



# The house Corba built

The OMG's Corba hasn't been talked about much recently, outside of mission-critical developments in key vertical markets. But now, explains **Paul May**, the organisation is trying to reposition itself at the centre of interoperability with the Model Driven Architecture

**T**HE WORD FROM VENDORS TODAY is that all the action in the middle tier of software development is focused on technologies such as EJB (Enterprise Java Beans) and COM+. We're hearing a lot less about Corba, the Common Object Request Broker Architecture that arrived in the early 1990s to enable component interoperability.

Corba is a technology that enables interoperability among disparate systems running on heterogeneous platforms. The first-generation standards appeared as middleware was starting to absorb large chunks of the attention and effort of development organisations. It's taken up residence in high-availability, high-performance systems in mission-critical functions, in domains such as telecoms and finance.

Corba's reduced visibility doesn't mean, though, that the OMG has abandoned the



mainstream for high-end applications. The organisation has introduced a newly rationalised context called Model Driven Architecture (MDA). This initiative is designed to provide a framework for integrating new applications with older, legacy software, using key modelling standards including the Unified Modelling Language (UML), the Meta Object Facility (MOF) and the Common Warehouse Meta-model (CWM) at its core. These modelling standards will be middleware-independent, meaning that they can hook into, say, Corba, XML or Java.

With this "one size fits all" approach, the OMG is promoting MDA as an all-embracing standards framework for application development, relying on UML's authority as much as its containment of Corba. The move is a shrewd one, opening up new vistas for the OMG; MDA provides an ongoing context for Corba, while designating it as just one of many potential infrastructure layers. In this way, it can keep itself involved in new developments, such as the burgeoning Web services market.

The OMG has travelled a long, strange path from Corba to MDA. Back then, the spread of networked PCs in organisations that relied on mainframe applications for their core business processes led to increased demand for client-server applications to exploit corporate data better throughout the business. With a number of incompatible middleware products competing for this lucrative space, organisations quickly found their choices were restricting their future options. Their chosen middleware product might be optimal for making legacy systems function with new client applications, but who could guarantee the mix of platforms within the organisation would remain fixed for all time?

Those who doubted such fundamental disruptions, especially on the legacy side of the equation, were often brutally surprised when corporate mergers brought new challenges into the family, as business managers demanded collaboration between systems that were never designed to meet. As systems integration rose on the agendas of all established organisations, Corba consolidated its position as the first widely supported architecture for enabling interoperability.

In the subsequent decade, the systems development landscape has become even more complex. Several waves of new technology have disrupted management plans and challenged individual developers to master new skills. Each technology creates headaches for decision-makers, from corporate IT strategists to systems designers. What impact will a new technology have on the organisation's plans? How quickly

should we rush to embrace it? And, most importantly, what impact will a new technology have on our ability to integrate legacy systems and commission future systems? The middleware issue has implications all the way up the line.

## MDA

While the OMG's original impact on the software industry derived from the Corba standard's role in the middle tier, with the MDA launch, the body is promoting itself as a broader standards-setting group for the systems development community. MDA is a forward and backward-looking systems development and integration strategy, designed to reduce developers' dependency on any one product type, vendor or platform which supports XML-based languages. One example is XMI (XML Metadata Interchange), an XML standard that enables analysts and designers to exchange modelling information.

These domain-specific XML standards are appearing widely. Developers throughout the industry are embracing XML as an elegant, efficient base technology for expressing semantics of all kinds, from engineering specifications to online monetary transactions. XMI was inspired by practitioners and UML can be seen as the result of practitioner pressure for a standard modelling approach in the face of previous industry confusion. The confusion was all the more frustrating when the analysis and design gurus at the heart of the modelling movement tended to disagree with each other more than they agreed.

Progress in systems development is, at one level, a product of the tension between innovation and consolidation. New technologies improve the efficiency of existing processes and increase an organisation's options. A technology as simple as HTML has allowed organisations to standardise on a user interface technology, while providing a user-friendly channel to customers and thereby enabling customer-driven systems. Feature variations within the user interface layer undermine HTML's status as a coherent standard, and at the same time drive efforts to produce subsequent standards that rationalise and embrace the extensions. One of MDA's aims is to provide a process and home for consolidating emerging technologies through standardisation.

At first sight, MDA looks like a heavyweight, industry-sanctioned initiative, but one important cultural development of the past decade is the open source movement and its recognition by mainstream technology players as a key influence on system development trends. What role can an

industry-led, standards-setting consortium play in this more developer-empowered environment? The OMG points out that, far from being incompatible with the open source movement, the standards body is complementary to the movement and intimately involved at a practical level.

## Open source

In the first instance, there are a number of open source object broker projects, including Mico (Mico is Corba). OMG is also working with vendors on an open source Corba testing initiative called Cost, while Gnome, the open source desktop environment for Linux, incorporates a Corba ORB. Open source developers tend to welcome open specifications such as Corba because they provide stable targets. Many initiatives are designed to replace existing branded products, so published specifications provide developers with reassurance that their systems will perform as required in the eventual deployment environment.

Although Corba is the OMG's most widely acknowledged standard, the group's offering has broadened considerably over the last few years on the road to MDA, in particular with its custodianship of UML. The OMG has observed huge growth in UML use in the organisations it deals with. The OMG's vice president and technical director, Andrew Watson, estimates that about 70% of corporate software development organisations now have at least one UML practitioner on board. The fragmented methodology landscape of the early 1990s is being gradually replaced by a world in which UML is the standard for modelling – and modelling is becoming standard practice in development teams.

The spread of modelling, and the associated growth of UML as a modelling approach, is also facilitating the emergence of standard models for vertical industries. MDA provides a home for domain-specific models such as the PDM (Product Data Management enablers) specification. PDM is a generic specification for an entire class of manufacturing and engineering systems, expressed as Corba objects. It could be used by a designer of a product configurator, for example. Domain models such as PDM provide a useful link between descriptive methods such as design patterns and generative technologies like Corba.

Are Corba and MDA only for large organisations, which have the sophistication and resources to manage and deploy architected solutions with complete confidence? Bigger companies have bigger problems to solve; the higher level of complexity engendered in large enterprises leads necessarily to



standards, models and documented processes, as well as issues of reuse and domain compatibility. However, most technologies start life in large organisations and cascade to the wider market in time.

## Adding Corba to the value chain

The growth of ebusiness, and in particular collaborative business-to-business applications such as total supply chain management, is generating big-company complexity for smaller players. As organisations increase their external systems interactions, they become exposed to a wider range of platforms and a diversity of overlying technologies. Corba is a technology designed to solve large, complex problems. At a time when smaller, discrete problems are joining hands to generate more complex systems challenges, it has a vital role to play in new types of business that exploit systems connectivity to construct new value chains. Corba is already notably successful in real-time systems such as telecoms, where predictable and reliable service that can be audited is vital. The spread of ebusiness is beginning to pull many other types of business into an effective real-time operational stance, opening the way for Corba in new classes of business.

At the enterprise systems level, the growing role for Corba across the full range of systems developments is being signalled, surprisingly, by a steady reduction in its individual profile. With Corba object brokers being a natural feature of products such as Lotus Domino, Oracle 8i and Netware 5, Corba is melting into the background as a taken-for-granted function of the contemporary systems environment. We hear less about it today than we did 10 years ago because its ubiquity makes it less interesting as a marketing feature.

Corba is indicated as one of an unlimited number of candidate infrastructure technologies in MDA, alongside emerging technologies such as J2EE (Java 2 Enterprise Edition) and .Net, Microsoft's Internet-based interoperability initiative. From the OMG's point of view, alternative infrastructure options can only be a good thing. While Corba has proved itself in a wide range of applications over a decade, and has particular dominance in real-time and embedded systems, new technologies tend to add richness to the systems development field rather than entirely replace existing ones.

For larger organisations focusing on long-term development, integration and migration programmes, the emergence of new technologies in any part of the MDA scheme may represent complementary routes to

their goals without threatening their overall direction. MDA creates a context in which enterprise planners can judge the contribution of individual technologies, creating a counterbalance to the partisan claims of vendors. As an over-arching view of development technologies, it provides a place where a buyer's perspective can be added to each "next big thing" delivered from the vendor camp.

The appearance of MDA after a period of accelerated change in the technology landscape, and an explosion in the number of complex systems commissioned by organisations of all types, inevitably create echoes of the Case (Computer Aided Software Engineering) movement of the late 1980s. Development organisations, drowning in system requirements, looked to combine advances in analysis and design methodologies with greater desktop processing capability, in an attempt to automate the software production business. Amid the usual outlandish claims, many Case products offered measurable benefits for development teams, especially in the standardisation and versioning of system models. Most attention was drawn to Case's claims to generate usable production codes

from design documentation, and subsequent disappointment that no Case tool could perform the whole job.

The OMG acknowledges some parallel between MDA and the Case movement, in that both concepts are inspired by similar goals of productive, managed, architecture-led software development. MDA focuses less on tool support and more on its component disciplines and practices. One key difference between Case and MDA is the acceptance of a mature, mainstream modelling standard in UML. Another important difference is that the dominance of object-oriented technologies makes for more confident generation of code from models.

While Corba continues its largely unsung role, enabling collaboration among components at the systems level, its new MDA home gives development professionals hope for strengthened interoperability across technologies, business domains and corporate boundaries. But, more than that, it gives the OMG a shot at retaining its visibility in the face of public relations luminaries such as Soap, COM and .Net. The motto seems to be, if you can't beat them, embrace them. ■

## Eurocontrol: interoperability in the skies

**Organisations continue to demonstrate the practical and strategic longevity of Corba and its neighbouring MDA standards. Corba and UML have proved important tools for enabling integration and collaboration among Eurocontrol's Flow Management systems. Brussels-based Eurocontrol isn't a statutory European body, but it has a key regulatory role in ensuring the safety and efficiency of the Continent's skies.**

Eurocontrol's Flow Management systems are responsible for collecting and disseminating flight plans covering the entire European airspace. The systems receive flight plans, validate them and distribute them to the relevant national organisations. The process involves complex mapping and addresses resolution functions to ensure the right information is delivered to the right teams in a timely fashion.

In addition to this information centre role, Flow Management systems also monitor airspace demand and capacity. Where demand for airspace in a particular sector outstrips the available supply, the systems calculate alternative routes to bring the sector back into balance. Eurocontrol can propose new routes or delays, which are then implemented by the relevant national bodies.

The project settled on BEAs Broker product early on, leveraging early adopter experience of Corba in Eurocontrol's R&D department, while aligning M3 (as the ORB was known at that time) with Tuxedo on the mainframe. Existing Eurocontrol systems written in ADA are using ADA object brokers provided by the GNU community. This is proof that, via the Corba standard, the open source movement can plug the gap between enterprise products such as BEAs with domain-specialised technologies.

The first generation of systems, built between 1992 and 1995, met their original goals and progressed through normal maintenance and upgrade paths. At this time, they were conceived as separate systems that could communicate with each other. In this era, each system gave excellent quality of service, interoperability wasn't the organisation's primary concern, and the mainframe platform was the most significant factor in technical architecture decisions.

The following years provided an opportunity to phase out the mainframe, saving considerably on systems support costs. At the same time, the Internet arrived as a credible platform for systems delivery, offering a new path for communications with users. Flow Management functions could now be delivered through the web interface anywhere inside the organisation or beyond. The new requirements that began to emerge convinced the project team that a more flexible architecture was necessary to ensure the future value of the systems. Corba has allowed the organisation to meet new needs as they arise, and still represents the project's best choice for infrastructure technology, despite continual evaluation of newly emerging alternatives such as EJB.

The emergence of MDA validates Eurocontrol's experience, not just with Corba but with good software engineering practice. Eurocontrol's Willem Janssens stresses that the Flow Management project is as model-centric as possible. The team uses UML for model development, with strict document control and code generation where practical. All development on the server side is model-driven, while Java client functionality has yet to show any clear benefit from UML.