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Inside the Digital Commerce Engine™

The architecture and deployment of the Elastic Path Digital Commerce Engine

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Executive Summary

To properly evaluate any commerce software, it will be crucial for your executives, architects, and developers to truly understand its underlying technologies and their potential impact on your overall IT and customer experience ecosystems.

Designed and built for enterprise-grade ecommerce, the *Elastic Path Digital Commerce Engine*™ boasts a streamlined, modular architecture, with application components built on a foundation of the world's best open source libraries and projects. Its high performance and developer-friendly technology stack, coupled with an unwavering product focus on flexibility, agility, and monetization features for digital goods and content, have led the most innovative companies in the world to select Elastic Path as their digital commerce software of choice.

This document takes you inside the Digital Commerce Engine for a closer look:

- Out-of-the-box architecture
- Infrastructure requirements and compatibility
- Server application components and implementation technologies
- Core domain and service design
- Exclusive Digital PIM functionality
- Typical configuration and deployment topology

Major enterprise software initiatives will always be shadowed by substantial risk. But we believe this can be reduced through our uncompromising commitment to clarity around the technologies and processes that your team will have to work with every day—before, during and after the launch of your digital commerce project.

Introduction

To properly evaluate any commerce software, it will be crucial for your executives, architects, and developers to truly understand its underlying technologies and their potential impact on your overall IT and customer experience ecosystems. This knowledge will help to reduce the risk of deploying a new platform or framework, and ensure that your selection will result in the best possible fit with the technical, infrastructure, and operational needs of your enterprise.

This document is intended to provide your team with a basic introduction to the architecture, components, and deployment of the Elastic Path Digital Commerce Engine.

What is the Digital Commerce Engine?

The Digital Commerce Engine is flexible, enterprise-grade commerce software built with a modular architecture on a foundation of the world's best open source libraries and projects. In contrast to heavily proprietary, monolithic ecommerce platforms or SaaS solutions designed for traditional retail, it is far more suitable for integration into the complex technology ecosystems that are a hallmark of companies in the software, gaming, publishing, media, and information industries. With its agile, service-oriented design, functions and workflows can be tailored in almost any way to match the unique requirements of each individual enterprise, and our open source heritage and code transparency mean that any internal team or systems integrator with Java experience can deploy, integrate, and operate the Digital Commerce Engine with skill and confidence.

At a schematic level, the complete Digital Commerce Engine is comprised of several major components in three primary application areas:

Server applications

- Digital Commerce API™
- Storefront Server
- Connect Web Services
- Search Server
- Commerce Manager Server

Desktop application

- Commerce Manager Client

Data connectivity utilities

- Import-export Tool
- Data Synchronization Tool

Underpinning each of these components is the *Digital Commerce Engine Core*, a set of secure, high-performance Java APIs and libraries. It describes the application domain model, provides business logic encapsulation and data access services, and forms the basis of our exclusive *Digital PIM* functionality.

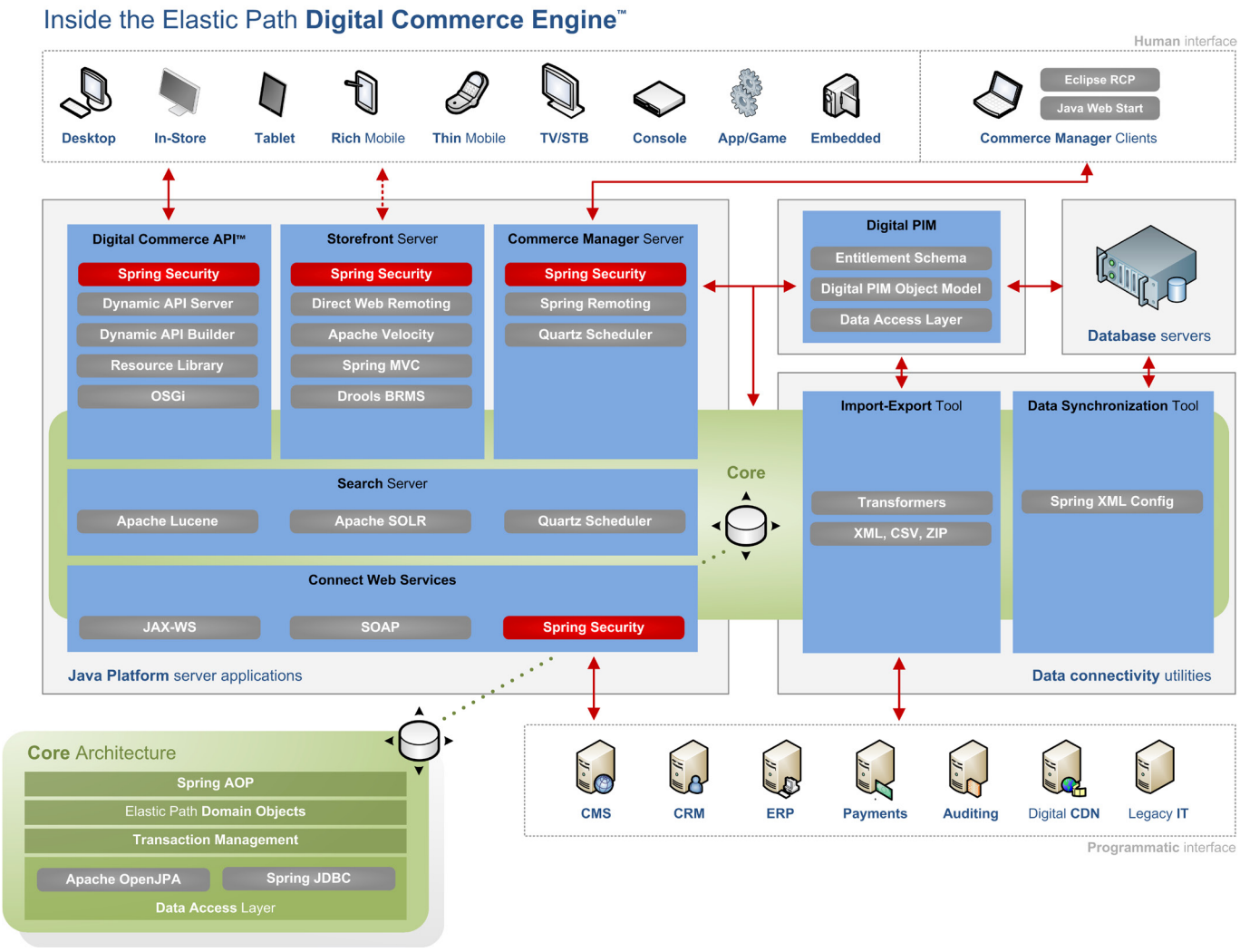


Diagram 1.0

Digital Commerce API™

Successful vendors of digital goods and content understand that today's connected consumers demand differentiated buying, ownership, and consumption experiences that extend far beyond the boundaries of a desktop computer and web browser. From smartphone and tablet apps to transactions embedded deeply within games, publications, televisions, social networks, and appliances, traditional online shopping is rapidly being eclipsed by the growing importance of new digital touchpoints that are frictionless, social, and everywhere.

To ensure that your enterprise is prepared to take maximum advantage of this rapidly expanding consumer ecosystem, our software features the Digital Commerce API, an agile and dynamic interface that uses navigable, self-exploratory *REST* and *JSON* to provide any connected system with secure, optimized access to the Digital Commerce Engine. Easy to deploy and scalable to match the capabilities of different target applications, the Digital Commerce API was designed from the ground up to give developers the best possible way to bring enterprise-grade commerce into any mobile, embedded, or CMS-driven customer experience with simple lightweight calls.

Storefront Server

This is a Java Platform web application designed to deliver digital shopping and consumption experiences to users of a conventional desktop web browser or other rich HTML client. Built on a foundation of proven open-source technologies, this component, like others in the Digital Commerce Engine, can easily be deployed and managed by any team with enterprise Java experience.

The Storefront Server uses the *Drools* business rule management system, *Apache Velocity* template processing engine, and *Direct Web Remoting (DWR)* to provide users with an engaging, data-driven customer experience. These are combined using the *Spring MVC* framework to isolate the presentation layer and protect the integrity of code, domain objects, and services within the Digital Commerce Engine Core. To ensure that all our software meets or exceeds the highest levels of protection and access control, each component is secured with *Spring Security*, the same framework used in some of the world's toughest environments, including financial institutions, government agencies, and military applications.

Connect Web Services

As a complement to the interaction-focused Digital Commerce API, our Connect Web Services layer provides a secure programmatic link between the Digital Commerce Engine and other parts of your enterprise IT ecosystem. Connections are made via a simple, powerful interface based on *SOAP*, *REST*, and *JAX-WS*, so any team with enterprise Java experience can rapidly construct matching services and adapters using basic industry-standard protocols to access and control every operation within the Digital Commerce Engine. Paired with our extensive documentation and source code transparency, no other commerce software comes close to providing this level of flexibility and interoperability with other systems of record.

Search Server

The Search Server is a Java Platform web application used by other parts of the Digital Commerce Engine to execute simple or advanced searches, and associated functions such as filtered navigation. In addition, it provides a significant performance boost to the platform by efficiently caching de-normalized data. This component is built on a foundation of *Apache Lucene* and *Apache SOLR*, the Java industry standards for enterprise search, and offers a wealth of advanced functionality including detailed text analysis, faceting, fuzzy matching, and complex data schema modeling.

Commerce Manager Server

This is the component responsible for executing administrative requests and managing communication with instances of the Commerce Manager Client. Deployed as a Java Platform web server application, it leverages the industry-standard *Spring* framework, and includes the use of *Spring Remoting* for client-server data interchange. Automated, periodic, and recurring functions within the Digital Commerce Engine are also executed by the Commerce Manager Server, in conjunction with the *Quartz* enterprise job scheduler.

Commerce Manager Client

The Commerce Manager Client is the administrative interface used to configure and operate the Digital Commerce Engine. It is a Java application built on the *Eclipse RCP* (Rich Client Platform) and can easily be installed by systems administrators using *Java Web Start* technology for simple, one-click deployment to the desktop. Comprehensive, secure access is based on individual roles and permissions, which can be configured to provide independent access to management features including:

- Digital PIM/Catalog
- Price List Management
- Marketing and Merchandising
- Entitlements
- Customer Service
- System Configuration
- Reporting and Analytics

Import-export Tool

The Import-export Tool is a supplementary Java Platform utility used to move large volumes of data between the Digital Commerce Engine and other parts of your enterprise IT ecosystem. Although most often used to import and export bulk third-party product information, it can also be configured via *XML* and *transformer plug-ins* as a general purpose ETL tool with a range of operational modes, used to migrate and manage other domain objects in the Digital Commerce Engine.

Data Synchronization Tool

The Data Synchronization Tool streamlines and automates the movement of domain objects from one instance of the Digital Commerce Engine to another, primarily during the promotion of Digital PIM updates from a staging to the production system. Large groups of modifications are grouped together efficiently for processing in Change Sets, and the transaction processes involved can be easily integrated with existing workflow, approval, and auditing mechanisms.

The Digital Commerce Engine Core

The heart of the application is the *Digital Commerce Engine Core*, a set of high performance Java APIs and libraries shared by the major server components and complementary utilities. Methodically divided into discrete *Domain*, *Service*, and *Data Access* layers, the Core provides demanding enterprises with the unprecedented flexibility to customize and differentiate their unique deployment of the Digital Commerce Engine using *Spring* configuration, without negatively impacting overall security, performance, or upgradeability.

Spring is a layered Java Platform application framework, and contributes to the power and flexibility of the software by providing key system services such as component configuration, object lifecycle management, and security. Its Inversion of Control container and dependency injection allow the implementation of any class to be customized without changing the code that invokes that class, creating a loose coupling between layers that imparts a tremendous level of simplicity, agility, and confidence to developers who need to differentiate their installation of the Digital Commerce Engine.

Core Layers

The *Domain Layer* defines the object model of the Digital Commerce Engine, and reflects the behavior and characteristics of real-world entities such as products, entitlements, categories, and prices. *OpenJPA*, a compliant implementation of the *Java Persistence API 1.0 Specification*, is used as a foundation for Object-relational mapping (ORM) between the domain objects and database schema. This technique allows developers to customize and extend the Domain Layer without having to concern themselves with specific database characteristics, and also allows the database software to be upgraded or changed entirely in the future, preventing version and vendor lock-in.

The *Service Layer* provides domain-level, integration-level, and system-level functions used by other components to complete their business operations. In keeping with the true service-oriented architecture of the Digital Commerce Engine, discrete Core functions in each domain area are provisioned separately and uncoupled for maximum flexibility.

The *Data Access Layer* supplies basic Create, Update and Delete (CRUD) functionality to the service layer, and handles communication between Elastic Path domain objects and the underlying database. Leveraging the *Spring* framework for declarative transaction management, the Digital Commerce Engine Core offers maximum performance by leveraging the full gamut of *OpenJPA* capabilities, including concurrency with optimistic locking and transaction integrity, named queries, and configurable cache management.

Digital PIM

The Digital Commerce Engine Core is also home to our exclusive *Digital PIM* functionality, which provides sellers of digital goods and content with advanced product management methods tailored for enterprises that monetize digital relationships. Unlike conventional ecommerce catalog systems built around the notion of static SKUs, the Digital PIM natively understands that today's products are alive and need to evolve or transform over time in order to be managed effectively.

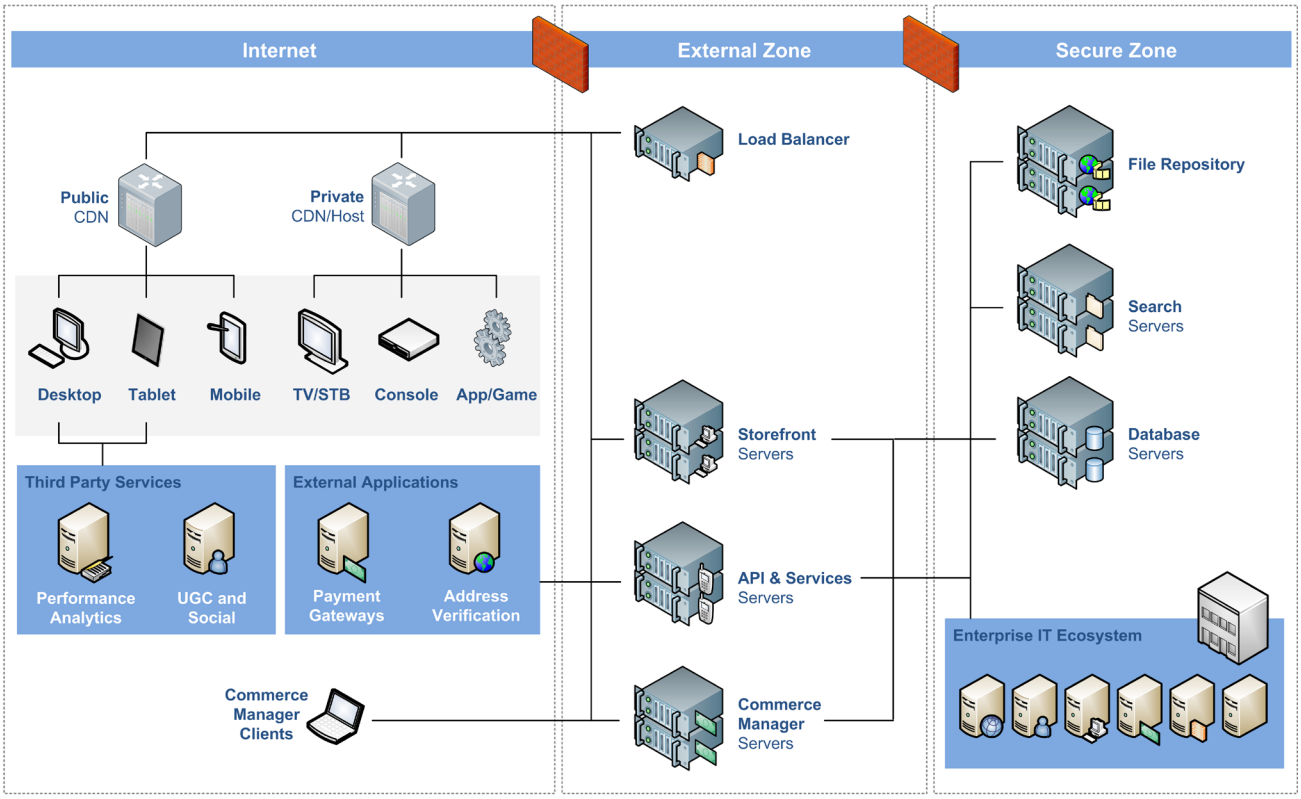
Based on this recognition, dynamic policies for ownership variables such as terms, durations, renewals, eligibility, cancellations, and prerequisites are native to the core object model of the Digital PIM. This fundamental awareness of how digital products are purchased, owned, and consumed enables the Digital Commerce Engine to easily drive the most innovative retail, rental, and access business models without requiring the expense of supplementing or modifying the core business logic.

Deployment Topology and Configuration

Diagram 2.0 shows a typical Digital Commerce Engine deployment. Depending on your needs, the location and configuration of specific servers might vary significantly. As part of any implementation, the optimum deployment architecture will always be carefully assessed, with full consideration given to hardware, software, scalability, and characteristics of your existing enterprise IT ecosystem.

Minimum hardware requirements for high availability:

Deploying the Elastic Path **Digital Commerce Engine**™



* **Sample deployment** with selected touchpoints and server configurations

Diagram 2.0

- 2 x **Storefront Server** - Quad Core (2.5 GHz), 8 GB RAM
- 2 x **Search Server** - Quad Core (2.5 GHz), 8 GB RAM
- 2 x **Commerce Manager/Services Server** - Quad Core (2.5 GHz), 8 GB RAM
- 2 x **Database Server** - Quad Core (2.5 GHz), 8 GB RAM

This scenario assumes a Linux/UNIX environment, a relatively standard commerce workflow, and normal storage requirements for customer data. We always share our performance testing framework with customers, and also offer comprehensive optimization services if they are needed.

Next Steps

No matter which digital commerce solution you select, your technical team will need to develop a deep understanding of its technology and architecture in order to be truly prepared for the operational demands of today's integrated customer ecosystems.

At Elastic Path, one of our core principles is to be open, and we strive to be completely transparent with both our customers and those considering the Digital Commerce Engine. This document is a first step to help you understand the design and architecture of our software, but it's only the beginning. Detailed technical and developer documentation is freely available for you to evaluate, and our licensed customers are always permitted to inspect and modify our source code in order to meet their unique demands for customization and differentiation.

Designed and built for enterprise-grade ecommerce, the Digital Commerce Engine boasts a streamlined, modular architecture, with application components built on a foundation of the world's best open source libraries and projects. Its high performance, developer-friendly technology stack, coupled with an unwavering focus on flexibility, agility, and monetization features for digital goods and content, all ensure that the Elastic Path Digital Commerce Engine is unrivalled as the software of choice for the world's most innovative and demanding businesses.

Thank you for your evaluation of Elastic Path and the Digital Commerce Engine.

Connect With Us

Website: www.elasticpath.com

Phone: (604) 408.8078

Technical and developer documentation: docs.elasticpath.com

Developer community: grep.elasticpath.com

Developer queries: dev@elasticpath.com

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Appendix: Hardware and Software Requirements

This appendix serves as a basic reference for the hardware and software requirements of the Elastic Path Digital Commerce Engine. The most current compatibility information can be found on our website at www.elasticpath.com, and specific exceptions that may be applicable to your deployment will always carefully assessed as part of any implementation.

Hardware

Hardware requirements are highly dependent on several factors including the operating system, anticipated traffic, transaction levels, catalog size, and Digital Commerce API usage. If necessary, we would be happy to assist your team with optimal system sizing. As a rule of thumb, the Digital Commerce Engine supports 32-bit and 64-bit Intel, AMD, Sparc, and PowerPC processor platforms.

Software

Software products listed below are fully tested and supported. Other releases may work, but are not guaranteed or part of our automated regression testing.

Application Servers
Apache Tomcat 6.0
JBoss 4.2, 5.1
Oracle WebLogic Server 10gR3, 11g
IBM WebSphere 7.0

Databases
Oracle 10g, 10g RAC, 11g, 11g RAC
Microsoft SQL Server 2005, 2008
MySQL 5.x

Operating Systems (Server Components)
Microsoft Windows Server 2003, 2008
Sun Solaris 9, 10, 11
Red Hat Linux ES 5.0
Novell SUSE Linux 11