

Cloud vSwitch Project Proposal

Vision and Goals Of The Project:

Cloud vSwitch seeks to provide a secure and streamlined IT independent VPN as a service in the cloud.

Goals:

- Connections between remote clients and a network in the cloud
- VPN as a service
- Automated:
 - Cloud environment setup
 - OpenVPN setup
 - CA setup
 - DHCP server setup
 - Cloud network connection
- Web Interface for:
 - User Management
 - Organization Management
 - Cloud Management

Users/Persons of the Project

Cloud vSwitch will be used by organizations without IT department and users without VPN configuration experience.

It targets both owners and end-users of the Cloud network.

The project is not targeted for expert users requiring specific or customized VPN service.

1. Scope and Features Of The Project:

Cloud vSwitch

- Cloud vSwitch Portal
 - User management
 - User add/edit/delete functionalities
 - Organization management
 - Organization add/edit/delete functionalities
 - User invitation
 - Instance management
 - Instance add/edit/delete functionalities
 - Certificate management

- Request certificate signing to join organization
 - API
 - OpenVPN setup
 - Creation of vSwitch instance (VPN)
 - OpenVPN server installation
 - DHCP server installation
 - Certificate Authority installation
- vSwitch Client
 - OpenVPN client setup
 - OpenVPN client installation
 - Certificate integration
 - VPN connection
 - connection/disconnection functionalities

2. Solution Concept

2.1 Global Architectural Structure Of the Project and a Walkthrough:

Below is a description of the key components of Cloud vSwitch which allow the VPN as a service. These components include: vSwitch portal, cloud network side and client side components

vSwitch portal :

- Presents an interface for users to:
 - Deploy the installation of an organization cloud
 - User and organization management (CRUD)
 - Instance management (CRUD)
 - Download installers
 - Invite to organization

Cloud side:

- Certificate Authority: entity responsible for issuing certificates
- DHCP server (Dynamically assigns IP address)
- OpenVPN server: responsible for
 - Certificate verification
 - Provide access to the virtual local area network

Client side:

- OpenVPN client
- File System client (just for demo purpose)

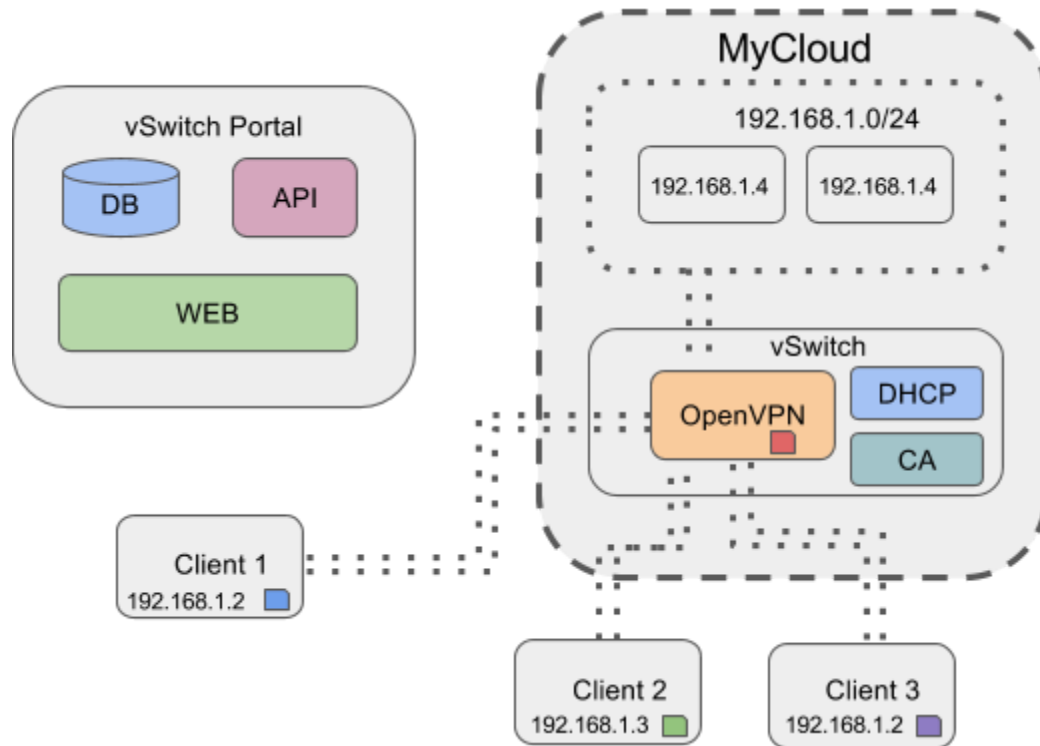


Figure 1. presents our global architecture design for Cloud vSwitch. A client first registers through the Web Portal which provides him/her with the necessary UI to create an organization's Cloud and download both certificate and client installer. Once the client has the OpenVPN client and his/her certificate signed by the CA, the client is able to connect to the Organization's Cloud network with an local Ip address assigned by the DHCP server.

2.2 Design Implications and Discussion

Key design decisions and motivation behind them.

- OpenVPN as a our VPN server:

OpenVPN provides:

- Cross-platform compatibility
- Secure connections
- Extensible VPN framework
- Mature software
- Easy setup

- vSwitch portal:

User Interface

- Implemented using AngularJS

RESTful API

- User management (CRUD)
- Organization management(CRUD)

- Interaction between the clients and vSwitch Cloud for
 - vSwitch instance creation (VPN)
 - Other instance management
- Implemented using Node.js, Sails.js and MongoDB
- Instance:
 - vSwitch instance
 - Manipulate the networking resources in the cloud
 - Managed by Cloud vSwitch
 - Contain vSwitch required components
 - Instance
 - Provide services
 - Managed by clients
- Certificates:
 - OpenSSL as Certificate Authority
 - Server certificate:
 - To verify client certificates
 - Issued by CA
 - Client certificate:
 - Issued by CA
 - Retrieved through vSwitch Portal
- Inviting users to join an Organization: In order to prevent unauthorized users from joining an organization, we provide a scheme wherein an invited user must use a valid code in order to join an organization.

Minimum acceptance criteria is

- A Client must be able to:
 - create a user
 - create an organization
 - invite other users to join the organization
 - connect to the local network of his organization
 - access his remote files (just for demo purposes)
- The cloud must be able to:
 - Automate installation of vSwitch instance which includes:
 - Installation of OpenVPN server
 - Installation of DHCP server
 - Installation of CA
 - Installation of the File server (just for demo purposes)
 - Automated certificate management
 - Issue server certificate
 - Sign client certificates
- vSwitch portal for:
 - User management
 - Organization management

Release Planning

Detailed user stories and plans are on the Trello board:

Release #1:

User Register:

As a user I would like to register on the vSwitch.com page so that I can log in to the vSwitch webpage.

User Login:

As a user I would like to log into my vswitch account so that I can create or join a cloud network

View user:

As a user I would like to view my user so that I can review my information

Update user:

As a user I would like to edit my user so that I can update my information

Inviting and Joining:

As a user, I would like to invite people so that they can join my organization's network.

Release #2:

Create instance:

As a user I would like to create an instance so that I can install a service

vSwitch instance setup:

As a user I would like to have a setup vSwitch instance in MyCloud so that MyCloud is functioning.

Client side installation:

As a user I would like to download the installer and connect to the cloud so that I can access the LAN in MyCloud.

Release #3:

Automation of Cloud Setup

Integration of Cloud environment and vSwitch Portal

Release #4:

Testing

Extension

Release #5:

More testing