Software Architecture Document

Internet provider “Wind”

Solution Information

	Information
Solution Name	Internet provider “Wind”
Solution Acronym	WB
Document Owner	Bed Anatolii
Version/Release Number	1.0

SAD Revision History

Date	Version	Description	Author
02.04.2014	1.0		Bed Anatolii
17.05.2014	1.1		Bed Anatolii

Definitions, Acronyms and Abbreviations

UML: Unified Modeling Language

SI: Service Instance

SL:Service Location

RI: Resource Inventory

SO: Service Order

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Purpose

The purpose of this document is to define the detailed Solution Architecture for “WindBoreas”. This system provide ability full-cycle service provisioning with the usage of self-service portal. The document ensures that the Solution Architecture is in compliance with enterprise application architecture principles, best practices, and conceptual target application architectures.

1. Solution Overview

The system is solution for internet providers. The system allows you to arrange a convenient interface between you and your customers, have a pleasant and intuitive interface, which allows ordinary Internet users to take advantage of your services. You can provide information on the tariff plan, quickly implement an internet connection to your customers, establish a feedback from them, organize technical support. This will allow your customers receive the highest level of service. You can receive automatically generated reports on the state of the system . This is a good tool for the successful organization and business automation. In the system can exist 5 roles: Administrator, Customer Support Engineer, Provisioning Engineer, Installation Engineer, Customer User. Basic operation items are Service Instance, Service Order.

2. Architectural Goals and Constraints

This section describes the software requirements and objectives that have some significant impact on the architecture.

2.1 Architectural Assumptions and out of scope

One user have only one role. System uses English language for text and graphical screens.

2.2 Technology

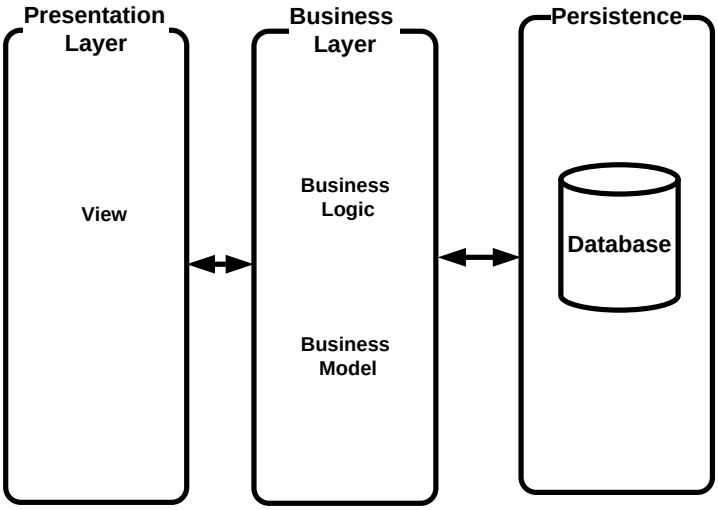
Name	Solution	Description
Server	GlassFish 4.0	GlassFish Server is the world's first implementation of the Java Platform, Enterprise Edition (Java EE). Built using the GlassFish Server Open Source Edition, GlassFish Server delivers a flexible, lightweight, and production-ready Java EE 6 application server.
Databases	OracleXE 10g	Oracle Database 10*g* Express Edition (Oracle Database XE) is an entry-level, small-footprint database. It's free to develop, deploy, and distribute; fast to download; and simple to administer.
Technologies	Servlet	Servlets used to extend the applications hosted by web servers, so they can be thought of as Java applets that run on servers instead of in web browsers.
	JavaMail API + Apache James	The JavaMail API provides a platform-independent and protocol-independent framework to build mail and messaging applications. Apache James is an open source SMTP and POP3 mail transfer agent and NNTP news server written entirely in Java.

	JAAS	Java Authentication and Authorization Service, or JAAS, is the Java implementation of the standard Pluggable Authentication Module (PAM) information security framework. The main goal of JAAS is to separate the concerns of user authentication so that they may be managed independently.
	jXLS	jXLS is a small and easy-to-use Java library for writing Excel files using XLS templates and reading data from Excel into Java objects using XML configuration.
Additional APIs	Google Maps API	The Google Maps API is free for commercial use, provided that the site on which it is being used is publicly accessible and does not charge for access, and is not generating more than 25 000 map accesses a day.
Pagination	Display tag library	The display tag library is an open source suite of custom tags that provide high-level web presentation patterns which will work in an MVC model. The library provides a significant amount of functionality while still being easy to use.

3. Application Architecture

3.1 Logical View

The application is divided into layers based on the 3-tier architecture



This strategy improves system development and maintenance.

3.2 User Interface

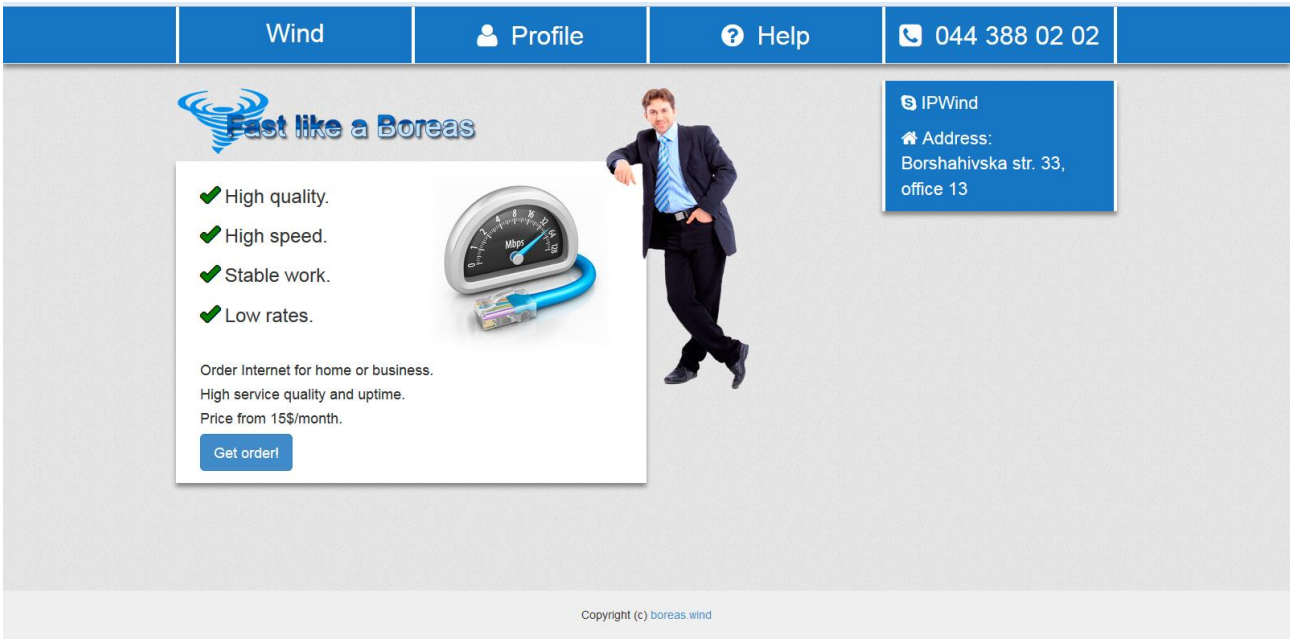


Figure 1 – Main page

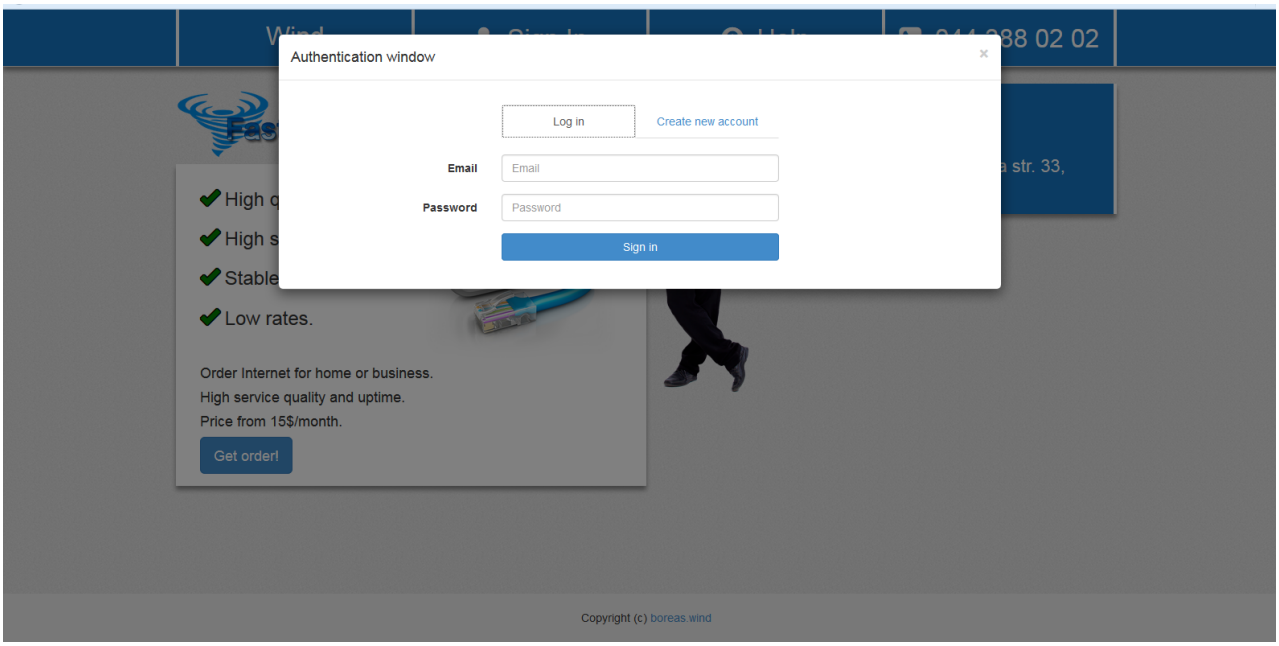


Figure 2 – Authentication page

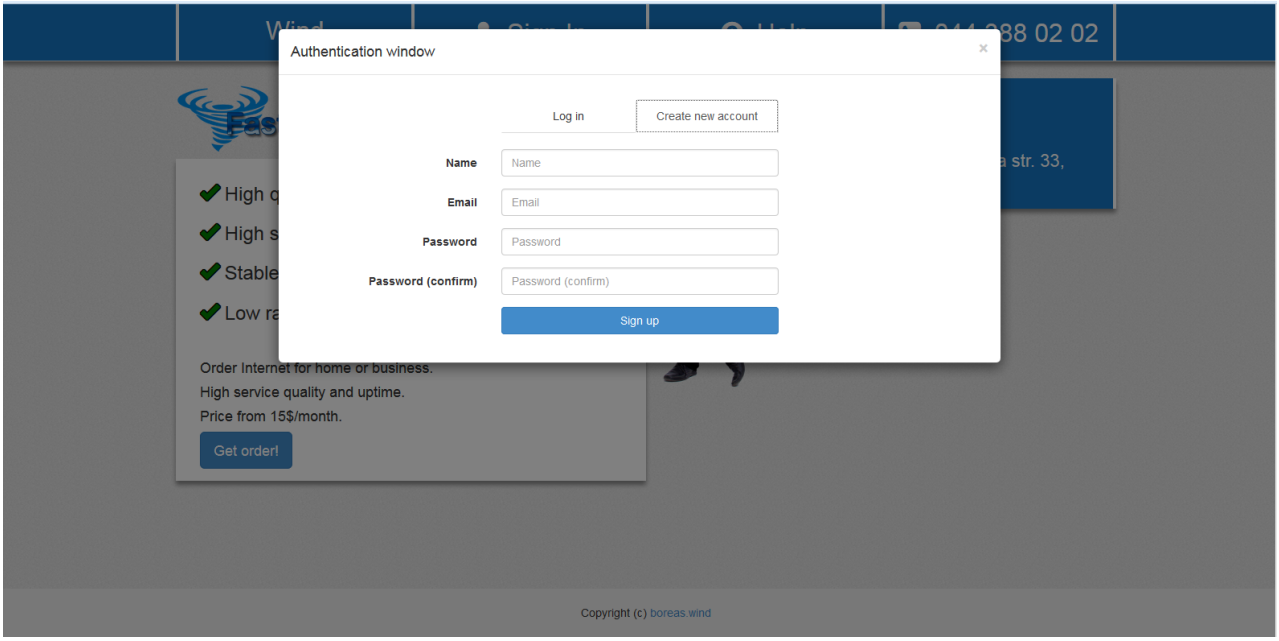


Figure 3 – Registration page

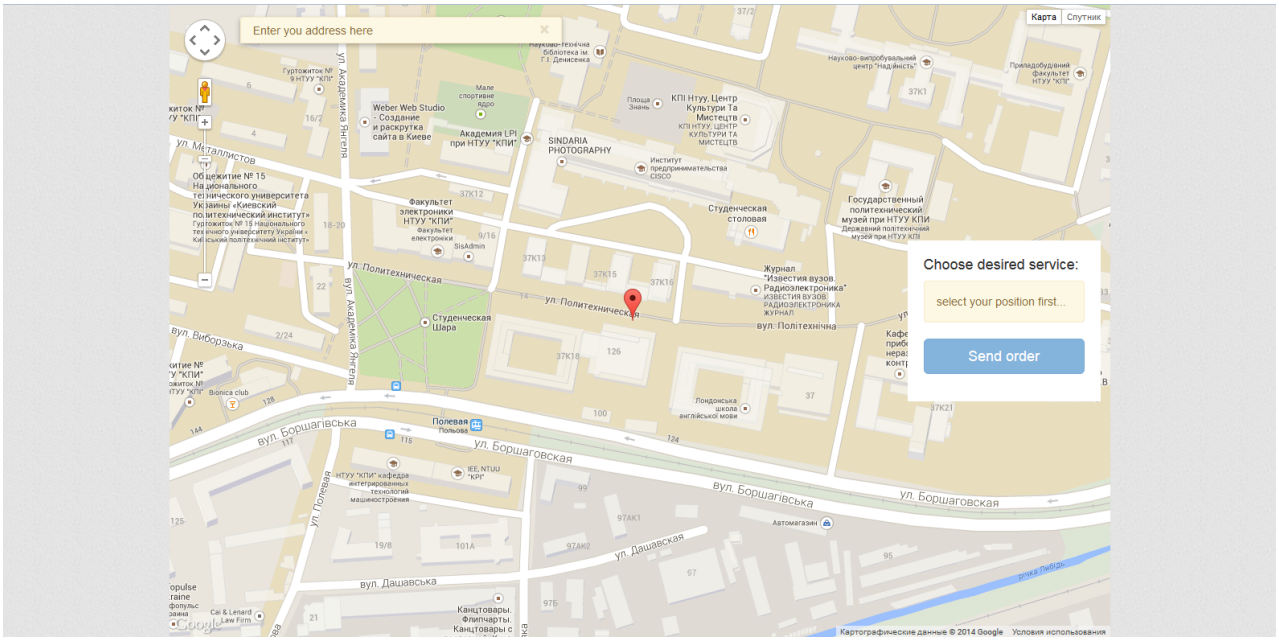


Figure 4 – Get order page

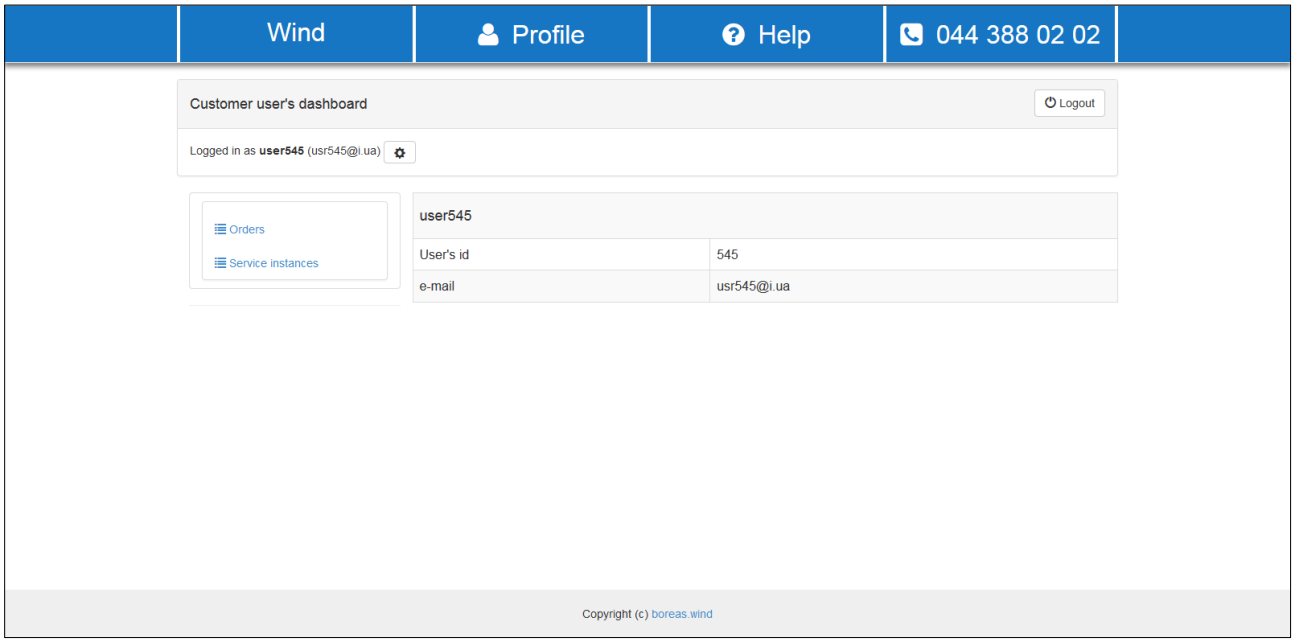


Figure 5 – Customer user's dashboard

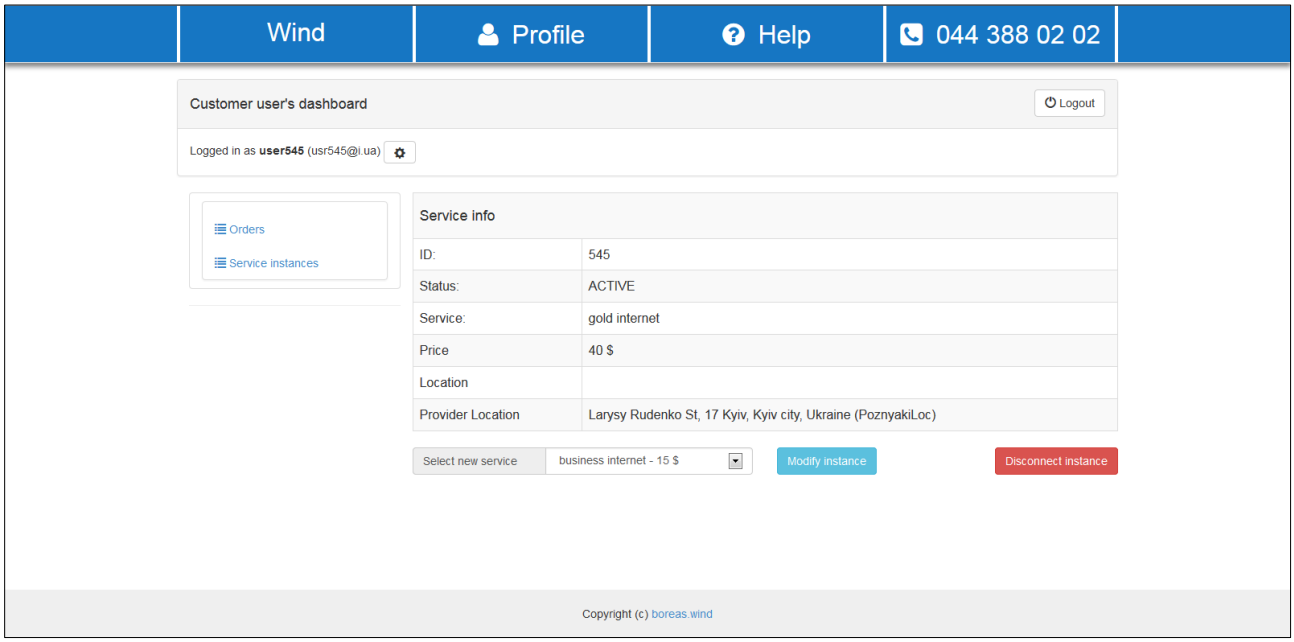


Figure 6 – User's page for review Service Instance

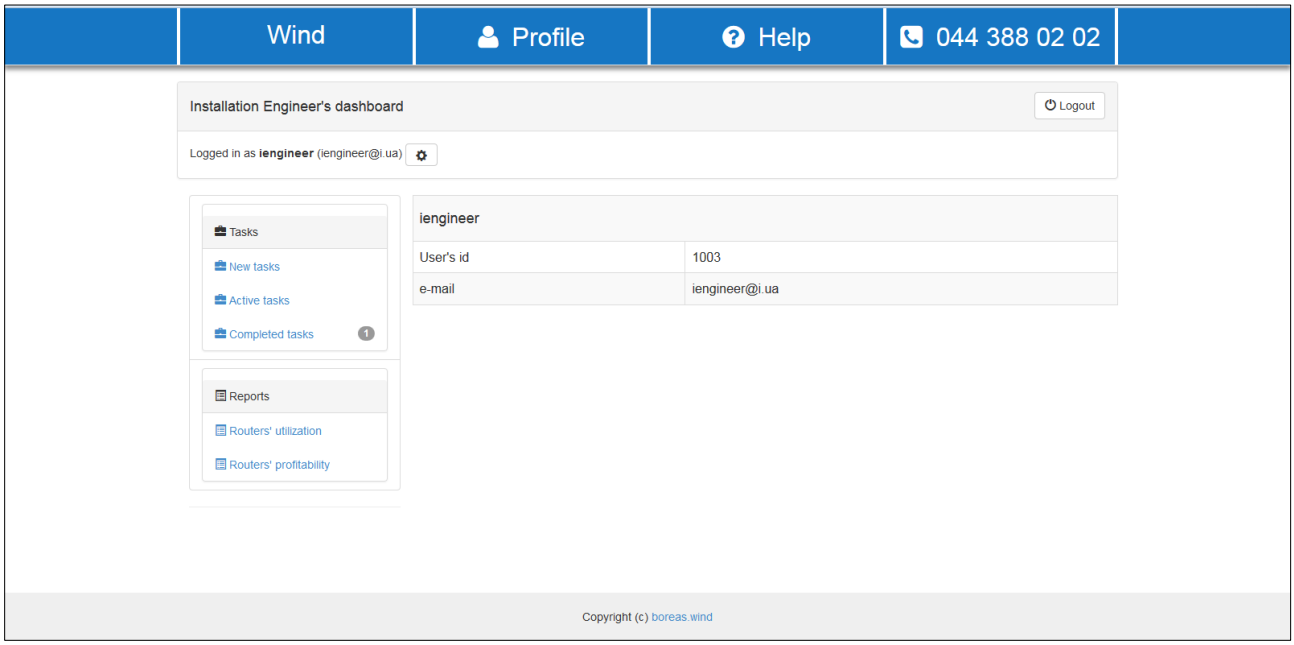


Figure 7 – Instalation engineer's dashboard

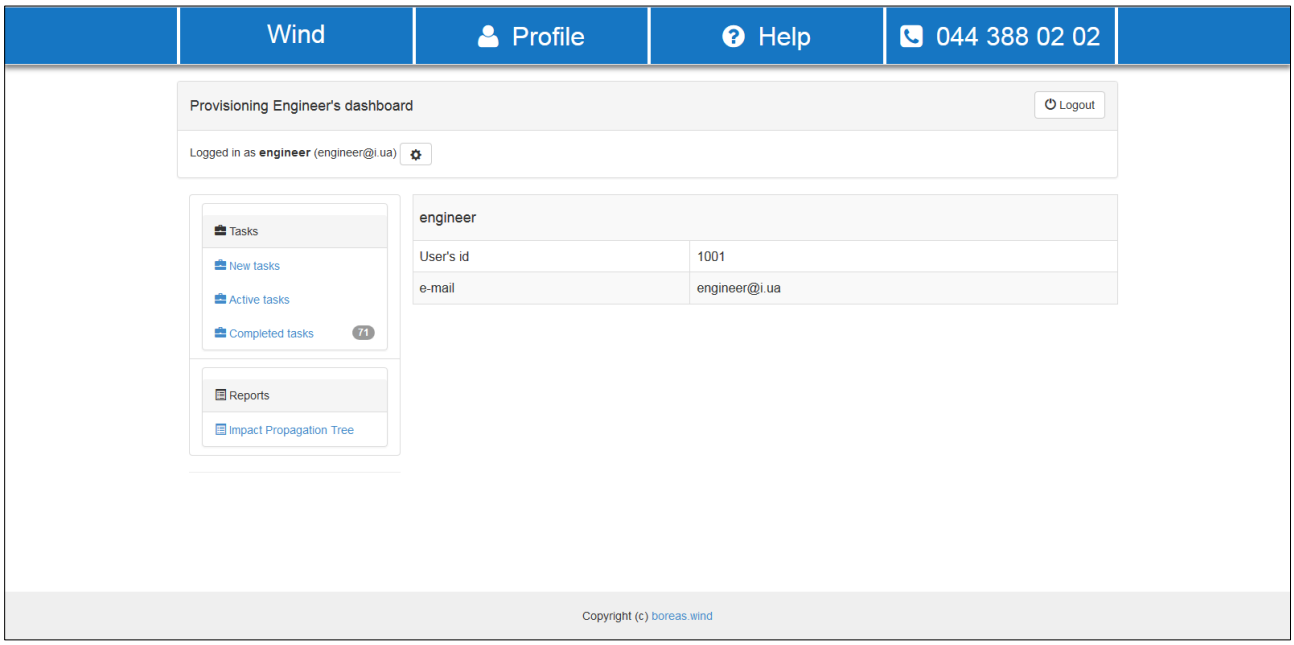


Figure 8 – Provisioning engineer's dashboard

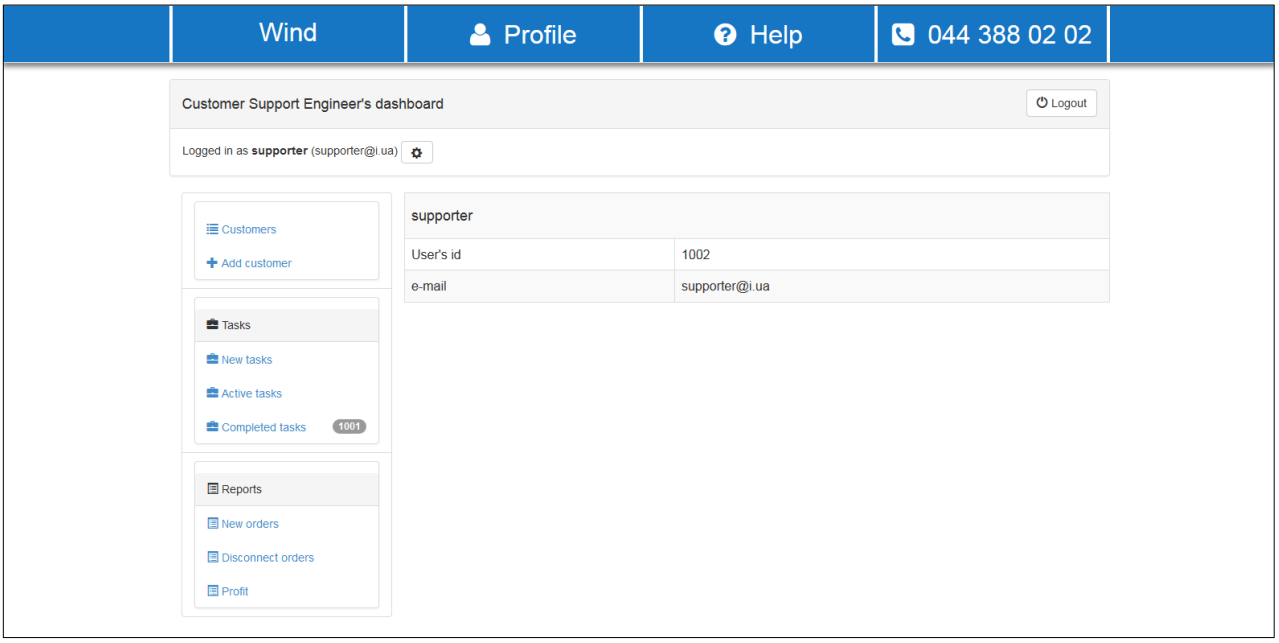


Figure 9 – Customer support engineer's dashboard

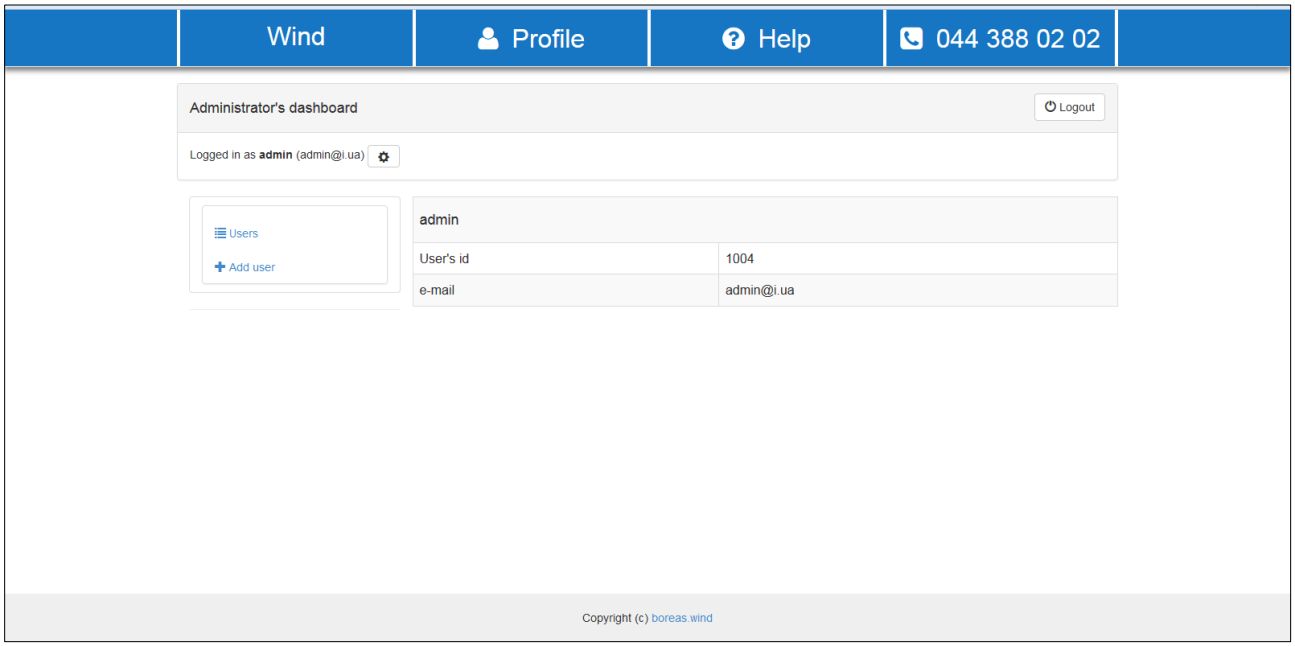


Figure 10 – Administrator's dashboard

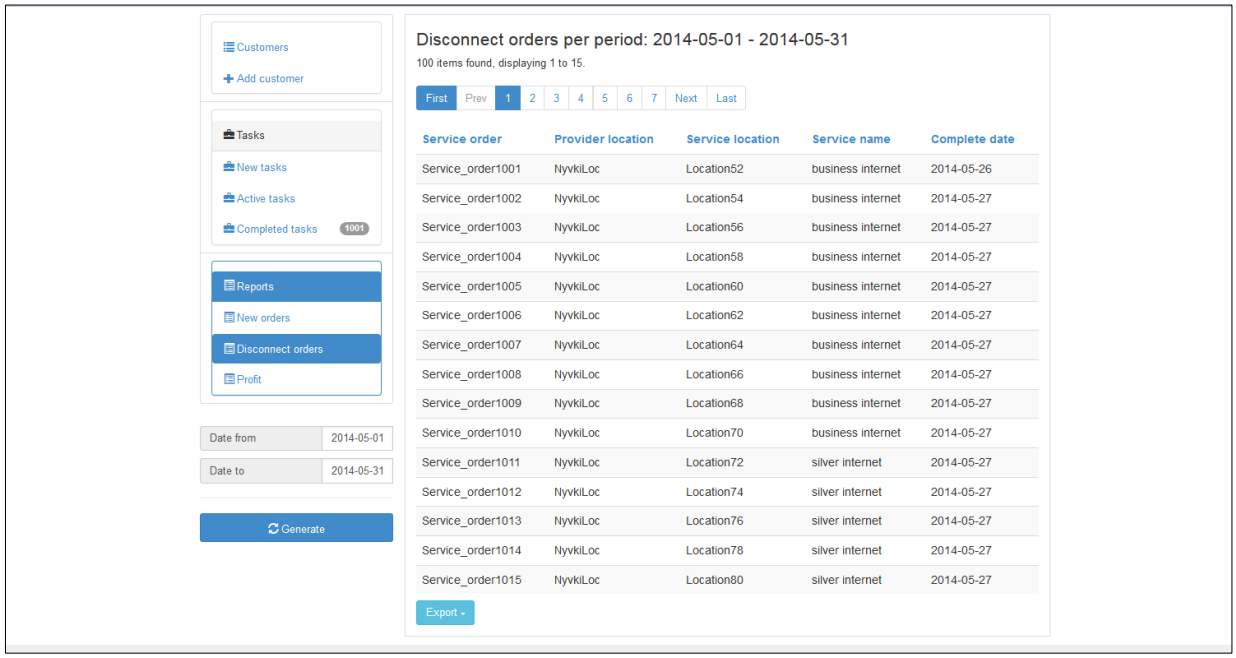


Figure 11 – Reports page

3.3 Supported Business Processes

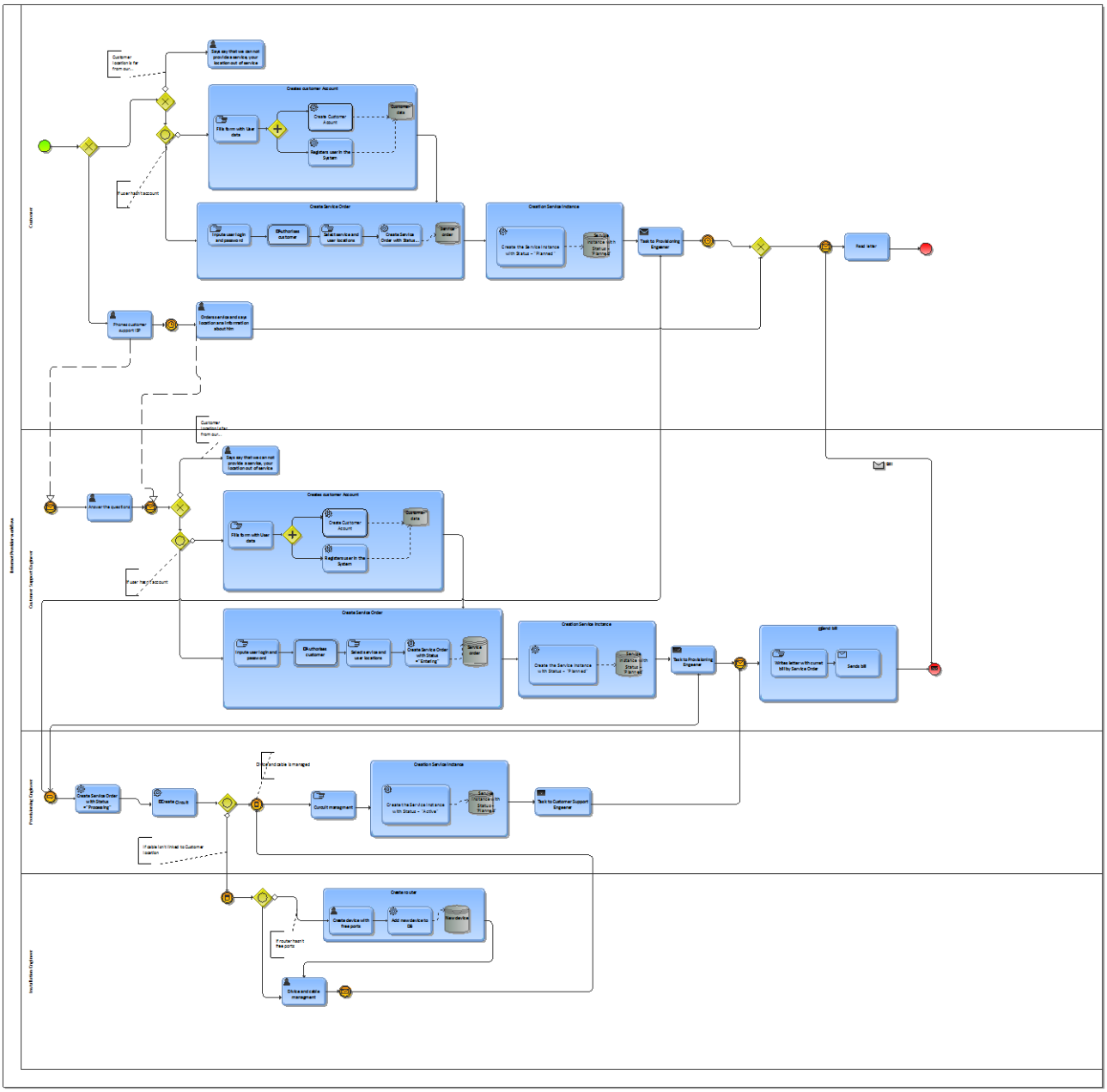


Figure 12 – Business processes

3.4 Sequences

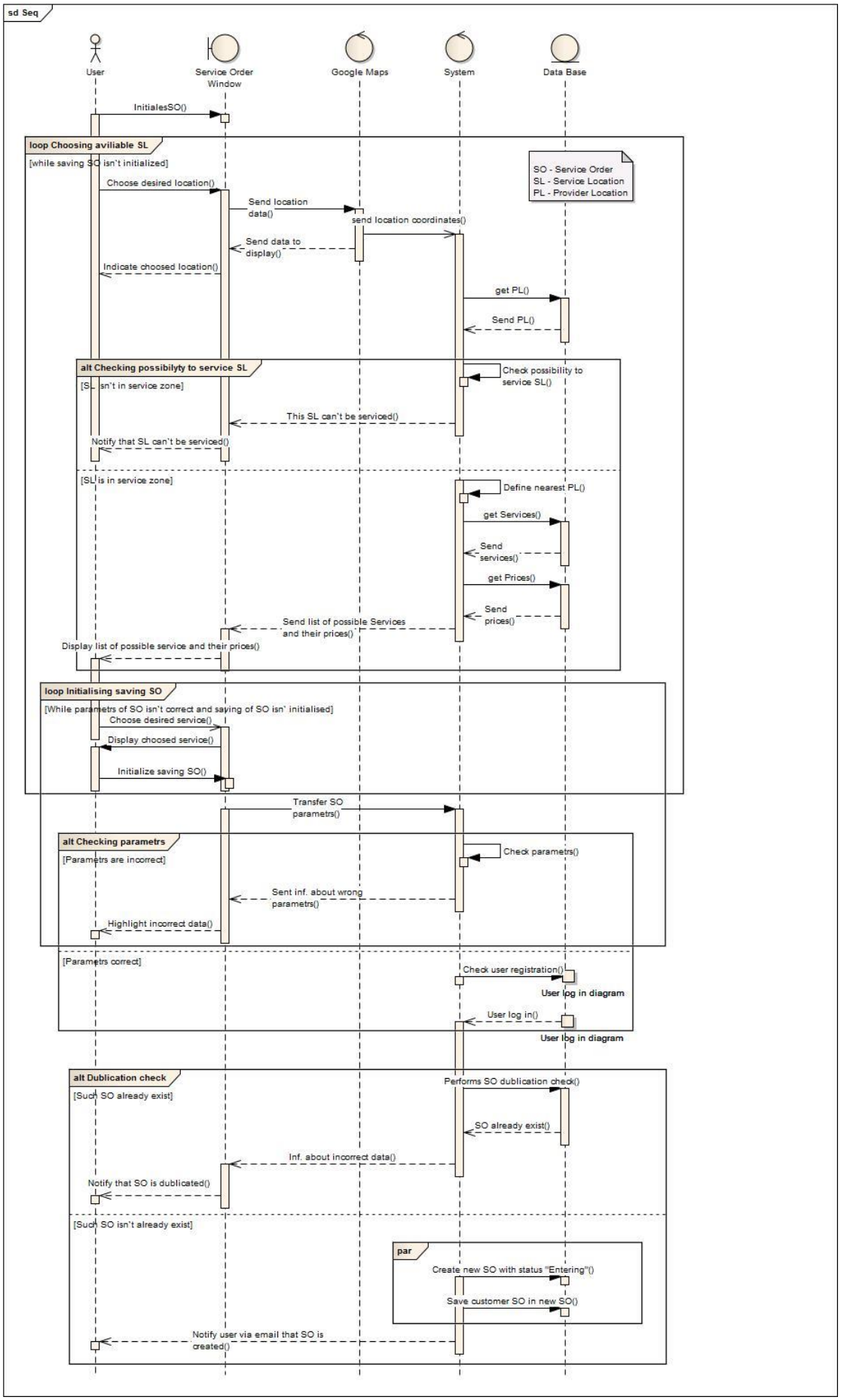


Figure 13 – Sequence diagram Service Order

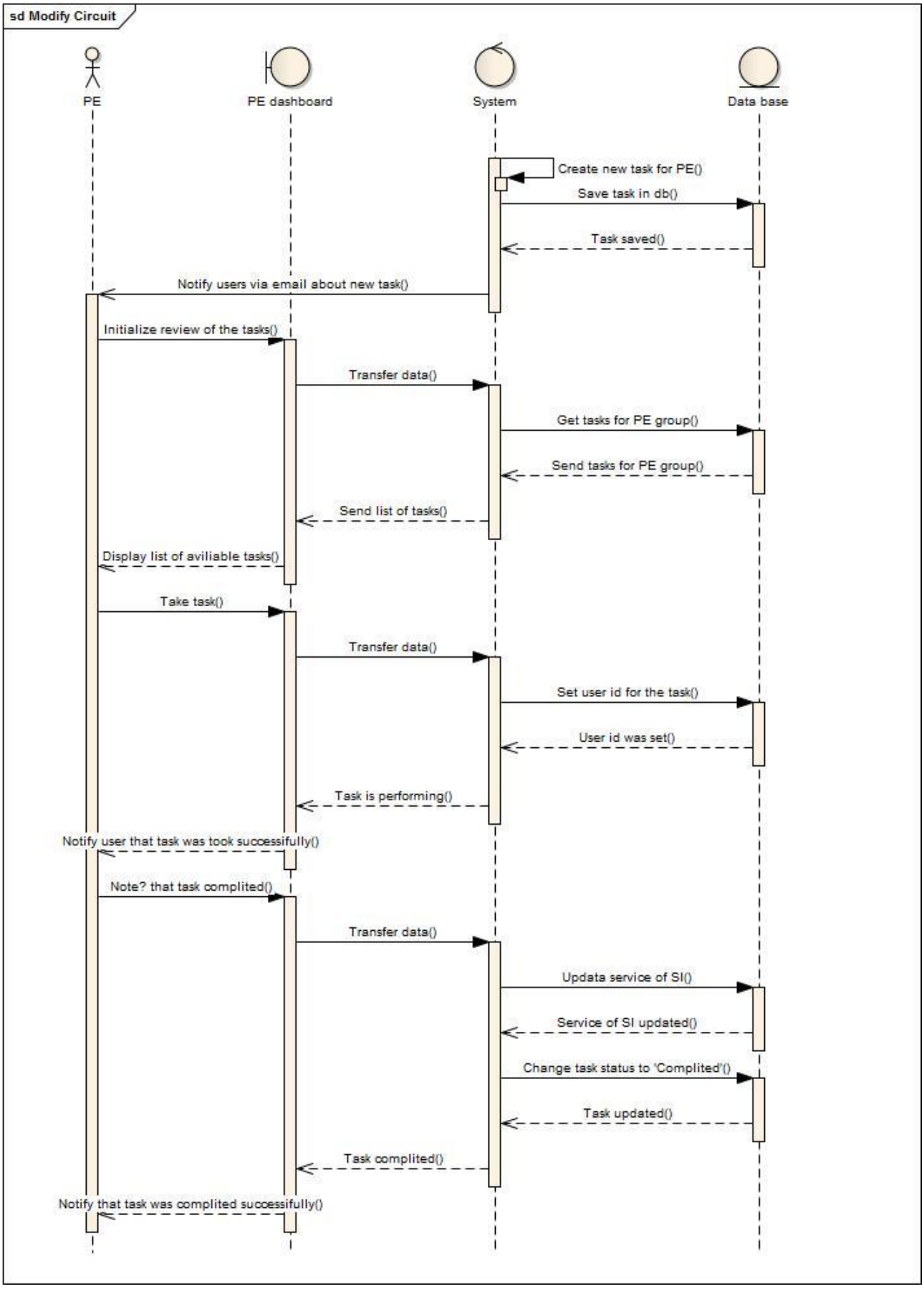


Figure 14 – Sequence diagram modify Circuit

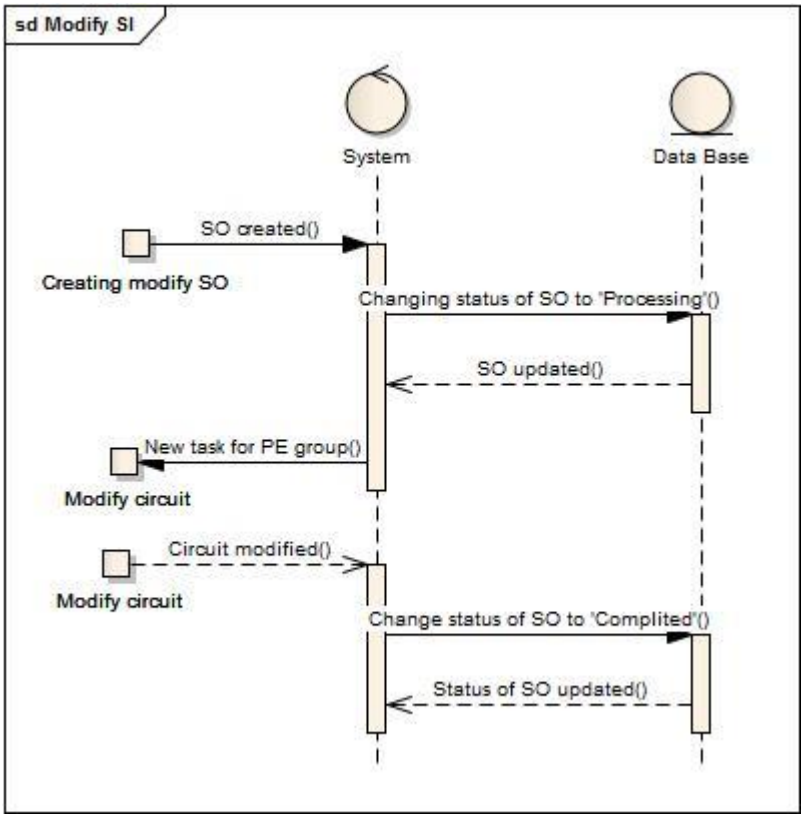


Figure 15 – Sequence diagram modify SI

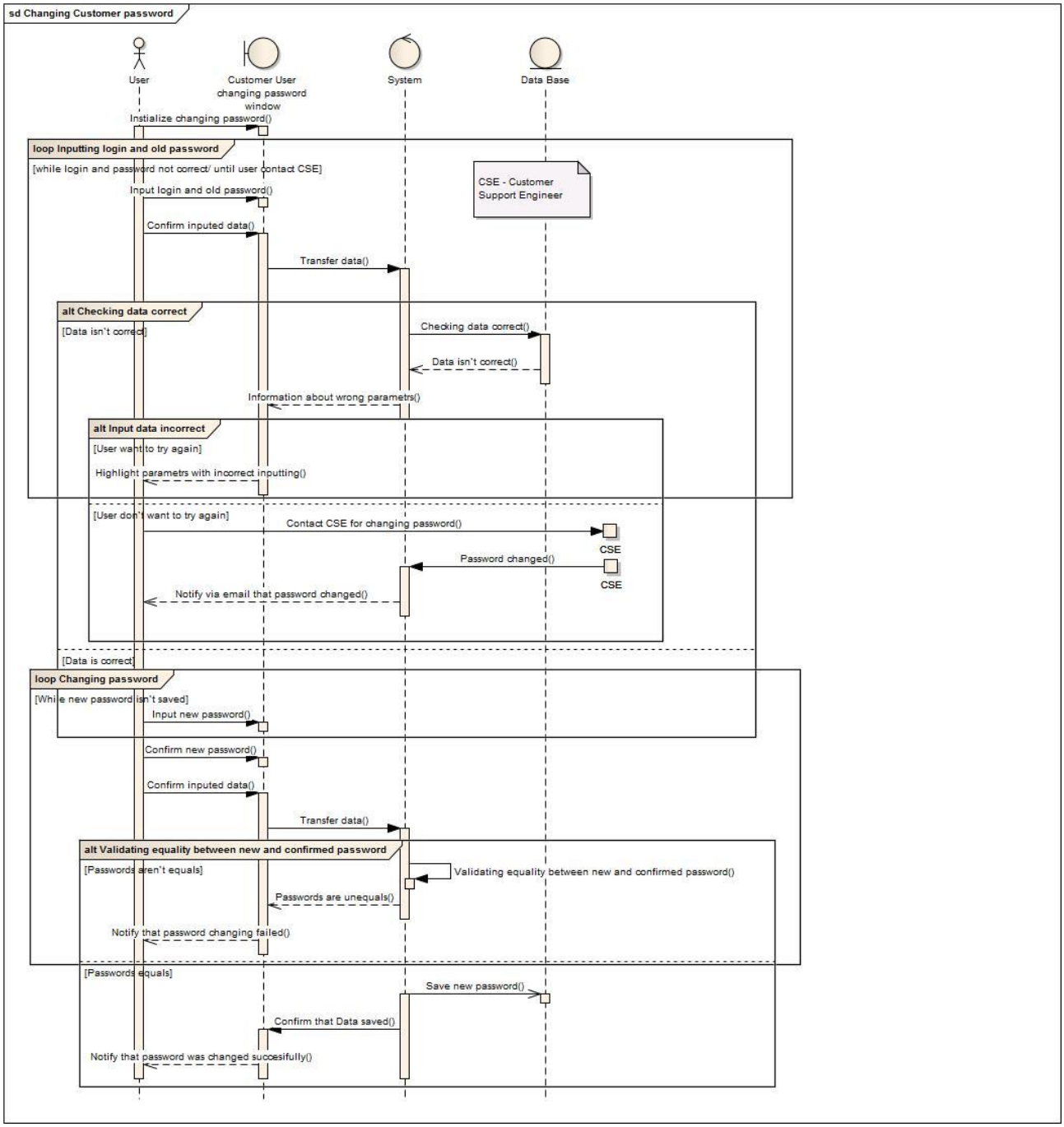


Figure 16 – Sequence diagram changing customer password

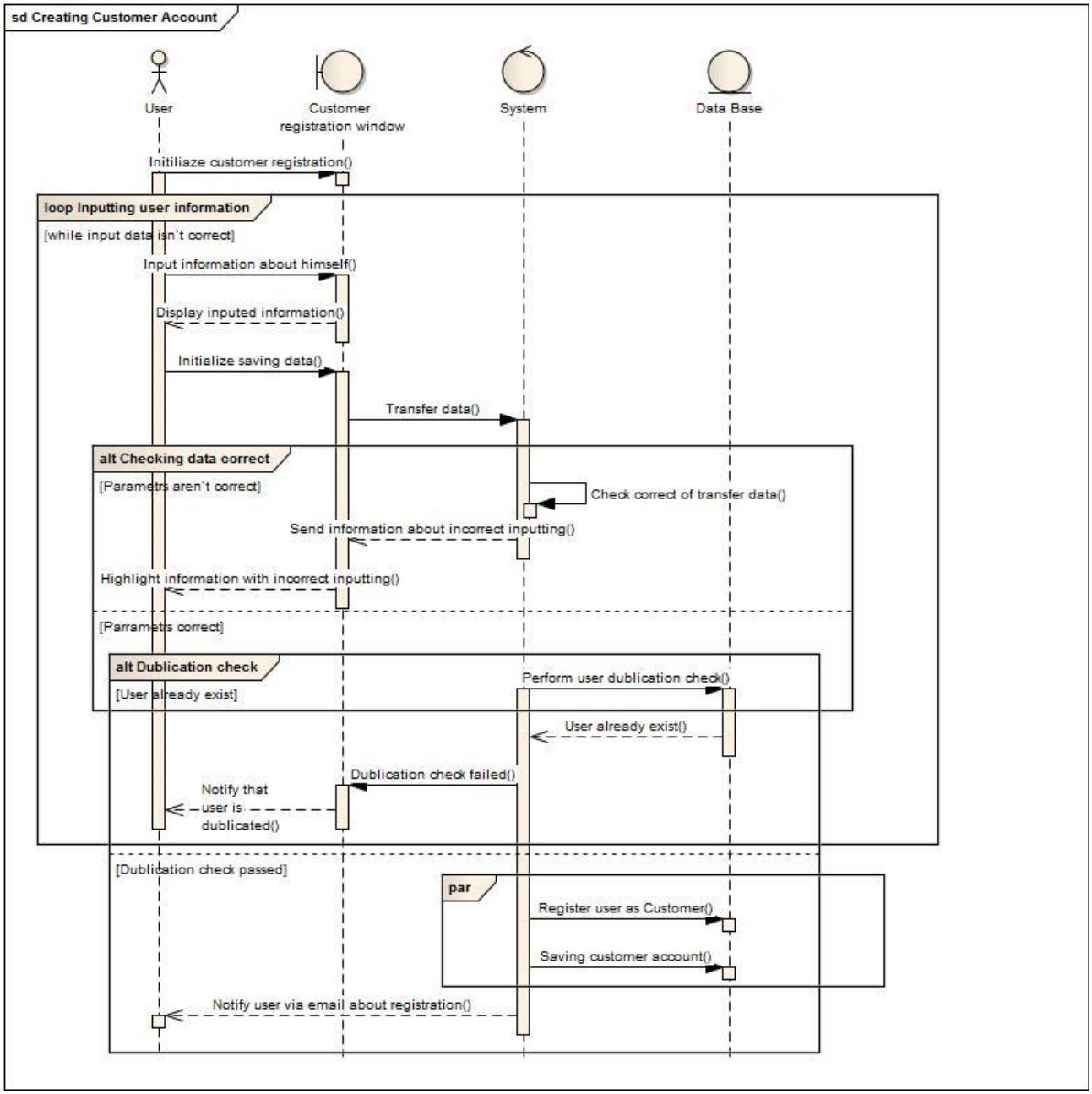


Figure 17 – Sequence diagram create customer account

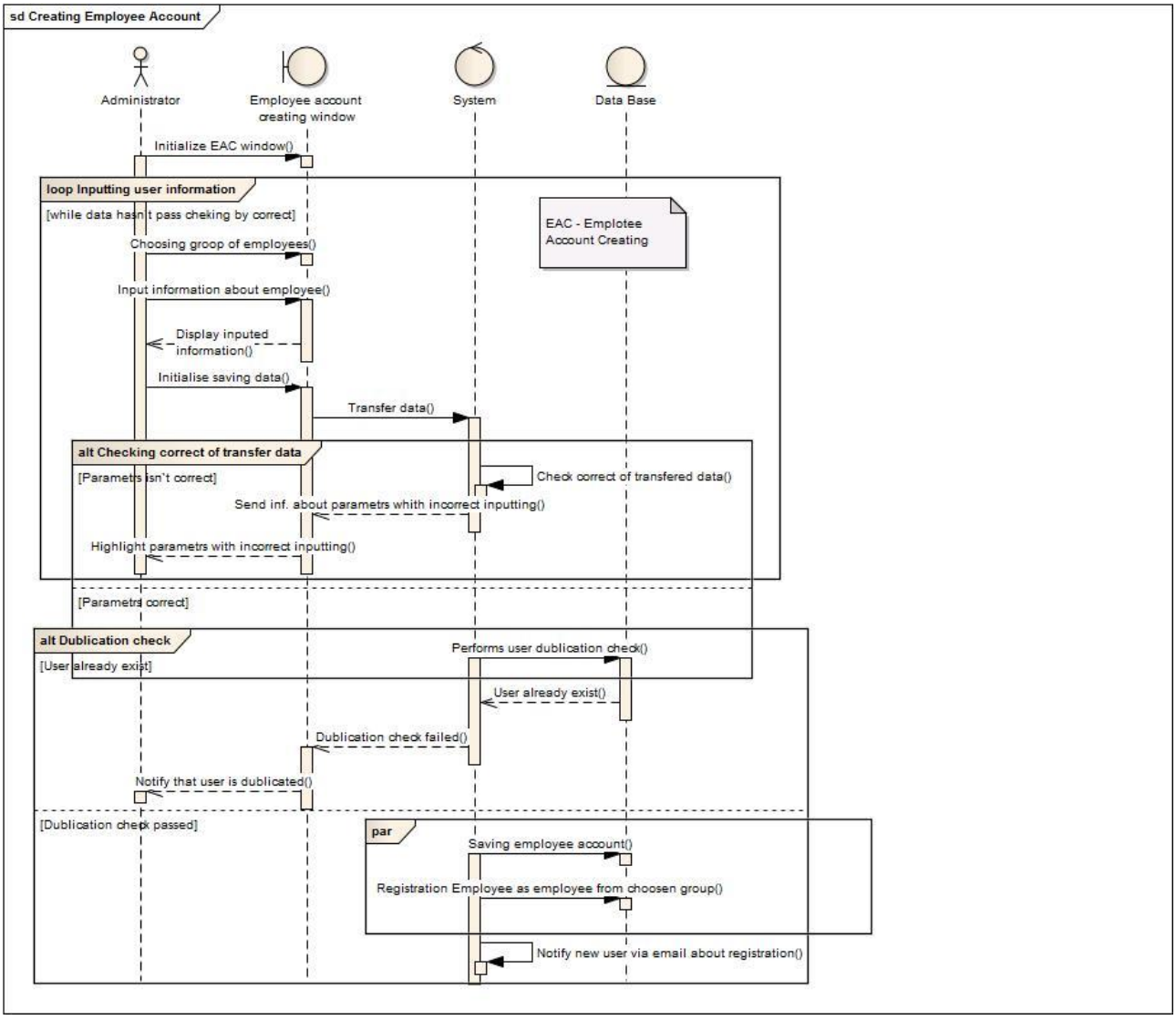


Figure 18 – Sequence diagram create employee account

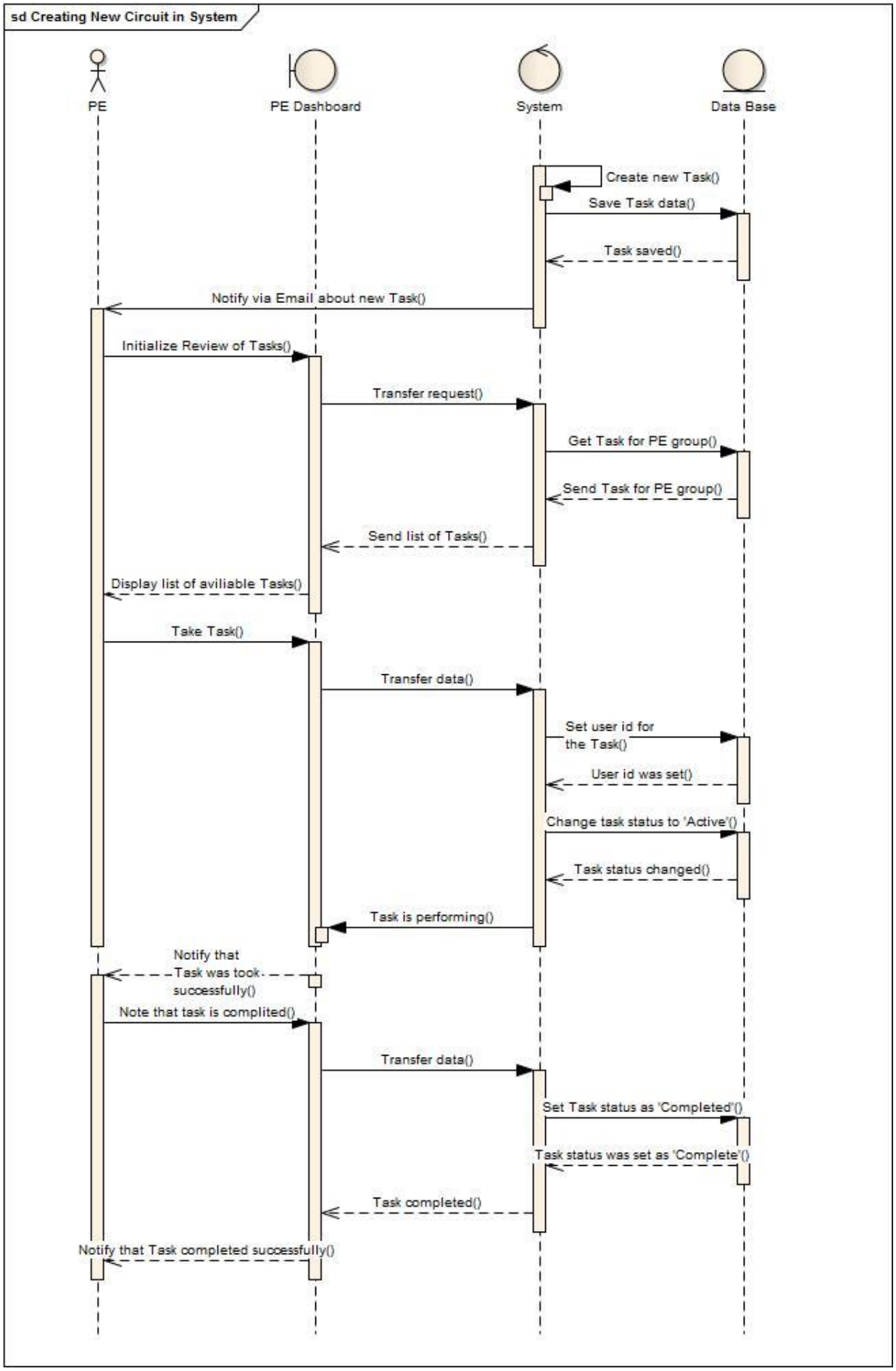


Figure 19 – Sequence diagram create new Circuit in system

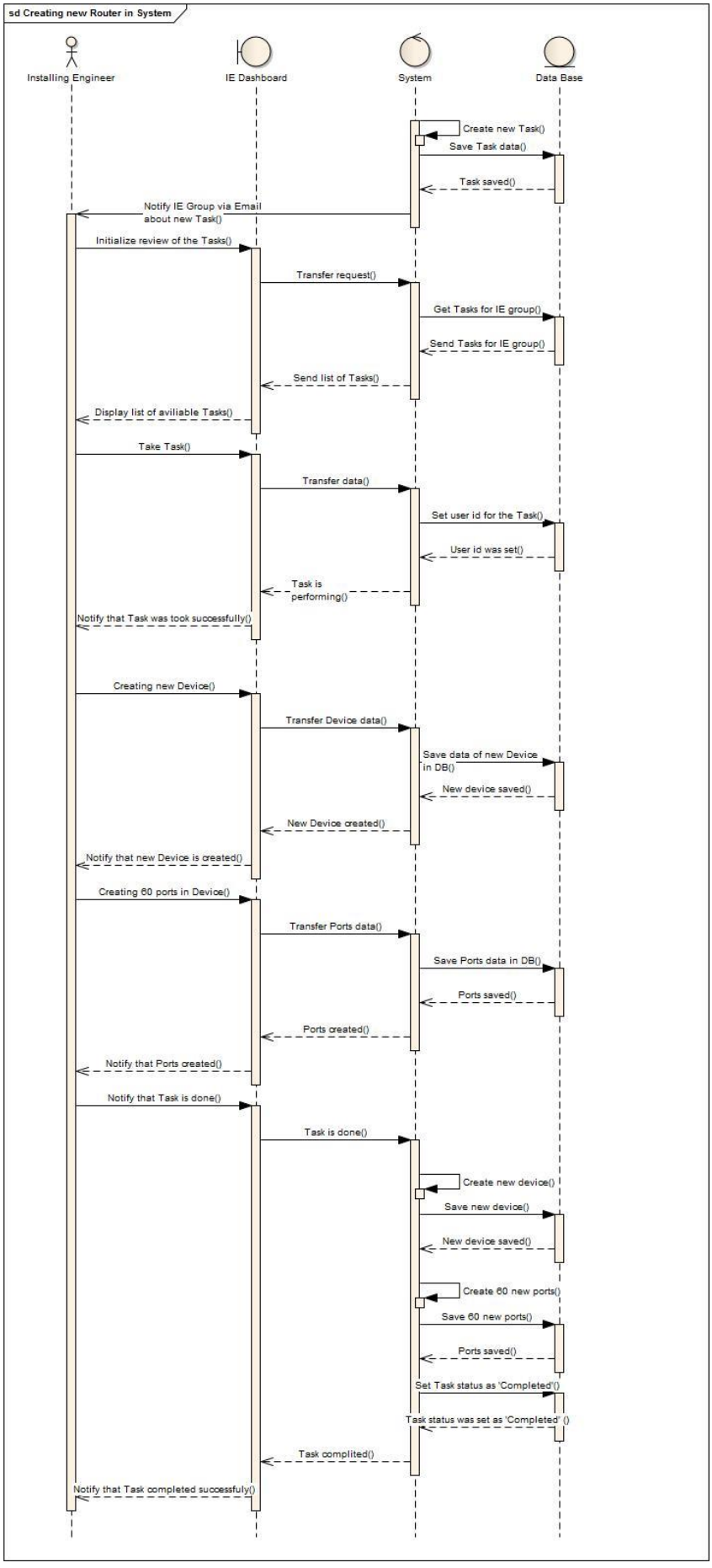


Figure 20 – Sequence diagram create new router in system

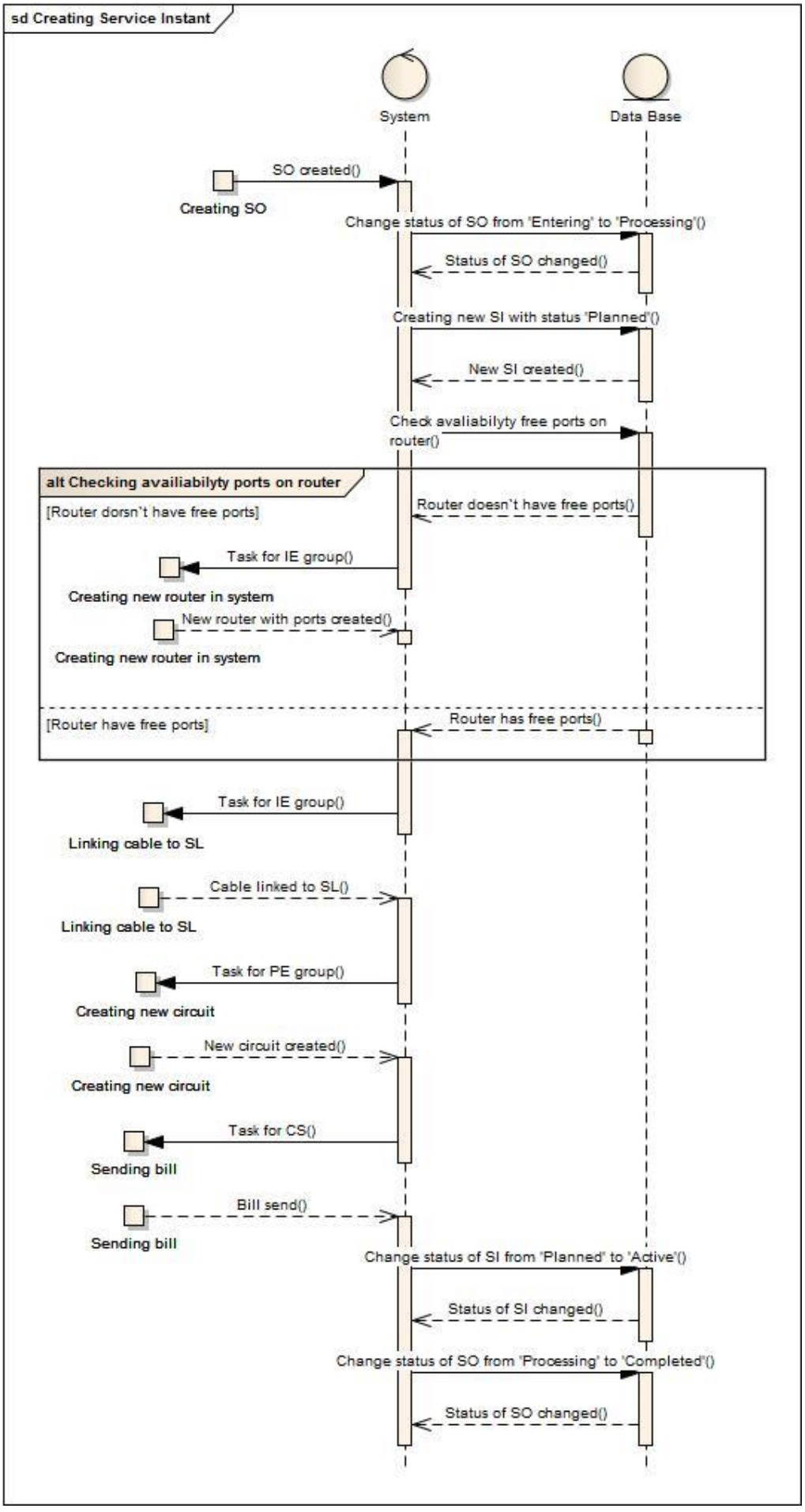


Figure 21 – Sequence diagram create Service Instance

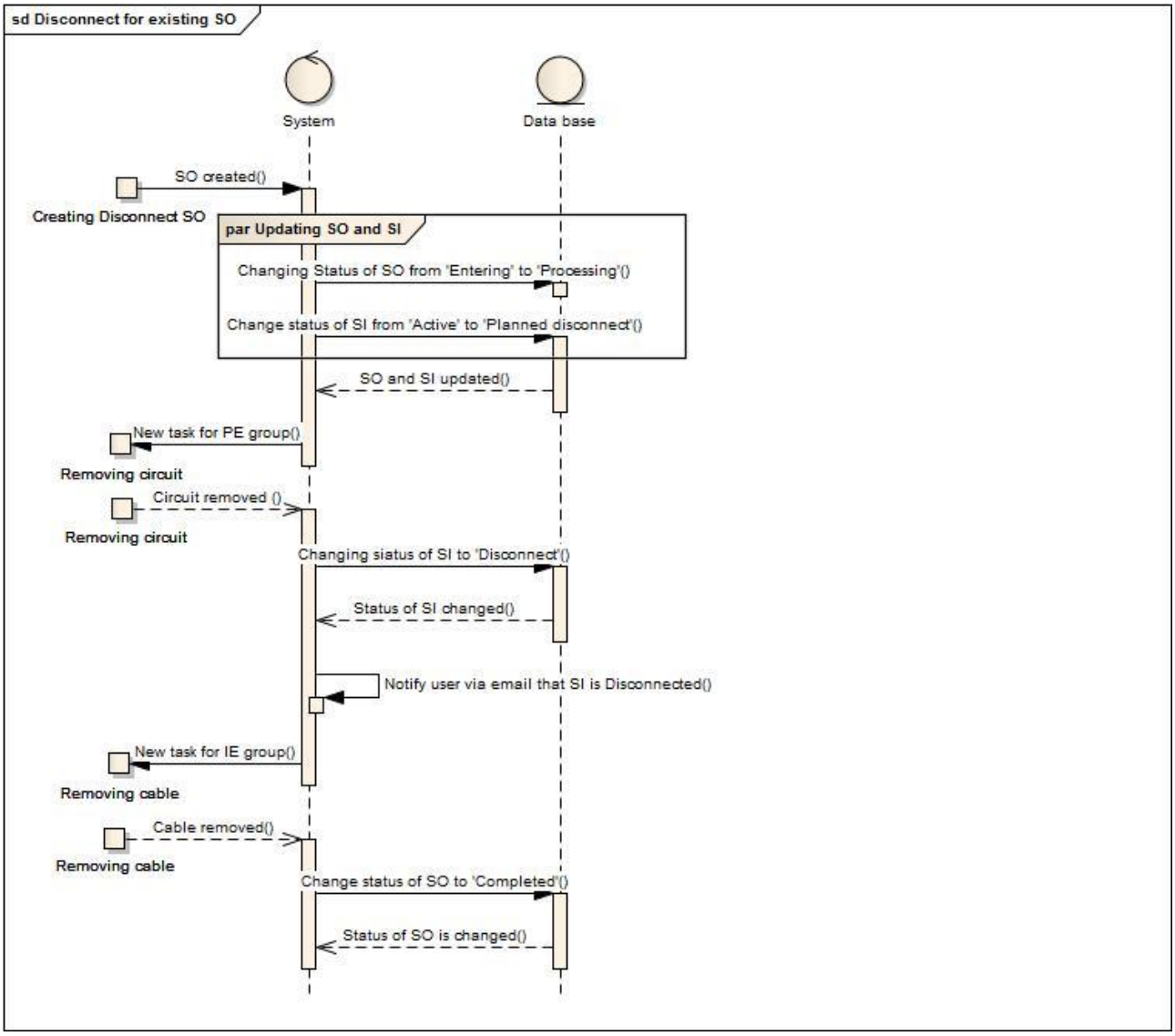


Figure 22 – Sequence diagram disconnect for existinf SI

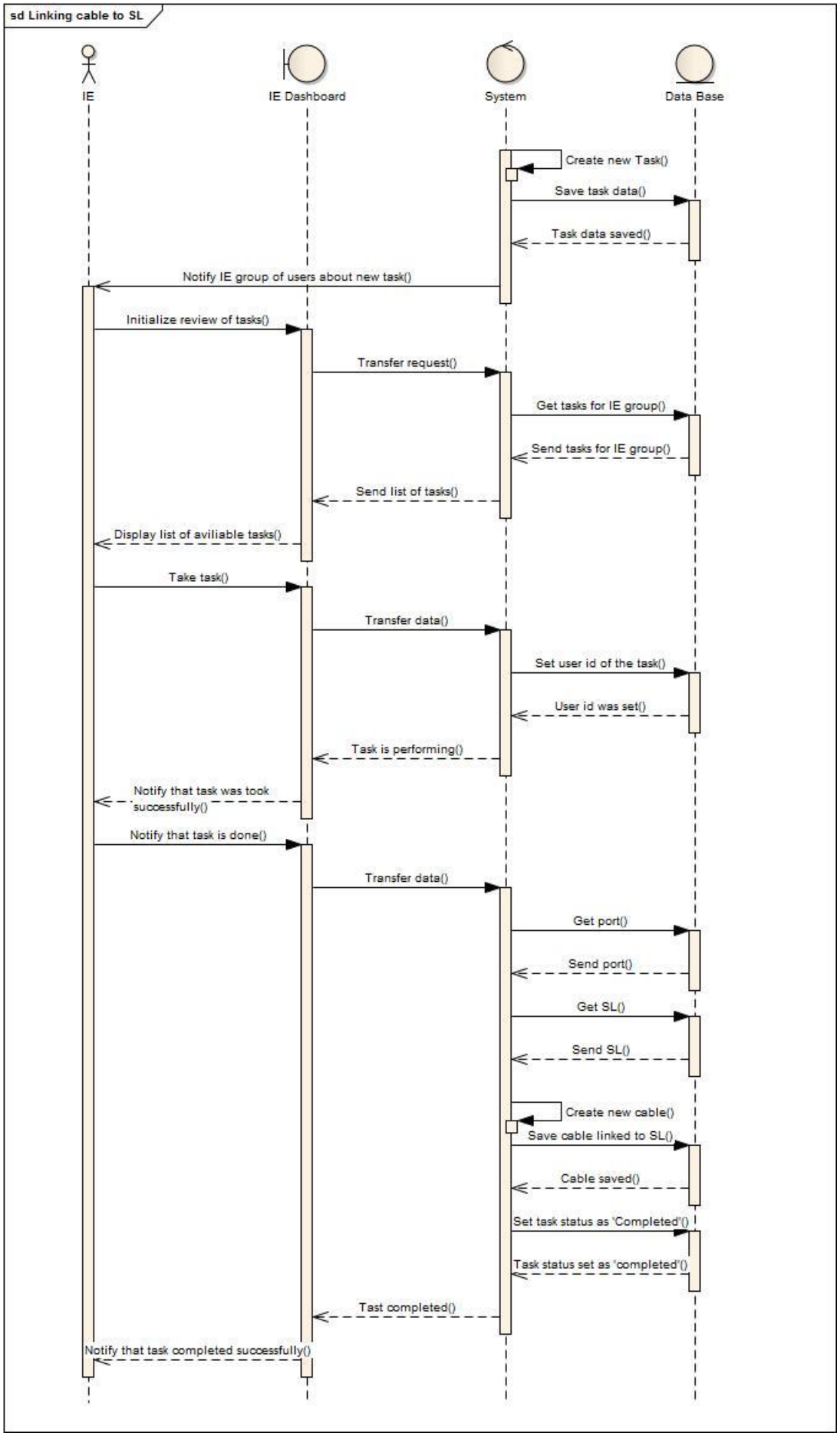


Figure 23 – Sequence diagram linking cable to SL

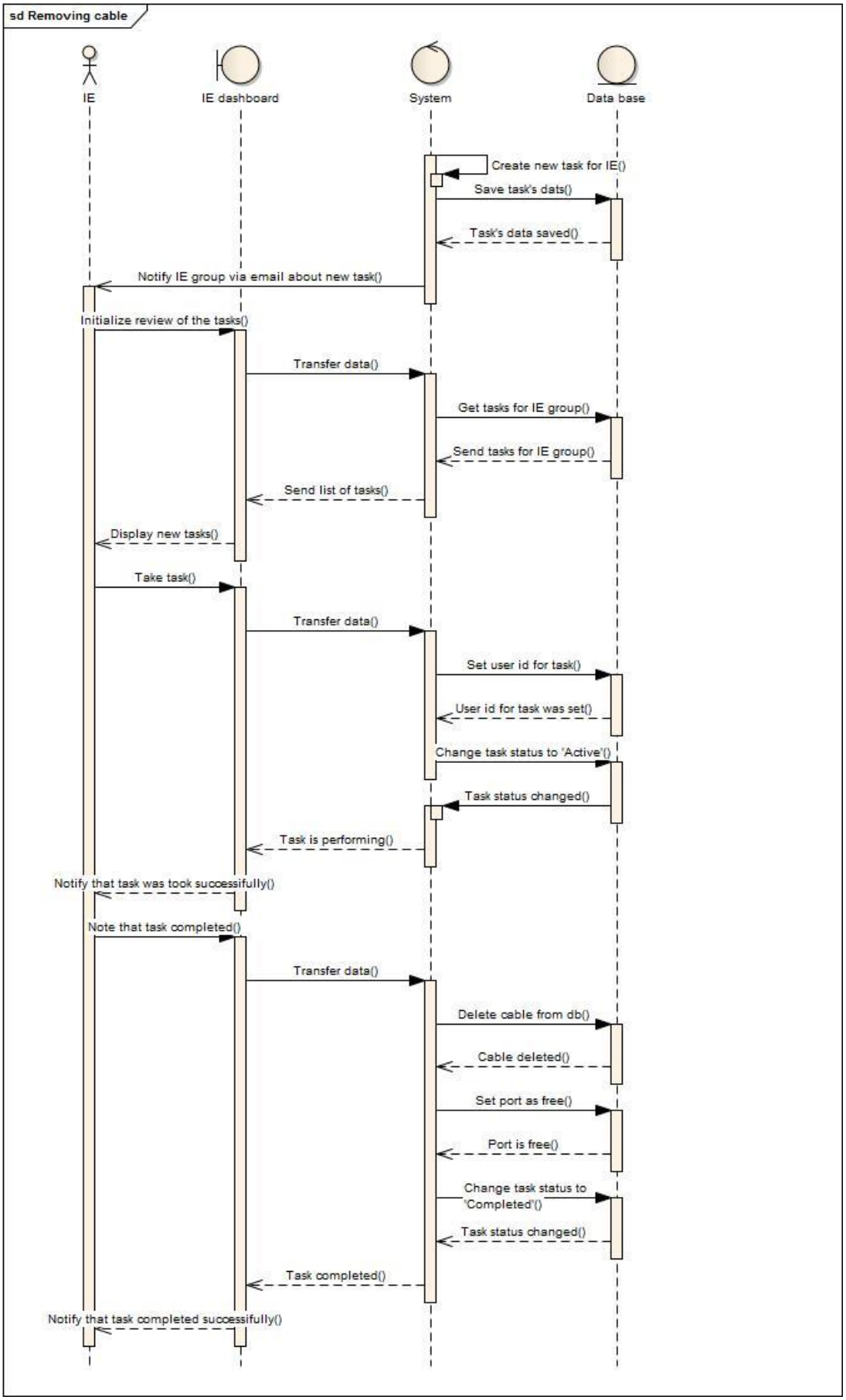


Figure 24 – Sequence diagram removing cable

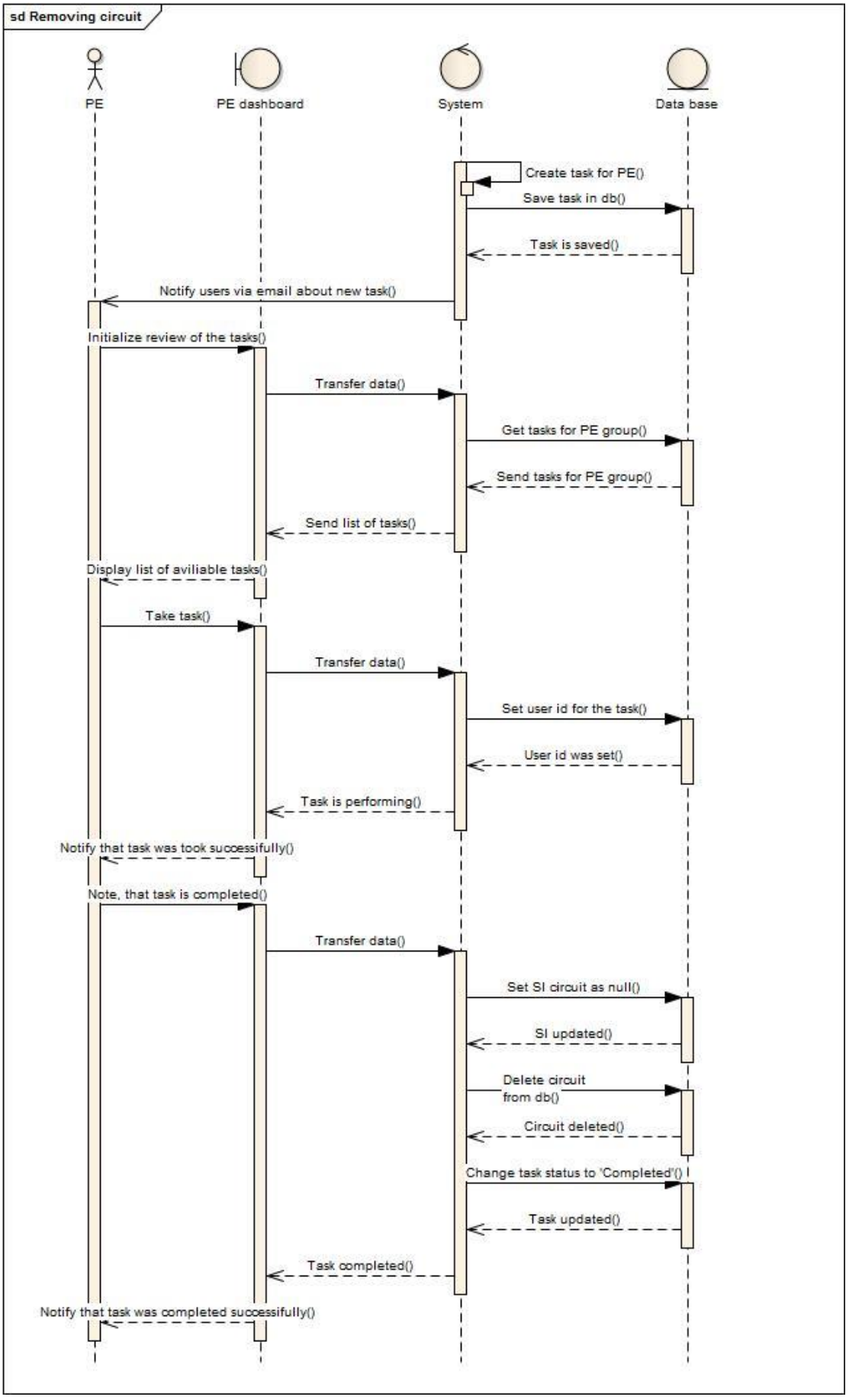


Figure 25 – Sequence diagram removing circuit

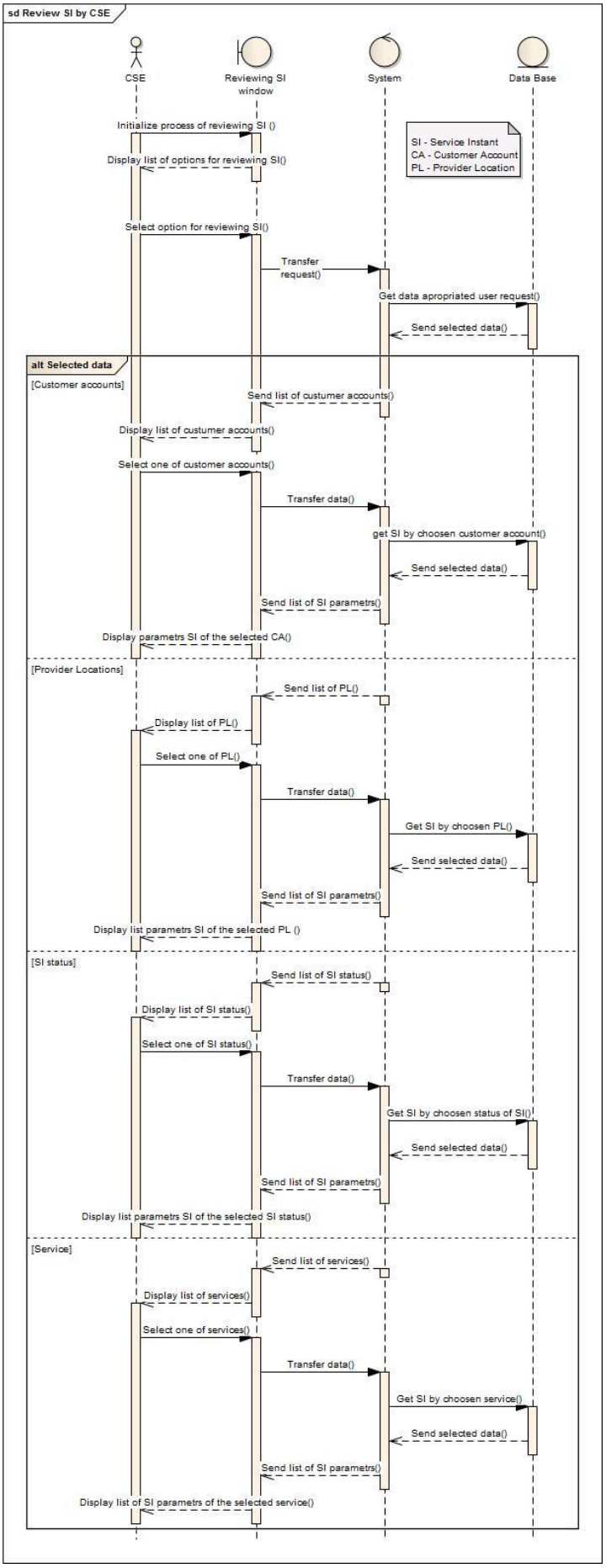


Figure 26 – Sequence diagram review SI by CSE

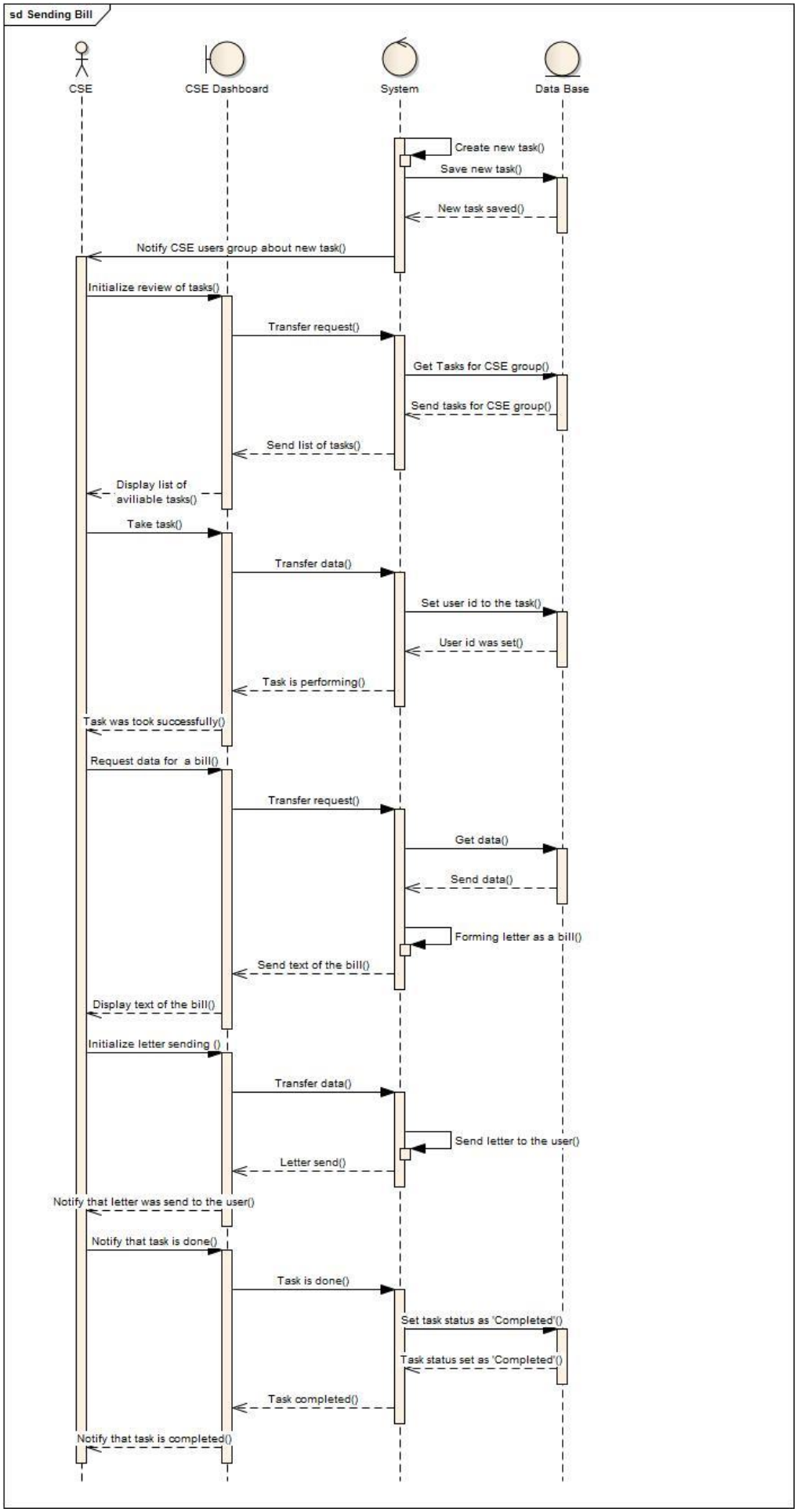


Figure 27 – Sequence diagram sending bill

3.5 Data managment

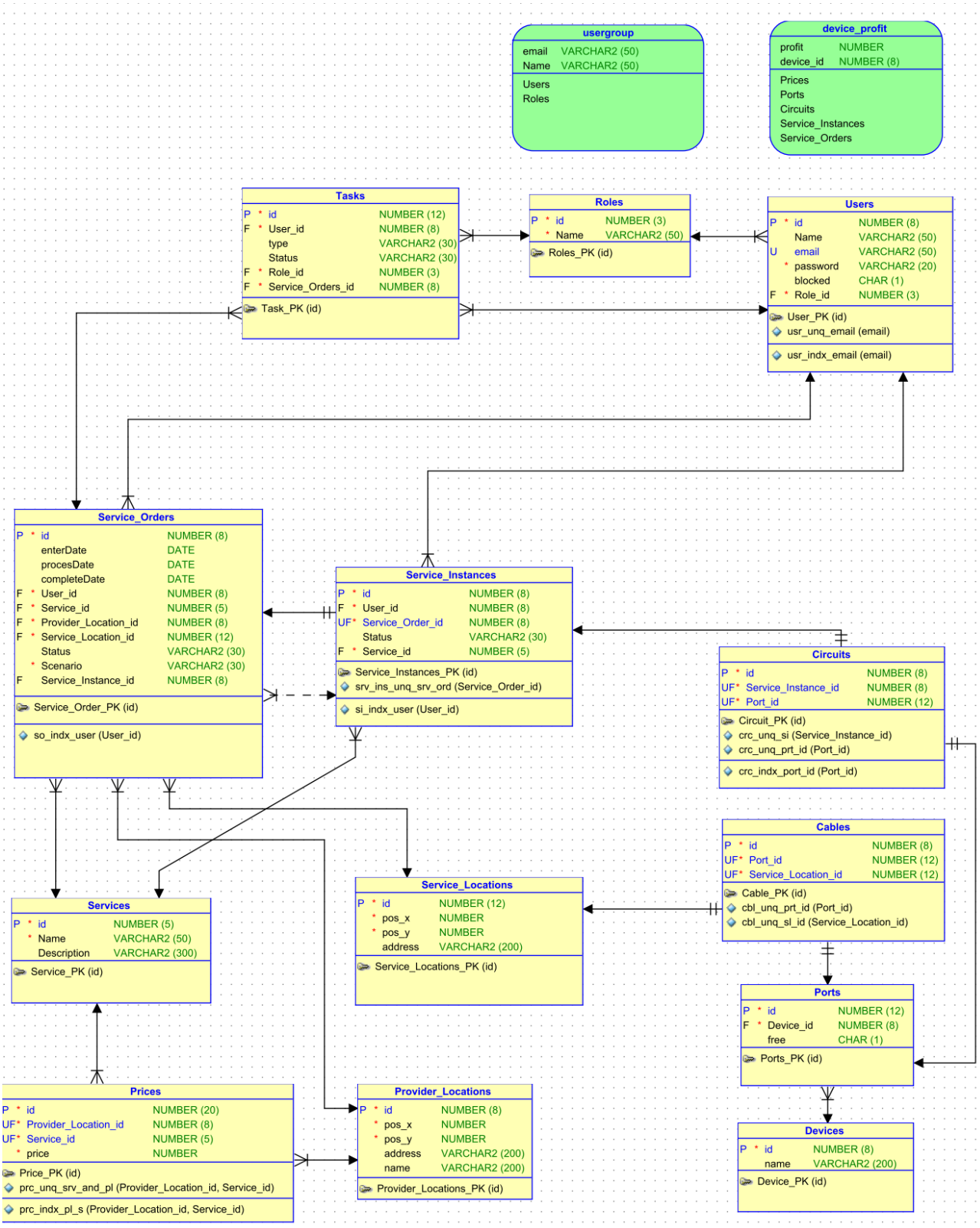


Figure 28 – ER-diagram

3.3 Security Architecture

The system allows to adjust the rights and roles to the user. Depending on the role, the system provides a different user interface and different rights.

Any user from internet can register in system as Customer User. Only Administrator can create employee accounts such as Customer Support Engineer, Provisioning Engineer, Installation Engineer. Only provider employee can perform administrative task.

Security matrix:

Roles Rights	Administrator	Customer Support Engineer	Provisioning Engineer	Installation Engineer	Customer User
Can create employee accounts	Yes	No	No	No	No
Can register in system himself	No	No	No	No	Yes
Can register customer user's accounts	Yes	Yes	No	No	No
Can block other accounts	Yes	No	No	No	No
Can select services based on SL	No	Yes	No	No	Yes
Can review own SI	No	No	No	No	Yes
Can disconnect own SI	No	No	No	No	Yes
Can create new SO for himself	No	No	No	No	Yes
Can create new SO for customer users	No	Yes	No	No	No
Can creatie Devices, Ports and Cables in the system	No	No	No	Yes	No
Can create the	No	No	Yes	No	No

circuit and refer the assigned port to SI					
Can modify SI	No	No	Yes	No	Yes
Can generate RI reports	No	No	No	Yes	No
Can generate SI reports	No	Yes	No	No	No
Can generate CIA reports	No	No	Yes	No	No
Can change own password	Yes	Yes	Yes	Yes	Yes
Can change customer user's password	Yes	No	No	No	No
Can review new task for CSE group	No	Yes	No	No	No
Can review new task for PE group	No	No	Yes	No	No
Can review new task for IE group	No	No	No	Yes	No
Can review list of customer user	Yes	Yes	No	No	No
Can review list of all user	Yes	No	No	No	No

Security for Internet provider "Wind" integrated with existing security mechanism Java Authentication and Authorization Service and GlassFish Security.

4. Reporting

The system provide a possibility to generate and to export reports to Excel, CSV format.

The system can generate:

1) RI reports:
   - Routers utilization and capacity %
   - Most profitable router

   Reports are available to restricted user groups.
2) SI reports
   - New orders per period
   - Profitability by month
   - Disconnect orders per period
3) CIA report
   - Impact Propagation Tree

5 Resource Inventory

Resource Inventory includes resource topology, configuration, status, connectivity, and other information about it in a centralized store. Resource Inventory includes Physical and Logical Inventory, that provides modeling and management capabilities. The system can store information about devices, connected cables, installed ports, circiouts and their location. It is possible to add new devices.

6 Test Strategy

1. System description:

- Database Oracle XE;
- Application server Oracle Glassfish 4.0;
- Production server Amazon AWS.

2. Strategy description

Testing process includes 3 rounds. WIND.TC.SEC.004 test-case based on “white box” strategy for mandatory requirements control in system. Rest test-cases & test-sequences based on “black box” strategy. Some test-cases performed by one users group, but control of their result performs by other group.

3. Rounds of testing:

- Test-cases for security and access control testing execution;
- Test-cases for interoperability testing execution;
- Test-sequences for functional testing execution.

4. Start of testing criteria:

- Production server created;
- All mandatory functional requirements are completed;
- Software architecture and design documentation completed.

5. End of testing criteria:

- All test-cases and test-sequences are executed;
- System has less than 2 non-blocker and non-critical errors in test-cases based on optional requirements;
- System has no blocker and critical errors.

7 Product Testing

Action	Round 1. May 8-9, 2014	Round 2. May 10, 2014	Round 3. May 11, 2014
WIND.TC.026. Non-functional requirements – Positive Scenario 1	Completed	-	-
WIND.TC.023. SQL-injection – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.024. Viewing dashboards without right access – Positive Scenario 1	Completed	-	Completed
WIND.TC.025. Viewing reports without right access – Positive Scenario 1	Completed	-	Completed
WIND.TS.001. "New user's day" test-sequence	89% Completed	Completed	Completed
WIND.TC.027. Map Integration – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.009. Creating Service Order – Negative Scenario 1	Completed	Completed	Completed
WIND.TC.009. Creating Service Order – Negative Scenario 2	Completed	Completed	Completed
WIND.TC.009. Creating Service Order – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.002. Creating Customer Accounts – Negative Scenario 1	Completed	Completed	Completed
WIND.TC.002. Creating Customer Accounts – Negative Scenario 2	404 Error	Completed	Completed
WIND.TC.002. Creating Customer Accounts – Negative Scenario 3	Completed	Completed	Completed
WIND.TC.002. Creating Customer Accounts – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.017. E-mail Notification – Positive Scenario 1	Completed	Completed	Completed
WIND.TS.002. "Customer user's day" test-sequence	Completed	Completed	Completed
WIND.TC.022. User Logs In – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.004. Changing Customer Password – Negative Scenario 1	Completed	Completed	Completed
WIND.TC.004. Changing Customer Password – Negative Scenario 2	Completed	Completed	Completed
WIND.TC.004. Changing Customer Password – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.009. Creating Service Order – Negative Scenario 1	Completed	Completed	Completed
WIND.TC.009. Creating Service Order – Negative Scenario 2	Completed	Completed	Completed
WIND.TC.009. Creating Service Order – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.017. E-mail Notification – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.015. Modifying Parameters for Service Instance – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.016. Disconnect for Existing Service Instance – Positive Scenario 1	Completed	Completed	Completed
WIND.TS.003. "Installation Engineer's day" test-sequence	Completed	Completed	Completed
WIND.TC.022. User Logs In – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.007. Installing New Router in System – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.007. Installing New Router in System – Positive Scenario 2	Completed	Completed	Completed
WIND.TC.018-020. Creating Reports	Completed	Completed	Completed
WIND.TC.021. Exporting Reports – Positive Scenario 4	Completed	Completed	Completed
WIND.TC.013. Bill Sending – Positive Scenario 1	Completed	Completed	Completed
WIND.TS.004. "Provisioning Engineer's day" test-sequence	Completed	Completed	Completed
WIND.TC.022. User Logs In – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.011. Creating New Circuit in System – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.012. Removing the Citcuit in System – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.001. Modifying Parameters for Service Instance – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.018-020. Creating Reports	Completed	Completed	Completed
WIND.TC.021. Exporting Reports – Positive Scenario 3	Completed	Completed	Completed
WIND.TC.013. Bill Sending – Positive Scenario 1	Completed	Completed	Completed
WIND.TS.005. "Customer Support Engineer's day" test-sequence	90 % Completed	Completed	Completed
WIND.TC.022. User Logs In – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.008. Creating Customer Account by Customer Support Engineer – Negative Scenario 1	Completed	Completed	Completed
WIND.TC.008. Creating Customer Account by Customer Support Engineer – Negative Scenario 2	404 Error	Completed	Completed
WIND.TC.008. Creating Customer Account by Customer Support Engineer – Negative Scenario 3	Completed	Completed	Completed

Action	Round 1. May 8-9, 2014	Round 2. May 10, 2014	Round 3. May 11, 2014
WIND.TC.008. Creating Customer Account by Customer Support Engineer – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.005. Review Service Instance – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.006. Review Service Order – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.018-020. Creating Reports	Completed	Completed	Completed
WIND.TC.021. Exporting Reports – Positive Scenario 2	Completed	Completed	Completed
WIND.TC.013. Bill Sending – Positive Scenario 1	Completed	Completed	Completed
WIND.TS.005. "Customer Support Engineer's day" test-sequence	Completed	Completed	Completed
WIND.TC.001. Creating Employee Account – Negative Scenario 1	Completed	Completed	Completed
WIND.TC.001. Creating Employee Account – Negative Scenario 2	Completed	Completed	Completed
WIND.TC.001. Creating Employee Account – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.001. Creating Employee Account – Positive Scenario 2	Completed	Completed	Completed
WIND.TC.001. Creating Employee Account – Positive Scenario 3	Completed	Completed	Completed
WIND.TC.003. Blocking Accounts – Positive Scenario 1	Completed	Completed	Completed
WIND.TC.003. Blocking Accounts – Positive Scenario 2	Completed	Completed	Completed
WIND.TC.003. Blocking Accounts – Positive Scenario 3	Completed	Completed	Completed
WIND.TC.003. Blocking Accounts – Positive Scenario 4	Completed	Completed	Completed
WIND.TC.003. Blocking Accounts – Negative Scenario 1	Completed	Completed	Completed
WIND.TC.003. Blocking Accounts – Negative Scenario 2	Completed	Completed	Completed
WIND.TC.003. Blocking Accounts – Negative Scenario 3	Completed	Completed	Completed
WIND.TC.003. Blocking Accounts – Negative Scenario 4	Completed	Completed	Completed
WIND.TC.018-020. Creating Reports	Completed	Completed	Completed
WIND.TC.021. Exporting Reports – Positive Scenario 1	Completed	Completed	Completed
Overal	99 % Completed, 2 bugs	Completed, 0 bugs	Completed, 0 bugs