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.
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.

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.
OpenTP1 provides two types of file systems to store the user data used by OpenTP1 application processes; DAM files*1 used as dedicated OpenTP1 direct access files, and TAM files*2 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.

**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.

**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.

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*1: Provided by uCosminexus TP1/FS/Direct Access
*2: Provided by uCosminexus TP1/FS/Table Access
Operation

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.

Examples of JP1 operations management

Automation of daily online operations

8:00

Server power on

System startup

Server power off

System shutdown

24:00

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.
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.

- **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.

- **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.
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.
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.
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**

|--------|--------------------------------------------------|
## 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: Financial terminal control support facility
- uCosminexus TP1/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

### Basic network products
- uCosminexus TP1/Message Control: Network control for communication protocol management
- uCosminexus TP1/NET/Library: Common library for network control
- uCosminexus TP1/Messaging: Message control facility on Windows®

### Additional network products
- 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/X/MAP3: Message exchange support facility based on the X.25 protocol
- uCosminexus TP1/NET/HDLC: Message exchange support facility based on the HDLC protocol
- uCosminexus TP1/NET/User Agent: Message exchange support facility based on the OSI-ASIA protocol
- uCosminexus TP1/NET/OSAS-NIF: Message exchange support facility based on the OSI-ASIA protocol
- uCosminexus TP1/NET/HSC: Message exchange support facility based on the HSC1/2 protocol
- uCosminexus TP1/NET/Secondary Logical Unit-TypeP2: Message exchange support facility based on the SLU TypeP2 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 queueing 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 queueing systems in collaboration with JTP1/Cm2
- Message Queue - Operation - Agent: The target node whose message queueing system is monitored in collaboration with JTP1/Cm2

### Client products
- uCosminexus TP1/ClientP: Libraries running on PCs as OpenTP1 clients
- uCosminexus TP1/ClientW: Libraries running on WSs as OpenTP1 clients
- uCosminexus TP1/ClientU: 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/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 Server 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

<table>
<thead>
<tr>
<th>Platform</th>
<th>OpenTP1 client products</th>
<th>OpenTP1 server products</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX 5L</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>HP-UX*</td>
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<tr>
<td>Solaris</td>
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<tr>
<td>Red Hat Enterprise Linux*</td>
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<td>●</td>
</tr>
<tr>
<td>Windows Vista®</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

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

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

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**Information service**

The service provides information about OpenTP1 over the internet. [http://www.hitachi.co.jp/soft-e/](http://www.hitachi.co.jp/soft-e/)

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Feb., 2008