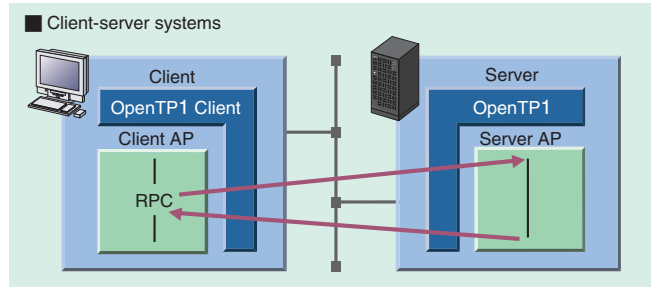


IIS: Internet Information Services

## System Configuration

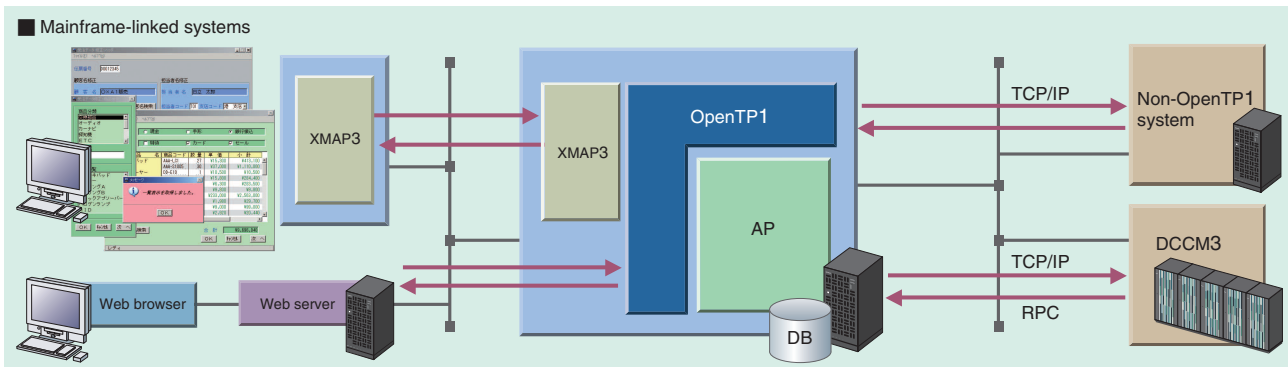
### Client-server systems

A client-server system consists of client terminals and a server. Processing requests are sent from the clients via a GUI created with an application such as Visual Basic, and the processing results are returned from the server to the clients.



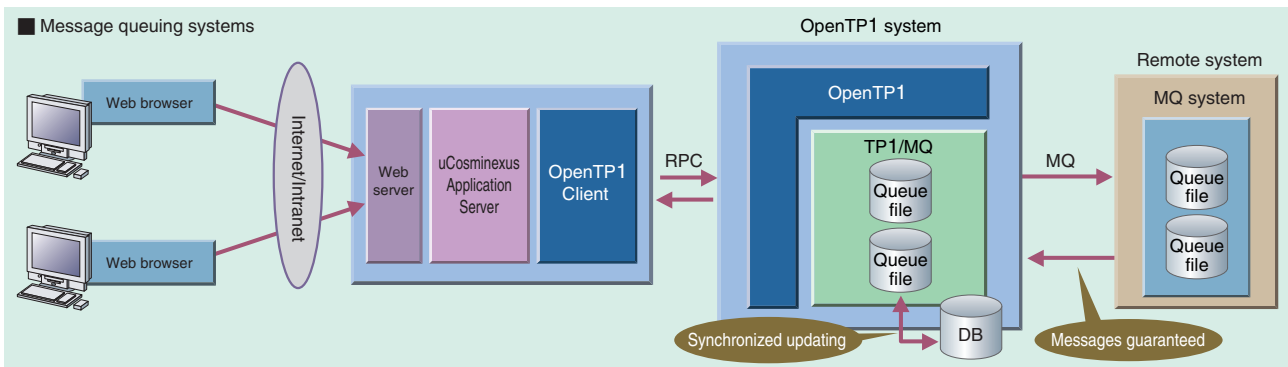
### Mainframe-linked systems and legacy system migration

OpenTP1 supports many different protocols. OpenTP1 has been widely applied in mainframe-linked systems and in migration from mainframe systems. A MAP system on a mainframe can be migrated to an open system by linking to XMAP3. In a non-mainframe environment, an OpenTP1 system can communicate with other non-OpenTP1 systems using supported protocols. OpenTP1 has high affinity with Hitachi's XDM/DCCM3 transaction processor, and remote procedure calls (RPCs) can be used in addition to TCP/IP for communication between OpenTP1 and XDM/DCCM3.



### Message queuing systems

OpenTP1 supports asynchronous communication that accumulates messages and transmits the messages to the remote system when required, so users need not be concerned about the status of the remote system. Functionality is provided to prevent sent messages from being dropped or duplicated. An OpenTP1 system can be linked with a WebSphere MQ system because the systems are compatible with each other at the API and TCP/IP level. When uCosminexus TP1/Message Queue - Access is deployed, since messages are registered to and retrieved from uCosminexus TP1/Message Queue, a non-OpenTP1 system can also register/retrieve messages to/from the message queue.



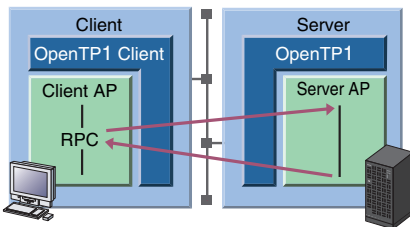


## System Connection

Three communication modes are available to suit the features of your system.

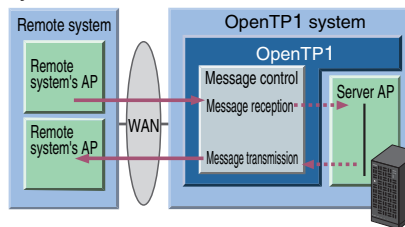
### Remote procedure calls

Communication between OpenTP1 application programs is realized by using remote procedure calls (RPCs) over a network connected by TCP/IP protocol. The application programs need not be aware of the protocol procedure, the remote system's IP address, and the communication port. OpenTP1 supports synchronous, asynchronous, and non-responsive RPCs.



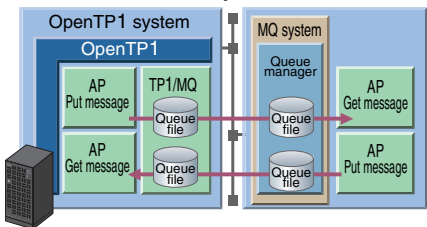
### Message transmission

Messages are sent and received in accordance with procedures specified by communication protocols. OpenTP1 provides libraries for the various protocols available, and an API for sending and receiving messages. Messages can be transmitted using the required protocol's communication procedure not only between OpenTP1 systems but also from non-OpenTP1 systems.



### Message queuing

Applications can communicate with each other using the OpenTP1 message queuing functionality. Since the communication process is controlled by OpenTP1 until the messages queued in OpenTP1 are accumulated in the remote system's queue, no messages are dropped or duplicated. Because asynchronous communication is used, users need not be aware of the status of the communication system.



Migration to SOA platforms is supported to ensure business flexibility.

### SOA support

OpenTP1 applications are structured as individual services, which means that existing resources can be applied effectively and there is potential for the future system migration to an SOA platform. Applications created in COBOL can be made openly available as services.

#### uCosminexus Service Platform

Existing and newly created OpenTP1 applications can be deployed as services using the enterprise service bus (ESB) provided by uCosminexus Service Platform. This enables existing resources to be applied effectively across the various systems, and increases the types of services that can be offered in the whole system.

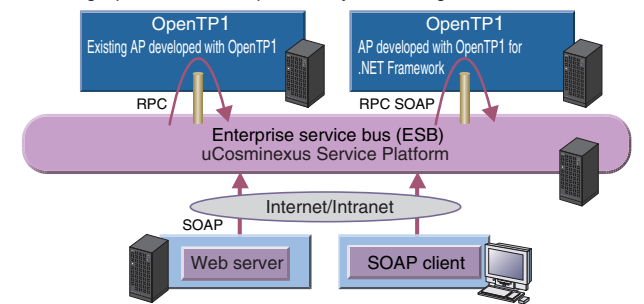
#### OpenTP1 for .NET Framework

.NET Framework enables users to create OpenTP1 applications and facilitates Web service development using ASP.NET. Because standard interfaces such as SOAP can be used, user applications can be created as Web services.

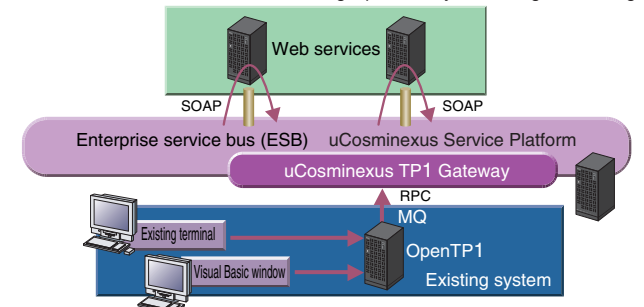
#### uCosminexus TP1 Gateway

uCosminexus TP1 Gateway enables SOA services on an enterprise service bus to be accessed by existing OpenTP1 client and server systems.

#### Existing OpenTP1 services provided by SOA linkage



#### Access to the services from an existing OpenTP1 system using SOA linkage

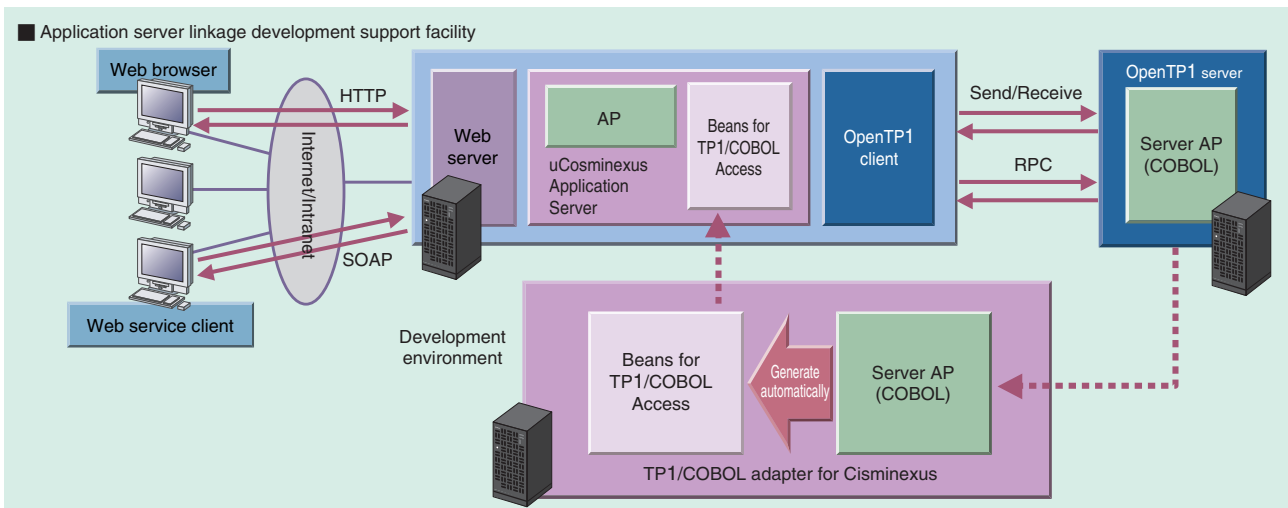


## Development

**Support is provided for quick and easy development of business applications.**

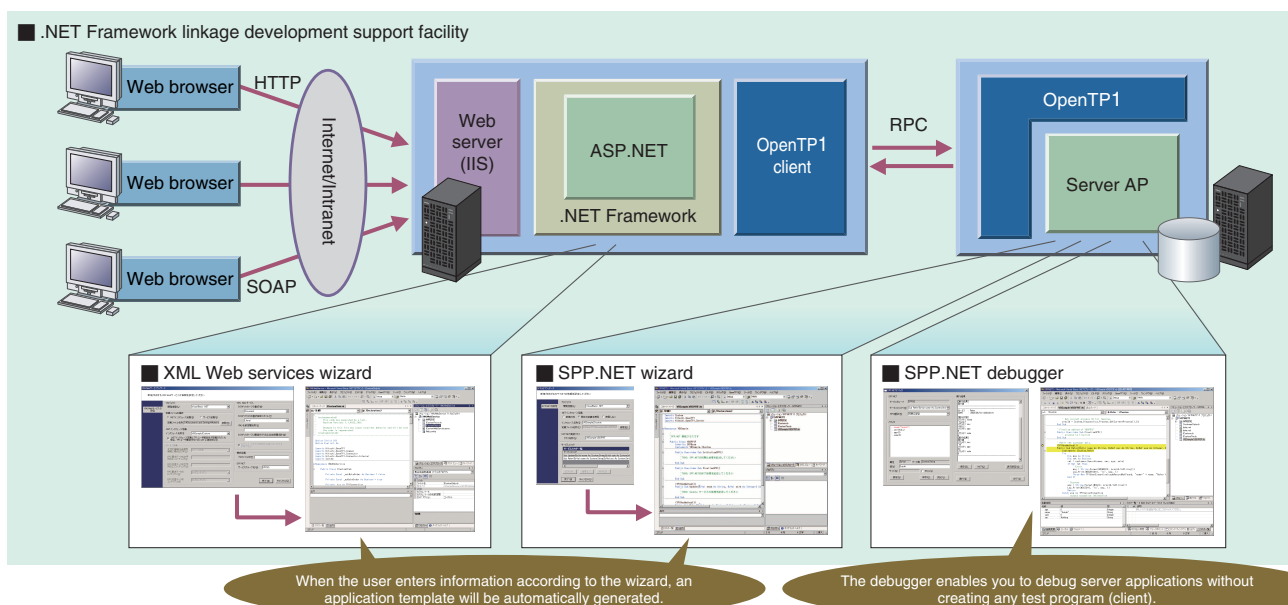
### Application server linkage

TP1/COBOL adapter for Cosminexus Version 2 can be used with OpenTP1. This tool automatically generates JavaBeans (Beans for TP1/COBOL access) for enabling communication from a Java application to a COBOL application running on OpenTP1.



### .NET Framework support

OpenTP1 application programs can be developed not only in C, C++, and COBOL but also in VB.NET, C#, J#, and the .NET version of COBOL (COBOL2002 for .NET Framework). OpenTP1 for .NET Framework provides tools for generating source code templates and for debugging created applications, using the development support facility built into Visual Studio. Developers can easily create Web front-end applications and Web services with ASP.NET.



#### ■ Development languages

Server	C, C++, COBOL2002, C#, J#, and Visual Basic .NET
Client	C, C++, COBOL2002, C#, J#, Visual Basic .NET, Visual Basic, and Java

## ■ Product List

Basic server product	uCosminexus TP1/Server Base Basic	Basic control for distributed transaction-processing environments
	uCosminexus TP1/LiNK	Basic control for distributed application system environments
Additional server products	uCosminexus TP1/FS/Direct Access	High reliability/performance file service
	uCosminexus TP1/FS/Table Access	Recoverable memory table
	uCosminexus TP1/Online Tester	The online tester that has OpenTP1 run in the test mode
	uCosminexus TP1/Offline Tester	The offline tester that verifies OpenTP1 APIs
	uCosminexus TP1/High Availability	High reliability facility for distributed transaction processing
	uCosminexus TP1/Multi	OpenTP1 Multi-node operation facility
	uCosminexus TP1/Resource Manager Monitor	External resource manager control facility
	uCosminexus TP1/Shared Table Access	Inter-node shared table facility
	uCosminexus TP1/Extension1	Extended facility 1 for OpenTP1 large-scale systems
	uCosminexus TP1/Terminal Control Library for Finance	Financial terminal control support facility
Basic network products	uCosminexus TP1/Server Base Enterprise Option	Extended OpenTP1 facilities including high reliability facilities and multithreading facilities that use technology acquired by development of mainframe data communication programs
	uCosminexus TP1/Message Control	Network control for communication protocol management
	uCosminexus TP1/NET/Library	Common library for network control
Additional network products	uCosminexus TP1/Messaging	Message control facility on Windows®
	uCosminexus TP1/NET/High Availability	High reliability facility for network control
	uCosminexus TP1/Message Control/Tester	Online tester for network control
	uCosminexus TP1/NET/OSI-TP	Message exchange support facility based on the OSI-TP protocol
	uCosminexus TP1/NET/TCP/IP	Message exchange support facility based on the TCP/IP protocol
	uCosminexus TP1/NET/User Datagram Protocol	Message exchange support facility based on the UDP/IP protocol
	uCosminexus TP1/NET/XMAP3	Message exchange support facility based on the XP protocol
	uCosminexus TP1/NET/X25	Message exchange support facility based on the X.25 procedure
	uCosminexus TP1/NET/HDLC	Message exchange support facility based on the HDLC procedure
	uCosminexus TP1/NET/User Agent	Message exchange support facility based on the OSAS UA protocol
	uCosminexus TP1/NET/OSAS-NIF	Message exchange support facility based on the OSAS NIF protocol
	uCosminexus TP1/NET/HSC	Message exchange support facility based on the HSC1/2 procedure
	uCosminexus TP1/NET/Secondary Logical Unit-TypeP2	Message exchange support facility based on the SLU TypeP protocol secondary-station
	uCosminexus TP1/NET/NCSB	Message exchange support facility based on the NCSB protocol
Internet-related product	uCosminexus TP1/Web	The gateways accessing from Web browsers to OpenTP1 systems through RPC or Send
Message-queue-related products	uCosminexus TP1/Message Queue	Message queuing facility
	uCosminexus TP1/Message Queue - Access	Transaction collaboration facility with TP1/Message Queue
	Message Queue - Operation - Center	The monitoring console that is used to monitor message queuing systems in collaboration with JP1/Cm2
	Message Queue - Operation - Agent	The target node whose message queuing system is monitored in collaboration with JP1/Cm2
Client products	uCosminexus TP1/Client/P	Libraries running on PCs as OpenTP1 clients
	uCosminexus TP1/Client/W	Libraries running on WSs as OpenTP1 clients
	uCosminexus TP1/Client/J	Class libraries for accessing from Java™ servlets, Java™ applets, and Java™ applications to OpenTP1 systems
	uCosminexus TP1/Client for .NET Framework	Facility for accessing from .NET Framework to OpenTP1
Application server collaboration products	uCosminexus TP1 Connector	The facility for accessing from Java™ applications to OpenTP1 systems through JCA interfaces
	uCosminexus TP1 Gateway	Gateway facilities for using SOA services from an OpenTP1 system
	TP1/COBOL adapter for Cosminexus Version 2	The facility that automatically generates JavaBeans™ (TP1/COBOL access beans) for communication between Java™ applications and OpenTP1 COBOL applications
	TP1/COBOL Extended Server Run Time System for Cosminexus Version 2	Libraries for executing auto-generated TP1/COBOL access beans on PCs
	TP1/COBOL Extended Run Time System for Cosminexus Version 2	Libraries for executing auto-generated TP1/COBOL access beans on UNIX machines
.NET Framework collaboration products	uCosminexus TP1/Extension for .NET Framework	.NET Framework-compliant extension product
	uCosminexus TP1/Connector for .NET Framework	The facility that enables access from ASP .NET to OpenTP1

ASP: Active Server Pages \*Note that supported facilities vary depending on your platform.

## ■ Supported platforms

AIX 5L	OpenTP1 client products	OpenTP1 server products
HP-UX*	●	●
Solaris	●	●
Red Hat Enterprise Linux*	●	●
Windows® 2000	●	—
Windows® XP	●	●
Windows Server™ 2003*	●	●
Windows Vista®	●	●

\* The Itanium® Processor Family (IPF) is also supported.

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WebLogic is a registered trademark of BEA Systems, Inc.

X/Open is a registered trademark of X/Open Company Limited in the U.K. and other countries.

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OpenTP1 has been developed under a quality assurance system approved by ISO9001 and TickIT.

## ■ Information service ■

The service provides information about OpenTP1 over the internet. <http://www.hitachi.co.jp/soft-e/>

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