



Deliverable D3 – Report on Technical Blog and SME Guidelines on the Reference Architecture

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Introduction

The SME guidelines for blockchain standardization address a crucial gap in Europe's digital transformation journey. Small and medium enterprises, which form the backbone of Europe's economy, often lack the resources and technical expertise to implement complex blockchain solutions while ensuring compliance with standards and regulations. Many SMEs struggle to understand how standardization requirements apply to their specific use cases, leading to either delayed blockchain adoption or non-compliant implementations.

These guidelines translate complex technical standards into practical, actionable steps that align with SME operational realities. By providing clear pathways for adopting standardized smart contract architectures, SMEs can reduce their development costs and accelerate their market entry. The guidelines demonstrate how standardization can actually simplify blockchain implementation rather than add complexity, showing SMEs how to leverage the multichain adapter pattern to build once and deploy across multiple platforms.

The value for European blockchain SMEs extends beyond technical implementation. These guidelines help SMEs position themselves competitively in the European digital single market by ensuring their blockchain solutions are interoperable and compliant with European standards from the start. This standardization-first approach opens opportunities for cross-border collaboration and makes it easier for SMEs to integrate their solutions with larger enterprise systems. Furthermore, by following these guidelines, SMEs can demonstrate compliance with European regulations more efficiently, reducing the regulatory burden while maintaining high standards of security and data protection. This combination of technical guidance and compliance support helps create a level playing field where European SMEs can innovate and compete effectively in the global blockchain market.

Understanding the Need for Standardization

Many European SMEs have already developed smart contract solutions tailored to specific blockchain platforms. While these solutions work well within their intended environment, they often face challenges when scaling across different platforms or integrating with other systems. The reference architecture we present addresses these challenges by providing a standardized framework that allows existing solutions to become platform-agnostic and interoperable.

The following text is developed and written in the form of a technical blog on SME guidelines with European SMEs working on blockchain as the intended audience. It has been published in Digiotech's medium.com channel - <https://digiotech.medium.com/adopting-a-standard-reference-architecture-for-smart-contracts-a-guide-for-european-smes-7fe735971b41>.

The Reference Architecture: A Framework for Standardization

Think of this reference architecture as a blueprint for organizing your smart contract infrastructure. Just as modern buildings follow standardized codes while maintaining unique designs, your smart contract solutions can adhere to standards while preserving their innovative features.

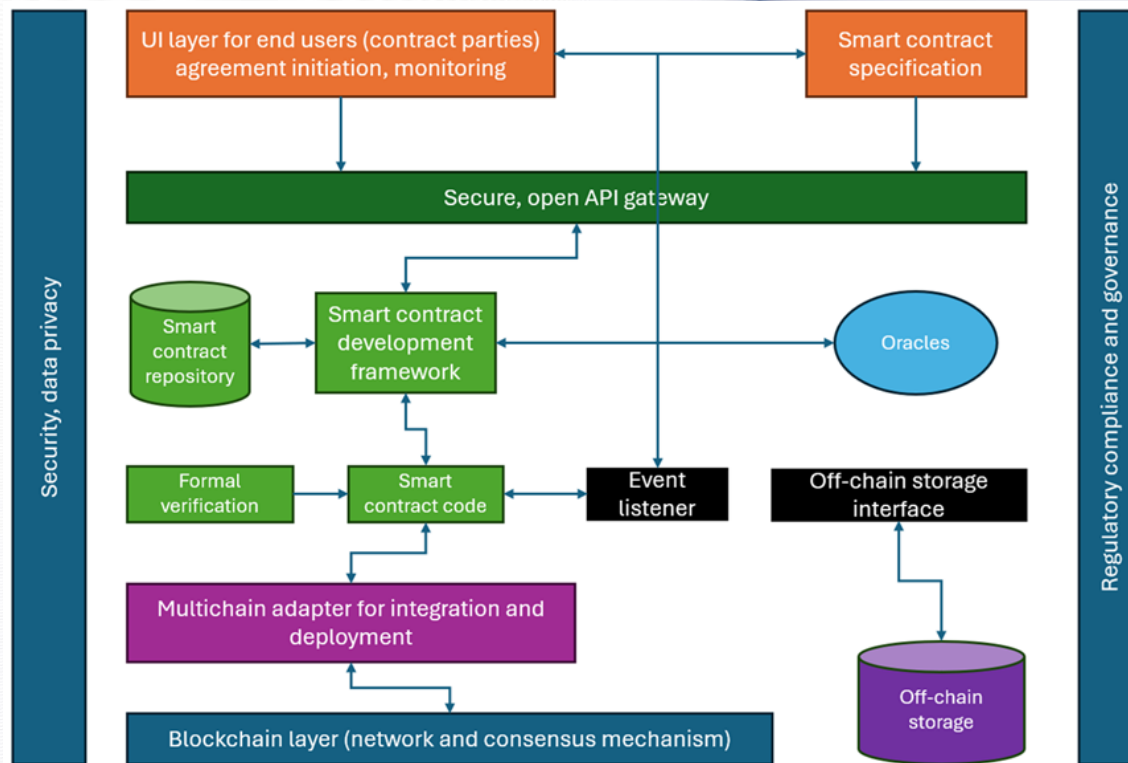


Figure 1 – Proposed reference architecture

Layer 1: Interface Standardization

The first step in adopting the reference architecture involves standardizing how users and systems interact with your smart contracts. This includes:

- Standardized API endpoints that follow REST principles
- Consistent authentication and authorization patterns
- Clear separation between user interface and business logic

For example, if your current solution directly connects your front-end to specific blockchain nodes, you would need to introduce an API layer that standardizes these interactions. This makes your system more maintainable and allows for easier integration with other services.

Layer 2: Smart Contract Organization

The smart contract layer in the reference architecture provides a structured approach to organizing your contract logic:

- Clear separation of concerns between different contract functionalities
- Standardized patterns for contract upgradability
- Formal verification requirements for security assurance

If your existing smart contracts are tightly coupled with specific blockchain platforms, this layer guides you in abstracting the core business logic to make it platform-independent.

Layer 3: The Multichain Adapter Pattern

This is where the architecture truly shines for SMEs. The multichain adapter pattern allows you to:

- Abstract blockchain-specific implementations behind a standard interface
- Maintain consistent behavior across different platforms
- Scale to new blockchains without modifying your core business logic

Consider your current blockchain-specific code. Instead of rewriting it, you can wrap it within the adapter pattern, making it conform to standardized interfaces while preserving its functionality.

Layer 4: Infrastructure Standardization

The architecture provides clear guidelines for standardizing your supporting infrastructure:

- Event handling and monitoring
- Data storage patterns (on-chain vs. off-chain)
- Security and compliance mechanisms

Adopting the Architecture: A Phased Approach

Phase 1: Assessment and Planning

Begin by analyzing your existing smart contract infrastructure:

- Document current architecture and dependencies
- Identify gaps between current state and reference architecture
- Plan a gradual transition that minimizes disruption

Phase 2: Module Adaptation

Start adapting your existing modules to align with the reference architecture:

- Refactor interfaces to match standardized patterns
- Implement the multichain adapter for your current blockchain platform
- Enhance security and compliance mechanisms

Phase 3: Standardization

Focus on making your solution fully standards-compliant:

- Align with European blockchain standards
- Implement formal verification processes
- Establish clear documentation following standard patterns

Benefits of Architectural Standardization

Enhanced Interoperability: Your smart contract solutions will work seamlessly with other standardized systems, opening new opportunities for collaboration and integration.

Future-Proofing: By following standardized patterns, your solutions become more adaptable to new blockchain platforms and technologies as they emerge.

Cost Efficiency: Standardization reduces long-term maintenance costs and makes it easier to onboard new developers who are familiar with the standard patterns.

Regulatory Compliance: The architecture incorporates European regulatory requirements, making it easier to maintain compliance as regulations evolve.

Cost-Benefit Considerations: When adopting this architecture, consider these factors:

- Initial investment in refactoring existing solutions
- Reduced long-term maintenance costs
- Improved market opportunities through standardization
- Enhanced ability to participate in European blockchain initiatives

Moving Forward with Standardization: The journey to standardization is an investment in your company's future in the blockchain space. By adopting this reference architecture, you're not just improving your technical infrastructure — you're positioning your company to play a key role in the European blockchain ecosystem.

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