

E-iSERV Structure (On-board Center-linked Information Transmission Service System)

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Abstract

Of the multitudinous internet businesses, the technology attracting the most attention as of late is information transmission solutions for the mobile environment. Among map transmission applications, GPS-equipped cellular phones have enjoyed rapid and widespread market penetration. Although a market for transmission of maps to automotive systems has been in existence for quite some time, obstacles such as high transmission costs prevented this potential from being realized. The arrival of 3G cellular phones in the outset of 2002, together with the launch of automotive information transmission services such as Nissan Motor Co., Ltd.'s CARWINGS and TOYOTA MOTOR CORP's G-BOOK heralded the outset of widespread market acceptance for map transmission. FUJITSU TEN has been involved in these trends since 2001, actively pursuing planning and development of our first On-board Center-linked Information Transmission Service System (E-iSERV ECLIPSE Infotainment Service), scheduled to launch in June 2003, as well as compatible products. The first product compatible with the aforementioned system, the i-audio E5503CDI, is scheduled to ship in June 2003. This report contains an overview of connection applications developed for the i-audio unit in addition to information regarding FUJITSU TEN's development of the E-iSERV, from planning through operation.

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Introduction

i-audio are Fujitsu Ten Ltd's first Infotainment product to go on the market. These devices combine audio functions such as CD, memory stick, and AM/FM radio with connectivity between customers' cellular telephones (compatible with all PDC models and cdma 2000-1x, not compatible with FOMA) and Centers. Simultaneous development of i-audio and the Center System (E-iSERV) will enable Fujitsu Ten's Center-linked Service to launch at the same time the aforementioned product goes on sale. Center-linked Services for i-audio provided by E-iSERV are as described below:

- 1) Area Shot Service: Service in which the latest map images and POI (Point Of Interest) data are continually acquired through transmission of information to the Center via the GPS antenna connected to the i-audio.
- 2) E-iSERV Portal Service: A dedicated service for i-audio which provides settable wallpaper in addition to weather forecasts and snow information for ski resorts and campgrounds.

Customers can use the services described above on the day they purchase their i-audio. The service requires no complicated procedures or fees (information charges). The desire to offer something that is easy for anyone to use led to the development of a customer-centered service that requires absolutely no complicated user registration.

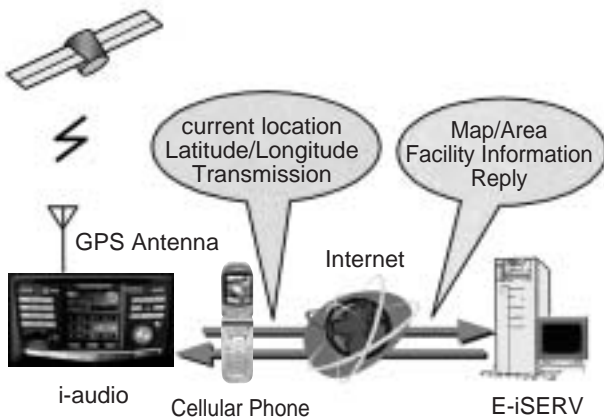


Fig.1 i-audio Center Connection Service

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An Overview of Center-linked Services

i-audio center-linked services, including E-iSERV, are composed of multiple ASPs (Application Service Provider) and CPs (Content Provider). Linked ASPs and CPs are as follows:

- Map Providing ASP:** MyDriveNet.Com (MDNC)
- POI Search ASP:** DAIKEI DATA PROCESSING CO., LTD.
- Seasonal Event Information CP:** Railway Information Systems co., Ltd.

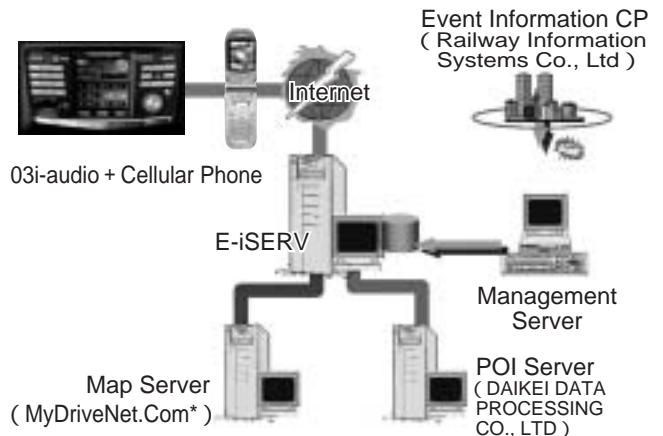


Fig.2 Center System Structure Drawing

Features

Services provided by E-iSERV to 03 i-audio are divided into two categories: the "Area SHOT" service, which displays map information, including vehicle position and information on facilities located in the vicinity of the area being looked up in accordance with specified conditions, and the "E-iSERV Portal Service", which transmits information intended for on-board units such as wallpaper and weather reports.

Area SHOT

- **Map Acquisition (Current Location/Designated Location/Overview Map)**

In accordance with requests, the following 3 types of maps are acquired from map servers and transmitted to on-board systems.

- Maps of the area surrounding the current location of the vehicle
- Maps of the area surrounding a location designated by the user
- An overview map showing the current location of the vehicle and a designated area

Current Location Map	Designated Location Map	Overview Map
300 x 300 [pixels]	300 x 300 [pixels]	160 x 176 [pixels]

*Vehicle location on map is displayed on On-board unit.

Fig.3 Map Output Image/Size

- **Destination, Designated Location Searches**

The following conditions are specified on on-board systems, and a location search request is made to the POI server.

- Telephone Number (Company, Private Home)

Address (Zip Code, Address)

Train Station Name Search

Map Code (Latitude/Longitude conversion is implemented on on-board systems)

• **Area Facility Information Search**

When maps of the current location and/or designated location are requested, E-iSERV searches for 5 hits in the specified category (convenience store, gas station, etc., 6 categories available) that are in the relevant area. Map data is transmitted to the onboard system along with POI data.

• **Group Information Acquisition**

This feature allows two 03 i-audio users to display each other's locations as well as comments to each other on their on-board systems by entering the same password.

• **Public Information Registration**

This feature allows users to attach recognized comments (selectable from a string of phrases) to their current locations and register this information to E-iSERV so that it can be seen by other users.

E-iSERV Portal Service

• **Notifications**

Provides users with maintenance schedules and update information.

• **Downloadable Wallpaper**

Provides users with wallpaper content they can display on their on-board unit screens.

• **Seasonal Event Information**

Provides weather forecasts and seasonal event information

- Cherry Blossom Viewing Swimming
- Campgrounds Autumn Foliage
- Skiing/Snowboarding Information
- Fireworks Displays

• **Phrase Download**

This feature enables users to download phrases into their onboard systems by selecting them from the E-iSERV system.

3 System Development Objectives

3.1 Enhanced Entertainment

Consumers demand that product applications have some entertainment value. When developing the i-audio Area SHOT applications, it was crucial that some features beyond current location display and destination search be incorporated. To allow users to actively participate in Area SHOT services, "Group Information Acquisition" and "Public Information Registration" features were added as dedicated applications. Using these features, users can go beyond simple map image downloads and share the information they transmitted with other users, forming a service composed of a community in which they can participate. The "Group Information Acquisition" feature, which enables information sharing

between specific group members, allows friends to exchange information such as each other's locations between themselves, enabling it to be used as a bulletin board. The "Public Information Registration" feature allows all users to share information among themselves. Using this feature, users can register their geographic locations and distribute this information to other users, enabling them to experience the pleasure of being a source of information transmission anytime, anywhere.

3.2 ePID (electrical Product ID) Terminal Information Management

ePID is information electrically written by center systems into the product interior during the product manufacturing process. ePID is used as a key to manage the access location's terminal information.

ePID Format			
Product DestinationCD	Product Number	Software Version	Product Specific ID
1) Product shipment destination main customer code, automobile manufacturer and domestic/overseas sales shipment destination CD			
2) Product number			
3) Internal software version number, version number of software provided during development			
4) ID number used to distinguish individual products, unique ID containing manufacturing location, manufacturing date, serial No. generated by dedicated number generation system.			

Fig.4 ePID Code Format

ePID contains the following four pieces of information: 1) Shipping Destination Code, 2) Product Number, 3) Software Version, 4) Product Specific ID. This information is embedded into the HTTP header USER_AGENT information sent when a terminal access the Center. The Center dynamically generates the best content for each terminal and manages terminal repository information based on this information.

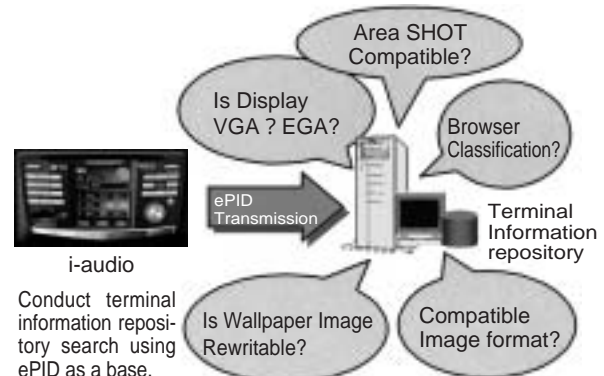


Fig.5 Terminal Recognition

The individuality of ePID Terminal Specific ID numbers is guaranteed by the Exclusive Number Generation

System. Numerical data is strictly managed by the Number Generation Management Department and written in the interior of products during the manufacturing process by the ID writing unit. Terminal Specific ID is also linked with information management systems in the manufacturing process, enabling traceability of information related to manufacturing quality and design changes.

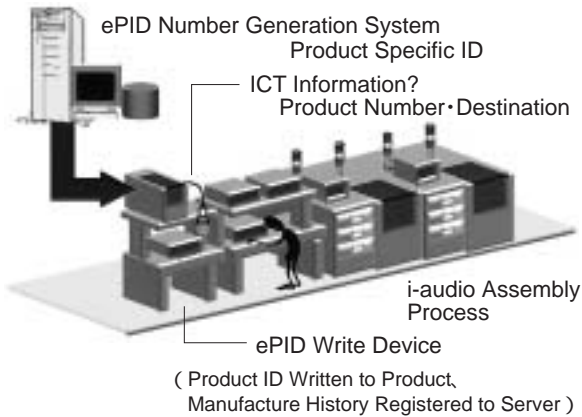


Fig.6 ePID Write during Manufacturing Process

i-audio group information registration and public information registration functions utilize ePID to manage information within E-iSERV and build applications. ePID also enables more specific CRMs to be realized through the use of delivery destination codes. EPID is a promising method for future application expansion.

3.3 Rapid Trouble Shooting

Users and retailers demand that the Customer Support Center provide appropriate and rapid response to customer concerns. Implementation of strategies for cause analysis and reproducibility at the time of error occurrence are of particular importance. E-iSERV performs access log analysis using the ePID as a key in order to make reproducibility confirmation tasks easier.

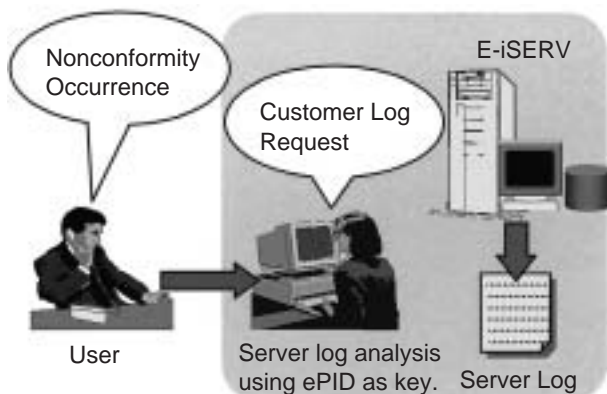


Fig.7 ePID Error Cause Analysis

Messages (Caution Messages) often appear onscreen when an error occurs at a terminal. Initial cause analysis

begins by using this caution message to assess whether the cause of the error is at the Terminal, the Center, or both. If the cause is determined to be at the Center, the ePID of the corresponding Terminal is examined. Special commands can be used to display Terminal ePIDs on the diagnostic screen for confirmation.

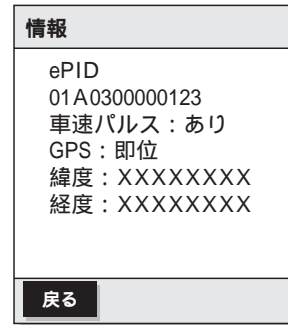


Fig.8 ePID Diagnostic Screen Display

Once the Terminal ePID is acquired, the System Administrator can use it as a key and analyze the E-iSERV access log. Since the access log contains detailed information on each Terminal such as access date/time, request details, internal processing results, response data, and processing time, past conditions at the time of error occurrence can be confirmed if the Terminal ePID and date/time of error occurrence are known. This system enables rapid response to system errors and improved service when errors occur.

```
08:49:59.474 getClientClass() ePID=ct:1234/id:0000000000224
08:49:59.656 GetMap@2a5a5e process()
08:49:59.659 convCoordinatesToInt( +34.39.24.00 )
08:49:59.660 convCoordinatesToInt( +135.10.3.00 )
08:49:59.683 HttpClient@628e42 connect()
08:49:59.684 callPictMap@77d583 connect start
08:49:59.698 HttpClient@4eb8e2 connect()
08:49:59.699 HttpClient@628e42 connect start
08:50:00.595 handler.Facility@69ae9f
Err: java.net.ConnectException: Connection refused
```

An analysis of error occurrence factors using ePID as a key.

Fig.9 E-iSERV Access Log (Example)

4

Application Structure

4.1 E-iSERV Software Structure

E-iSERV server applications installed at the Center are JAVA applications that run on WEB Server (apache 1.3.27)+ Servlet Engine (tomcat 3.2.4).

Refer to Figure 10, E-iSERV Software Structure Diagram

For E-iSERV server applications, Borland VisiBroker 4.5 for Java (CORBA) and Xalan-Java 2.4.0 (XSLT conversion component) are used as Java add-ons because CORBA/IIOP provides the map acquisition interface from MyDriveNet.Com and the Daikei Data Processing

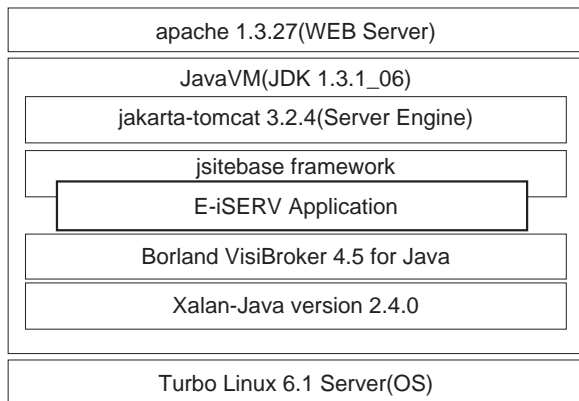


Fig.10 E-iSERV Server Software Structure Drawing

Co., Ltd. facility information acquisition interface provides XML/HTTP.

Java Web site construction framework from PFU Limited (jsitebase framework) was also used.

For jsitebase frameworks, components with proven records in website construction are reused to build Web systems such as section management. Various necessary features are encapsulated and offered for E-iSERV server applications in order to implement a structure where it is easy to repair offered content and add features.

4.2 Terminal Information Repository Management via ePID

Features are provided for E-iSERV applications that allow the ePID to make decisions during connections between Terminals and the Center. Specific terminal information for each product such as product identification information, screen size, supported media, and terminal unique information is stored in XML format to enable future support for multiple E-iSERV compatible products.

Utilization of this feature will enable specialized services for specific products and optimal content that includes terminal-specific information to be offered by E-iSERV in the future.

Refer to Figure 11, shown below, for an example of i-audio Terminal Repository Information

```
<?XML version="1.0" encoding="ISO-8859-1"?>
<repository>
<product name="ECLIPSE" article="123000-123000123">
  <screen name="ai" x="160" y="174" color="256" />
  <image jpg="true" gif="true" gif-anim="true" png="false"
    bmp="false" thum="1" thum-line="20" />
  <sound mp3="true" atrac3="true"/>
  <others motion-pic="false" mediaclick="false" service-code="false" />
</product>
... (omission, multiple products defined following repository information)
</repository>
```

Fig.11 Terminal Repository Information

4.3 CORBA Application Links

CORBA (Common Object Request Broker Architecture) is a distributed object technology format

established by OMG (Object Management Group). This software uses ORB (Object Request Broker) format software to exchange objects between different types of machines in different environments across a network.

The E-iSERV described herein uses the Area SHOT service to provide a map information service that includes facility information on the surrounding area. For E-iSERV server applications, this map information is made possible by linking MyDriveNet.Com's map search service with CORBA .

Refer to Figure 12 for a schematic diagram of E-iSERV Application Links via CORBA

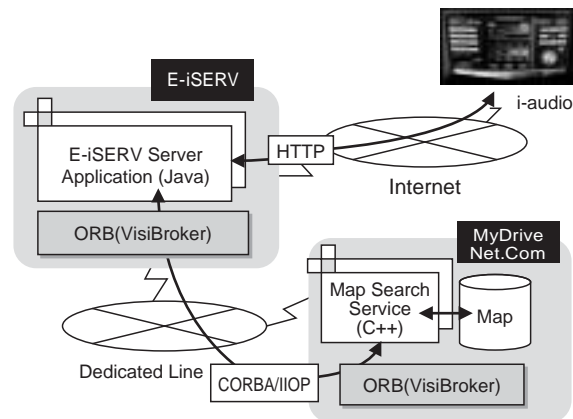


Fig.12 CORBA Application Link Overview Drawing

Transmissions between E-iSERV and MDNC are carried out by the object communication protocol IIOIP in CORBA (Internet Inter-ORB Protocol).

Two or more computers connected by IIOIP in networks can transmit data such as objects dispersed to multiple locations between one another or request processing regardless of differences in model or program language.

CORBA link implementation at E-iSERV applications only performs object call up implementation for map search services via the stub class used to link with CORBA libraries based on IDL (Interface Definition Language) files provided by MyDriveNet.Com. Since ORB performs transmissions to MyDriveNet.Com,, implementation is carried out regardless of other systems under the distributed environment.

4.4 Individual On-board Feature Application Specifications

Although E-iSERV server applications are configurations that do not have data base systems such as RDB on E-iSERV sites, data management specifications for generating related management information and content itself have been independently constructed since E-iSERV is a service for handling data.

Due to transmission speed during connections between i-audio and the Center, number of units, and future E-iSERV service additions, these have become

the specifications for applications featuring response processing performance and expandability. The chief characteristics of E-iSERV server applications are explained below:

Reduction of the bottleneck resource consumption accompanying system I/O during application operation

Reduction of the amount of I/O processing to disk

Since E-iSERV sites do not have database systems, data managed in applications is fundamentally managed on optimally designed memory. To establish permanence, data content for output to disk is subdivided into manageable units. A fixed cycle lag record is used to manage only the modified portions of data, thus reducing the amount of I/O processing to the disk.

Asynchronous calls to other system links

The Area SHOT service links contend data transmitted to the i-audio such as maps and facility information with services provided by other vendors (MyDrive Net.Com, Daikei Data Processing Co., Ltd.) and performs data generation. Linking with other systems reduces resources consumption and bottlenecks that result from network status through asynchronization of request processing from the i-audio and treating processing results from each of the other system services as a single unit.

Refer to Figure 13 for an example of a sequence that links with other systems asynchronously and generates response data

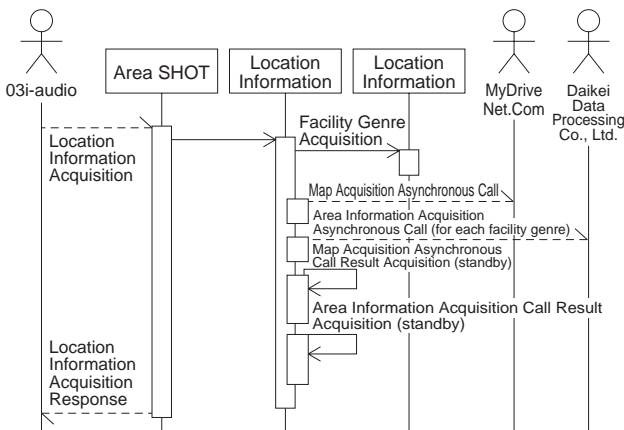


Fig.13 Location Information Acquisition Sequence Drawing

E-iSERV Server Application Modeling

Services offered by E-iSERV server applications are not extracted one feature at a time. The entire domain that contains the application is extracted, and modeling is performed per domain. Due to this structure, it is easy to accommodate future feature expansions and specification modifications. In addition, demands and effective range during error response is clarified.

Refer to Figure 14 for an example of an application model.

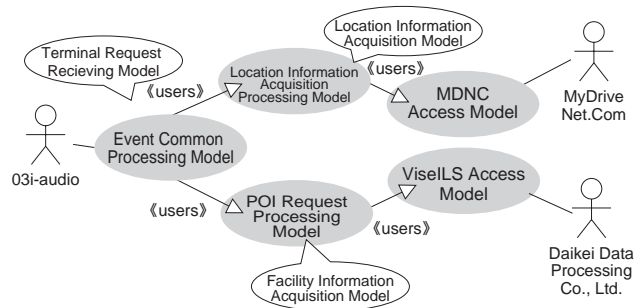


Fig.14 E-iSERV Application Model Drawing

Permanent storage of serialized files

Although E-iSERV server applications data is fundamentally managed in memory, data for which managed event information is subject to change (local event information, etc.) is permanently stored as a serialized file. Consistency verification processing, etc. of data stored as a serialized file is simplified. Serialized files are separated into data information and index information. Only data information is permanently stored. Index information is restructured upon application startup in order to prevent errors originating in data inconsistencies that occur during disk errors, etc.

4.5 Content Generation

Seasonal information distributed at E-iSERV portals is provided by Railway Information Systems co., Ltd. (hereafter, JR Systems), processed, and generated. There are three types of information distributed by JR Systems: "fixed information", which shows the location/contact information/and facilities available at individual locations as well as information on snow coverage at ski resorts; "updated information", which changes daily and contains information on cheery blossom bloom status and autumn foliage; and "weather bulletins", which distributes weather reports (including probability of precipitation) at individual locations. Since the aforementioned information is provided as a row/string of data, content distributed to the i-audio must be assembled on the E-iSERV. This processing is explained in general below.

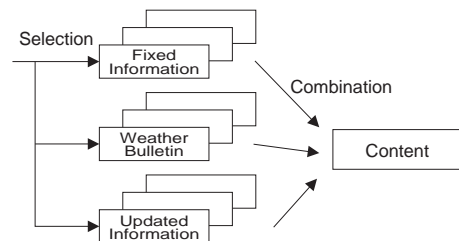


Fig.15 Content Creation Concept Drawing

Theoretically, it is also possible to generate all content on the E-iSERV portal server. However, doing so may result in the load being concentrated on the server, making it impossible to secure a response. Moreover, when information is distributed <from a distribution

source> without any verification, limits of the On-board browser, which are described later, can cause an error caution to occur. In order to avoid such risks, data distributed by JR Systems is either received or verified on a content conversion subsystem on a management server that is independent of the E-iSERV portal server. The system is set up so that data whose safety has been verified is sent to the E-iSERV portal server. Content verification/conversion processing is described in general below.

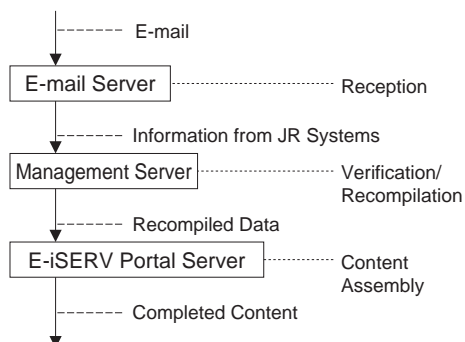


Fig.16 Content Conversion Subsystem Composition Drawing

By making the content conversion subsystem independent of the E-iSERV portal server, confirmation of flexible response to repairing information distributed by JR Systems can be effectively performed. <flexibility can be effectively confirmed> It is expected that any additions (such as facility information) or repairs to information distributed from JR Systems will be performed at arbitrary/voluntary intervals. In order to improve E-iSERV service, the format and contents of content distributed to On-board systems must be capable of being flexibly altered.

In order for this to be achieved, the format and contents of content distributed to On-board systems are not fixed to applications on E-iSERV portal servers, but are generated from the "template" that defines their design and the "database" that contains the distributed data. Engines that generate content from the aforementioned template and database are stored on the E-iSERV portal server. This engine is an application that is independent of content design.

Templates are generated by a content administrator. Content conversion subsystems support template creation. The above are implemented on administration servers.

Information related to templates, databases, and engines is given below.

During database construction, the amount of data that should be stored on the E-iSERV portal server is compressed to approximately 10% of its original volume before being converted through extraction of the minimum necessary content according to the template. This data is then reassembled instead of using all the content distributed from JR Systems, enabling reduction of both

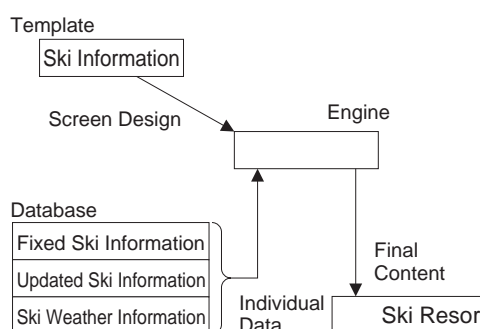


Fig.17 Engine Database Template

memory consumption at the portal server and processing time.

5 System Operation

5.1 Operation of a System Designed to Emphasize Automation and Content Quality Assurance

The browser on the i-audio is an unique design that incorporates original extensions added to the HTML 2.0 subset. Internal limits of the i-audio system resources apply to this browser. Since the DISPLAY Limitation dictated by the memory allocation limit of the browser directly affects the appearance of content, special attention must be paid to this limit during content creation. All content that exceeds the browser DISPLAY Limitation will be displayed in a divided form. Moreover, if internal limits such as maximum continuous text length and/or tag nest quantity are exceeded, an error caution will be displayed on the browser, terminating the content. Content generated by the automatic generation system mentioned in the preceding clause amounts to 3000 pages or more. Since it is not possible for the system to check the syntax and internal limits for all content, some sort of automated inspection tool is necessary.

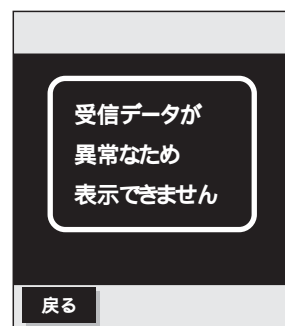


Fig.18 Browser Limit Error Cautions

Inspection tools that emulate the i-audio browser on the PC have been developed in order to inspect content and introduce content generated by the automatic generation system into the environment where it will

undergo prior evaluation. By porting i-audio browser syntax analysis sources to Win32, these tools enable content evaluation by the browser on a PC in a completely emulated environment. Automatic generation systems can use these inspection tools to perform preliminary verification of the quality of all dynamic content they have created.

```

Date : 2003/03/06
Time : 09:42:17
URL : http://www.xxx.xxx
Log :
[HTTP] H T T P Communication Start (http://www.xxxx.xxxx/index.html)
[HTTP] Connection to Server (www.xxxx.xxxx)
[HTTP] Request Transmission (GET /index.html)
[HTTP] Response Header Receive Status(200)
[HTTP] The completion of data reception (32494)
[HTTP]<HEADER>
0001:HTTP/1.0 200 OK
0002>Date: Thu, 06 Mar 2003 00:42:19 GMT
0003:Cache-Control: private
0004:Pragma: no-cache
0005:Content-Type: text/html;charset=euc-jp
[HTML] H T M L block number = 450
[HTML] H T M L analysis error
Result : 1
    
```

Fig.19 Automatic Testing Tool Test Results (Example)

From content generated in the environment for prior evaluation by the automatic generation system, the processing sequence that begins with quality inspection using quality inspection tools and ends with content registration in the actual operating environment is <completely> automatically implemented. The content administrator need only check the processing results via E-mail. Even if inspection tools detect an error, the content administrator can log into a dedicated maintenance system and correct the error, and continue the processing described above.

On the other hand, the only way to confirm qualitative evaluations such as the "appearance" of wallpaper or "design", which is the result of changes made to templates that define content design, is to physically perform a visual inspection by looking at the i-audio Screen. However, since it is not efficient to prepare an i-audio and a cellular phone each time these tasks are performed, an i-audio browser emulator was developed that allows i-audio display results to be confirmed on a PC. In order to authentically emulate the display of the i-audio during emulator development, source code (including the character font patterns of the actual unit), increasing display accuracy.

5.2 System Error Management Structure

E-iSERV system errors can be divided roughly into the following five types:

- On-board unit errors
- Errors caused by transmission lines that connect E-

iSERV units to On-board units

- E-iSERV errors
- Errors caused by transmission lines that connect E-iSERV to linked ASPs
- ASP errors

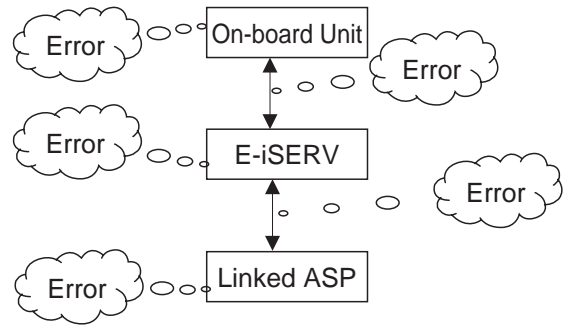


Fig.20 System Error Types

5.2.1 Errors caused by transmission lines between E-iSERV units and On-board Systems

Communication errors that occur between E-iSERV units and On-board systems happen somewhere during the process whereby a signal passes from the cellular phone through a carrier circuit and into the internet line through an unspecified line route before connecting to the E-iSERV unit. Should an error occur, first check the communication settings of the user's cellular phone. If all devices on the user end are functioning normally, examine all the lines, including all networking equipment at the IDC (Internet Data Center).

Errors caused by the Center can be responded to relatively quickly since there is always an administrator supervising equipment at the IDC end.

5.2.2 E-iSERV Errors

The following 3 types of errors can be considered E-iSERV errors:

- Errors that occur in E-iSERV portal servers themselves
- Management Server Errors
- Mail Server Errors

Failure of the E-iSERV portal server causes all services to shut down. For this reason, both the manager and the management server monitor the E-iSERV portal server. Requests are sent at fixed intervals from management servers to E-iSERV portal servers. If there is no response within a predetermined period of time, the E-iSERV portal server is considered shut down. At this point, the monitoring operator is notified via a warning while the E-iSERV system administrator is informed via e-mail. An operator checks E-iSERV portal server status and takes the necessary measures. In the event of a management server failure, information provided by E-iSERV is no longer updated. If content is no longer updated, updated a message is displayed explaining that it has "expired" and is no longer valid. If an "expired" message is distributed, administrators must analyze the

cause and take appropriate measures immediately.

For this reason, <a setup was adopted in which> data expiration dates are monitored at E-iSERV portal servers themselves, while update information and weather bulletins that have expired are cancelled automatically. With regard to content sent to On-board systems, data sent from management servers that did not arrive is specified with the message "No Data". Even if the management server and E-iSERV portal server are operating normally, if the mail server shuts down in response to outside attack, etc., the receipt of information from JR Systems, updated information, and weather bulletins are all disabled. In order to avoid such situations, two independent mail servers have been prepared. The management server automatically selects the operating mail server and transmits data. In the event that both mail servers have shut down, update information and weather bulletins can be neither acquired nor updated. To facilitate easy separation between the error and the management server itself in the event that neither mail server is operating, a detailed status is recorded. In addition, the instruction that the message "No Data" be displayed on On-board units is issued for the E-iSERV portal servers.

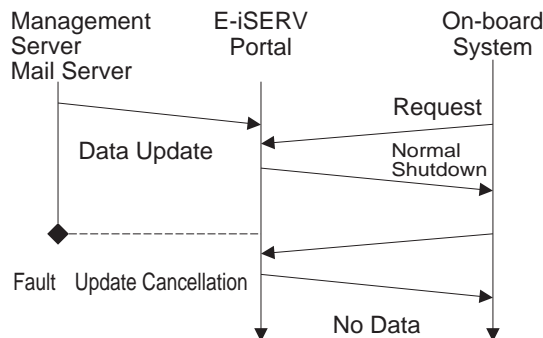


Fig.21 E-iSERV Troubleshooting

5.2.3 Errors caused by the transmission lines that connect E-iSERV units to linked ASPs

Although the communication path between E-iSERV units and linked ASPs uses a dedicated line to MyDriveNet.Com and an IP network with Daikei Data Processing Co., Ltd., and JR Systems, it must be assumed that partial data loss will result when errors occur because the error recovery feature mounted in the protocol stack does not sufficiently avoid errors.

Functions which enable retrieval of errors that could not be avoided or dealt with inside the protocol stack are stored on the applications at each server. These functions also enable data for which normal results could not be obtained even after the predetermined amount of retrials to be converted into data that is harmless to other components.

Detailed records are made for errors that could not be avoided/dealt with inside the protocol stack whether or not such errors could be solved by a retry. These

records can be used to locate the cause of the error.

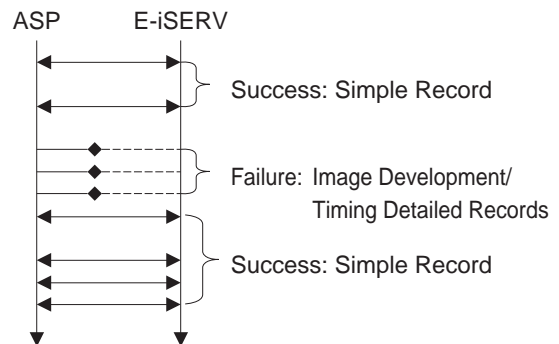


Fig.22 Communication Error Troubleshooting

5.2.4 Linked ASP Errors

In cases of service shut down due to an error on the linked ASP end, many different causes are conceivable, which is also the case when E-iSERV shuts down. Moreover, even if service itself is normal, there may be problems in the data that was transmitted. In order to avoid damage/detrimental effects to systems that do not require the corresponding data, the service administrator performs the following actions in addition to taking avoidance measures in the event that an error is detected by the management server:

- Notifies user
- Notifies system administrator
- Notifies ASP; requests cause analysis

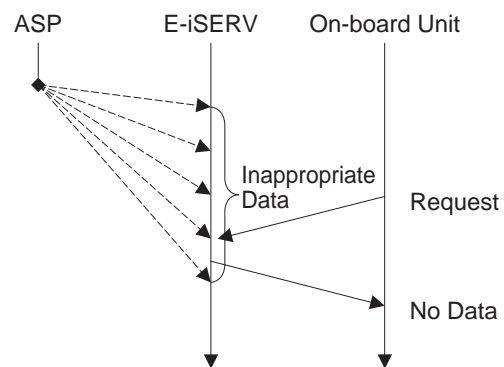


Fig.23 ASP Troubleshooting

Destination ASP systems, including the lines, are multiplexed and highly reliable. Although these systems are periodically shut down for planned maintenance, sudden shutdowns due to error should be rare based on past performance. However, since risks with a low probability are the ones to be most wary of, the formation of a crisis management system, including operation manuals, cannot be overemphasized. In cooperation with Fujitsu Ten Ltd.'s service department, IDC, and related ASP companies, E-iSERV actively promotes the creation of a framework that secures early response and improves CS, through the automation of error detection and its notification, analysis of initial factors during error occurrence, establishment of an information transmission

route, and the creation of a response QA list.

6

In Closing

Internet use in the home environment is undergoing a shift from merely expanding their user base to being actively used. Consumers have become aware of the value of the internet, which means that natural selection will lead to a higher standard of service. Vehicular information transmission services that utilize cellular phones, on the other hand, continue to be mired in the user base expansion phase due to the unchanged emphasis on automotive navigation systems and developer-centric thinking. In contrast to the thriving automotive navigation market, the slump in the car audio market has continued in recent years. In light of this situation, Fujitsu Ten Ltd. seeks to carve out a new niche for itself in the market backed by the increase in the amount of 3G(3rd Generation) cellular phone users with the release of the i-audio, our company's first foray into Infotainment. I would like to end this document by expressing my hope that the release of this product heralds the beginning of a new epoch in the car audio market.

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