Technology Audit

Integration and BPM

Sun

Sun Java™ Composite Application Platform Suite

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Abstract

Sun Java Composite Application Platform Suite (CAPS) is a fully-featured suite that addresses the development and deployment of integration processes and composite applications. Many organisations today are facing the challenge of needing to integrate existing applications whilst wanting to consider how these may fit into a future architecture that is more flexible. Java CAPS supports the integration of applications, business processes, and external entities within the suite, and also provides runtime deployment in a high-availability environment. The available per-employee licensing option is likely to make the solution particularly attractive to the small and medium-sized organisation that may have found the cost of high-specification integration solutions too great in the past. Interestingly, even though Sun is a supporter of the Java Business Integration specification, the suite is not as yet, compliant with it (although there are very few offerings to date that are) and Sun has made a reference implementation of JBI available to the open source community. Organisations that require a SOA-based solution that can address disparate integration styles are likely to benefit most from this suite, and a number of case studies are available that demonstrate its use.

KEY FINDINGS

Key: ✔ Product Strength ✘ Product Weakness *i* Point of Information

✔	Supports a wide range of integration styles including B2B and Single Entity View.	✔	A bulk data transfer / ETL capability is included.
✔	Supports high-performance integration.	✔	Novel licensing approach will be particularly beneficial to small-to-medium sized organisations.
i	Can be deployed on a number of application servers as well as the included one.	✘	Does not currently support the Java Business Integration standard.

LOOK AHEAD

The future roadmap for the product is already clearly defined and will address interoperability issues and enhanced SOA governance.

▶ **Analysis without compromise**

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▶ FUNCTIONALITY

Product Analysis

Integration is still high on the CIO agenda, but increasingly organisations are looking to reuse existing applications in new and imaginative ways, without the overhead of re-developing them. With phrases such as Service Oriented Architecture (SOA), and concepts such as the Enterprise Service Bus (ESB) and Composite Applications, there is much hyperbole and confusion in the market about how best to achieve the combined goals of business agility, integration between applications, and reuse. One way to achieve this is via a suite that has been designed specifically to help with these joint problems.

Sun acquired SeeBeyond in 2005 following a joint marketing agreement the previous year, and has taken the former SeeBeyond Integrated Composite Application Network (ICAN) Suite, enhancing and extending it to become the Java Composite Application Platform Suite (Java CAPS) version 5.1. This is a comprehensive product suite that contains all of the elements needed to develop, manage, and deploy composite applications and complex integration projects.

The provision of a fully-featured suite adds value in that it unifies development and management of integrated and composite applications, with all relevant artefacts stored within a single, central repository – thereby maximising opportunities for reuse. This approach can deliver excellent Total Cost of Ownership (TCO) – a recent Butler Group White Paper on composite application development identified that customers achieved benefits across all phases of the application lifecycle – design, development, testing and deployment, and subsequent maintenance. The research concluded that an integrated suite offers a potential 50% reduction in the initial project development phase (design to deploy) compared to a traditional development approach, and up to a 58% saving in TCO over a three-year period, when ongoing maintenance costs are taken into account. Applying average developer cost rates to this example would give a total cost saving over three years of €180,000 (approximately US$223,000) on a single project.

What differentiates Sun Java CAPS from some competing integration solutions is the focus on a unified development and management environment with a single Enterprise Designer tool (complete with drag-and-drop GUI) to support the implementation of all styles of integration. All the artefacts – whether for presentation, integration, or business services – are stored in a single central repository, maximising reuse. This supports impact analysis across all components, ensuring that if a change to one is required it is obvious what it may affect. All artefacts contain standards-compliant code, such as Java EE, XML, and Web Service derivatives (XSLT, BPEL, and WS-Security). In addition, there is a single runtime monitoring component, the Enterprise Manager, which supports all deployed components – which can run on a number of different Java EE 1.4 application servers in addition to the one included in the suite.

Another key strength is the ability for the tool to generate a single entity view – for example, of an NHS patient, via the eView tool. This aspect of the suite is already in widespread use; there are over 50 master patient indexes in use worldwide. Support for B2B integration also differentiates this product.

A final differentiator is that the suite truly supports SOA, in that runtime access to all services is enabled via a UDDI compliant registry with WSDL definitions at the core, but at run time, the suite supports the concept of logical Web services where components residing on the same physical box can communicate directly with each other without the overhead of the SOAP stack – this can make big improvements to performance.

At present the solution does not support the Java Business Integration specification for interoperability, although this is probably still at an early stage in its development. Sun has, however, released a reference JBI implementation called OpenESB into the open source community. This technology will form the foundation of the JBI support planned in Java CAPS next year.

Sun has introduced a new service offering for Java CAPS (for an additional fee) called the Service Governance Framework to address common SOA governance requirements such as auditing, exception handling, and Quality of Service aspects. It provides a flexible and fully customisable framework for governance, monitoring, and life cycle management of services along with professional services and best practice guidance.

Overall, Butler Group believes that Sun's Java CAPS suite provides a valuable solution for organisations that wish to integrate a number of disparate applications, with the benefit of tools that support a comprehensive range of SOA and integration styles.

Product Operation

The Sun Java CAPS suite supports a wide range of integration styles, with different elements being used for various purposes. For example, for B2B integration, eXchange Integrator can be used to provide a consolidated B2B Gateway while eXpressway Integrator can be used to build a no-cost on-ramp for smaller trading partners; alternatively where comprehensive BPM is needed then the eInsight Process Manager would be the tool to select. The advantage that the suite brings is that the elements are all integrated, so that SOA and integration projects that need different styles at different times, are fully supported.

The elements of the suite have two main aspects – those used for developing integration flows and composite applications and those that support the runtime. The overall architecture of the suite is illustrated below:
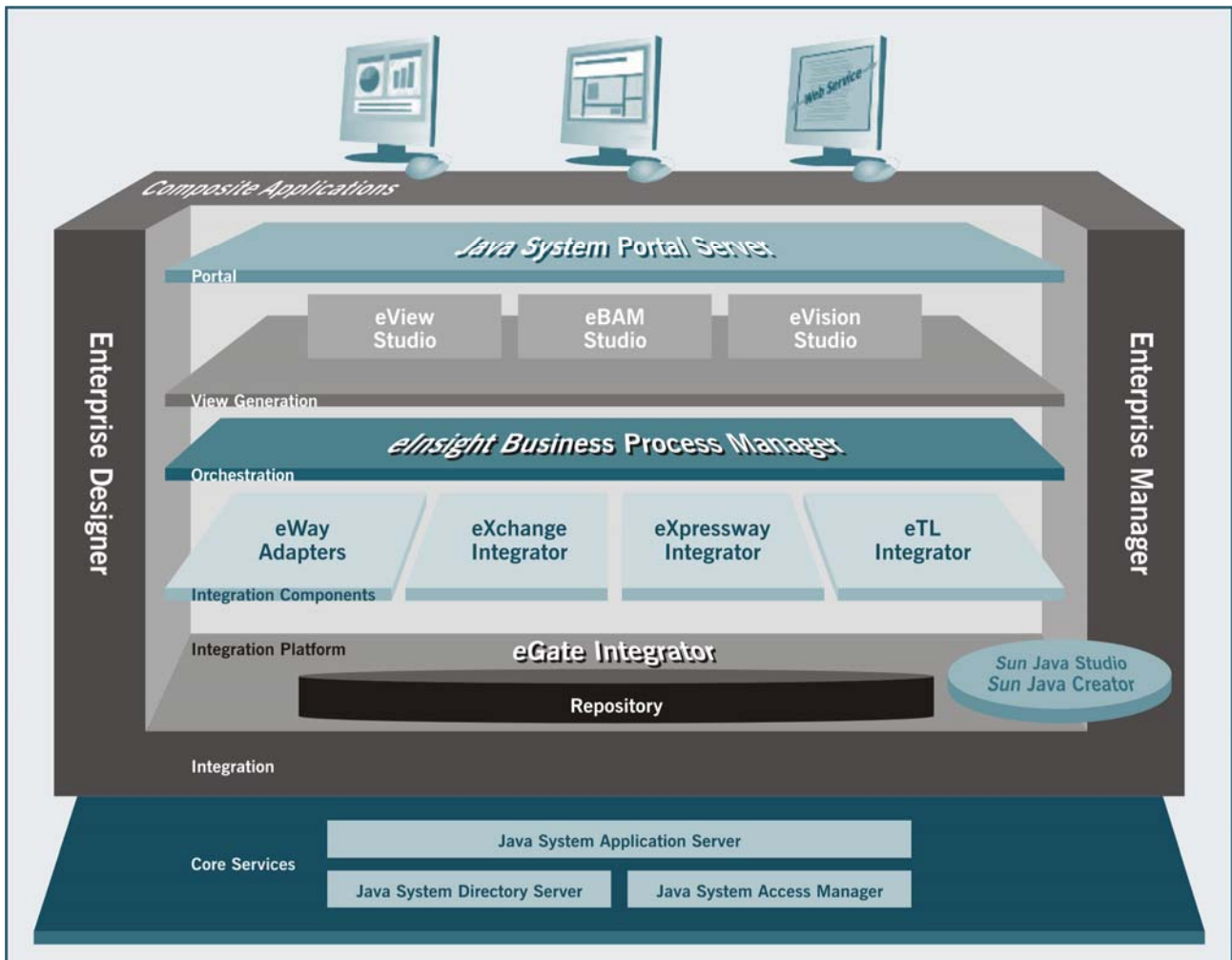

Figure 1 – Sun Java CAPS Suite Architecture

The Enterprise Designer (a part of the eGate Integrator, see below) provides a common integrated development environment across the entire suite, with a drag-and-drop GUI. Enterprise Designer allows business and technical users to share a consistent view allowing collaborations (Sun's terminology for integrations) to be designed using both a graphical editor for model-driven development, and a number of different editors (Java, XSLT, and BPEL) for code-centric development. It is the use of this common interface to the whole Java CAPS that enables an intuitive approach to designing end-to-end processes, across all levels, from connectivity and orchestration, right through to presentation. Much of the work is visual in nature, with components being dragged and dropped onto a working canvas, which minimises the coding required, and enables existing developers to be quickly productive without extensive retraining. The tool supports the concept of round tripping where changes made to code are reflected in the graphical display, and vice-versa; while many vendors offer a graphical environment that can generate code (in one direction only), Java CAPS permits completely bi-directional synchronisation between the graphical environment and the code-oriented environment. If necessary, code can be exported and modified using a third-party development tool and re-imported into Java CAPS, with the graphical representation again changing.

The principle elements of the suite are:-

- Sun SeeBeyond eGate Integrator – provides Application-to-Application (A2A) integration. This is the foundation of the suite, and is based on a certified Java EE 1.4 integration server. It offers robust transformation and guaranteed exactly once delivery; essential in many mission-critical environments. It has a single, open repository that stores all metadata for the system, including processes, objects, applications, and transformations, and exposes Java Management eXtensions (JMX) for management functionality. All integration points are exposed as Web services, with transformations available in a wide range of standards including Java, XSLT, BPEL, XML, and WSDL.

- Sun SeeBeyond eInsight Business Process Manager – Used for orchestrating business processes, which uses BPEL and represents the process definitions in Business Process Modelling Notation (BPMN). Each box within a process diagram can contain any integration task defined in the repository whether that be A2A, B2B, or human workflow. When a process is updated, current instances continue on the old version until they have finished, whilst any new instance will be the new process. It is not possible to change a process on-the-fly. WSDL is generated automatically for all components.

- Sun SeeBeyond eXchange Integrator – automates B2B interactions. It provides partner management and support for the common B2B protocols and schemas needed for a consolidated B2B gateway. It has a graphical protocol builder for defining new protocols and for modifying existing ones.

- Sun SeeBeyond eXpressway Integrator – a simplified B2B integration tool that allows an organisation's smaller trading partners (without their own B2B infrastructure) to participate in an integrated process. It also supports on-ramps and e-markets.

- Sun SeeBeyond eTL Integrator – provides Extract, Transform, and Load (ETL) bulk data integration. It is optimised for high-volume batch operations, and includes a graphical editing tool.

- Sun SeeBeyond eVision Studio – allows composite views to be generated, and is used to create user interfaces for delivering composite applications across multiple channels. It generates JSPs, and enables extensible page layouts and page flows to be built without coding.

- Sun SeeBeyond eBAM Studio – Business Activity Monitoring (BAM) provision, combining the use of business metrics with business process flows. It includes an editor for defining Key Performance Indicators (KPIs), generating alerts according to user-defined criteria, and presenting these through a dashboard format.

- Sun SeeBeyond eView Studio – enables single views of business entities (such as customer, client) to be created, which is often not clearly defined across enterprise systems – there are often multiple occurrences and it can be valuable to have a single, master view. Wizard-driven, and using fuzzy logic, eView creates a cross-index for entities such as individuals, businesses, or products, that are referenced across multiple application and data silos.

- Sun SeeBeyond eWay Intelligent Adaptors – over 80 adapters are available to provide connectivity to packaged applications, including Java Connector Architecture (JCA) compatibility.

The following components support the runtime aspects of integration:

- Java System Portal Server – a high-end portal to host composite applications. It provides identity-based content delivery, Wikis, community surveys and polls, and secure remote access and mobile access. In addition, it includes content management capability, inter-portlet communication, and has a full text search engine with federated search and taxonomy capabilities.

- Java System Application Server Enterprise Edition – a robust and fault-tolerant platform on which integration and other composite applications can be deployed.

- Java System Web Server – provides HTTP and proxy server capabilities for Web and application server environments.

- Java System Directory Server – a LDAP directory in which security and other parameter information is registered.

- Java System Access Manager – a single sign-on security solution that supports the identity propagation elements in composite applications. It can also provide username/token and (SAML) profile support for the emerging WS–Security standard.

In addition the suite contains development tools – the Java Studio Enterprise (an Integrated Development Environment (IDE) based on the NetBeans product) and Java Studio Creator – which are available to develop new business services.

Java CAPS has been designed to be fully scalable, from supporting the relatively small deployments found in entities such as hospitals, up to the very large scale projects in terms of number of transaction and data volume (such as those used in financial services, the energy industry, and retail).

From a transactional perspective, Java CAPS provides full XA support inside business activities and even across groups of related business activities in a process.

At the business process layer, eInsight can be configured in a cluster environment such that processing can be load balanced across a number of servers, and it is possible to configure servers such that they can failover in an active-active or active-passive mode.

At the messaging layer Java CAPS includes a JMS Grid component which provides for clustering of a number of JMS servers for either high performance or active-active failover. Clustering can be across heterogeneous servers and across wide area networks (for example, for a site-to-site network to support disaster recovery scenarios).

The suite is available in a number of different packages; as well as the entire suite:-

Sun Java ESB Suite – includes the majority of the integration components except eTL Integrator, and eView Studio, but excludes the B2B elements and the Java Web Server/Proxy Server.

Sun Java B2B Suite – includes most integration elements except eBAM Studio, eTL Integrator and eView Studio, and it also does not include the Java Web Server/Proxy Server.

In addition, individual products can be licensed separately if required.

Product Emphasis

The overall emphasis of Java CAPS is that it supports the various integration styles that organisations require, thereby integrating the different methods within a common toolset. This is likely to prove valuable for organisations that are looking to a SOA approach; particularly since Sun also provides substantial support for this in addition to having a number of customer success stories in this area.

▶ DEPLOYMENT

As might be expected for a solution designed for integration of heterogeneous systems, all deployed components can run on a number of different Java EE 1.4 application servers. In addition to the Sun Java Application Server which comes as part of the suite, Java CAPS components are certified to run on IBM, BEA, and JBOSS application servers.

The solution can be deployed across a wide range of operating systems. In particular, it supports:

- Microsoft Windows 2000 SP3 and SP4, Windows XP SP1a and SP2, and Windows Server 2003 SP1.
- HP Tru64 V5.1A and V5.1B, with required patches.
- HP-UX 11.0 (on PA-RISC), v11i (11.11) (on PA-RISC), and 11i v2.0 (11.23) (on Itanium), with required patches and parameter changes. For HP-UX, CAPS 5.1.0 requires a 9000/8xx machine running in 64-bit mode.
- IBM AIX 5L versions 5.2 and 5.3, with required maintenance level patches. On AIX, CAPS 5.1.0 can run on either a 64-bit kernel or a 32-bit kernel with the 64-bit extension enabled.
- Red Hat Enterprise Linux AS 2.1 (on Intel x86) and AS 3 (on AMD Opteron and Intel x86).
- Sun Solaris 8 (on SPARC), 9 (on SPARC), and 10 (on SPARC and AMD Opteron), with required patches; the Sun SeeBeyond Integration Server can operate in 64-bit mode on Sun Solaris 9 or 10, but only if the '-d64' argument is set. Note that operation in 64-bit mode on Solaris 8 is not supported.

Japanese and Korean-specific versions of most of these operating systems are also supported.

The Enterprise Designer runs on Windows machines only, while the Enterprise Manager can be accessed from any standard Web browser. The suite requires an existing database instance (which is not provided), which is usually pre-existing for the majority of customers.

Management of the solution will require skills including systems administration, business analysis, developers, and some domain expertise in the existing packaged and legacy applications to be integrated. From a systems administration perspective, it is usually possible to train existing staff in the management and operation of Java CAPS, with minimal additional workload and overhead. Business Analysts will be required to analyse existing orchestrations, business processes, and workflows to identify appropriate process optimisation opportunities, and then to develop new flows accordingly. This may require additional overhead and resources over time depending on the needs of the business; a more dynamic business will require a greater investment in these resources than a stable business environment. The range of roles employed in a typical project includes SOA Architects, Business Analysts, Java Developers, and Systems Administrators.

Small projects can usually be implemented with the minimum of technical expertise; typically a Java CAPS developer and a systems administrator are all that is required. Medium- to large- scale deployments are usually managed by a combination of Java CAPS developers, the client's own staff, and often systems integrator staff. Sun recommends a modular approach to implementing Java CAPS.

The company states that most projects are implemented within a three to six month time frame, but pilot and limited-scope implementations can take as little as one elapsed month. Larger and more complex projects can continue for a year or more.

Naturally some training will be required for most people involved in an integration project, and an understanding of how business services can best be re-used will be needed. The company has a specific education division; Sun Education Services, which provides a comprehensive curriculum of instructor-led training. All classes are regularly scheduled in Sun training centres in North America, France, Germany, the UK, South Africa, and Australia, and classes are restricted to 10. Java CAPS resources will require some or all of the following classes, depending upon their role:-

- JCAPS 500 – JCAPS Solutions course (5 days), provides developers with foundation JCAPS skills.

- JCAPS 570 – JCAPS Development course (3 days), provides developers with skills in Business Process Development and Web Service Orchestration.

- JCAPS 580 – JCAPS Advanced Development course (2 days), provides lead developers with the skills necessary to create more complex JCAPS solutions.

- JCAPS 550 – JCAPS Administration course (3 days), provides administrators with the skills necessary to maintain, deploy, monitor, and configure JCAPS solutions.

- JCAPS 509 – JCAPS Overview course (1 day), provides a comprehensive overview of JCAPS to anyone working on a JCAPS project.

Integration with legacy and packaged applications is provided via the eWay adapters, which range from Application Adaptors that understand the API of the application through to Communications Adaptors that talk basic message protocols such as TCP/IP to facilitate bi-directional and non-invasive communication to legacy applications. Over 80 intelligent adaptors are provided, and there is also an eWay developer kit, which allows users to build their own eWays where needed. In addition any third-party adaptor that is based on JCA 1.0 or 1.5 can be used.

The company provides full 24x7 technical support, with multi-lingual support centres in the US, UK, Australia, and Japan allowing a 'follow-the-sun' support method. Third-party translation services are available if needed. Support is available via telephone, e-mail, or via the company's Web site, and all support requests are logged and tracked.

Sun Customer Support offers customers three Support Offerings; standard, premium, and Enterprise, with costs ranging from 18% to 23% of the original licence fee or are included as part of a subscription pricing agreement (see the Product Strategy section for a more detailed discussion of licensing). Standard support covers Web, e-mail, and phone support Monday to Friday, for two contacts; while Enterprise provides full 24x7 Web, e-mail, and telephone support, an assigned customer advocate, go live support, and priority bug fixes.

Implementing Java CAPS is unlikely to force any change on business processes, but moving to a service-oriented approach to applications is likely to have an impact on both IT and business users, since it does require an understanding and acceptance of reuse. As such, project risks are comparable to other business projects – business sponsorship and understanding will be required to minimise risk.

▶ PRODUCT STRATEGY

Sun's acquisition of SeeBeyond added a strong integration perspective to its existing application server business arm, and has allowed it to now offer a comprehensive suite that supports both the development and deployment of composite applications. In spite of Sun's Java focus, this suite supports a range of integration styles and in particular offers strong support for integrating older architectural styles, which helps it stand out from competing integration solutions.

The Sun Java CAPS product suite is horizontal in nature and is therefore relevant for all industries, although the company does have existing clusters of customers in verticals such as healthcare, retail, or financial services. It is targeted at a range of organisations from mid-size companies to the largest multi-national organisations.

Sun sells the product through its own direct sales channel as well as through its partner network.

The company maintains partnerships with a number of key Systems Integrators including Accenture, CapGemini, LogicaCMG, CSC, FujitsuSiemens, Capita, Atos, TietoEnator, Engineering, and Enabler.

Sun has recently altered the way that it licences its software to customers, with a view to increasing usage of its products without increasing the cost of use. While the individual product components are still available on traditional perpetual licensing models, Sun now offers a unique subscription model of US$100 per employee per year for unlimited deployment of Java CAPS. Two subsets of Java CAPS are also available to address two common methods of use, A2A and B2B, and are priced at US$50 per employee per year. These pricing structures make the solution particularly appealing to the smaller organisation, and the subscription price also covers new product upgrades and Standard support.

The average deal value for the former ICAN suite was approximately $400,000. Under the new subscription model, the deal value will depend on the number of employees in an organisation.

Sun plans to release updates to the product suite annually, eventually synchronising its releases with the overall Java Enterprise System. The company's recently announced development roadmap shows release v5.1.1 late summer 2006, v5.2 in the first half of 2007, and v6.0 during 2008.

The next main release is likely to include integration with the company's Identify Management Suite, and support for BPEL 2.0. It is also planned to support the JBI specification for interoperability, although full native JBI architecture is not planned until the 2008 release of version 6.0, which is also planned to address further SOA governance issues.

The integration market is mature yet evolving, with the recent emergence of the concept of the ESB competing with the more traditional EAI players. Sun's most obvious competitors with this offering are other SOA platform vendors such as Oracle, IBM, and BEA since these address the wider integration, development, and deployment concepts as well. Against these, Sun's licensing strategy is likely to be one of the major competitive differentiators, although its integrated solution set will also keep TCO down. By making the cost of acquisition of tools relatively low, uptake is likely to be greater in the long term, since an existing tool can then be relatively cheaply propagated through an organisation.

▶ COMPANY PROFILE

Sun Microsystems was incorporated in 1982 with just four employees, and underwent rapid growth, achieving annual revenues of US$1 billion in 1988, and becoming a Fortune 500 company in 1993. Co-founder Scott McNealy is now the company's chairman, having recently been succeeded as CEO by Jonathan Schwartz. Sun has undertaken ground-breaking technology development in fields such as UNIX systems, the Java language, and Internet enablement. In 2005 it acquired SeeBeyond, an established vendor of integration software.

The company's headquarters are in California, and it has offices in 48 countries. As of the third quarter of the current fiscal year, it had over 37,800 employees, of whom about 2,000 are based in the UK. The company is publicly owned and trades on the NASDAQ stock exchange under the symbol SUNW. Sun's R&D is carried out principally in the US, UK, Ireland, France, Germany, Japan, Norway, and India.

Approximately 2,200 customers use either Java CAPS or its predecessor, SeeBeyond ICAN Suite. Key clients include Harrods, which is using the suite to help provide a single view of the customer; Harrow Council, Carrefour Belgium, Schipol Group, and British Energy.

The company's financial year closes at the end of June, and figures for the last three years are shown below:-

	2005	2004	2003
Revenue (US$ million):	11,070	11,185	11,434
Change on previous year (%):	-1.03%	-2.18%	-8.50%
Total Net Income/(Loss) (US$ million):	(107)	(388)	(3,384)

▶ SUMMARY

Sun Java CAPS Suite is a powerful solution for both integration and composite application development. It provides strong support for reuse of existing applications where required, enabling them to continue to be used in a more modern way over time. The novel licensing policy is likely to make it particularly attractive to medium-sized organisations since the per-user fee allows projects to be more self-funding. The single development environment and the way that the toolset supports a wide range of different integration styles, will also make it valuable.

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