

Product Bulletin

Corema Loyalty Technical Overview

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The following information is provided for those who need a deeper understanding of Corema Loyalty, its architecture, detailed features, offers, interaction with ISS45, integration, solution design, etc.

Please also see Marketing Bulletin 1182, providing a complete overview of the Corema Loyalty program for Dealers.

Fujitsu's Corema Team looks forward to working with the StoreNext Dealers with this powerful combined solution.

To Your Success,

Rowan

*Rowan Cape
Director, Corema*

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Corema Loyalty Detail

Corema Loyalty is a maturing product, which has been invested in and developed by the Fujitsu Group since 1996. The Fujitsu group has invested over \$5 million in the development of Corema.

In 2001 Fujitsu embarked on a packaging project with Corema Loyalty to provide a cost-effective and easy to manage solution for grocery retailers with 20-200 stores. This version of Corema Loyalty runs on Microsoft's Windows 2000 and SQL 2000 Server. Continuing the theme of keeping things simple, Corema Loyalty has a web browser-based application (Corema Loyalty Relationship Manager) accessible from any networked PC in the retailer's back office or front of store. The handheld TeamPad can provide retail representatives with wireless access to Corema so they can use this when on the shop floor, or in a store customer service booth. This feature also allows easy access for any member of staff from any networked PC, locally or remotely.

Corema Loyalty interfaces with both ISS45 Version 7 and Version 8. The functionality of Corema Loyalty is dependent on the scope of functionality of offers, promotions and discounts available within the installed version of ISS45's Advanced Promotion System.

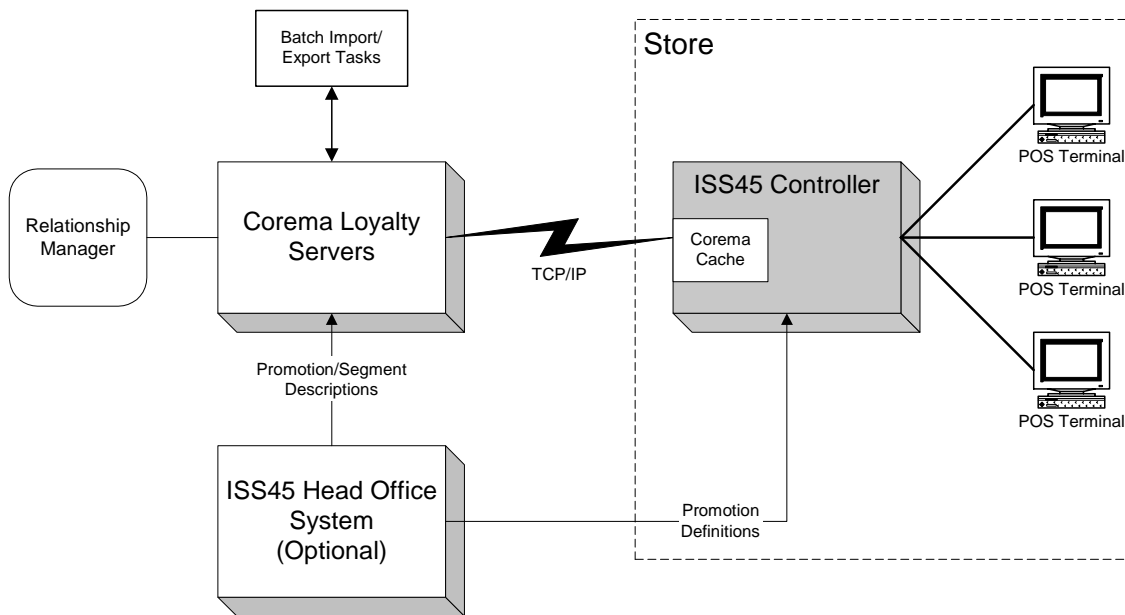
Corema Loyalty is made up of several components:

Corema Loyalty Servers - the SQL 2000 Server database that stores the customer profile detail provided to PoS at every transaction in real-time and is updated after each transaction by PoS

Corema Cache - the component that provides offline resilience when the network connectivity between Corema and the stores is missing. Corema Cache sits on the PoS controller and provides the PoS with a limited subset of local customer detail information from the last transaction

Corema Loyalty Relationship Manager - the real-time interface for all users. A web browser based application that allows users to view, edit and update customer profile and transaction data. The full details of the information held in the Relationship Manager is detailed below

Corema Loyalty System Monitor - the real-time dashboard interface that illustrates the status of all services and stores connections to the retailer's systems administrative team



Corema Loyalty incorporates a System Monitor within the Relationship Manager to enable a fast and clear real-time view of the Corema services, databases and connectivity to stores. This is shown through both a simple helpdesk page displaying system status information, and a number of log files showing detailed system information. The log files can be used to monitor system health, message throughput, store connections and other significant systems metrics. Batch data changes are logged and summary information is provided at the completion of all batch tasks. This allows administrators to have confidence that Corema Loyalty is live and operational in all stores. If a store loses connectivity to Corema an offline flag automatically appears on the System Monitor to alert the administrator of a problem.

Corema Loyalty's Relationship Manager database holds customer, offer and segment information that can be edited or updated by any authorized user. The following information is stored in the Corema Loyalty Server database and accessed via the Relationship Manager interface:

- **Customer relationship database** - including name, address, email address, gender, date of birth; in addition to customer type, status and preferences
- **Customer search** - allows the Customer Service agents to search for customers by name, telephone number or by card number
- **Exact search** - refines the search to an exact match only
- **Householding** - allows a customer to be linked with others that share the same address or telephone number. This enables faster advancement towards offers and promotions as progress is totaled under the nominated primary cardholder
- **Customer or household totals** - displays the total spend and total number of visits by the cardholder or the household. An authorized user can adjust these totals
- **Segment list** - displays the marketing segments the customer or household is assigned to by the retailer
- **Transaction record** - displays a detailed record of when and where the customer has shopped and what offers were earned and awarded
- **Contact history** - allows the Customer Service representative to record contact with a customer, details of the enquiry or conversation can be recorded for future reference
- **Offers** - records the offers each customer is eligible for. Editable 'spend' and 'offers hit' fields allow authorized CS representatives to amend the offer eligibility in response to customer agreed adjustments
- **Card management** - records all cards associated with a customer and links a new card to a customer. The new card automatically picks up any points or offer eligibility when it is added
- **Segment maintenance** - maintains a full record of all customer segments defined by the retailer's marketers. Segments are defined to group together a number of people. These people are usually associated by a common factor, such as zip code, social interest or age group. Segmenting a customer base allows the targeting of offers and promotions at specific groups of customers, or employees (based on their inclusion in an eligible segment) with an aim to maximize the return from those within the relevant segments.
- **User access levels** - to ensure that users can edit or update information within the authorization level associated with their role
- **User maintenance** - manages the number and access levels of additional users and enquirers

- **Audit** - captures every change to the application by any user. This feature is designed to provide the retailer with an audit trail of changes to customer, segment or offer information
- **System monitoring** - displays a status of the connections to all stores. This allows centrally based administrators to have real-time confidence that Corema Loyalty is live and operational in all stores and alerts the administrator when a store goes offline
- **Corema cache** - designed to provide a level of resilience even if an external problem means the PoS cannot communicate with the Corema Loyalty database. The Cache holds a copy of the latest customer information and will feed this back to enable the PoS to complete the transaction. Updates, as a result of the transaction, are held within the Cache and transferred to the Corema Loyalty database when the system is back online

How does Corema work with ISS45?

COREMA AND POS MESSAGING

Corema Loyalty communicates with the ISS45 PoS via a series of four messages that take place in real-time during the transaction.

In the first of these messages the customer identifies themselves to the PoS via several means, either:

- Scanning/swiping a card in the checkout lane
- The cashier key-entering a card number in the checkout lane
- The customer providing another identifier (e.g. telephone number) that is key-entered in the checkout lane

The PoS system will send message one to Corema Loyalty containing one of the identifiers listed above.

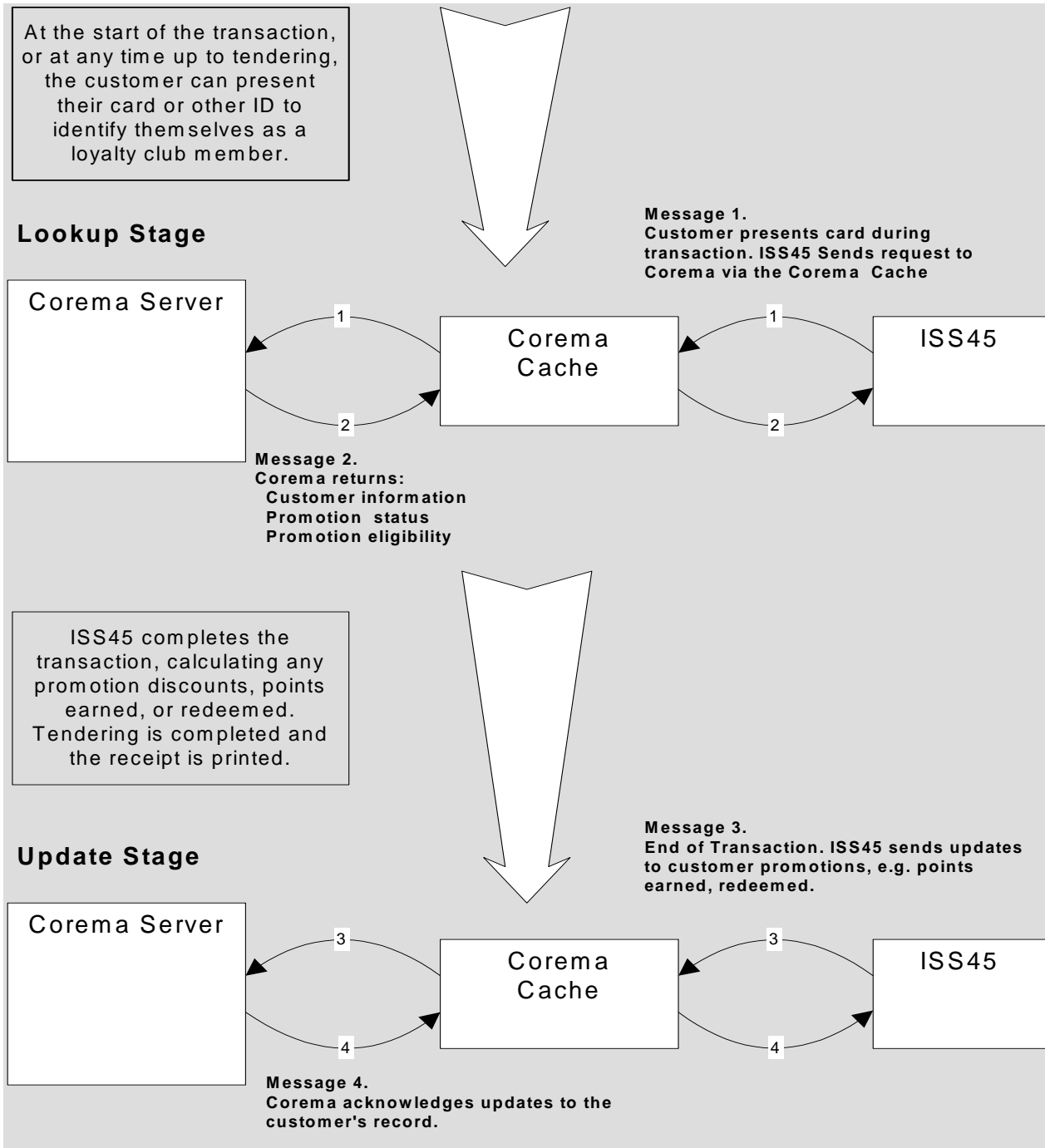
In message two, Corema Loyalty will respond immediately to the PoS with customer information including:

- The customer name (unless it's a new customer or the store connection is down). If it is a new customer, Corema Loyalty will create a new record. If the store is down, Corema Loyalty will use the last transaction data held in Corema Cache
- The customer's current "segments" - these are used to determine eligibility for offers by the PoS system
- The customer's current "offers" - the status of any promotions for which the customer is eligible or has prior activity

Once the transaction is completed and the PoS has awarded any appropriate rewards to the customer, following the business rules defined in the Advanced Promotions System and Corema, it sends message three to Corema. This third message confirms a summary of the new updated status of the customer including any offer redemptions, new points totals and other transaction summary details.

Finally, Corema sends an acknowledgement back to PoS in message four to confirm that it has received the new data and updated the customer record.

The messaging is illustrated in the diagram below:



COREMA CACHE

In the unlikely event that both servers are unreachable, Corema's in-store component, Corema Cache, provides offline caching and store/forward facilities to ensure that the latest customer data is available in store.

Corema Cache supplies the following information, provided the customer has visited the store before it went offline:

- Customer name
- Segments to which the customer belongs (for targeting)
- Continuity totals
- Spend
- Total savings
- Points

Totals are obtained from the central server, and therefore include previous purchases from other stores. This process is transparent to the PoS system.

COREMA AND POS OFFERS

As the grocery marketplace becomes more competitive, grocers are inventing new ideas to attract shoppers and make shopping in their stores more interesting and fun. Many grocers already use PoS driven discounts, offers and coupons extensively, and some of the more imaginative grocers are using 'clubs' to recognize shoppers with particular interests and high channel spend.

Keeping track of these shoppers, however, and providing offers that spark interest and purchases – and then analyzing whether the good marketing ideas worked – is much more difficult. Corema Loyalty enables retailers to move down this road and help them catch up and stay up with the leaders. Remember, this version of Corema Loyalty includes all the capabilities available to those Tier I grocers your customers are trying to emulate.

Corema Loyalty not only allows retailers to target specific offers at particular shoppers, it also allows them to build on ISS45 and offer special pricing, at particular stores, to specific people.

Resellers can help extend the retailer's success by helping them exploit the marketing creativity already available in ISS45 and waiting to be customized to their marketing requirements.

Essentially, Corema Loyalty centrally manages any offer or promotion set up in ISS45, so that a transaction is treated as if it were taking place in the 'home store.' So the discounts, continuities and multi-level threshold rewards that they would get in the home store can be given in any store, at any time. In addition, Corema adds centrally managed rewards to extend marketing imagination and create excitement such as an instant winner or sweepstake award, cross-channel offers and rewards and external partner awards.

The key Corema Loyalty offer types, managed by Corema Loyalty centrally and awarded by the PoS, are:

- *Points* – points collected over time can be redeemed for awards or discounts
- *Continuity Offers* – Corema Loyalty manages many types of continuity offer
- *Multi-level thresholds* – specific continuity offers with increasing value of award
- *Accelerated Earnings* – aimed at particular stores or segments to encourage spending
- *Instant Winners* – a sweepstake style random award
- *Specific awards* – targeted at particular channel business areas, such as fuel purchases
- *External awards* – such as frequent flyer miles, or cross-retailer offers

Offers available at PoS fall into the following categories¹ (The customer loyalty card may be scanned at any point, up to the tendering phase):

1. No limit
2. Limited within Transaction
3. Available for cardholders, limited number of uses over multiple transactions.
4. Available for cardholders, dependent on total spend (over several transactions) passing a threshold.
5. Available for cardholders, accrue points that can be redeemed as tender.

All of these are instigated by the Point of Sale system. Corema Loyalty is aware only of types 3, 4 and 5.

When the card is swiped, Corema Loyalty makes the PoS application aware of any activities that the customer has made, perhaps in previous transactions, involving type C, D and E offers. If the customer has received a type C award, Corema Loyalty provides the number of times. If the customer has made purchases contributing to a type D or E offer, the amount in whole dollars, is supplied to the PoS.

If a purchase within the transaction would make the customer eligible for an offer type C, the PoS application first checks to see whether the maximum number of awards has already been made. If so, the award is not given. If there are still some awards left, they are given, and Corema Loyalty is informed of this at the end of the transaction, so that it can update its customer summary totals.

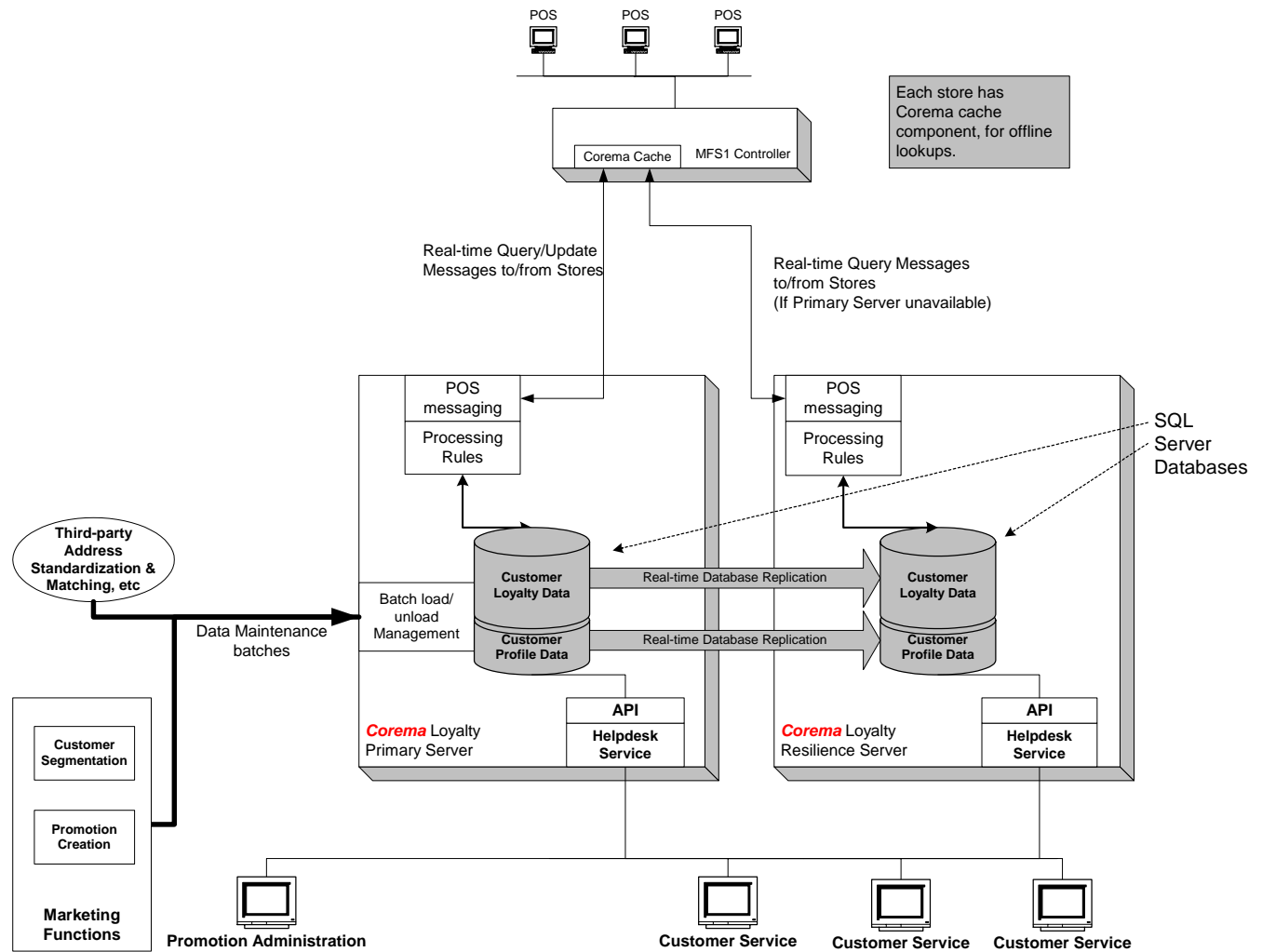
If a type D or E offer is active, eligible customer spend will be passed to Corema Loyalty at the end of the transaction. If the threshold on a type D offer is achieved within the transaction, the award is given, and Corema Loyalty is informed of the fact at the end of the transaction.

¹ Note: Not all functions are available in all versions of ISS45.

Architecture

The Corema Loyalty solution is built on an open architecture. It has been designed to provide a cost-effective and easy to manage solution operating on an Intel platform with Windows 2000 and SQL 2000 Server operating and database software.

The diagram below illustrates the major components of the Corema Loyalty system:



Solution Design

Corema solutions are based on a proven, scalable architecture and tested database design. This standard offering can be extended and tailored by Fujitsu's professional service teams to meet the retailer's unique needs if required.

COREMA LOYALTY ELEMENTS

The Corema Loyalty Server is installed on a server running Windows 2000 and SQL Server 2000 sized for the number of current transactions and customers and with capacity for future growth. This sizing is not intended to take account of substantial store addition, merely to allow for growth at the current store level.

The Corema Loyalty Relationship Manager is installed on the same server.

COREMA LOYALTY DATABASE DESIGN

Corema uses two databases to manage customer information, although in most configurations these will reside on one server. The separation of data into the two databases provides improved performance for the online transaction flow when batch data changes are being applied.

BATCH FEEDS

Corema Loyalty supports the conversion and import of data from other operational systems. Data for conversion must be supplied in ASCII format and in file layouts specified in the Corema Loyalty documentation.

Corema Loyalty can also be configured to export customer and sales data to other systems, typically analytical or marketing applications such as Fujitsu's Corema Target or Corema Data Warehouse. Fujitsu can also export data in a standard format to other vendor's solutions, such as Market Expert. Fujitsu can provide professional services to create appropriate feeds to transform data and perform these exports if requested. The standard export formats are described in the Corema Loyalty documentation set (see Marketing Bulletin 1182 Section C-2).

SYSTEM PROCESSES

All Corema Loyalty system processes write to plain text log files that are readable by system administrators. The most active processes automatically rollover to new log files at the start of each day, allowing these files to be easily archived.

COREMA LOYALTY BACKUP STRATEGY

Fujitsu strongly recommends the retailer invest in a Corema Loyalty Backup or Resilience Server. This server will have the same specification as the main Corema Loyalty Server, and will be configured as a mirror of the primary server.

The Corema application files can be backed up using any Windows backup tool. The database engine contains facilities for creating backups and these should be carried out regularly and archived to backup media. Fujitsu will advise on a suitable backup strategy for the system based on the system usage and rate of updates.

IN-STORE POS CONTROLLERS

Corema Loyalty requires the in-store PoS controllers to be capable of supporting TCP/IP communications to the Corema host. If the Corema Cache is to be installed one of the following configurations must be used:

- One of the PoS controllers (MFS1 or 2) must be running Windows NT or Windows 2000, with at least 1GB available disk space and sufficient available processing capacity to allow Microsoft SQL Server or Microsoft SQL Desktop Edition to be installed
Note: ISS45 V8 meets these requirements by default as long as sufficient disk space is available.
- A separate server is available for Corema Cache, with Windows NT4 or Windows 2000 and at least 1Gb available disk space.

DBMS

The standard database engine for Corema Loyalty is SQL 2000 Server. While we can work with any database package that has ODBC drivers, this would usually be a custom task. Therefore, we recommend SQL 2000 Server.

COMMUNICATION PROTOCOLS

Corema uses TCP/IP to communicate with the store systems. Internally the Corema software uses local queues to distribute processing among a number of modules. The Microsoft MSMQ service is used in local mode to manage Corema system processes. The Corema Loyalty Relationship Manager uses HTTP 1.1 to deliver screens to standard browsers. The Relationship Manager has been validated against Microsoft Internet Explorer 5.5 and 6.0, although equivalent contemporary browsers may also work.

SUPPORTED DATA FORMATS

Corema Loyalty uses an SQL database for most data. There are also a number of configuration files that are in plain ASCII text. All import and export files are in ASCII text format with fixed width fields. Definitions of import and export formats are supplied with the Corema Loyalty software.

SERVER TO CLIENT COMMUNICATION

Corema Loyalty uses a proprietary protocol for communication between the store system and the Corema Loyalty host designed to maximize on-line performance. A typical PoS transaction will generate two message pairs from the store to the host. The first pair is a request for customer information and the associated response. The second pair is an update to the customer's data at the end of transaction.

The PoS controller will allow multiple outstanding information requests to be delivered to the Corema Loyalty system. Update messages will be buffered and delivered serially and in the order of generation. This helps to prevent lost messages and erroneous updates.

If a store is offline for any period of time, messages will not be delivered to the Corema Loyalty host, but will be cached by the Corema Cache software installed in each store. When the Corema Loyalty host comes back online, the cache will serially update the Corema host with all outstanding updates. This can potentially generate very high traffic volumes for periods of time (depending on how long the store was offline).

In a resilient configuration (strongly recommended by Fujitsu), the customer will have a replicated database on another server. This will generate a large volume of inter-server data as the primary database keeps the backup database in step.

REMOTE ACCESS

All clients and servers are connected via a LAN and usually use TCP/IP for communications. Access to any machine can be made from any other over IP, given the proper Windows2000 security settings. The Corema Loyalty Relationship Manager is a browser-based application and thus can be accessed from any client in the enterprise equipped with a suitable browser and appropriate network configuration.

WAN AND LAN

Most Corema installations are on Ethernet and use TCP/IP. Fujitsu have supported some Corema installations running over VSAT, although Frame relay is preferred. Fujitsu applications use standard protocols such as Sockets ODBC; any underlying infrastructure which supports these protocols is likely to be able to support the Corema system given adequate bandwidth.

COMMUNICATIONS

Standard data communications are used throughout.

OPERATING SYSTEMS AND MIDDLEWARE

The following products are required as part of the Corema Loyalty runtime environment:

Product	Version
Windows 2000 Server (including MSMQ component)	Service Pack 2
SQL 2000 Server	Service Pack 2
SQL Server JDBC Driver	2
Internet Explorer	5.5 or 6.0

SCALABILITY AND STORE GROWTH

Corema Loyalty is designed to cope, as ISS45 does, with the heavy turnover of stores or ownership changes that characterizes today's retailing marketplace.

The architecture is designed to be scalable to cope as stores are added incrementally to the chain, and the licensing model has been designed to be flexible and grow store-by-store as the retailer grows. Incremental licenses are available to be purchased as required on a store-by-store basis.

Corema Loyalty is a highly scalable solution that can be sized to suit a wide range of capacity requirements from small chains with only a few stores to larger chains with several hundred stores. The recommended configuration will depend on the volume and availability requirements of the retailer. Corema Loyalty handles scalability in a number of ways:

- Configurable message processing components which can be tuned to handle increased message volumes
- Distinct databases which can be deployed on separate servers if required
- Ability to use multiple network cards for improved message throughput

Clearly, the underlying platforms must be upgraded as the chain expands to provide the appropriate performance for the volume of transactions and data flow. Advice on appropriate configurations to accommodate chain growth can be provided.

Fujitsu's pricing model is also designed to accommodate flexibility in chain expansion and allow the retailer to easily and cost-effectively add additional stores to the license as more stores come on-line.

CUSTOMIZATION VS. PLUG AND PLAY

Although the smaller chains may not feel the need to customize Corema Loyalty beyond the addition of a logo and brand color scheme, larger chains may decide to invest in brand specific customization, perhaps involving the addition of specific customer data fields to the Relationship Manager screens.

If appropriate the Reseller can offer the retailer customization professional services as an option. Fujitsu is able to provide customization of Corema Loyalty and any specific requirements will be discussed during the Requirements and Specification Phase of service delivery (see Section C of Marketing Bulletin 1182). Once the requirements are captured and reviewed an estimate is provided to the retailer. A typical sales process is shown in Section D-2 and D-3 of Marketing Bulletin 1182.

Corema Loyalty will be installed and configured to interact with ISS45 by Fujitsu. The Reseller may be contracted to install Corema Cache in each store if the retailer is unable to complete this element of installation.

Security

RELATIONSHIP MANAGER SECURITY

All Corema Loyalty Relationship Manager functions require an ID and password. The user/enquirer are assigned an ID through an administrative maintenance screen.

Users of the Relationship Manager can be configured as administrators or regular users. In addition, they can be designated as having read-only or update privileges.

In a retail environment it is important that a terminal does not sit idle for prolonged periods of time without requiring an operator to re-establish their identity by signing back in. The Relationship Manager automatically ends a user session when a period of inactivity exceeds the designated idle timeout period. Anyone attempting to access the application will be required to provide a valid ID and password.

Integration

Fujitsu strongly recommends that the Corema Loyalty servers are dedicated solely to that function and are not used by other applications. This is to prevent other applications from impacting the performance of the Corema Loyalty server that can cause noticeable delays at the checkout lane.

The Corema Loyalty system integrates with other applications via batch data feeds that are in ASCII format with fixed-width fields as specified in the Corema Loyalty documentation.

Corema Loyalty supports connectivity to a number of touch points including point of sale, web shopping interface, kiosks and interactive voice recognition systems.

For information, Fujitsu uses ASCII, XML, ODBC and SQL. Corema Loyalty uses sockets, ODBC and HTTP.

Application Changes

The customization of Corema Loyalty can be achieved via a variety of mechanisms depending on the type of modification required. Supported modifications include changes in the presentation (GUI), changes in the application flow, and changes to the business logic. The most significant changes are those that require modification to the message protocol between the PoS and Corema, as the PoS software will also require modification.

Transaction time

Corema Loyalty will typically respond to a customer information request from the PoS within 200 milliseconds. An update request will be completed typically within 500ms, depending on the number of offers for the customer.

Replication and Resilience

The Corema Loyalty solution is designed to support fail-over resilience to an optional replicated server if a problem is detected with the primary server or the communication to the primary server is disrupted. To enable this, Fujitsu always recommends installation of a replicated server configured to have data replicated from the primary production server.

Corema Cache provides additional resilience by supporting Corema messaging to the terminals from a local database in-store in the event that communication to the central Corema Loyalty server is interrupted. See Page 6 for more detail.