



Bill Clinton Boulevard, Dardania
10000 Prishtina, Republic of Kosova

Tel. +383 (49) 686-668

info@sentry.co.com

www.sentry.co.com

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01 | Smart Contract Architecture & Design

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Smart Contract Architecture and Design

The software architecture of a program or computing system is a depiction of the system that aids in understanding how the system will behave.

Software architecture serves as the blueprint for both the system and the project developing it, defining the work assignments that must be carried out by design and implementation teams. The architecture is the primary carrier of system qualities such as performance, modifiability, and security, none of which can be achieved without a unifying architectural vision.

Architecture is an artifact for early analysis to make sure that a design approach will yield an acceptable system. By building an effective architecture, you can identify design risks and mitigate them early in the development process.

Sentry has a range of processes that can help organizations use software architecture to build and evolve systems that satisfy their business and mission goals. These methods and practices, which are applied at different stages of the development lifecycle, have evolved with the advent of **Agile** development approaches.

- **Architecture Analysis** is the process of understanding the environment in which a proposed system or systems will operate and determining the requirements for the system.
- **Architecture Design** is the process of creating the architecture. Given the requirements determined by the analysis, the current state of the architecture design and the results of any evaluation activities, the design is created and improved.
- **Architecture Evaluation** is the process of determining how well the current design or a portion of it satisfies the requirements.
- **Architecture Evolution** is the process of maintaining and adapting an existing software architecture to meet requirement and environmental changes.

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Software design is the process of conceptualizing the software requirements into software implementation. This is the initial phase within the software development life cycle (SDLC)—shifting the concentration from the problem to the solution.

When conceptualizing the software, the design process establishes a plan that takes the user requirements as challenges and works to identify optimum solutions. The plan should determine the best possible design for implementing the intended solution.

Software design includes all activities that aid in the transformation from requirement specification to implementation. Major artifacts of the software design process include:

- **Software requirements specification.** This document describes the expected behavior of the system in the form of functional and non-functional requirements. These requirements should be clear, actionable, measurable, and traceable to business requirements. Requirements should also define how the software should interact with humans, hardware, and other systems.
- **High-level design.** The high-level design breaks the system's architectural design into a less-abstracted view of sub-systems and modules and depicts their interaction with each other. This high-level design perspective focuses on how the system, along with all its components, implements in the form of modules. It recognizes the modular structure of each sub-system and their interaction among one another.
- **Detailed design.** Detailed design involves the implementation of what is visible as a system and its sub-systems in a high-level design. This activity is more detailed towards modules and their implementations. It defines a logical structure of each module and their interfaces to communicate with other modules.

02 | Blockchain Engineering

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Smart Contract Development

With an experienced team of full-stack blockchain developers, Sentry offers ethereum based custom smart contracts development services for different enterprises. We are aware of the necessary steps that it needs to take to develop a smart contract application for various financial, industrial, or economic applications.

Smart Contract Testing

Our QA team tests the first version of your smart contract and ensures that it is 100% bug-free. For the initial safety, our team first tests the contract locally on a local dev blockchain.

- Unit Testing
- Integration Testing
- System Testing
- Acceptance Testing

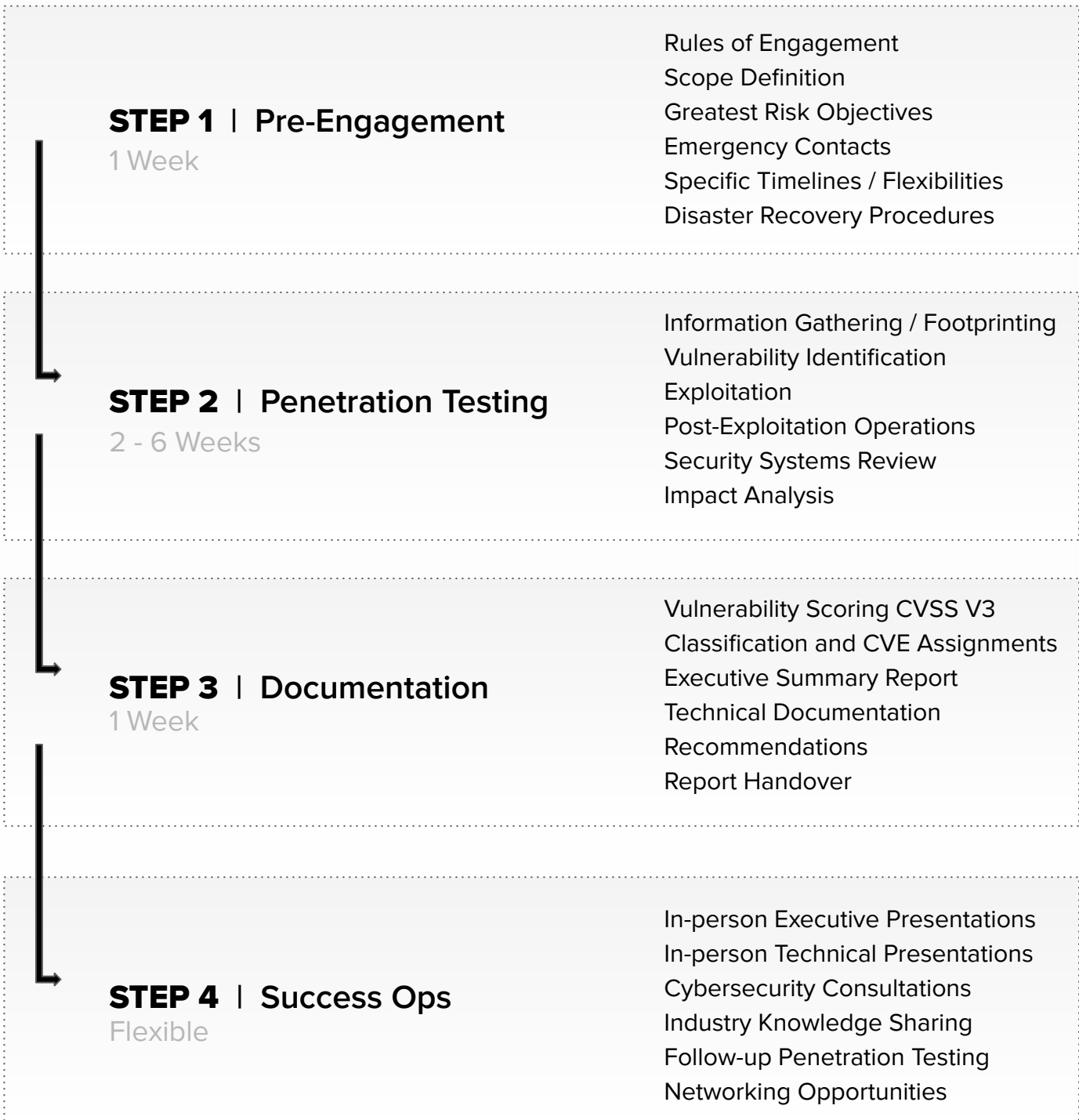
Smart Contract Auditing

The introduction of Smart Contracts by Ethereum allowed its protocol (blockchain) to be more flexible and applicable to the real world problems. However Smart Contracts are something that developers write through code and without security in mind those contracts are easily breakable and may cause massive financial loss.

Sentry provides Secure Smart Contract auditing/examination of a piece of software's source code to discover whether there are vulnerabilities, programming errors, bugs or violation of programming standards.

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04 | Risk Classification Systems

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The report classifies vulnerabilities in a five-step hierarchy:

Critical Vulnerabilities - these vulnerabilities allow an attacker to compromise confidentiality, integrity, and access to information fully. An attacker is able to gain full control over a system or completely cripple critical business activities. Examples of critical vulnerabilities include Unauthorized Code Execution, SQL Injection, Buffer Overflows, etc.

High-Risk Vulnerabilities - these vulnerabilities have a significant impact on confidentiality, integrity, and access to your information, but usually do not allow for a full compromise or control of an organization. Some examples include denial of service on specific resources, cross-site scripting, path traversal, and insecure direct object references.

Medium Risk Vulnerabilities - they are similar to high-risk vulnerabilities which allow for the unauthorized use of specific resources or systems, but they do not have a high impact on either confidentiality, integrity, or access. Some examples include weaknesses in SSL/TLS protocols, weak hashing algorithms, etc.

Low-Risk Vulnerabilities - include weaknesses which give relevant information to an attacker in order to further compromise a system. Some examples of this may be information leakage on critical applications, full path disclosure, insecure elements, etc.

Informational Vulnerabilities - these are usually missing best practices or smaller information leaks which may help an attacker further compromise a system. Some examples of these vulnerabilities include verbose or default error pages, insecure cookies, information leaks on technologies used and so on.

The vulnerabilities found are classified according to **CVSS V3 (Common Vulnerability Scoring System)**. When scores are computed, the vulnerabilities become contextual and help provide better understanding risk posed by this vulnerability to the organization.

Apart from vulnerability mitigation, this section will also include a top level look on your organization's resources and recommendations on upgrading the various layers of security in order to build highly secure environments.

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Layer 2 Solutions

As blockchain technology is becoming more and more applicable from corporates, government, exchanges to the individual users, blockchain is facing the scalability issue.

Scalability is a problem every blockchain shares due to the immutability properties since this 'public ledger' is always increasing and at some point it will be too large and not efficient for a user to function on blockchain. Our team is also focused on providing something known as Layer 2 Solutions which introduce the idea of pushing transactions **off-chain** (sidechain) but use the on-chain(blockchain) for **finality**.

The projects in which our team is already involved are **Payment Channels** and **Plasma Cash**. In difference, Plasma Cash is more complex in design than payment channels and is also under development by the ethereum team and researchers all around the globe.

Node Setup

Blockchain uses the peer to peer protocol which provided the ability that 2 or more nodes to connect and synchronize to each other and distribute data.

Ethereum provides two types of nodes in its network which are the **Geth Node** and **Parity Node**. Our team at Sentry provides node setup for projects that want to operate in ethereum network without using more centralized providers such as infura. Despite the node setup on Ethereum mainnet we also provide node setup and contract deployment on **ropsten** and **kovan** test networks.

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Crowdfunding (Token Sale) Development

Our team also provides ICO Crowdfunding development with security in mind, preventing loss of funds on fraud chats/websites that cost ICOs millions.

We also provide voting system Smart Contracts that suits clients needs like whitelisting, voting rights, burned tokens, time-lock tokens etc.

Securities Token Offering

While utility tokens can only be used to get access to specific services, security tokens represent assets with rights of ownership. The security holders are entitled to profit share, equity, dividends, voting and buy back rights.

Due to the increasing demand for regulatory frameworks associated with the token issuance, startups launching ICOs should follow legal regulations which can give more credibility and security to the investors. Tokenizing securities improves the liquidity of underlying assets which can engage more investors.

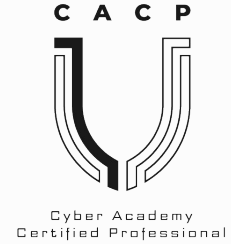
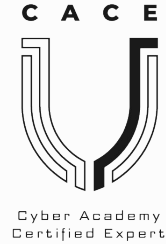
Security tokens also come up with other benefits like increased market efficiency, lower issuance fees and fractionalization of larger assets. If a startup meets the required regulatory obligations, the security token offering can create a vast potential for the variety of applications.

Our Security Token Creation Service consists of:

- KYC Identity Aware Tokens
- Smart contracts for the minting of tokens
- Smart Contracts for Crowd Sale

06 | Company Experience

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UNSA PROGRAM
Corporate Security & Defense

ISO/IEC 27032
Lead Cybersecurity Manager

ISO/IEC 27001
Lead Auditor



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Information Security Operations Center - MSSP

Sentry's security team is responsible for monitoring and analyzing an organization's security posture on an ongoing basis. Sentry's security operations center is staffed with security analysts and network defense operators as well as managers who oversee security operations.

Sentry SOC team's goal will be to detect and analyze all the suspicious ongoing traffic and data flow to ensure security issues will be addressed quickly upon discovery. Our incident response teams are highly specialized in incident response and forensics.

Compliance Audit

Sentry offers audits and tests in order to get your organization up to speed with the latest standards in information and cyber security. Our team ensures that you have all of the prerequisites in place for standards implementation.

- ISO/IEC 27001
- ISO/IEC 27002
- PCI-DSS
- HIPAA
- And More

Risk Assessment

Sentry Risk Assessments are based on NIST Standards in order to identify, estimate, and prioritize risk to organizational operations (i.e., mission, functions, image, and reputation), organizational assets, and individuals, resulting from the operation and use of information systems.



Cyber Academy is one of the first institutions in the SEE region that provides a hands-on program that dives deep into different subjects of technology while presenting a new learning theory "Learn by Doing" where the students are more focused on practical knowledge and skills development. Our main focus is on Cybersecurity, Blockchain, and Artificial Intelligence.

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