

N-Squared Voucher Server

Introduction

The N-Squared Voucher Server (N2VS) is a software system for the management and real-time redemption of printed and virtual/on-demand vouchers.

The N2VS solution leverages a modern NoSQL database engine, data sharding, and replication to provide both high availability and linear horizontal scalability. Deployed on Linux and commodity x86-64 hardware, N2VS provides a robust solution with both low hardware and minimal third-party licensing costs. The result is a cost-effective deployment which can be easily upscaled in response to future business growth.

The base configuration of N2VS supports the storage of up to 20m vouchers and up to 300 transactions per second. The solution can be scaled with the addition of further hardware nodes.

Vouchers are generated in batches that are assigned cost and redemption details based on a voucher type definition. Voucher PINs are generated and encrypted using configurable hash functions, and when exported for distribution are encrypted using public/private key encryption.

The Voucher Server is integrated with the N-Squared Online Charging Server (N2OCS) and may perform voucher redemption against N2OCS accounts, or to other third-party systems via the N2VS RESTful API. Supported voucher redemption scenarios include:

1. Voucher redeemed by pre-existing PIN (e.g. pre-printed voucher).
2. e-Voucher without PIN.

Architecture

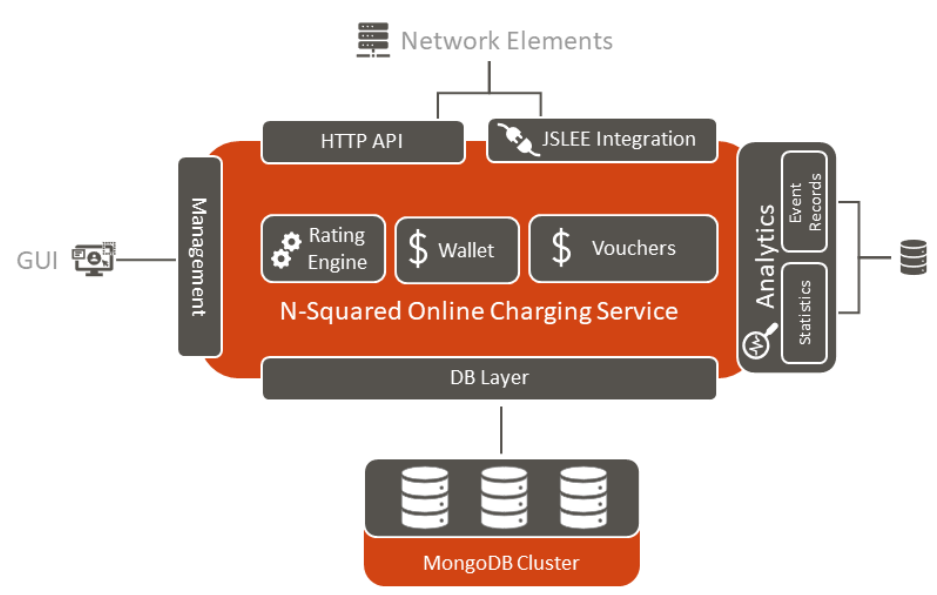


Figure 1 – N2VS High Level Architecture

The N2VS can be deployed either in-premises and self-hosted, or cloud-based as a third-party virtualized solution. Clustering across multiple mid-range servers provides high-availability through data replication and redundancy at an optimum price/functionality.

A feature-rich RESTful HTTP API provides the integration point for upstream BSS components.

Voucher Management Features

The N2VS stores voucher details, consisting of:

- Voucher value (optionally including multiple components of value). Voucher values are consistent with N2OCS bucket values and may be determined in cash, bytes, time, or general units.
- A voucher PIN, encrypted with a secure one-way hash.
- A voucher serial number for track and trace of the voucher.
- Extended voucher attributes, including distributor and reseller information.
- Voucher lifecycle, allowing vouchers to be flagged, or removed from circulation via automated processing or manual intervention (e.g. for stolen voucher batches).

Voucher Redemption

The N2VS integrates with N2OCS or other third-party systems for voucher redemption.

During redemption, the voucher server reserves the voucher, redeems the value of the voucher against the OCS account, then commits or rolls back the voucher reservation. Voucher redemption is transaction-safe against re-use or accidental loss-of-value.

Extensibility

The N-Squared Voucher Server offers multiple extensibility hook points, including configuration for standard features, scripting for advanced functionality, and programmable plugin hooks for full control.

Hook points include custom voucher PIN generation and custom voucher redemption processing.

Other Features

N2VS provides all key management features, including:

- Generating comprehensive EDRs for all events, both administrative and voucher redemption.
- Publishing statistics to external third-party monitoring tools.
- Generating alarms to system logs and SNMP on unexpected errors.
- Full API documentation for third-party system integration.

User Interfaces

The voucher server includes a web-based GUI for voucher management, including the ability to:

- Create and maintain voucher types.
- Generate voucher batches.
- Export and encrypt voucher batches.
- Import externally-generated voucher batches.
- View and update voucher status.
- Extended voucher attribute management.
- Access via OAuth identity management.

The screenshot displays a web-based interface for voucher management, divided into two main sections: 'Summary' and 'Lifecycle'.

Summary Section:

- ID:** 448048f-8201-4d71-8291-3a81cc172565
- Serial Number:** 1
- Type:** \$10 Voucher (with a red 'X' icon)
- Batch:** Voucher Batch 1 (with a red 'X' icon)
- Reseller:** Budget (with a red 'X' icon)
- Program:** 80
- Created:** 2020-02-19 20:04:11
- Last Modified:** 2020-02-19 20:07:38 by rdicks: oim
- Issued Date:** 2020-02-19 20:07:38
- Redeemed To:** 2463814345 (with a red 'X' icon)

Lifecycle Section:

- Created:** 2020-02-19 20:04:11
- Redeemed:** 2020-02-19 20:07:38
- Resealing:** 2020-02-19 20:07:37
- Active:** 2020-02-19 20:07:38
- Created:** 2020-02-19 20:04:11

At the bottom, there is a 'Voucher List' button and a 'Close' button.