Marlin Developer Community Overview

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Executive Summary

Marlin is a content sharing platform for media distribution services and devices based on digital rights management (DRM) technology. It is designed around the principle of interoperability and open standards and is developed with a community-based approach. A group of companies that include Intertrust, Panasonic, Philips, Samsung, and Sony jointly developed the Marlin specifications. Today, Marlin-based systems continue to be deployed worldwide.

The primary goal of the Marlin community is to enable the market for competitive, value-added content services and devices that are interoperable and consumer friendly. The organizational structure of the Marlin community and the activities it organizes and undertakes reinforce the goal of enabling an open content distribution market, not just specific entities within it. A key value proposition of Marlin technology is that it enables interoperability of content and devices while allowing differentiation on implementation choices. Marlin offers great flexibility in implementation choices, from platforms and formats to business models and trust services, allowing all members of the value chain to protect their interests while fully participating in compelling media distribution services.

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1. Introduction

In January 2005, five companies – Intertrust, Panasonic, Philips, Samsung, and Sony – jointly developed specifications for Marlin, a content sharing platform based on digital rights management (DRM), targeted for consumer devices and multimedia services. Marlin was created to allow consumers the ability to share their licensed content seamlessly across different devices and services in their home network or domain. This new focus improved the user experience and limited the side-effects of historical DRM-based implementations.

To promote market development, the Marlin founders formed the Marlin Developer Community (MDC) as an open standards community development initiative in October 2005. Later that year, the Marlin founders identified the need for a neutral trust management licensing organization with the Marlin Trust Management Organization (MTMO). In October 2008, the Marlin founders launched the Marlin Partner Program (MPP) as the solutions development group of the MDC. Together, these entities and programs comprise the Marlin community's efforts to develop and deploy next-generation content distribution systems across all networks.

Marlin has evolved from initial specifications to a commercially deployed platform. Consumer demand is driving enormous opportunities for complex distributed content systems. Service providers and device makers are choosing Marlin to provide an end-to-end content sharing platform that offers flexible, customized implementations within an efficient, interoperable context. The Marlin community provides the market with all of the elements necessary for complete and vibrant content distribution capabilities.

This white paper provides an introduction to Marlin and the Marlin Developer Community. It is intended for the general business reader. This paper covers the following topics: the goals of the Marlin community, its organizational structure, the scope of activities of the MDC, the Marlin value proposition, participation opportunities, and a technology overview.

2. Goals

The primary goal of the Marlin community is to enable the market for competitive, value-added content services and devices that are interoperable and consumer friendly. To achieve this, the Marlin community pursues specific goals to provide the technology, the partners, and the trust services necessary for service providers and device makers to develop and deploy content across all networks.

Technology	With the open input of a broad range of participants, Marlin technology responds to content distribution market needs, creating high-value revenue opportunities for service operators and device makers.
Partners	Marlin partners develop a wide range of technology solutions (from small components to large implementations) and offer them to adopters, reducing implementation costs and speeding time to market.
Trust Services	Marlin trust services provide adopters with critical services necessary for commercial deployments, including standards for security operations, maintenance of compliance and robustness requirements, as well as measures for remediation in the event of security breaches.

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3. Organizational Structure

There are two separate Marlin organizations – the Marlin Developer Community (MDC) and the Marlin Trust Management Organization (MTMO) – with very different functions. The MDC builds on existing Marlin technologies in an open community and promotes the market development. The MTMO is the operational entity that grants commercial licenses to deploy Marlin-based devices or services. It is an independent organization that provides critical, system-wide services to all Marlin deployments. As a separate entity, the MTMO can maintain neutrality among all the entities it services, thereby enabling the entire content distribution market.

Marlin Developer Community (MDC)	⟷	Marlin Trust Management Organization (MTMO)
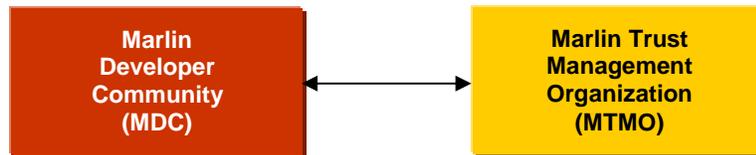
**Figure 1: Organizational Structure**

The MDC is responsible for:

- Developing and maintaining the Marlin technology specifications through open participation;

- Maintaining a Community Source Program for specifications, reference technologies, software development kits (SDKs), reference implementations, conformance test suites, and other technology;

- Promoting the adoption of Marlin technology through programs such as the Marlin Partner Program (MPP) and other market building outreach activities.

The MDC has a contractual agreement with the Marlin Trust Management Organization (MTMO) to handle four primary functions. The MTMO is responsible for:

- Granting commercial (non IPR[1]) licenses for the use of Marlin technology;

- Providing key management and certificate services;

- Enforcing compliance and robustness requirements for Marlin products and services;

- Handling Refusal, Remediation, and Renewability services for commercial deployments.

4. Scope of Activities

The activities of the Marlin community cover four key areas: technology development, partner solutions, trust management, and general market development. These areas are distinct, yet interrelated, and provide the market with all of the elements necessary for complete and vibrant content distribution capabilities. Figure 2 illustrates the relationship among these activities, with further description below.

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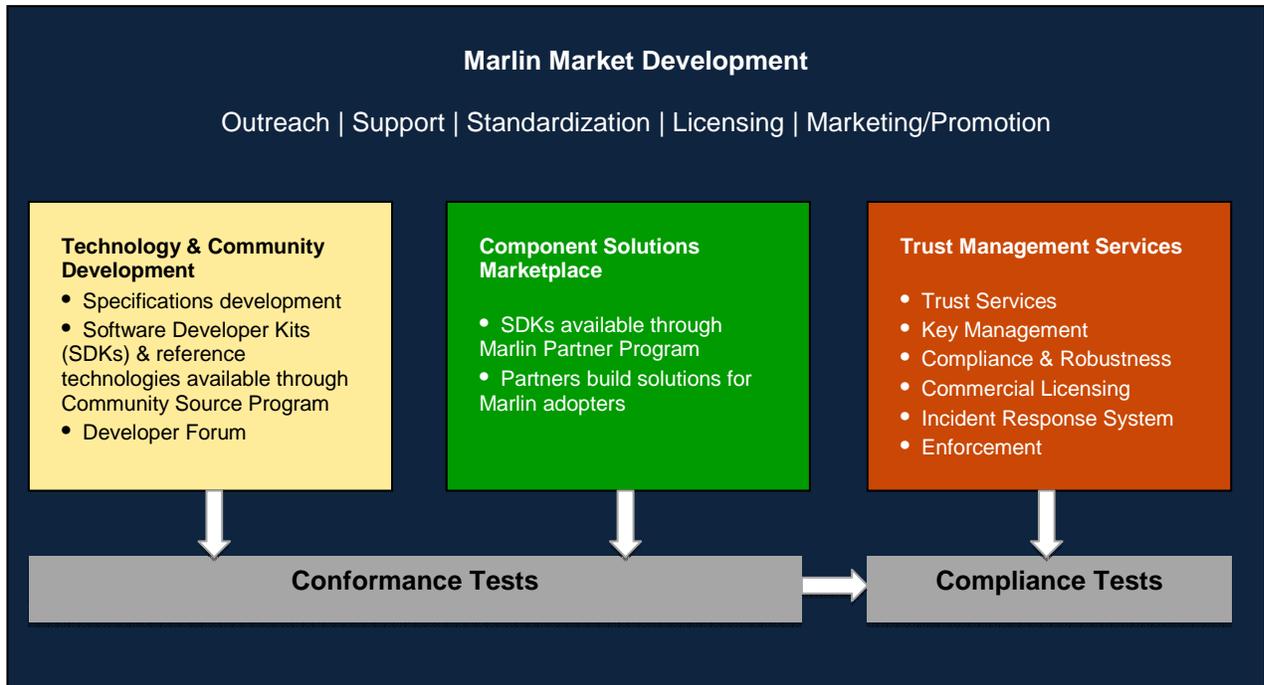
Figure 2: Marlin community scope of activities

4.1. Technology & Community Development

The MDC develops specifications, tools, and reference technologies, builds software development kits (SDKs) and reference implementations, and provides a set of conformance test suites. Detailed information about the specifications and technology are contained in the Technology Overview section of this paper. Additional information, including white papers, is available for download at http://www.marlin-community.com.

The MDC promotes technology development that is community-driven and standards-based. It encourages interested parties to participate in the review, testing, and further development of Marlin technology. The MDC also identifies avenues for defining or adopting applicable standards. The Community Source program allows participating developers access to specifications and code through repositories as well as a variety of working groups and forums. In addition, the MDC provides training workshops and other community-development activities. These activities speed development time, ensure the technology responds to real market needs across the value chain, and allow implementations based on best practices.

4.2. Partner Component Solutions

The MDC created the Marlin Partner Program to promote the global market development and deployment of Marlin-enabled devices, services, and content. The program offers content solutions providers, content aggregators, system integrators, technology solutions providers, and device makers the opportunity to identify and build key applications and components applicable to specific Marlin implementations. (See Figure 3.)

Marlin partners develop a wide range of technology, market, and deployment solutions. These companies evaluate, design, build, integrate, and test solutions ranging from small components to large implementations. Adopters interested in Marlin deployments can work with partners to reduce implementation costs and speed time to market.

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The MDC organizes partner workshops to train partners on the latest technology as well as provide a forum to identify solutions requirements and needs.

Figure 3: Marlin Partner Program companies

4.3. Trust Management

The Marlin community established the MTMO as the primary trust management operational entity that grants commercial licenses to service providers, clients (device and/or application), and content participants who wish to adopt Marlin technology. The goal of trust management is to provide the necessary services that maintain the integrity of the whole system.

As a result of the MTMO services, Marlin adopters minimize deployment costs and liabilities and can focus on offering differentiated business models. The MTMO supports multiple distribution methods while efficiently scaling for significant deployments. Importantly, it enables system-wide interoperability among device and service providers within the market.

Trust management provides services in three areas:
- Key management operations
- Compliance and Robustness Certification
- Remediation Management

Key Management
The MTMO maintains the root key structure for Marlin implementations and delegates subordinate certificate authority for key issuance to provisioning data centers or adopters.

Compliance and Robustness
The MTMO designates products and services as being Marlin-compliant by defining requirements adopters must meet. Compliance requirements ensure content is persistently protected in the consumer space. Robustness requirements ensure the proper implementation of security aspects of a compliant product (e.g., secure storage, secure time, secure memory, and tamper resistance). Through adherence to these rules, the MTMO can certify that adopters' implementations are tested, secure, and commercially-ready.

Remediation Management
The MTMO defines procedures to manage and implement remediation actions in the event of a security breach. These procedures include revocation of devices and services, such as by Certificate Revocation List (CRL) or Broadcast Key Block (BKB), establishing shunning and exclusion from content, and shunning access to services. Once the breach has been remediated, renewal procedures can be instituted where required. The MTMO also employs both legal recourse and contractual remedies articulated in the MTMO agreements.

4.4. General Market Outreach

The Marlin community undertakes additional outreach activities, including participation in standards-based efforts and marketing and promotional activities that further enable the market for competitive, value-added content services and devices based on Marlin technology.

Standards organizations: The Marlin community supports a series of open standards and coordinates with other applicable standards bodies including: Coral (The Coral Consortium www.coral-interop.org) which

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establishes specifications for interoperability among rights management systems and OMA (the Open Mobile Alliance www.openmobilealliance.org) which establishes specifications for interoperability for mobile services. Other groups it monitors include the Digital Living Network Association (DLNA) and the Open IPTV Forum.

Marketing and Promotion: the Marlin community website (www.marlin-community.com) serves as a forum and resource for the Marlin community. The Marlin community also undertakes additional marketing such as media outreach, conferences, events, and trade show exhibits as well as brand and logo management and community marketing requirements.

5. Value Proposition

From the beginning, the Marlin founders set certain design goals for the specifications. First, the approach had to be simple and move complexity out of the consumer experience. Second, the technology had to enable the ability to share licensed content across different devices and services in a home network, or consumer domain. Taken a step further, Marlin had to enable users to acquire content rights from multiple services and exercise these rights on a diverse set of devices within a consistent and interoperable environment.
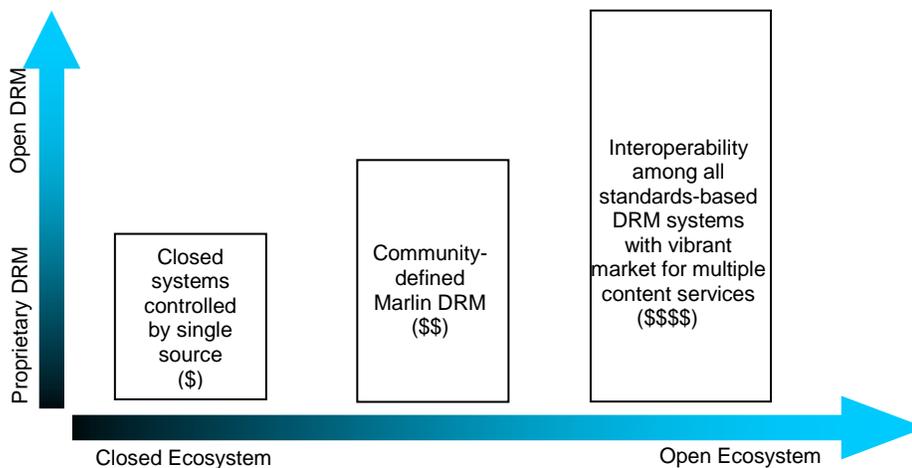
Figure 4: Marlin Landscape

These design goals drive Marlin's value proposition and market differentiation. Marlin promotes open standards and community development to ensure broad acceptance of commercial-grade, leading-edge technology. As Figure 4 shows, an open DRM platform within an open media distribution "ecosystem" provides the greatest opportunity to achieve long-term commercial success (both in deployment and revenue).

Importantly, Marlin adopters are not bound by a "one-size-fits-all" approach. Marlin enables interoperability of content and devices while allowing differentiation on implementation choices, such as business models. Devices and services can be available from multiple sources (broadband, Internet/IP television, broadcast, mobile services or optical discs) and use a common interoperability standard, yet compete on quality of service and other business offering innovations. In fact, Marlin supports new, dynamic and highly flexible business models (subscription, gift, user-generated, advertising-supported, etc.)

By providing a consumer-friendly experience for handling protected content, Marlin achieves a high level of consumer satisfaction that directly benefits potential adopters across the value chain. Content providers increase revenue by distributing a variety of content with a single delivery platform that ensures protection. Operators or service providers benefit through differentiated value-added services that

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generate additional revenue per user (ARPU). Device and component manufacturers benefit from the sale of devices that are "service-enabled" and interoperable.

6. Participation

The Marlin community relies upon the input of all in the value chain, allowing diverse input to the specifications and encouraging active participation from many developers and commercial adopters. The following list offers specific focus areas, but participating companies and individuals within those companies are often involved in multiple areas covering a range of activities.

MDC participants evaluate and develop specifications, write and use community code, etc. This category is for technology development, not commercial deployment.

MDC partners (through the MPP) identify and build component Marlin solutions, or work with adopters to design, build, integrate, test, and deploy Marlin solutions.

MTMO adopters build products and services; certify them, and license keys and certificates. The MTMO has separate service adopter and device maker commercial deployment agreements.

For more details on joining Marlin, go to: www.marlin-community.com/get_started.

7. Technology Overview

Marlin is based on a group of specifications and tools, including conformance test suites, reference implementations, and software development kits (SDKs) necessary to create a content sharing platform. The descriptions below include Marlin's primary SDK products, tools and underlying specifications. Additional information can be found at www.marlin-community.com/technology.

To date the MDC has developed and made available the following SDKs, reference implementations, and tools:

> The **Sushi Marlin Client SDK** is used to create client-side DRM functionality. This SDK provides the primary Marlin components necessary for determining license conditions and controlling access to protected content. It is easily adapted to hardware devices and media playback and service access applications can also utilize it to provide DRM functionality.

> The **Bluewhale Marlin Broadband Server** is a configurable implementation of a Marlin server providing the support necessary to secure the delivery of digital content to Marlin clients. In order to prepare appropriate information requested by clients, a Bluewhale server integrates with a service provider's back-end business logic, using a simple XML-based interface. It translates the business logic into Marlin rights objects, creating and managing licenses and user registrations, for example.

> The **Bento4 Marlin Packager** is a convenient tool for content packaging and parsing that works with Marlin clients. This tool packages, encrypts and protects content files at the server side. On the client side, the tool provides content decryption and parsing.

> The **Fishnet Marlin Conformance Test Suite** ensures that specific types of implementations, such as Sushi-based Marlin clients, and Bluewhale servers that have been customized via configuration, conform to the specifications.

The current specifications bundles, including incorporated reference technologies, released to the Marlin community include:

- Marlin Broadband

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- OMArlin
- IPTV-ES
- Other

The **Marlin Broadband** bundle contains elements common to most Marlin implementations. It includes the Marlin Broadband Delivery Specifications, the Marlin Core Specifications, the DRM Engine Specifications (Octopus), the Technology Platform Specifications (NEMO), and the Conformance Test Specifications.

The Marlin Core System Specification defines the basic components, protocols, and consumer domain model that enable the interoperability between Marlin-enabled devices and services. This specification is based on the Octopus and NEMO reference technologies, which have been adapted for peer-to-peer device interactions.

Octopus is a general-purpose DRM architecture that is extremely expressive and allows for flexible business rules. At the center of an Octopus system is a graph-based relationship engine. In Marlin, Octopus node objects are used to represent system entities (such as users and devices), and links between nodes represent relationships. The system of nodes and links is integral to managing where, how, and when content can be used in a Marlin system.

NEMO is an acronym for Networked Environment for Media Orchestration. It provides a services-based framework for trusted connections between various components of a Marlin DRM system.

The **OMArlin** specifications bundle bridges OMA[2]-compliant devices with Marlin technology. The OMArlin specifications enable interoperable download, streaming, sharing and consumption of content between OMA and Marlin DRM systems. This bundle also includes the Marlin URI Templates.

The **IPTV-ES** bundle contains the IPTV-ES Specification that defines support for "end point" devices, such as TVs with IP capabilities. This bundle also includes supporting Specifications, and Conformance Test Specifications.

The **Other** bundle includes the Marlin Broadcast Delivery System Specification, the Marlin Common Domain Specification, and the Marlin IPTV Network Service Implementation Guideline.

8. Conclusion

Consumer demand is driving enormous opportunities for complex distributed content systems. Marlin and the Marlin community are leaders in the effort to respond and transform media distribution by providing the market with a content sharing platform based on DRM that enables compelling consumer-driven content services and devices. Recognizing the opportunity to transform DRM through a combination of technology, standards, and open community development innovations, Marlin community members – founders, participants, partners, and adopters – are working to create an open and vibrant market. Service providers and device makers are choosing Marlin to provide an end-to-end content sharing platform that offers flexible, customized implementations within an efficient, interoperable context. Marlin has evolved from initial specifications to a commercially deployed platform. The Marlin community invites additional participation in this global effort.

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[1] "IPR" is Intellectual Property Rights
[2] "OMA" is Open Mobile Alliance (www.openmobilealliance.org)