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1. Introduction

This document contains recommendations for information and technical support of the software complex **«WebIUS»**, as well as requirements for fault resistance of the solution.

2. Implementation options for the technical architecture

The **«WebIUS»** system consists of four levels:

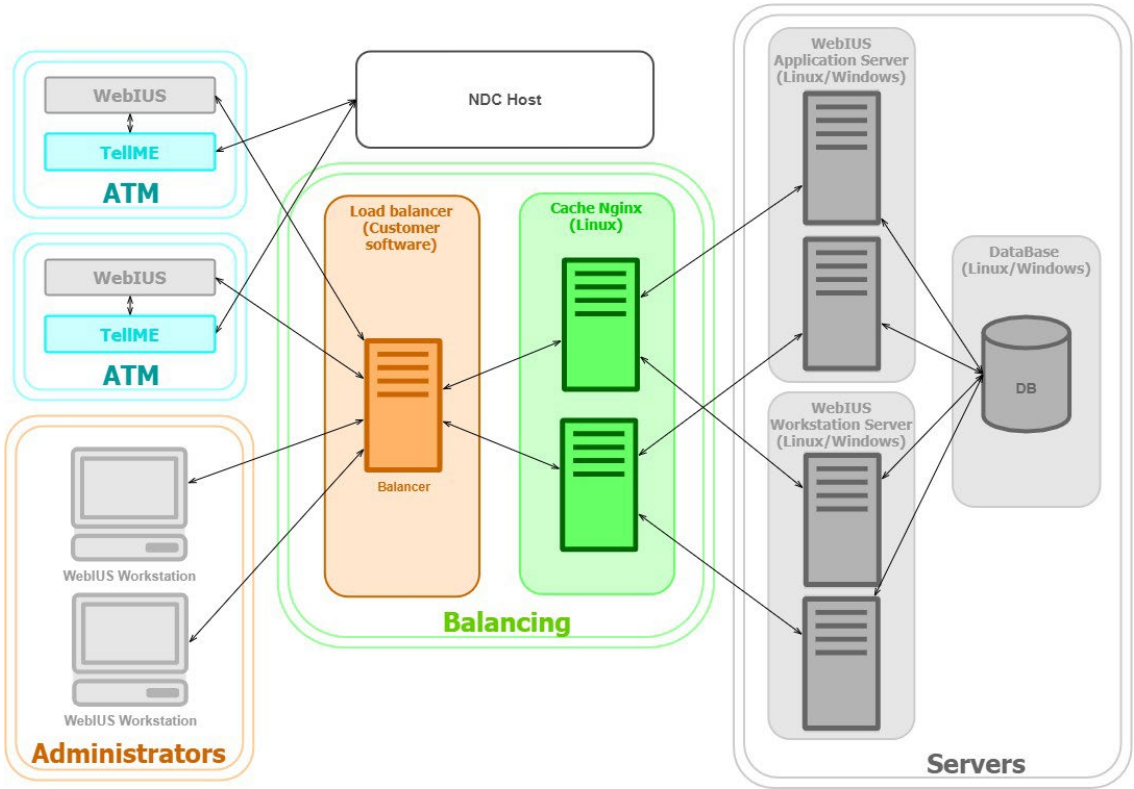
- Client level: software called **'WebIUS Updater Agent'** is installed on ATMs.
- Level of balancing (balancing servers, which can be implemented with the help of specialised software or additional hardware allocated for this purpose);
- Application level (servers with WebIUS Workstation and Web Service);
- Database level.

The technical architecture of **«WebIUS»** can be implemented in two variants:

1. using a hardware balancer;
2. cusing a balancing server cluster.

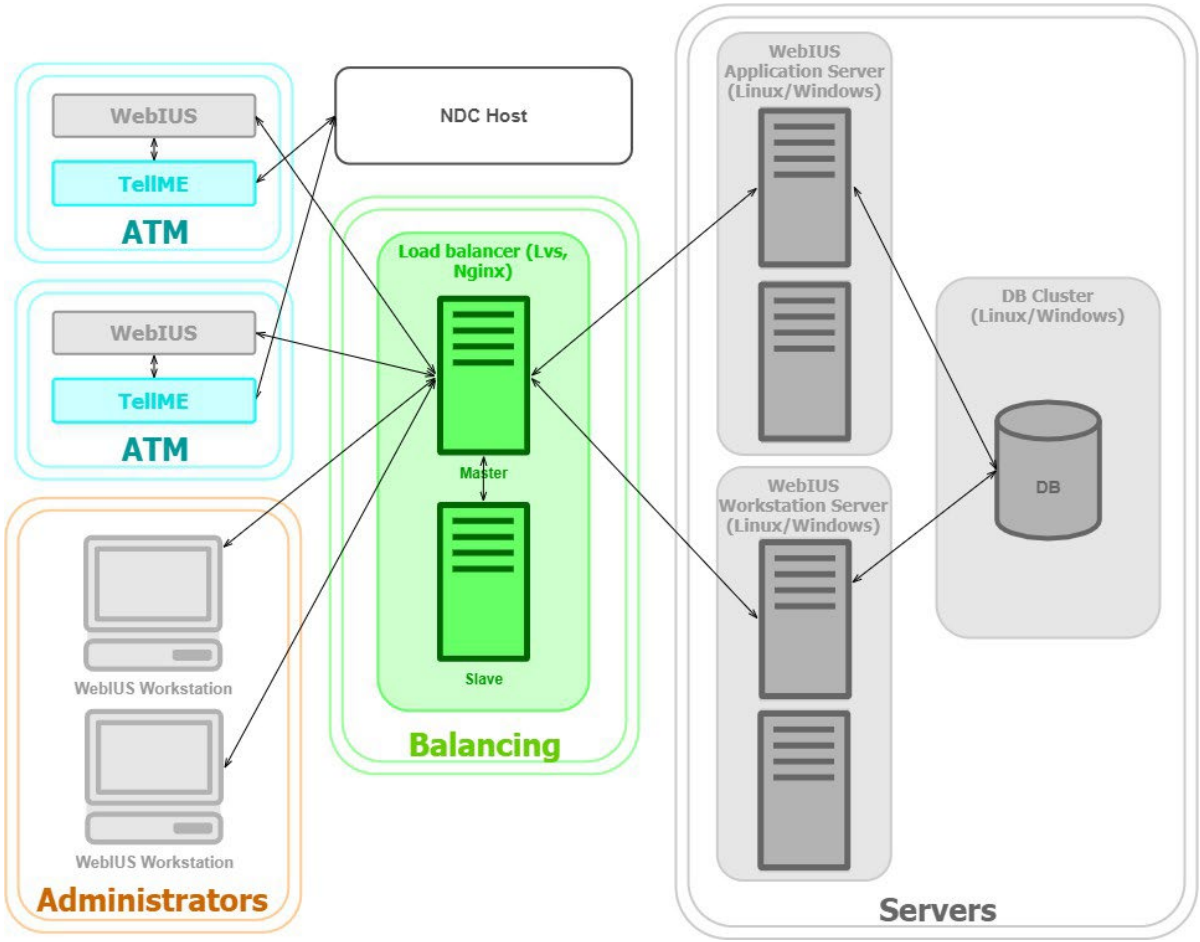
Implementation of architecture is chosen by the customer.

2.1 Architecture when using a hardware balancer



The hardware balancer is provided by the customer. During system operation, it accepts all requests from the client and distributes them among the Nginx servers, which then redirect them to the server part of the **«WebIUS»** system.

2.2 Architecture when using a balancing server cluster



When the system is running without using a hardware balancer, all requests from the client part are accepted by the Nginx master server and redirected to the server part.

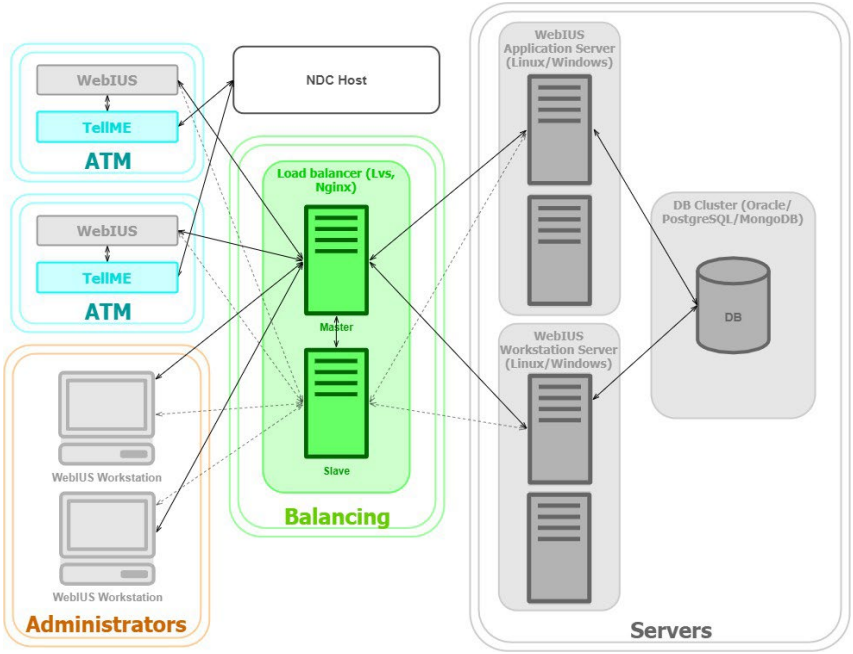
3. Fault tolerance of the 'WebIUS' system

The following system fault tolerance scheme, given in section "**2.1 Description of system level fault tolerance**", is based on balancing between redundant servers, database clustering or replication (depending on the chosen DBMS), and servers on Ubuntu, RedHat or Windows Server.

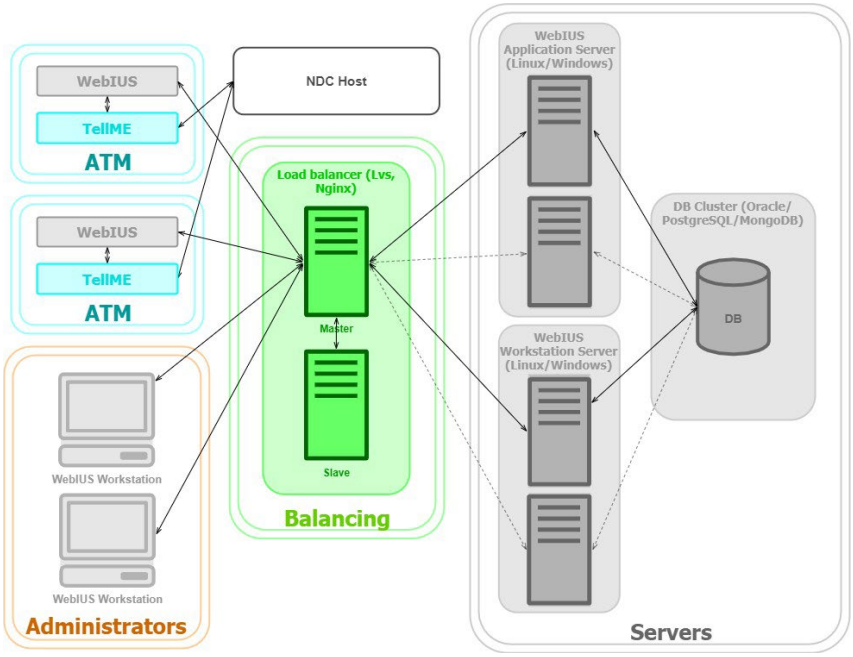
3.1 Description of system-level fault tolerance

Ensuring that the entire system works without failure is achieved by reserving key systems within the balancing, application and DB levels:

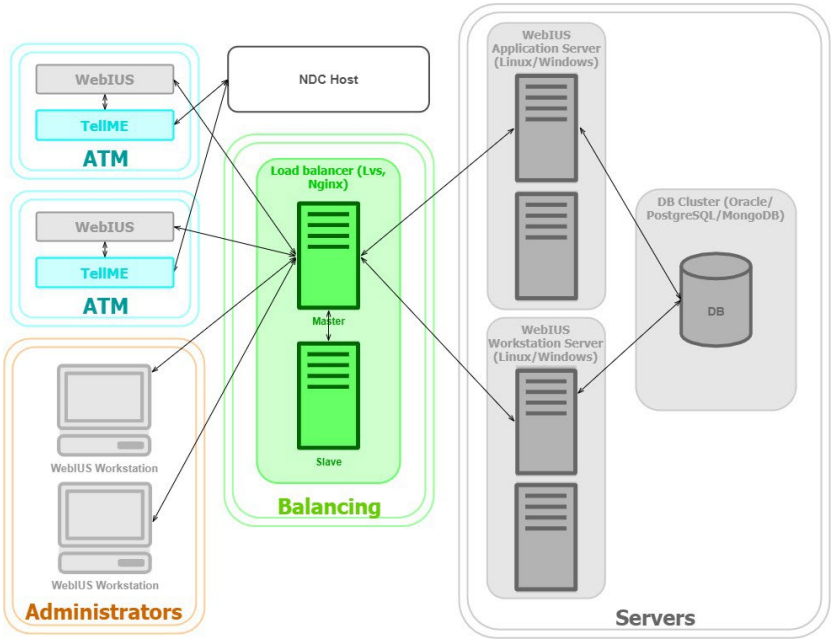
1) HAt the balancing level, fault tolerance is provided by creating a cluster of Nginx balancing servers. The Nginx master server communicates with clients and servers using a virtual IP address while maintaining communication with balancing backup servers. In the event of a failure, the backup slave server detects the problem and automatically activates the virtual network adapter to send and receive traffic, thereby becoming the master server.



2) Application-level fault tolerance is ensured by the parallelism of multiple servers and balancing server capabilities. If one of the application servers becomes unavailable, Nginx blocks it and divides all traffic between the remaining servers.



3) At the database (DB) level, fault tolerance is achieved by using database management system (DBMS) tools to create a cluster of multiple servers.



4. Infrastructure requirements for system fault tolerance

4.1 Recommendations for the client level:

Client modules **"WebIUS Updater Agent"** of the **"WebIUS"** system function on a hardware-software complex with the following recommended parameters:

Operating system: Windows XP, 7.

Software: .NET Framework 4.0.

Intel platform PC. CPU 2 GHz, 2GB RAM, 2GB HDD.

4.2 Recommendations for server components of the system

To organize uninterrupted operation of the system it is recommended to comply with the requirements presented in the following sections (the presented values are valid for a fleet of up to 5,000 devices, but may vary depending on the tasks to be solved both to a greater and lesser extent).

4.2.1 Recommendations for the DB level

Number of servers: according to the DBMS developer's recommendations.

Operating system: Ubuntu Server 18.04 LTS and newer x64/ Windows Server 2016/ RedHat 7 and newer.

Software: Oracle 10.2 and newer/ PostgreSQL 12.0 and newer / MongoDB 3.6 and newer.

Server	CPU (Core x 3,2 GHz)	RAM (GB)	HDD (GB)
DB	8	32	400

4.2.2 Recommendations for the level of applications

Number of servers: 4pcs (minimum 2 servers, 3 or more servers recommended for **Web Service** and 2 for **«WebIUS Workstation»**).

Operating system: **Web Service** – Ubuntu Server 18.04 LTS and newer x64 / Windows Server 2012 / RedHat 7 and newer.

«WebIUS Workstation» – Ubuntu Server 18.04 LTS и новее x64 / Windows Server 2012 / RedHat 7 и новее.

Software: **Web Service** – proprietary software;

«WebIUS Workstation» – proprietary software.

Сервер	CPU (Core x 3,2 GHz)	RAM (GB)	HDD (GB)
Web Service			
WebIUS Application Server1	4	16	120
WebIUS Application Server2	4	16	120
«WebIUS Workstation»			
WebIUS Workstation Server1	4	16	300
WebIUS Workstation Server2	4	16	300

4.2.3 Recommendations for the level of balancing

If you are using a Nginx web server:

Number of servers: 2pcs (Need to allocate 3 ip: 2 for each server and one common).

Operating system: Ubuntu Server 18.04 LTS and newer x64.

Software: Nginx + Linux Virtual Server.

Сервер	CPU (Core x 3,2 GHz)	RAM (GB)	HDD (GB)
Nginx-Primary	8	32	120
Nginx-Secondary	8	32	120

If the balancer is implemented on a hardware solution, the operating system and software are at the customer's discretion.