

Awingu Platform Reference Deployment Guide

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1 Scope

This document is a guide to design Awingu deployments in an on premise, hybrid or cloud setup. The goal is to allow for potential customers to design the solution and create a bill of materials (BOM).

The proposals made in this document are not binding and are subject to external factors. This guide is to be used as a guideline only.

2 Product Architecture

2.1 Introduction

The Awingu platform is a software solution that runs on any virtualization platform and general-purpose hardware from a wide range of vendors as well as on major public clouds. An Awingu deployment is defined in terms of a number of virtual appliances, as a function of the number of users and expected usage pattern. These virtual machines specifications are independent of the underlying virtualization platform.

The Awingu platform is multi-tenant application in such a way that it supports the use of Organizational Unit (OU) as well as multi-domain configuration. Multiple customers can be served this way. On the other hand, different tenant admins can log on to the management console to manage their resources.

The Awingu architecture allows both physical and virtualized Windows application servers and back-end servers.

Awingu allows for both **onsite and cloud-based** deployments. In an onsite deployment, Awingu is typically deployed in the DMZ of the enterprise network. If Awingu is deployed from the cloud, it connects over VPN to onsite infrastructure or connects to infrastructure deployed in the cloud as well.

2.2 Networking requirements

Awingu requires IP connectivity between the end-user browser and the Awingu infrastructure. The browser can be deployed behind a NAT device. The Awingu appliance is single-homed, i.e. there is only one network interface that can be configured.

Awingu makes use of standard TCP ports for both HTTP(S) traffic and WS(S) traffic and hence requires that these ports are not blocked by any firewall that sits in between the Awingu infrastructure and the end-user browser.

If there are (forward/reverse) proxies on the path, these (forward/reverse) proxies also need support for web sockets. These are long-living TCP connections on TCP port 80 (or 443 in case of SSL offloaded traffic).

End-users can connect to Awingu over a VPN infrastructure as long as the above requirements are met.

2.3 Browser and device requirements

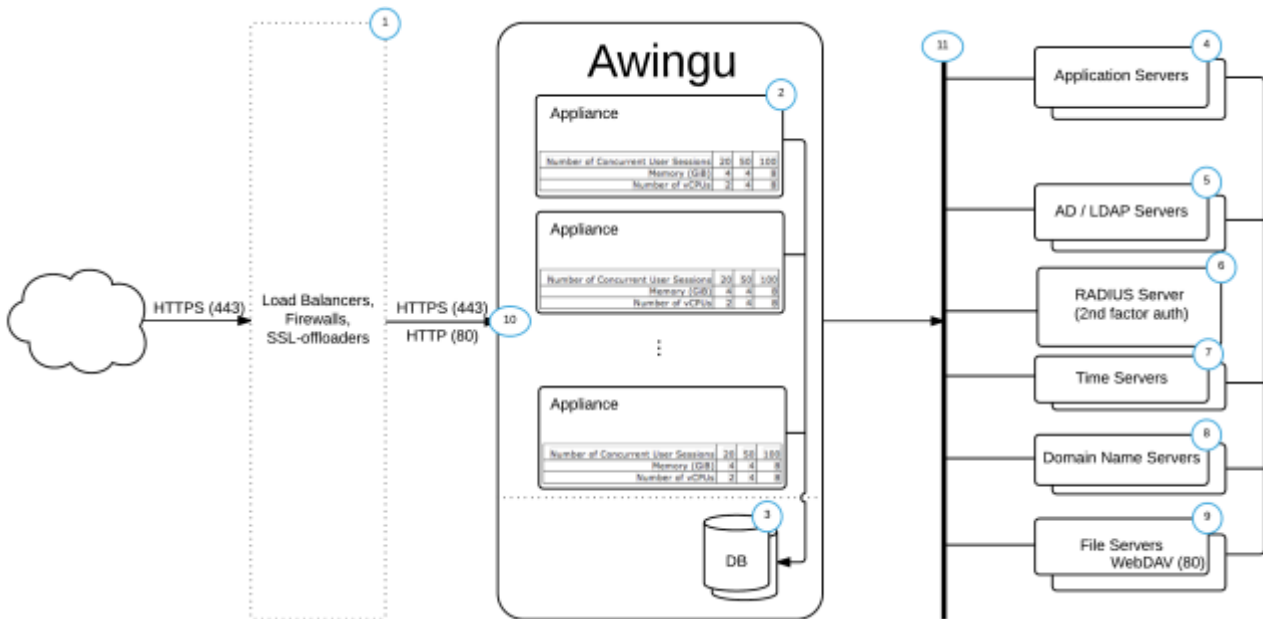
Awingu requires the browser to support secure Web sockets and HTML5 Canvas 2D context. Awingu supports 4 major brands of browsers: Safari, Internet Explorer, Chrome, and Firefox. The latest major release of each of these browsers is recommended for usage with Awingu. If you are using an older version of these

browsers, please verify with your Awingu sales representative for more information on compatibility. Please consult Awingu release notes for the latest recommendations with regards to browsers.

Awingu can be used on PCs, MACs, Notebooks, Android and iOS tablets. There are no plugins or extensions required to be installed the end-user browser. Smartphones are not yet supported, but may become available in a future release.

3 Reference deployment and dimensioning guidelines

3.1 On premise reference deployment



1. Load Balancer, Firewalls, SSL-offloaders

Load balancer: This component is only needed in a Awingu multimode deployment. Can be a hardware solution or software (e.g. DNS Round Robin)
 Firewalls: Awingu recommends to be deployed behind a firewall.
 SSL-offloading: Optional external (hardware) SSL offloader. Awingu ships with a built-in SSL offloader

2. Awingu appliances

In a single node set-up, all processes are running on a single appliance VM. This architecture can support only a limited number of the concurrent sessions. This is not a hard limit, but a limit that has been determined during in-depth performance testing cycles. For these tests, Awingu has used average user profiles (3 streamed applications tabs, 5 new previews per hour, a number of file operations per hour per user). This has resulted in the following deployment recommendations:

Number of Concurrent User Sessions	20	50	100
Memory (GiB)	4	4	8
Number of vCPUs	2	4	8

For deployments with more than 100 concurrent users, different appliances can be clustered together to deliver a horizontal scaled performance.

For deployments between 100 and 200 concurrent user sessions, a deployment with 2 VMs of 8 cores and 8 VCPUs is necessary. For set-ups that support more than 200 concurrent users, the recommendation is to deploy an extra VM of 4 cores and 4 Gig RAM for each from group of 50 concurrent user sessions.

In the following graph (see Figure 1), you can see the number of cores and VMs that are required to support a number of concurrent user sessions.

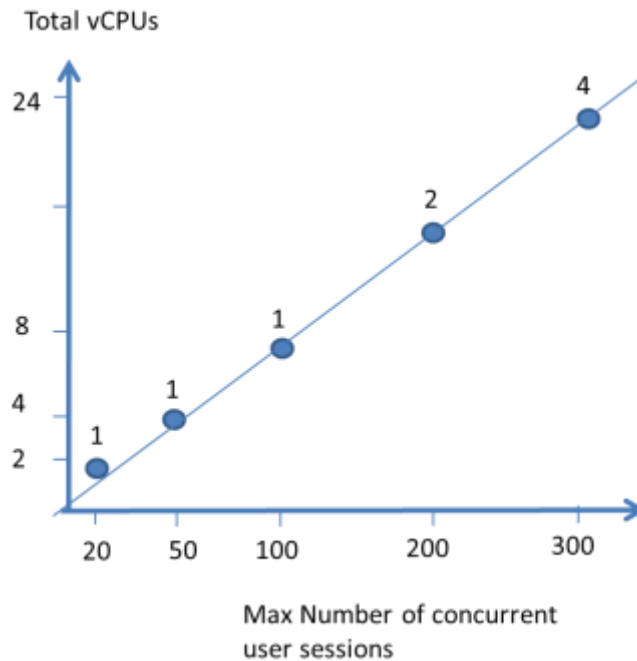


Figure 1: The number of vCPU (y-axis) and number of VMs required (labels) which are required to sustain a number of concurrent user sessions (x-axis)

The Awingu solution is delivered as a virtual appliance and can be run on a hypervisor of choice.

3. External database

An external database is required for deployments larger than 200 concurrent users or to setup the solution in HA mode. The sizing of the database is in function of the number of concurrent user.

The minimum requirements for an SQL server based on Windows 2012 R2 are:

CPU: 2.0 GHZ 64 bit processor

RAM: 4 GB

HDD: 36GB

Source: <https://msdn.microsoft.com/en-us/library/ms143506.aspx>

4. Application servers

The dimensioning strongly depends on the expected usage pattern and the type of applications that are offered. The expected usage pattern is determined by the

number of simultaneously opened applications and well as the level of concurrency between users. So for every deployment, the configuration needs to be assessed and tuned separately.

As a rule of thumb, Awingu recommends one physical Windows application server per 100 concurrent users, with a minimum of 2 for redundancy. If virtualized, then 4 Windows application server virtual machines per physical machine, with each 4 cores, 32 GB RAM serving up to 25 concurrent user sessions.

5. AD/LDAP server

Awingu connects to a AD/LDAP server. The sizing of the Domain controller(s) depends on number of objects to be stored and the amount of simultaneous requests.

The highly diverse scope of potential deployments makes it unrealistic to state "recommended" system requirements that would be generally applicable. Consult documentation for each of the server roles you intend to deploy for more details about the resource needs of particular server roles. For the best results, conduct test deployments to determine appropriate system requirements for your particular deployment scenarios.

The minimum requirements for an DC based on Windows 2012 R2 are:

CPU: 1.4 GHz 64 bit processor

RAM: 512MB

HDD: 32GB

Source: <https://technet.microsoft.com/en-us/library/dn303418.aspx>

6. Radius Server

Awingu can use an external Radius Server to provide multifactor authentication. There are many solutions/services and price is depending on the choice of service.

7. Time (NTP) server

Awingu uses the time server to make sure all components are using the same time. Typically this service is offered by the Domain controller or a third party service. No dedicated machine is needed.

8. Domain Name Server (DNS)

Awingu uses DNS services for easy configuration. Typically the Domain Controller or an existing server offers this service. No dedicated machine is needed.

9. File Servers

Awingu can connect to file servers exposing their data over CIFS or WebDAV. The sizing of these servers depends on the total amount of data (disk storage) and the number of file accesses.

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RAM: 512MB
HDD: 32GB

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10. WAN Network

When deploying Awingu, LAN and WAN bandwidth dimensioning is an important factor. Obviously, bandwidth consumption depends on application usage: users intensively streaming application with a high number of screen updates will consume more bandwidth than users editing Word documents.

Bandwidth consumption is also dependent whether the anti-aliasing option is turned on or not.

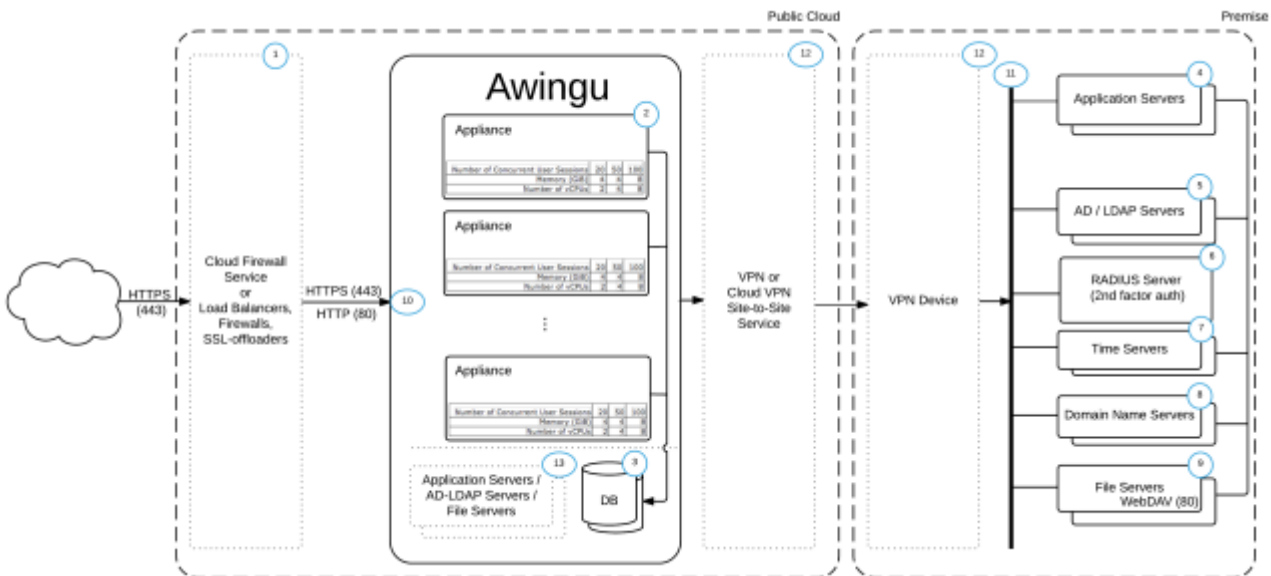
Awingu has conducted bandwidth tests, assuming an average office worker editing documents, opening a browser, scrolling, etc. The average bandwidth consumption on the WAN side was between 30kbit/sec and 250kbit/sec per user, depending on the application mix.

Awingu proposes to monitor bandwidth consumption during the initial roll-out phase and make adaptations to the reference configuration afterwards, if required.

11. LAN Network

Since the traffic over the WAN is the aggregate of the different services on LAN we can consider the LAN sizing to be the same as the WAN sizing.

3.2 Hybrid reference deployment



1. Load Balancer, Firewalls, SSL-offloaders

Next to the on premise solution one can choose to use these services provided by most public cloud providers.

2. Awingu appliances

Same as the on premise setup

3. External database

Next to the on premise solution one can choose to use these services provided by most public cloud providers.

4. Application servers

Same requirements as the on premise setup. The servers can be deployed on available server flavours of the Cloud Provider

5. AD/LDAP server

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12. VPN Endpoint cloud

In order to connect the Awingu solution to resources on premise (in case of a hybrid deployment, not needed in full cloud deployment) a site-to-site solution is needed. This can be achieved by using a public cloud service or to deploy a virtual appliance. A compatible endpoint needs to be setup on premise as well.

13. Cloud backend servers

In a hybrid scenario windows backend servers can be deployed in the cloud as well. These have the same requirements as those on premise. (This model can be used to gradually migrate on prem servers into the cloud)

4 Abbreviations

AD	Active Directory
BOM	Bill Of Materials
HTTP	Hypertext Transfer Protocol
HA	High Available
IaaS	Infrastructure-as-a-Service
IE	Internet Explorer
IT	Information Technology
KVM	Kernel Based Virtual Machine (hypervison)
LAN	Local Area Network
LDAP	Lightweight Directory Access Protocol
NTP	Network Time Protocol
PDF	Portable Document Format
RDP	Remote Desktop Protocol
REST	Representational State Transfer
SSL	Secure Socket Layer
UI	User Interface
URL	Uniform resource locator
UNC	Unified Naming Convention
VM	Virtual Machine
VPN	Virtual Private Network
WAN	Wide Area Network

Document History

Version	Date	Updated by	Update Description
1.0	16/10/2015	Pieter De Clerck	Creation of document
1.1	02/06/2016	Pieter De Clerck	Updated after 3.1 with multi tenancy for mgmt