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CORBAmed
The OMG Healthcare Domain Task Force

Roadmap

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[Editor: This is a first draft of this document. The intent for this draft is to serve as a strawman for discussion purposes at the Salt Lake City OMG TC meeting. Feedback on both structure and content is requested and required. The first released version of this document is targeted to be issued at the OMG TC meeting XXXX meeting in XXXX. This document was created from the Manufacturing DTF Roadmap]

Revision A

Revision History & Document Evolution Planning

Version	Release Date	Description
Revision A	January 16, 1998	Initial Draft submitted per 3 week rule. Structure and initial cut at content to be reviewed at the Salt Lake City OMG TC meeting.
Revision B	*February 20, 1998*	*Second Draft to be issued after incorporating the comments, directions from the* Salt Lake City *OMG TC meeting.*
Revision C	*March 6, 1998*	*Comments from Roadmap working group conference call. Sumitted per 3 week rule for presentation at UK Meeting*
1.0	*April 3, 1998*	*Agreed upon short term roadmap by CORBAmed at UK Meeting*

[Editor's Note: Roadmap Working Group Conference Call, February 27th, 1998 2-4pm edt.]

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Executive Summary

This document serves as a plan and schedule for activity conducted by the CORBAmed , the OMG's Healthcare Domain Task Force.

There are four focus areas of group effort:

- **Requirement Elaboration:** activity which increases the Task Force's level of awareness of industry requirements. An example is issuing a Request for Information (RFI) and attendant response evaluations.
- **Specification Development:** activity which results in the specification and adoption of standard object interfaces for healthcare domain components. An example is issuing a Request for Proposal (RFP) and attendant response evaluations.
- **Healthcare Reference Object Model Development:** activity which defines a reference model for healthcare domain software components, possibly utilizing the enterprise view of the RM-ODP. Once developed, it will guide the specification developments.
- **OMG Support:** activity which ensures consistency with, and support of, healthcare domain requirements by existing OMG specifications. An example is active participation in OMG Platform Technical Committee task forces.

Listed below are some of the significant activities undertaken thus far:

- Issuance of several RFIs to gather information of worldwide activities to guide the direction of the task force's efforts and advice in the on issuance of a RFP (or RFPs).
- Issuance of an RFP for a Person Identification Service (PIDS)
- Issuance of an RFP for a Lexicon Query service (CORBAlex)
- Issuance of an RFP for a Pharmacy Interaction Facility (PIF)
- Issuance of an RFP for a Clinical Observation Access Service (COAS)

Amongst others, topics for future specification development include Legacy Wrapping, M to IDL mapping, Healthcare Security Framework, Clinical Encounter Management, Clinical Order Services or Frameworks, and Clinical Resource Scheduling

1.0 INTRODUCTION

1.1. Intended audience

There exists a need to communicate the activities of the CORBAmed DTF to a variety of groups of individuals. These groups include OMG members who are not active participants within CORBAmed, new members to CORBAmed, and also existing members of CORBAmed. It is becoming more and more difficult to remain current on all activities as the group is growing at such a rapid pace. We therefore will create a working document to communicate past and current activities as well as to provide guidance for our future activities.

The roadmap metaphor can thereby describe the locations that we have visited and our final destination, including the path and stops we must traverse along the way.

1.2. Purpose of the CORBAmed Roadmap

The purpose of the CORBAmed Roadmap is to allow for creating OMG deliverables, interoperability specifications within the Healthcare domain, while creating an overall comprehensive domain architecture. One of the goals of the roadmap is to allow for immediate significant achievements by CORBAmed by clearly defining the scope, boundaries and relationship within one or more sub-sections of the vast domain of healthcare.

This document serves as a plan and schedule for the activities related to creating OMG specifications within healthcare. The roadmap includes the work currently initiated and expected to commence within the next 36 months. The roadmap is a working document and will be updated upon the initiation of CORBAmed activities not anticipated at the onset. It identifies categories of activity and specific work items within those categories, lists expected work item deliverables; and provides a schedule for work items. Hence, this document will serve the purpose of guiding as well as describing the CORBAmed activities.

Much of what is contained in this document exists in the minds of those who participate in CORBAmed DTF activities. The purpose of this inclusion is to provide communication to those expressing an interest. This can be seen in the following sections: requirements elaboration and specification development. A point should be made that sections of this document introduce new areas which need to be addressed by the CORBAmed DTF, including a healthcare reference object model which is crucial to insure that DTF specifications not only provide a solution for a target area but that they also fit into the architecture for previous and future specifications.

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176 1.3. Short vs Long Term Roadmap

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178 The debate of the role and existence of domain architecture(s) within the OMG has been
179 widely discussed. There are a great deal of OMG and ISO activity in exploring an
180 appropriate methodology and model for describing such architectures. It is certain that
181 CORBAmed as a vertical domain within the OMG will be given some directives on how
182 to describe its architecture. It is also certain that the many excellent efforts within the
183 healthcare field and other related efforts within the OMG, including its vertical domains,
184 will directly drive the input for such domain architecture, as the role of CORBAmed is to
185 create open standardized CORBA interfaces. The initiative of producing specifications
186 will ultimately be driven by the CORBAmed healthcare reference object model.

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188 The enterprise view of the Reference Model – Open Distributed Processing (RM-ODP) is
189 being discussed and presented as a likely and appropriate candidate methodology to
190 describe a domain architecture.

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194 1.4. Architectural Vision

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196 The Manufacturing Domain Task Force proposes a high-level architecture for object-
197 oriented manufacturing systems that is equally representative for healthcare. While very
198 abstract in nature, it none the less establishes the context for identifying work areas for
199 the group. Figure 1 depicts that model.

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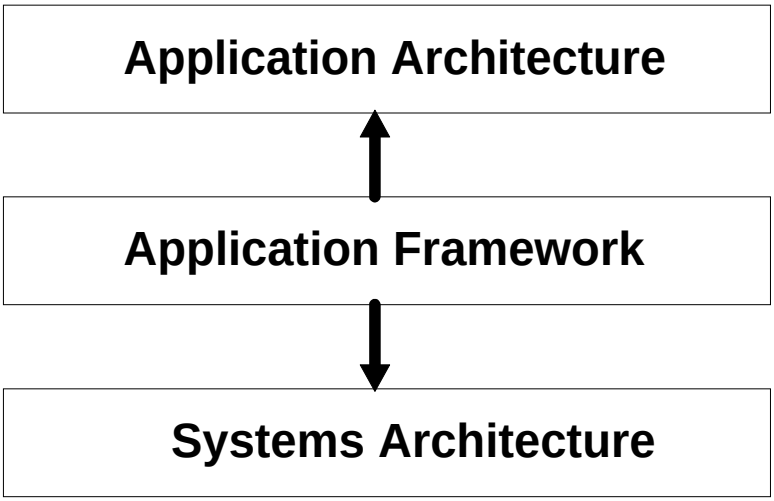

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Figure 1. Proposed Top-Level Architecture for Object-Oriented Manufacturing Systems.

The first component, the *Application Architecture*, is a model of the business policy and processes that a system is intended to carry out. The second component is the *Application Framework*, which is a reusable, domain-specific design and the implementation of that design. The third component is a model of the automation mechanism, the *Systems Architecture*. Relating Figure 1 to *the Object Management Architecture (OMA)* the system architecture block corresponds to the platform specific infrastructure elements (e.g. operating system) as well as the *Object Request Broker, Object Services* and *Common Facilities*. The Application Framework block corresponds to the Domain Interfaces and the Application Architecture block corresponds to *Application Interfaces.*

It is this architectural vision that serves as a guideline to the activities defined within this roadmap.

2.0 BACKGROUND

2.1. The State Of Healthcare Informatics.

The use of automation in healthcare began in the late 1960's with the advent of Hospital Information Systems (HIS). The original HIS' were mainframe based information systems and supported billing. Other administrative functions (admission-discharge-transfer of patients, inventory, scheduling) were added with time. The availability of lower cost minicomputers in the 1970's spurred the introduction of departmental information systems (radiology information system, lab information system, pharmacy management system, etc.). These systems supported similar administrative and workflow tracking functions at the clinical departmental level. The mainframe-based HIS systems tried to respond by adding departmental modules, but the special clinical requirements of individual departments hindered this (at least until the early 1990s when acquisitions resulted in a few companies with domain expertise across the hospital's departments. However, ambulatory care remains an informatics specialty largely unto itself to this day). The result has been a "tower of babel" situation where most information systems within a hospital or IDS cannot interoperate. The HL-7 standard was created to allow these systems to *communicate*, but even in its current (third) iteration, the HL-7 standard has had virtually no effect on healthcare systems interoperability.

The 1980's saw the rise of relational database management systems and client server computing. Many businesses made major investments in converting to these technologies. However, healthcare has been slow to respond. The reasons for this can only be speculated upon, but it has been noted that healthcare institutions typically spend a far lower percentage of their operating budgets on informatics than do other industries, such as banking, communications and transportation. This is thought by many to be due to a lack of incentive under fee for service medicine to invest in money saving informatics. In addition, there has been a strongly held belief on the part of clinicians that healthcare delivery is not a "business" and cannot be managed as such (note: managed care directly challenges this assumption which is one likely reason why it is so controversial). In any event, the healthcare informatics business is just now in the process of converting from mainframe/minicomputer – terminal technology to client-server. Industry groups such as Microsoft's Healthcare Users Group (HUG) have grown in response to this trend.

While informatics has long supported the financial and administrative sides of healthcare, it is only recently that it has looked toward supporting the clinician. Electronic patient monitoring and imaging equipment has been around since the 1960's, but until the 1990's each such piece of equipment was an island unto itself. Physicians typically never touched these machines; specially trained technologists operated them and produced hardcopy for the physician to diagnose from. The medical imaging business responded to

a call for interoperability in the mid-1980's with the ACR-NEMA standard, but it took over ten years for this to evolve to the present DICOM standard. DICOM, even more so than HL-7, supports interfacing various pieces of imaging equipment, but interoperability remains an elusive goal. Clinical monitoring equipment has likewise achieved cross-vendor connectivity (i.e. with the Medical Information Bus – MIB – standard), but not true interoperability.

As we move toward the year 2000, we find that healthcare institutions (the IDS', in particular) have suddenly developed a strong need for affordable, interoperable information systems. These systems must operate seamlessly across a wide variety of institutions – pharmacies, laboratories, physician practices of all sizes, outpatient clinics, community hospitals, and tertiary/quadinary care regional medical centers. Furthermore, the MCO model means that participating institutions need to interoperate by sharing their information; but as individual business entities, each institution in an IDS must maintain ownership of their important patient-centered records. Centralized systems cannot meet these needs. Neither can client-server systems (which, themselves, are centralized data storage systems with local data analysis and presentation capabilities). *However, distributed object technology would seem ideal for this purpose.* The object oriented (OO) principle of encapsulation is ideal for the protection of data ownership while allowing controlled access to the information by external clients. Distributed object technology (such as CORBA) allows healthcare related objects to communicate over a network; in particular, across physical computer boundaries. CORBA, specifically, as a platform and language independent standard for distributed object technology, seems to offer the best migration path from the current tower of babel to interoperable IDS's.

2.2. The Distributed Object World In Healthcare.

The last section presented a brief history of healthcare informatics and stated a case for distributed object technology in healthcare in terms of encapsulation and platform independence. Section 2 demonstrated that the trend toward managed care is forcing healthcare to look at itself as a business, and to behave as such. If this trend continues (and there is no reason to believe that it will not), then the other important OO attributes of inheritance and polymorphism should support a major paradigm shift in healthcare informatics; that is, the trend way from "vertically oriented" departmental systems toward "horizontally oriented" business objects. This concept is depicted in figure 4.1.

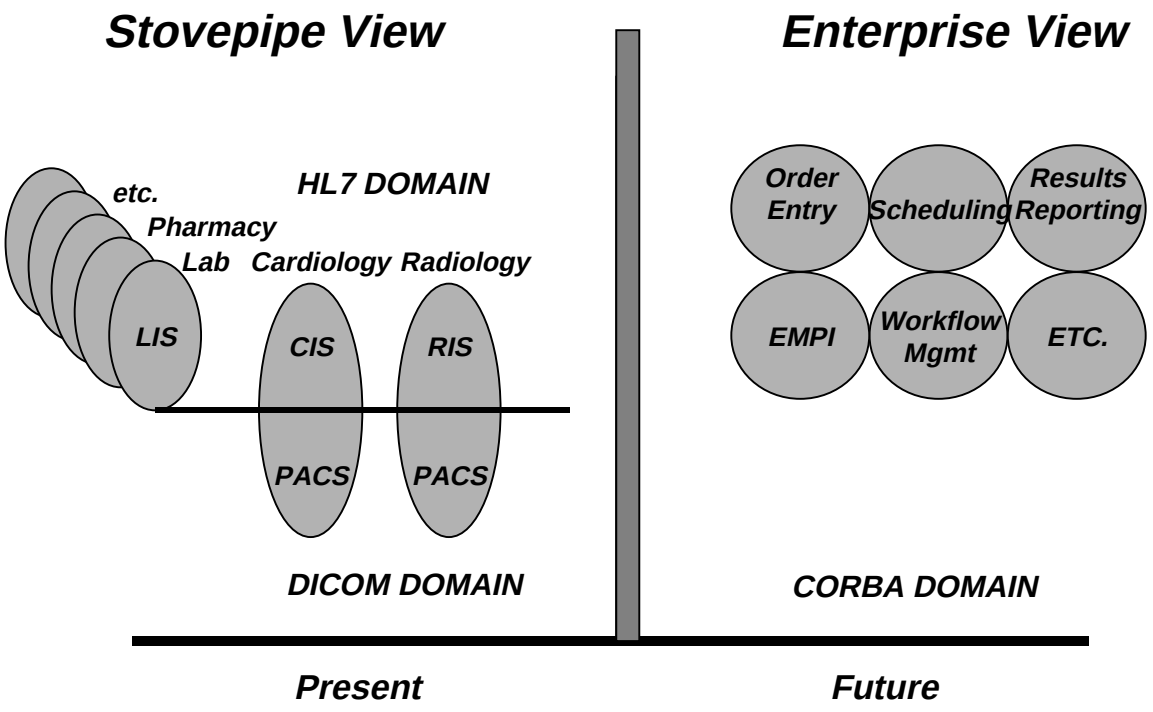

Figure 4.1 The changing paradigm of Healthcare Informatics.

Instead of viewing the IDS as radiology, cardiology, laboratory, etc., the object oriented view is of common services, e.g.: order entry, enterprise scheduling, results reporting, etc. These services have many operations (methods) in common across the clinical departments. If they are created on an enterprise basis, they can be subclassed to meet any detailed needs or nuances of specific clinical departments. The feeling here is that a lot of duplicated functionality (in operations, staffing and software) could be eliminated with this approach.

The cost and quality of healthcare software can be improved by inheriting characteristics which are common to other businesses. Most businesses involve persons and/or institutions which interact in the following ways:

- Ordering
- Tracking (workflow)
- Scheduling
- Delivery of goods/services (order fulfillment)
- Billing
- Inventory
- Personnel administration
- Common services (security, timekeeping, persistence, vocabulary, etc.)

It should therefore be possible to build a top-level model of the healthcare domain that inherits from these general business functions and objects:

- Persons(PIDS service):
  - Patients
  - Guardians/guarantor
  - Physicians
  - Nurses
  - Technologists
  - Therapists
  - Pharmacists
  - Clerical Personnel
  - Administrative personnel
  - Maintenance personnel
  - Etc.
- Institutions:
  - Hospital
  - Clinic
  - Office practice
  - Laboratory
  - Pharmacy
  - Etc.
- Ordering
  - Clinical Orders (medications, diagnostic procedures, therapeutic procedures)
    - *Pharmacy*
  - Event orders (ADT)
- Tracking
  - Enterprise (patient tracking)
  - Departmental (workflow tracking)
    - *CORBA Workflow Management Facility*
- Scheduling
  - Enterprise
  - Departmental
- Delivery of goods/services (order fulfillment)
  - *Clinical Observations*/Results Reporting
    - *CORBAlex (vocabulary service)*
  - *Clinical Decision Support*
- Etc.
  - *Healthcare Financial Services*
  - *Healthcare Security Framework*

The italicized items in the above “inheritance model” indicate where current CORBAmed activities can fit.

It is important to note that the transition from a legacy department- based information environment to an enterprise-wide distributed object environment cannot realistically take place in one shot. There are far too many legacy systems which support essential functions within the healthcare delivery system today. Therefore, CORBAmed should adopt a solution which allows CORBA specifications to support implementations that bridge between message-based legacy systems and interoperable CORBA components.

3.0 REQUIREMENTS ELABORATION

[Editor's note: The description of the RFIs should be re-written perhaps by the group leader that produced the RFI. We need to capture/request information about its Relevance to Architectural Vision. The current descriptions are directly from the RFPs, perhaps a summary of the responses is appropriate.]

3.1. Introduction

The purpose of this focus activity is to acquire more detailed requirements. This effort is vital to the group's comprehension of industry needs and is crucial in aligning OMG specification development with healthcare requirements. The request for discovering requirements in a particular area is primarily based on an interest and participation by an OMG member.

3.2. Explanation of the OMG RFI Process

Requirements Elaboration activities are achieved primarily through the issuance of Requests for Information (RFIs). The OMG RFI process does not directly lead to technology adoption. RFIs are used by task forces to solicit general information from the industry. Both OMG members and non-members can respond. Submissions may include information about relevant technologies, products, standards, research, requirements, and other guidance for the task force.

RFIs are recommended by CORBAmed to the Architecture Board (AB) and Domain Technical Committee (DTC) for issuance. RFIs are usually created whenever information is needed by the task force or a collaborating group to solicit information about industry requirements. In some cases, CORBAmed will issue an RFI in order to define industry requirements for key OMG technology and to help locate potential technology sources for fast track adoption.

There are no restrictions on who may receive or respond to a RFI. RFI responses are evaluated by members of the CORBAmed and are used to guide the group's activities. Restrictions are placed on the voting process, however. A DTC member must be at least at the Domain Contributing Member (DCM) level in order to vote for issuance of a RFI.

The following timetable shows a typical schedule of events for a CORBAmed RFI. The duration is approximate. An exact schedule (with specific dates) is established for each RFI.

Day	Event / Activity	Duration
	RFI review (“Three week rule”)	21 days
	Vote by CORBAmed to issue RFI	
0	Vote by AB and DTC to issue RFI	
	Preparation of submissions	120 days
120	Submissions due	
	Review of RFI responses by CORBAmed	30 days
150	Evaluation report by CORBAmed	

TABLE 1. TYPICAL RFI PROCESS TIMETABLE

3.3. Specific Work Items

Work items of a general nature identified within this focus activity include:

- issue Requests for Information (RFIs) on requirements / solicit vendors
- survey available, existing healthcare architectures (via RFIs) for purpose of identifying candidates for standardization, positioning the group to ask rather than define healthcare frameworks
- issue white papers addressing healthcare topics

3.4. Deliverables

Anticipated deliverables produced by this focus activity include:

- white papers
- RFIs
- RFI responses
- RFPs
- Statement of Requirements (is this the same thing as what goes out in the RFP or something more?)
- updated architectural model
- updated roadmap

3.5. Planned Work Items

3.5.1. RFI 1

Summary

CORBAmed RFI 1 was issued to solicit information about requirements, projects, and products that would provide guidance for healthcare related object system interoperability. The Object Management Group (OMG) CORBAmed Domain Task Force will use this information to begin the technology adoption process for OMG-compliant interfaces for systems used in healthcare delivery. This RFI seeks information to help CORBAmed make useful and efficient decisions in the healthcare technology adoption process.

CORBAmed RFI 1 can be found on the OMG web server as document #:
corbamed/96-01-01: CORBAmed RFI

Responses to CORBAmed RFI 1 are as follows:
corbamed/96-04-01: IBM Health Solution Unit RFI response
corbamed/96-05-01: HL7 IMSIG Response to CORBAmed RFI
corbamed/96-05-02: HealthMagic CORBAmed RFI response
corbamed/96-05-03: University of Magdeburg RFI response
corbamed/96-05-04: RFI response from SHINE
corbamed/96-05-05: RFI response from RICHE
corbamed/96-05-06: Protocol Systems RFI response
corbamed/96-05-07: CORBAmed RFI response from Andersen Consulting
corbamed/96-05-08: University of Wales, Aberystwyth RFI response
corbamed/96-05-09: Benchmarking Partners RFI response
corbamed/96-05-10: Hewlett-Packard RFI response
corbamed/96-05-11: Health Data Sciences Corp. RFI response
corbamed/96-05-12: Los Alamos National Laboratory RFI response
corbamed/96-05-13: NHS RFI response
corbamed/96-05-14: Koop Foundation RFI response
corbamed/96-05-15: Kurzweil AI RFI response

3.5.2. RFI 2: Clinical Observations

Summary

CORBAmed RFI 2 was issued to solicit information about requirements that would provide guidance to the CORBAmed Domain Task Force (DTF) of the Object Management Group (OMG) in developing specifications for healthcare information systems dealing with patient observation data. The overall goal will be to adopt vendor-neutral common interfaces that may improve the quality of care and reduce costs by utilizing CORBA technologies for interoperability between systems, applications, and instruments that detect, transmit, store, and display medical information dealing with observations of a particular patient's medical condition. CORBAmed DTF will utilize the OMG's open technology adoption process to standardize interfaces for these healthcare objects.

CORBAmed RFI 2 can be found on the OMG web server as document #:
corbamed/97-05-02: Clinical Observations RFI

Responses to RFI 2 are as follows:
corbamed/97-08-04: Protocol Systems Response to CORBAmed RFI2
corbamed/97-08-05: Joint Response to CORBAmed RFI2 (MIG/CHIME)
corbamed/97-08-06: The Gehr Architecture-Supporting document to the MIG/CHIME Response to CORBAmed RFI2 (Part 1)
corbamed/97-08-07: The Gehr Architecture-Supporting document to the MIG/CHIME Response to CORBAmed RFI2 (Part 2)
corbamed/97-08-08: Yale University Response to CORBAmed RFI2
corbamed/97-08-09: Addendum to the Protocol System Response to CORBAmed RFI2
corbamed/97-09-04: HL7 SGML/XML Response to CORBAmed RFI2
corbamed/97-09-05: Joint Response to CORBAmed RFI2 (Baptist, CareFlow, Kurzweil, & Philips)
corbamed/97-09-06: American Association For Medical Transcription Response to CORBAmed RFI2
corbamed/97-09-07: DICOM Working Group 8 Response to CORBAmed RFI2 (Clinical Observations)
corbamed/97-09-08: HL7 IMSIG Response to CORBAmed RFI2 (Clinical Observations RFI)
corbamed/97-09-10: Addendum to the University of Michigan/Protocol Systems Response to CORBAmed RFI2

3.5.3. RFI 3: Clinical Decision Support

Summary

This Request for Information (RFI) solicits information about requirements that will provide guidance to the CORBAmed Domain Task Force (DTF) of the Object Management Group (OMG) in developing specifications for clinical Decision Support Systems (DSS). The overall goal will be to adopt vendor-neutral common interfaces that may improve the quality of care and reduce costs by utilizing CORBA technologies for interoperability between systems, applications, and instruments that detect, transmit, store, and display medical information used in clinical DSS. The CORBAmed DTF will utilize the OMG's open technology adoption process to standardize interfaces for these healthcare objects.

The complete CORBAmed RFI 3 can be found on the OMG web server as document #:

corbamed/97-06-05: Clinical Decision Support RFI (CORBAmed RFI3)

Responses to RFI 3 are as follows:
corbamed/97-08-02: University of Utah/CogniTech response to the CORBAmed RFI3 (Clinical Decision Support RFI)
corbamed/97-08-03: ASTM Response to CORBAmed RFI3 (Clinical Decision Support RFI)
corbamed/97-09-03: Federal University of Sao Paulo Response to CORBAmed RFI3 Clinical Decision Support RFI)
corbamed/97-09-09: Chiron Diagnostics to CORBAmed RFI3 (Clinical Decision Support RFI)

3.5.4. RFI 4a: CORBA and HL7 - Approaches and Considerations

Summary

This Request for Information (RFI) solicits information about requirements that will provide guidance to the CORBAmed Domain Task Force (DTF) of the Object Management Group (OMG) in the area of CORBA based HL7 implementation approaches. The overall goal of CORBAmed is to adopt vendor-neutral common interfaces that may improve the quality of care and reduce costs. CORBAmed DTF will utilize the OMG's open technology adoption process to standardize interfaces in the healthcare arena.

In the area of HL7 as a standard messaging approach, CORBAmed has established a liaison relationship with the HL7 standards group. One of the primary reasons for this liaison is the desire on the part of CORBAmed to not 'recreate the wheel'. CORBAmed desires to leverage the HL7 reference information model, other HL7 based initiatives, and other standards that help support healthcare communications. As part of that relationship, CORBAmed is attempting to assist HL7 by providing technical analyses regarding implementation approaches, and how to best take advantage of the capabilities inherent in the CORBA distributed object technology framework. We believe that there are a number of possible technical approaches that can be utilized, but are uncertain as to the most optimal approach. Several approaches have been defined already within HL7, through the SIGOBT. There are, we believe, a number of other organizations who have begun to implement CORBA based solutions, who are also using HL7 messages as the semantic backdrop to their implementations.

The complete CORBAmed RFI 4a can be found on the OMG web server as document:
corbamed/97-09-15: HL7 RFI

Responses to RFI 4a are as follows:
corbamed/98-01-04: HBO & Company Response to the HL7 RFI
corbamed/98-01-05: Hewlett-Packard Response to the HL7 RFI

3.5.5. RFI 4b: Lifesciences RFI

Summary

This Request for Information (RFI) solicits information about requirements, projects, and products that will provide guidance for life sciences research related object system interoperability. The Object Management Group (OMG) and, specifically, the Life Sciences Research Domain Special Interest Group (LSR-DSIG), will use this information to begin the technology adoption process for OMG-compliant interfaces for systems used in life sciences research. The mission of the Life Sciences Research DSIG is:

- To improve the quality and utility of software and information systems used in Life Sciences Research through use of the Common Object Request Broker Architecture (CORBA) and the Object Management Architecture (OMA).
- To encourage the development of interoperable software tools and services in Life Sciences Research.
- To prepare to use the Object Management Group (OMG) technology adoption process to standardize interfaces for software tools, services, frameworks, and components in Life Sciences Research.
- To communicate the requirements of the Life Sciences Research domain to the Platform Technical Committee.
- To coordinate with OMG Task Forces and Special Interest Groups, and other standards organizations and information providers to ensure common standards.

The OMG encourages users, consultants, systems integrators, and developers of life sciences research related devices, instruments, applications, databases, and systems to become involved with this process by responding to this RFI. OMG members and non-members may submit responses. Current compliance with OMG specifications is not a prerequisite for response to this RFI. The RFI response can consist of pre-existing product documentation, but should preferably be organized and presented in accordance with this RFI.

NOTE: According to OMG rules, SIGs may not issue RFIs. Therefore, this RFI is being issued by the CORBAmed Task Force on behalf of the Life Sciences Research DSIG. Responses to this RFI will be reviewed by LSR-DSIG.

The complete CORBAmed RFI 4b can be found on the OMG web server as document:
corbamed/97-09-16: Life Science Research RFI (CORBAmed RFI4)

Responses to RFI 4b are as follows:

corbamed/97-11-07: Birkbeck College, Dept. of Crystallography Response to the Lifescience RFI

corbamed/97-11-08: Genome Database Reponse to the Lifescience RFI (Part 1)

corbamed/97-11-09: Genome Database response to the Lifescience RFI (Part 2)

corbamed/97-11-10: Oxford Molecular Group Response to the Lifescience RFI

corbamed/97-11-11: Roslin Institute Response to the Lifescience RFI

corbamed/97-11-12: University of Manchester Response to the Lifescience RFI

corbamed/97-11-13: University College London response to the Lifescience RFI

corbamed/97-11-14: National Center for Genome Resources Response to the Lifescience RFI

corbamed/97-11-15: Sequana Therapeutics Response to the Lifescience RFI

corbamed/97-11-16: Bioperl Developers response to the Lifescience RFI

corbamed/97-11-17: Tripos Response to the Lifescience RFI

corbamed/97-11-18: NetGenics Response to the Lifescience RFI

corbamed/97-11-19: EBI Response to the Lifescience RFI

corbamed/97-11-20: Berkeley Drosophila Genome Center Response to the Lifescience RFI

corbamed/97-11-21: G.I.S Infobiogen Response to the Lifescience RFI

corbamed/97-11-22: University of Pennsylvania Response to the Lifescience RFI

3.6. Schedule

Planned Start	Activity	Planned Completion
96-01-01	RFI 1	Last presentation
97-05-02	RFI 2	December 1997
97-06-05	RFI 3	December 1997
97-09-15	RFI 4a	March 1998
97-09-16	RFI 4b	March 1998

TABLE 2. ROADMAP OF CORBAMED REQUIREMENTS ACTIVITIES

4.0 SPECIFICATION DEVELOPMENT

[Editor's Note: The manufacturing specification section includes the categories shown below in the description of each RFP. The intent is to document each effort but also understand the impact or relationship to other efforts

- ***Summary***
- ***Business Requirements***
- ***Relevance to Architectural Vision***
- ***Schedule***

The description of the RFP should perhaps also include one or more use-cases, representing the main business process the service supports.]

4.1. Introduction

The purpose of this focus activity is to foster the adoption of standard object interfaces for healthcare domain components. These standard object interfaces will be developed through the group's adherence to OMG convention. That is, the issuance of Requests for Proposal (RFP), the evaluation of proposed solutions to the RFP, and the evolution of a related specification.

This focus activity embraces the primary purpose for the group's existence.

4.2. Explanation of the OMG RFC and RFP Process

Specification Development activities include the issuance of Requests for Proposal, evaluation of RFP responses and evaluation of Requests for Comment. Each is discussed below.

4.2.1. OMG Request for Proposal Process

The OMG Request for Proposal (RFP) process entails a solicitation for technology proposals, followed by revision, evaluation, selection, and approval processes. CORBAmed evaluates the RFP submissions and revised submissions. CORBAmed then selects specifications (by vote of members who are at least at the Influencing or Government Member level) which it recommends to the DTC and AB. OMG members who are at least at the Domain Contributing Member (DCM) level then vote to recommend adoption. The Architecture Board (AB) review normally precedes the DTC vote. The final step is to forward the proposal to the OMG Board of Directors (BoD) for

final approval. Adopted specifications are then available for use by OMG members and non-members alike.

Following the conventions established by the other OMG task forces, CORBAmed will use a three step process for handling submissions. This process can be altered by consensus of CORBAmed.

4.2.1.1. Submissions

OMG members who are at the least at the DCM level can submit a proposed specification in response to an RFP. Submitters must send a Letter of Intent (LOI) to the OMG declaring their commitment to commercialize the technology. If an organization is not at the DCM level, they may upgrade their membership to either DCM (or Contributing Member) prior to submission. Groups of DCM and/or Platform Contributing Members may submit in teams, representing multi-vendor alliances and external consensus. Other organizations, which are not co-submitters, may be identified in the proposal as supporters of a technology.

The RFP will establish a submission deadline for the full technology specifications.

4.2.1.2. Revised Submissions

There will be a subsequent deadline for revised submissions. This revision process encourages mergers of submissions. An organization must have submitted an initial submission in order to participate in a revised submission. For revised submissions, a date by which a working implementation will exist is required.

4.2.1.3. Specification Selection

After revised submissions are received, the CORBAmed will select (through evaluation) a single specification for each RFP item. Specifications may be conditionally accepted subject to minor changes to be made by the submitter. In most cases, the CORBAmed will establish a revision process to improve specifications in terms of clarity or correctness. Major changes to selected specifications will only take place during a later RFP or RFC-driven enhancement cycle.

A specification selected by CORBAmed is then endorsed by the Architecture Board, Domain Technical Committee and Board of Directors.

The CORBAmed RFP process will typically follow the timetable shown below:

Day	Event / Activity	Duration
	RFP Review (“Three week rule”)	21 days
	Vote by CORBAmed to issue RFP	

0	AB and DTC votes to issue RFP	
	Preparation of submissions	120 days
60	LOI to submit to RFP due	
90	Voting registration for CORBAmed members closed	
120	Submissions due	
	Preliminary evaluations by CORBAmed and preparation of revised submissions	120 days
240	Revised submissions due	
	Specification selection by CORBAmed	60 days
300	CORBAmed votes to select specifications	
	Review by AB and DTC ("Three week rule")	21 days
	AB and DTC votes to recommend specification	
	BoD review	
360	BoD votes on specification adoption	

TABLE 3. TYPICAL RFP PROCESS TIMETABLE

Please note that duration noted above is approximate. The exact schedule (with specific dates) for each RFP will be established on an RFP-by-RFP basis and documented in the RFPs.

4.2.2. OMG Request for Comment Process

The OMG Request for Comment (RFC) process is a fast track adoption process that uses an industry comment period. The RFC process includes the following steps:

The OMG RFC process starts with an unsolicited technology proposal submitted by one or more OMG members who are at least at the Domain Contributing Member (DCM) level to the CORBAmed. If an organization is not at the DCM level, they may upgrade their membership to DCM (or Contributing Member) at any time prior to submission.

A presentation and vote on the RFC can be scheduled for a particular CORBAmed meeting by one of the CORBAmed co-chairs. The technology proposal should be available to CORBAmed members three weeks prior to this meeting. At the meeting, the role of the submitters is to convince the CORBAmed to recommend the proposal for OMG review. A CORBAmed member must be at least at the Influencing or Government Member level in order to vote.

After the CORBAmed recommendation, the Architecture Board and Domain Technical Committee votes to release the RFC, starting the public comment period. DTC members must be at least at the DCM level of membership in order to vote.

The RFC comment period is 90 days. Any OMG member or non-member may comment. OMG staff can stop the RFC process if they determine that significant negative comment has been received.

After the comment period, the AB and DTC vote for technology adoption. A DTC member must be at least at the DCM level in order to vote.

The final step is OMG Board of Directors (BoD) approval.

CORBAmed encourages the use of the RFC process because it consumes fewer resources than a comparable RFP process. CORBAmed offers the following guidance to potential submitters:

The submitters should be confident that the proposal will survive the RFC period without significant comment.
If there is an external industry group that covers the proposal's technology area, it would be highly desirable if the submission represents an industry consensus from the external group.
The submitters should consider soliciting feedback from CORBAmed prior to submission. Most potential submitters give a presentation to CORBAmed and disseminate a pre-submission draft of the specification for review. The early review can surface potential problem areas. This optional step can greatly enhance the chances of successful technology adoption.

The following timetable shows a typical schedule of events for a CORBAmed RFC process. The duration is approximate. Exact schedules (with specific dates) are established for each RFC.

Day	Event / Activity	Duration
	Formal submission of full specification for review by CORBAmed, AB and DTC (“Three week rule”).	21 days
	Vote by CORBAmed to issue RFC for OMG review	
0	Vote by AB and DTC to release RFC for OMG review	
	Review period – comments from industry	90 days
90	CORBAmed votes to recommend specification	
	AB and DTC votes to recommend specification	
	BoD review	30 days
120	BoD votes on specification adoption	

TABLE 4. TYPICAL RFC PROCESS TIMETABLE

4.3. Specific Work Items

Work items identified within this focus activity include:

- issue RFPs
- evaluate responses to RFPs
- make recommendations for adoption - specification development
- follow-up with RFPs that subsume integration frameworks and address domains
- evaluation of RFCs

4.4. Deliverables

Anticipated deliverables produced by this focus activity include:

- RFPs
- RFP responses
- recommendations to DTC

4.5. Planned Work Items

The principal work items in this focus activity are related to the issuance and evaluation of RFPs.

4.5.1. RFP 1: Patient Identification Services (PIDS)

Summary

Through out an individual's lifetime they may have episodes of care provided by hundreds of healthcare providing organizations (e.g. hospitals, medical centers, Dr. offices, etc.). These organizations maintain medical records for the patients they have cared for. When a patient comes into a healthcare organization for care there is a need to find the records for any previous care that patient had with the institution. Each healthcare provider may have used a different scheme (e.g. numbering system) to identify the patient. The system used for identifying a patient is called a Master Patient Index (MPI).

In addition it is desirable to combine the medical records from multiple institutions in order to show a complete picture of a person's health record. This need to combine records from different organizations has increased dramatically in the last few years due to consolidations and collaborations between providers.

Because of the rapid change in the healthcare environment within the last few years the systems and standards needed to satisfy this need to share patient records do not yet exist. One of the major impediments to this sharing of patient records between organizations is

a lack in the ability to identify a patient in a consistent manner. Due to this inability there is no standard way today to combine a patient's records from multiple institutions.

This RFP solicits proposals for specifications for the common features of a patient identification system that allows multiple of these patient identification systems to interoperate.

The complete CORBAmed RFP 1 can be found on the OMG web server as document:
corbamed/96-11-02: Patient Identification Service RFP (CORBAmed RFP1)

Responses to RFP 1 are as follows:
corbamed/97-05-03: Joint Initial Submission to the CORBAmed RFP1 (PIDS)
corbamed/97-05-06: Health Data Sciences Corporation's Initial Submission to CORBAmed RFP1
corbamed/97-06-01: Revision 2 of the Joint Submission to the CORBAmed PIDS RFP (CORBAmed RFP1)
corbamed/97-07-03: Joint Initial Submission to the CORBAmed RFP1 (PIDS), Revision 3
corbamed/97-10-03: Joint Initial Submission-Revision 4 to the PIDS RFP
corbamed/97-11-01: Revised Joint submission to the PIDS RFP
corbamed/98-01-02: PIDS Final Revised Submission

4.5.2. RFP 2: Lexicon Query Services

Summary

This RFP solicits proposals for specifications of IDL interfaces for the common features of a set of lexicon query services.

This RFP describes the requirement for services to support lexicons (controlled terminology resources) in a distributed object system conforming to the OMA. Despite many efforts over the years, the ability to consistently and precisely represent information, such as observational and historical data in healthcare, has eluded the industry. This ability to represent a concept in an unambiguous machine-readable format is key to the better management of clinical processes within a healthcare organization, and between a healthcare organization and its various trading partners. The ability to support a discrete coded lexicon is of critical importance within the healthcare business segment. It is the first step towards being able to:

Better manage the communication of information between disparate organizations

Support the collection and analysis of clinical processes and outcomes as a result of consistent and clinically specific encoding

Enable the use of sophisticated rule-based 'decision support' tools, which require consistent data representation to be effective. For example, the rule:

If the order is for any drug in the category antibiotics and there is a history of allergy to any antibiotic, send an alert regarding possible cross-allergic reactions

requires the ability to classify all antibiotics under a single 'parent' in a specified hierarchy to assure that no matter what drug is ordered, if it is in the category antibiotics, this rule is triggered.

Assist in the reporting of information to various interested parties in a consistent manner

It is important to make the distinction between the lexicon content (i.e., the "vocabularies" themselves), and the methods to support lexicon queries and functions. In fact, we should not assume that the lexicon query services defined through this effort are necessarily limited to support of a health lexicon/domain of content. It may be the case that these services are a requirement across other domains/task forces within OMG. It is anticipated that responses could be received from vendors who provide similar services outside of the healthcare arena. However, since the primary interest and critical, near term need resides within the healthcare domain, CORBAmed has taken the lead the effort to define these services.

The complete CORBAmed RFP 2 can be found on the OMG web server as document:
corbamed/97-01-04: Lexicon Query Services RFP

Responses to RFP 2 are as follows:
corbamed/97-09-02: Joint Initial Submission to CORBAmed RFP2

4.5.3. RFP 3: Pharmacy Interaction Facility (PIF)

Summary

This RFP solicits proposals for the interface specifications of a Pharmacy Interaction Facility (PIF) that will facilitate the communication of prescription information between pharmacy prescribers and pharmacy dispensers using established healthcare data content as reflected in a variety of publicly-available national and international standards.

Current trends in public policy involved with government mandated standards for electronic healthcare interactions will influence the requirements for interoperability in

healthcare. We will likely see multiple technologies coexisting and interoperating in the future. In particular, future pharmacy interaction systems, based on standards with object-oriented specifications, will likely need to interoperate in some way with systems based on today's character string standards. In addition, pharmacies and physicians will require interoperability to allow communications across many disparate computing platforms.

The complete CORBAmed RFP 3 can be found on the OMG web server as document:
corbamed/97-12-22: Pharmacy Interaction Facility (PIF) RFP

Responses to RFP 3 are as follows:
There are currently no responses to RFP 3

4.5.4. RFP 4: Clinical Observations Access Service (COAS)

Summary

This RFP solicits proposals for accessing clinical observations. Clinical observations constitute a significant proportion of the information recorded about any patient. Examples of clinical observations include the following: laboratory results; vital signs; subjective and objective observations and assessments; observations and measurements provided by a specialist such as radiologist or pathologist who interprets images and other multi-media data. Interoperable specifications that support the activities involved in accessing clinical observations are sought in this RFP. The specifications should leverage existing standards such as HL7 and DICOM .

The complete CORBAmed RFP 4 can be found on the OMG web server as document:
corbamed/97-12-28: Clinical Observations Access Service (COAS) RFP

Responses to RFP 4 are as follows:
There are currently no responses to RFP 4.

4.6. Candidate Topics for Future RFPs

The following lists, derived from topical areas identified in the responses to the CORBAmed's RFI 1 and discussed by the group, identify RFPs that may be issued in the future.

The "coarse-grain" list of potential RFP categories includes:

- Healthcare Security Framework (currently in draft status as: corbamed/98-01-03: Healthcare Security Framework RFP, DRAFT)

- Clinical Order Management System
- Clinical Encounter Management System
- Clinical Decision Support System
- Clinical Context Service
- Distribution and Logistics Systems
- Business Management Systems
- Quality Management Systems
- "M" programming language mapping
- Integration with OMG workflow specifications
- Scheduling Applications

4.7. Criteria for Selection

Specification development will proceed in an order that CORBAmed identifies as meeting critical industry needs and essential to completing the group's architectural model.

5.0 Healthcare Domain Architecture Development

[Editor's Note: See www.omg.org/omaodp/ for information about a related workshop that was held recently. Also see www.iso.ch:8000/RM-ODP/ for some ISO RM-ODP information.]

5.1. Introduction

The purpose of this focus activity is to define a reference model for healthcare domain software components. This activity supports the first focus activity, requirements elaboration and will provide a framework for the continuos specification development activity.

5.2. Specific Work Items

There is only one work item within this focus activity: model development. Elaboration of the model not only assists the group in its activities but also identifies how the CORBAmed model relates to other OMG activities that relates to extending the OMG object model.

The Enterprise Viewpoint from the Reference Model – Open Distributed Processing (RM-ODP) has been proposed as a description technique for specifying the domain architectures of the vertical domains, including the CORBAmed Healthcare Reference Model or Domain Architecture. The Enterprise Viewpoint of the RM-ODP describes the focus, purpose, scope and policies of a system.

However, development of a generalized object-oriented healthcare model is a monumental undertaking for a volunteer group. It is the group's intention to take advantage of technical material included in responses to RFPs to generate this model. The CORBAmed RFP responses would perhaps be required to represent the proposed solutions in other RM-ODP viewpoints, in part utilizing IDL.

5.3. Deliverables

The anticipated deliverable produced by this focus activity is a growing Healthcare Reference Model. Future CORBAmed specifications should include viewpoints which contribute to the description of the semantics behind the interface definitions. These models will provide for increased interoperability and will also ensure consistency with other CORBAmed specifications as they will become part of the Healthcare Domain Architecture.

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979 ## *5.4.* Schedule

980

981 The schedule will be aligned with the adoption of CORBAmed specifications and include
982 a prioritized list of candidate future specifications.
983

Planned Start	Activity	Planned Completion
February, 1998	Issue whitepaper: The RM-ODP Enterprise Viewpoint and the CORBAmed RM	June, 1998
June, 1998	Presentations by RM-OPD and OMA experts on how it relates to the domain of healthcare	June, 1998

984
985 **TABLE 6. ROADMAP OF HEALTHCARE REFERENCE MODEL DEVELOPMENT**
986

6.0 OMG SUPPORT

6.1. Introduction

The purpose of this focus activity is to ensure consistency and support of healthcare domain requirements with existing and future OMG specifications. It will also be a forum for expressing healthcare requirements to existing and future OMG specifications.

6.2. Specific Work Items

General work items within this focus activity identified to date include:

- Identify and evaluate appropriate OMG specifications
- Participation in the Domain Technical Committee (DTC)
- Observation of the OMG Architecture Board (AB) activities
- Participation in Platform Technical Committee (PTC) task forces

Specific work items include:

- Unifying CORBAmed frameworks / interfaces with related OMG activities
- Working with the BODTF to develop a unifying OMG domain model
- Alignment with workflow specifications
- Evaluation of the CORBAsecurity service
- Evaluation of the Notification Service

6.3. Deliverables

Anticipated deliverable produced by this focus activity include:

- Documented conflicts / gaps / overlaps / acceptances
- Revisions to OMG DTC (and possibly PTC) specifications
- Revisions to healthcare domain specifications

6.4. Schedule

This is an ongoing activity; this table attempts to describe some of the current activities.

Planned Start	Activity	Planned Completion
July, 1997	Issue CORBAmed Security Working Group whitepaper	September, 1997
September, 1997	Issue 2nd CORBAmed Security Working group whitepaper.	December, 1997
March, 1998	Issue whitepaper on proposed Workflow Service	June, 1998
	Issue whitepaper on CBO and healthcare	June, 1998

Appendix A: Healthcare DTF Three-Year Plan

This appendix summarizes the Healthcare Domain Task Force activity for the next three years.

1997	1998	1999
Create the first draft of a roadmap.	Issue the first CORBAmed Roadmap . Expand in terms of Domain Architecture description.	
	Adopt RFP #1 – Patient Identification Service	
	Adopt RFP #2 – Lexicon Query Service.	
Issue RFP #3 – Pharmacy Interaction Facility	Adopt RFP #3 – Pharmacy Interaction Facility	
Issue RFP #4 – Clinical Observation Service	Adopt RFP #4 – Clinical Observation Service	
	Issue RFP #5 – Healthcare Security Framework	Adopt RFP # 5 – Healthcare Security Framework
Issue RFI #2 - Decision Support System	Issue RFP #6-	
	Issue RFP #7 – Clinical Encounter Management	
	Issue RFP #8 – Clinical Order Management	
	Issue Roadmap Paper	

TABLE 8. CORBAMED THREE-YEAR PLAN

Appendix B: Acronyms and Abbreviations

AB	Architecture Board
BoD	Board of Directors
BODTF	Business Object Domain Task Force
DCM	Domain Contributing Member
DTC	Domain Technical Committee
DTF	Domain Task Force
IDL	Interface Definition Language
ISO	International Organization for Standardization
LOI	Letter of Intent
PTC	Platform Technical Committee
RFC	Request for Comment
RFI	Request for Information
RFP	Request for Proposal
SIG	Special Interest Group

Appendix C: References

[ISO 94] International Organization for Standardization. ISO 10301-11:1994.

[ISO 96] International Organization for Standardization. *"Interface Definition Language (IDL) Binding to the Standard Data Access Interface (SDAI) Specification"*. ISO 10303-26. 1996.

[OMG 94] Object Management Group. *Policies and Procedures of the OMG Technical Committee,* Document Number 1994/94-04-14. Framingham, MA: Object Management Group, 1994.

[OMG 95] Object Management Group. *Object Management Architecture Guide, Version 3.0.* Framingham, MA: Object Management Group, 1995.

[OMG CF 95] Object Management Group. *Common Facilities Roadmap, Revision 3.2.* Document Number 1995/95-01-32. Framingham, MA: Object Management Group, 1995.