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| **Corporate Digital Banking**  **Enhancement of New Application**  **[CR23001]**  **for**  **BSNeBiz** |
| Performance Testing Report |
|  |
| ***(PENRIL/BSN-PERF-TEST/BSNeBiz/01) – [CR23001])***  ***Revision: 00*** |
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Performance Testing Acceptance

I/We hereby verify that this Performance Testing Acceptance Document consists of all the information requested by Bank Simpanan Nasional.

I/We also hereby AGREE that this satisfies our entire performance test result for DB Tech Refresh (MSSQL 2019) in UAT environment.

Bank Simpanan Nasional:

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| Approved by | Role | Signature | Date |
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**Document Management**

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| Rev. No | Date Update | Description of Change | Updated By | Reviewed By |
| 00 | 21/Sept/2023 | Initial Release | Nurin Sabrini Binti Azauddin | Najmi Bin Pasarudin |
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# Chapter 1 - Introduction

## Background

Bank implements the Enhancement of New Application Form in BSNeBiz and IBAM system, which is customer able to make new application and digital signing via online. However, the bank requested Penril to perform a performance report at BSNeBiz New Application Form.

## Purpose

Bank need to ensure that by implementing BSNeBiz New Application Form and integrating IB to this new system will not cause major performance degradation.

Thus, this document describes the Performance Test Result before and after IB integration to BSNeBiz New Application Form in the UAT environment.

# Chapter 2 – Content

## Execution Strategy

### Type of testing: Load Testing

A load test is a planned test to perform a specified number of requests to a system in order to test the query to DB under specific levels of simultaneous requests. A load test ensures that CDB is capable of handling an expected volume of traffic, and therefore is sometimes referred to as volume testing.

The goal of this load test is to prove that with new integration to BSNeBiz New Application Form, it can handle the expected volume with minimal to acceptable performance degradation. In this test scenario, we simulated the maximum number of requests with the goal of less than 1% of errors.

### Methods of Testing

Penril conducted load testing to the selected menu mentioned in Chapter 1 - 2 Purpose - Module to Test. The test scenarios will be New Application, because this is considered one of modules that perform heavy query to database and highest number of touch points BSNeBiz. Below is the list of detailed test modules in BSNeBiz:

|  |  |  |  |
| --- | --- | --- | --- |
| System | Function | Module | Test Case |
| BSNeBIZ | New Application | New Application Page – Step 1  (ibNewApplicationFormStep1.action) | [TS-CDB-FORM-1] |
| New Application Organization and Information Form Page – Step 2  (ibNewApplicationFormStep2.action) | [TS-CDB-FORM-2] |
| New Application Services and Access Type Form Page – Step 3  (ibNewApplicationFormStep3.action) | [TS-CDB-FORM-3] |
| New Application Confirmation Form Page – Step 4  (ibNewApplicationFormStep4.action) | [TS-CDB-FORM-4] |
| New Application Declaration Form Page – Step 5  (ibNewApplicationFormModal.action) | [TS-CDB-FORM-5] |
| New Application Save and Download Declaration Pdf Page – Step 6  (RegistrationSummaryPdfDownload.action) | [TS-CDB-FORM-6] |
| New Application Result Page – Step 7  (ibNewApplicationFormStep7.action) | [TS-CDB-FORM-7] |

|  |
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| Important Notes:  This performance test case does not reflect the actual performance in the production environment. Bank need to provide the ratio between staging vs. production environment. |

### Process of testing – BSNeBIZ New Application Form

This test scenario simulates concurrent users making a BSNeBiz New Application Form service. This test case depends on below test case to be executed:

#### **[TS-CDB-FORM-1] – New Application Page – Step 1 (ibNewApplicationFormStep1.action)**

**In this stage, the CDB connects to:**

1. DBO DB Schema

**The DBO fetches:**

* IB\_SERVICE\_INFO. IB\_SERVICE\_INFO contains some notes or announcements.

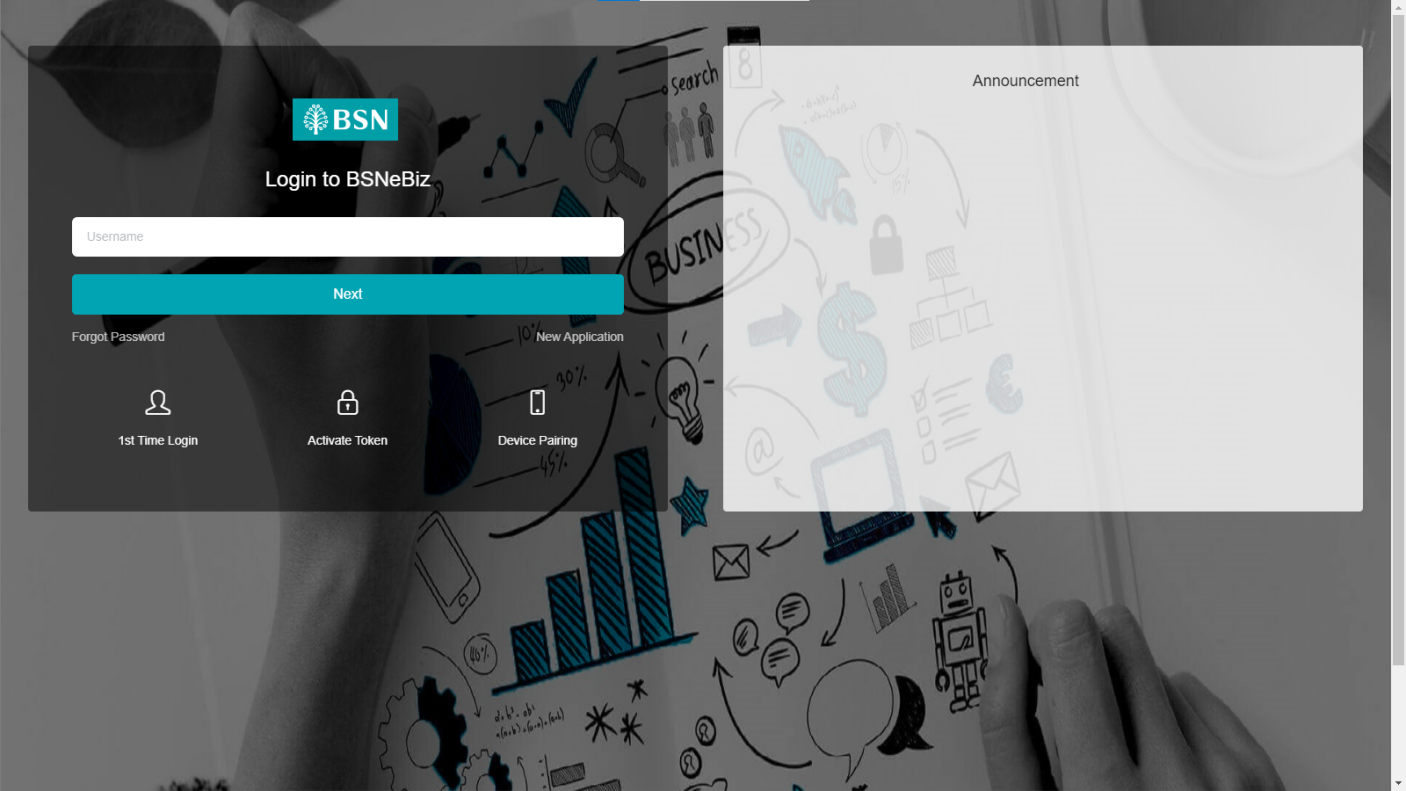


Figure 1: BSNeBiz Login screen

#### **[TS-CDB-FORM-2] - New Application Organization and Information Form Page – Step 2 (ibNewApplicationFormStep2.action)**

In this stage, the CDB connects to New Application Organization and Information Form Page:

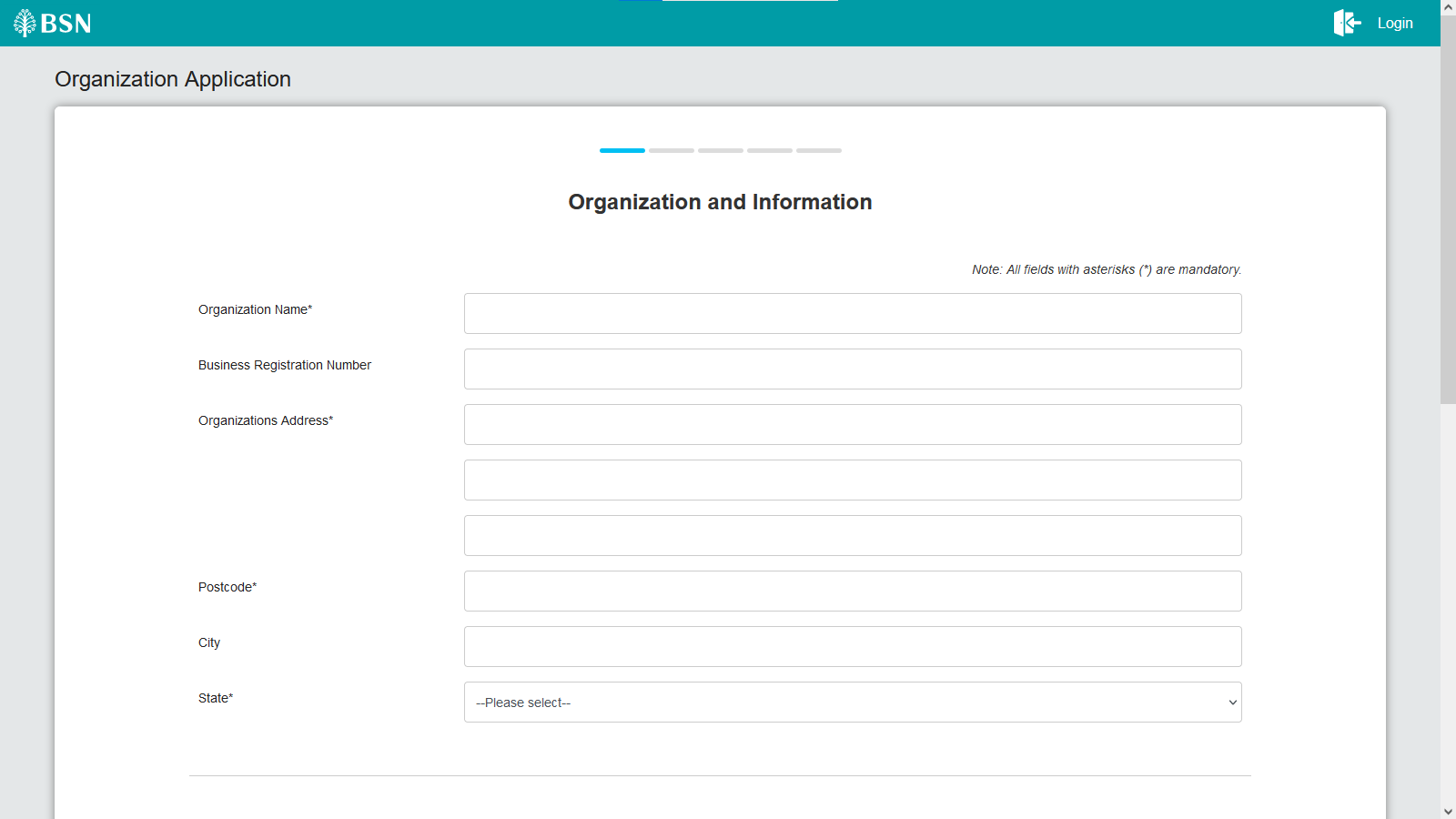


Figure 2: BSNeBiz > New Application > Organization and Information screen

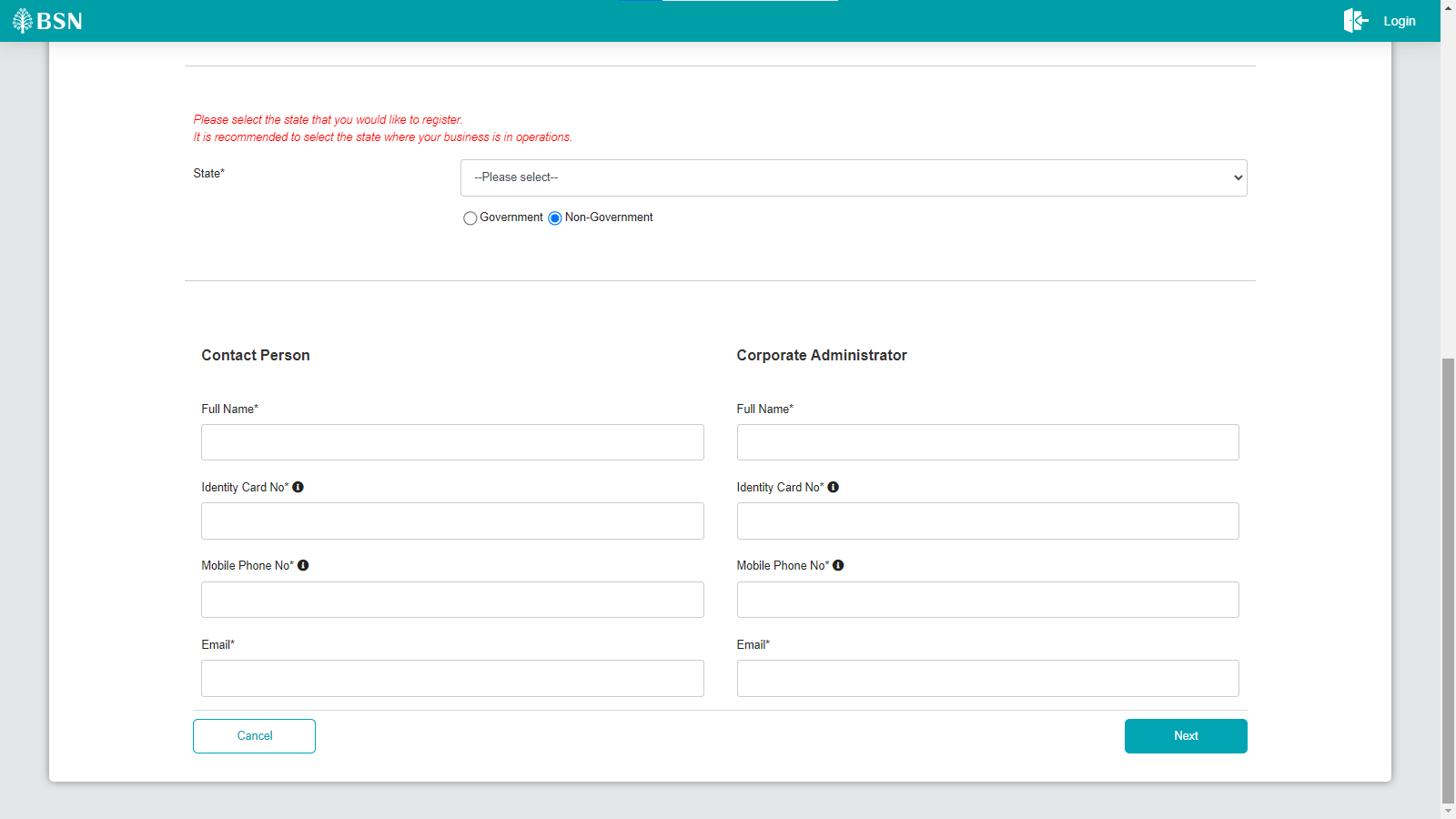


Figure 3: BSNeBiz > New Application > Organization and Information screen

#### **[TS-CDB-FORM-3] - New Application Services and Access Type Form Page – Step 3 (ibNewApplicationFormStep3.action)**

In this stage, the CDB connects to:

1. DBO DB Schema

**The DBO fetches:**

* Table BIB\_LHDN\_EMPLOYER\_NO. Table BIB\_LHDN\_EMPLOYER\_NO contains id number validation details.

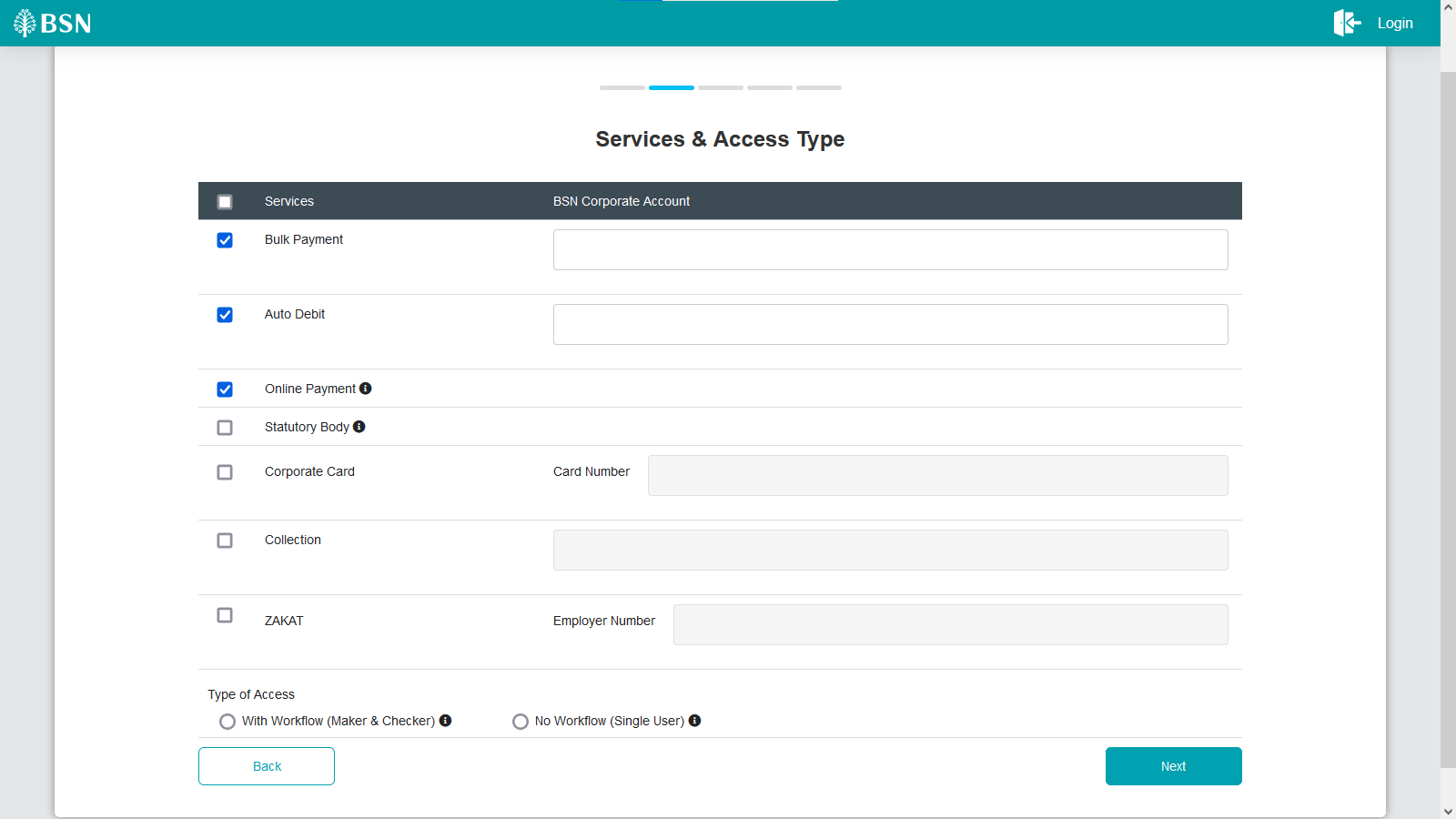


Figure 4: BSNeBiz > New Application > Services and Access Type

#### **[TS-CDB-FORM-4] - New Application Confirmation Form Page – Step 4 (ibNewApplicationFormStep4.action)**

In this stage, the CDB connects to New Application Confirmation Form Page:

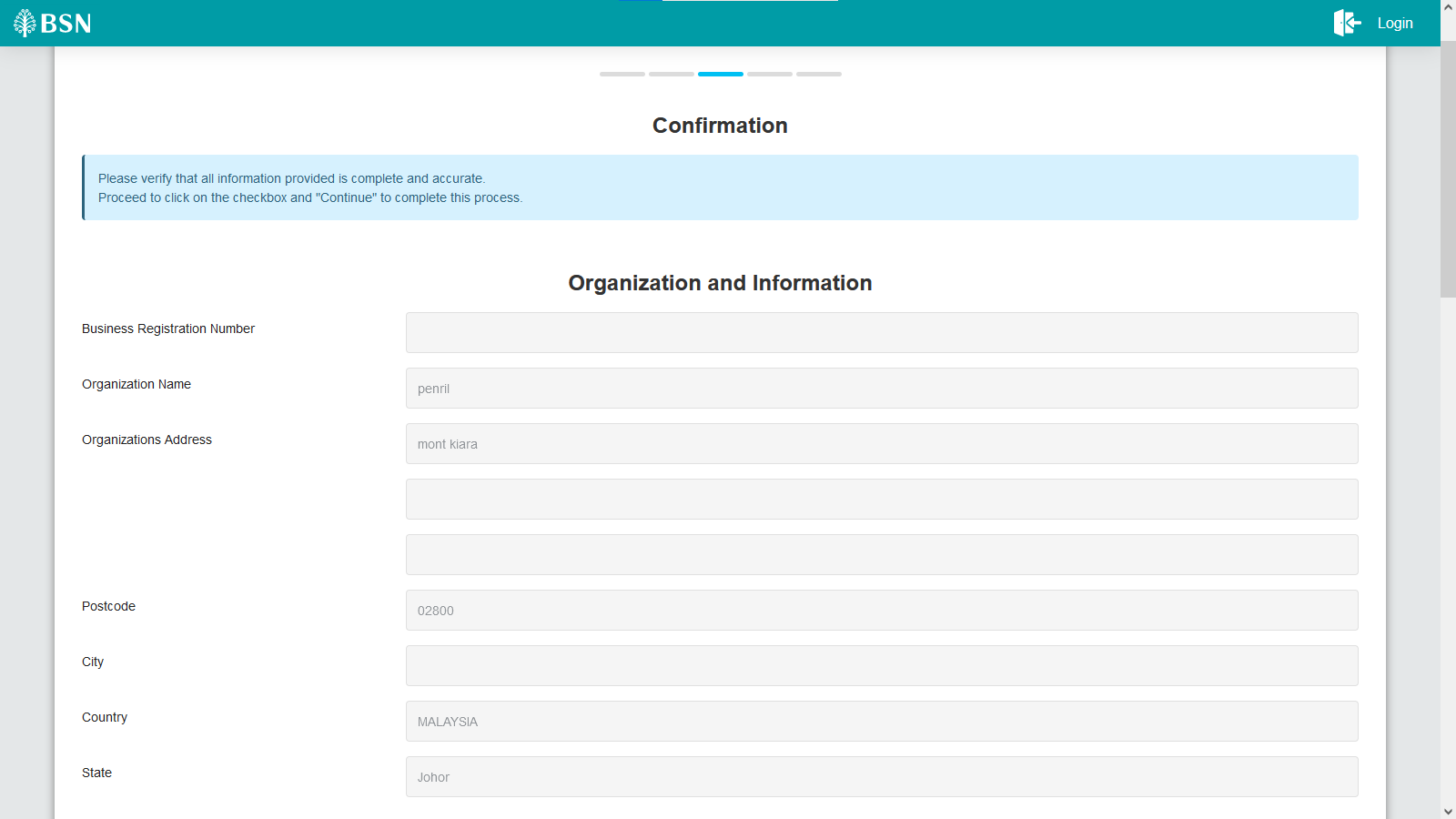


Figure 5: BSNeBiz > New Application > Confirmation Screen

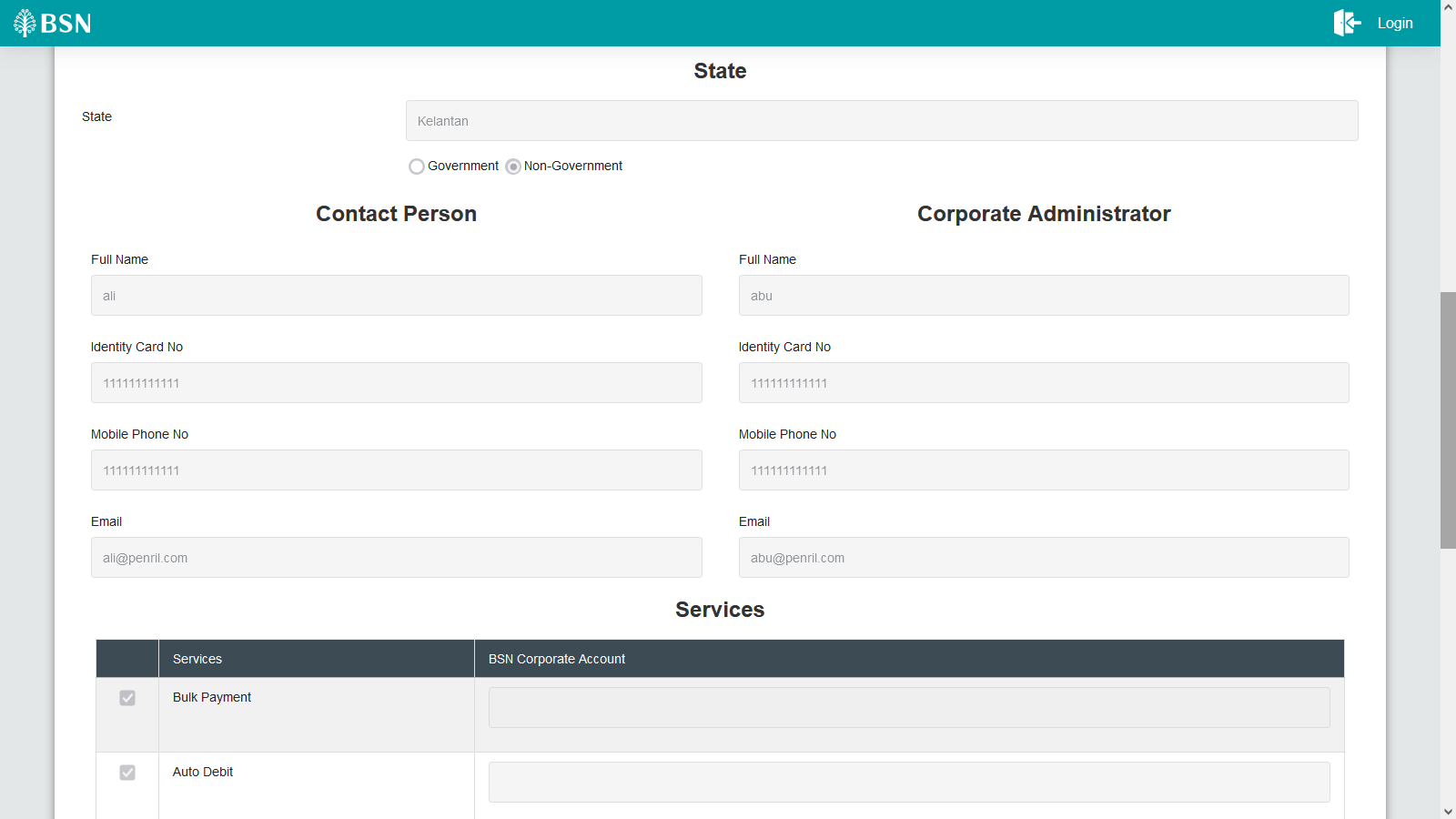


Figure 6: BSNeBiz > New Application > Confirmation Screen

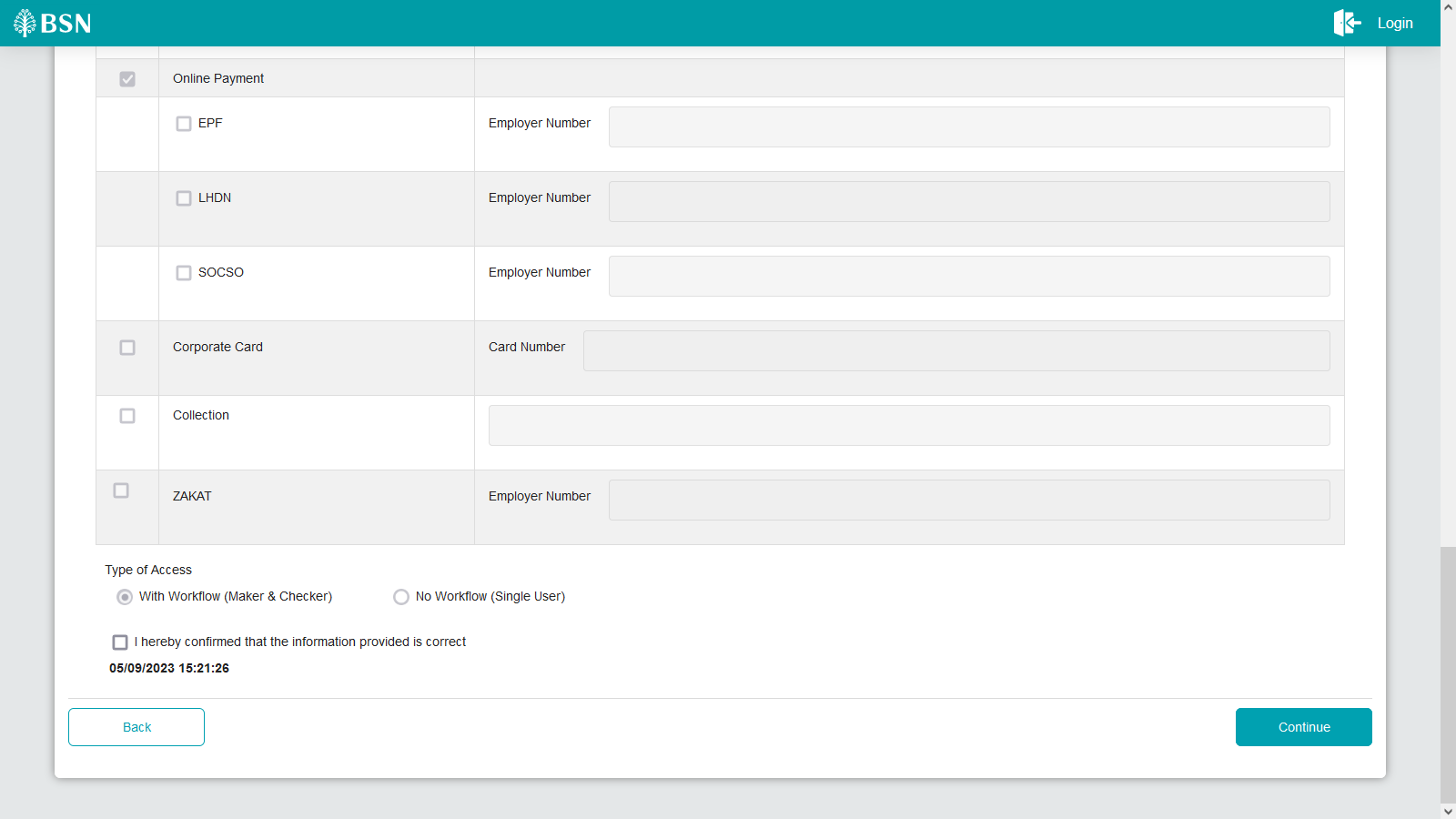


Figure 7: BSNeBiz > New Application > Confirmation Screen

#### **[TS-CDB-FORM-5] - New Application Declaration Form Page – Step 5 (ibNewApplicationFormModal.action)**

In this stage, the CDB connects to:

1. SACDA947 Server

**The SACDA947 fetches:**

* BSN folder. BSN folder contains BSN\_TNC.pdf file for Terms And Condition of BSNeBIZ pdf.

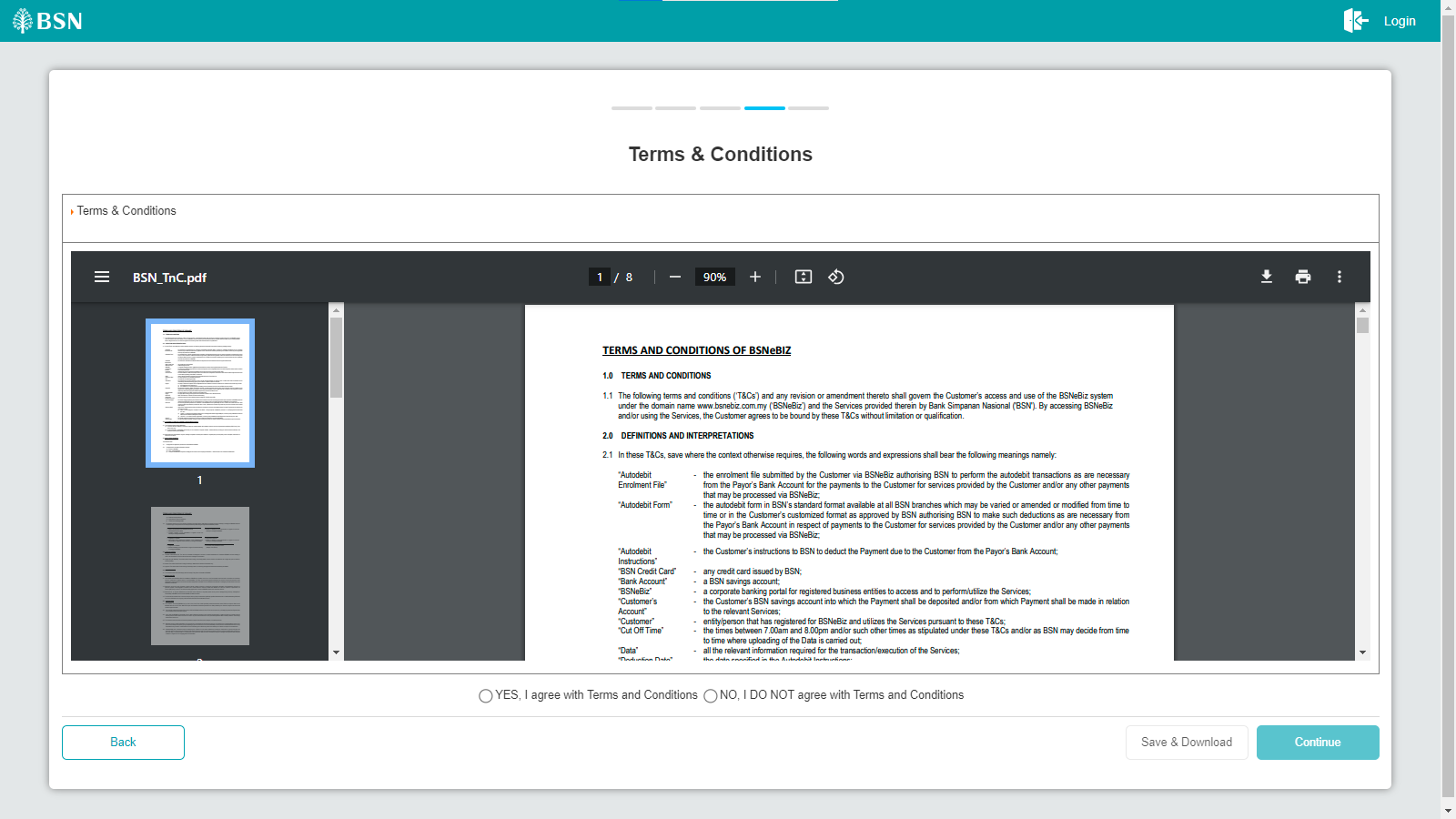


Figure 8: BSNeBiz > New Application > Terms and Condition screen

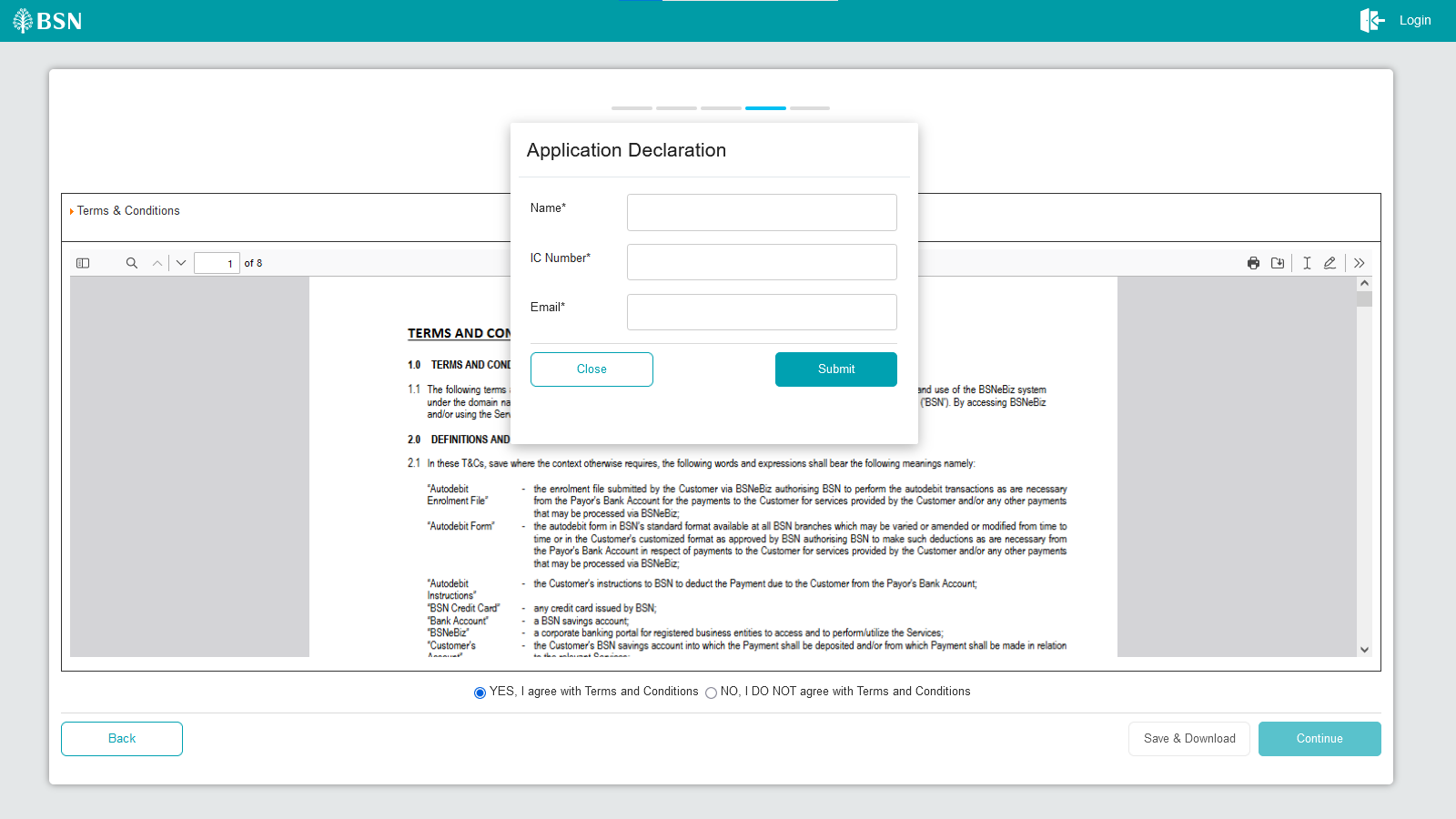


Figure 9: BSNeBiz > New Application > TNC >Application declaration popup

#### **[TS-CDB-FORM-6] - New Application Save and Download Declaration Pdf Page – Step 6 (RegistrationSummaryPdfDownload.action)**

In this stage, the CDB connects to:

1. SACDA947 Server

**The SACDA947 fetches:**

* BSN folder. BSN folder contains BSN\_TNC.pdf file for Terms And Condition of BSNeBIZ pdf.

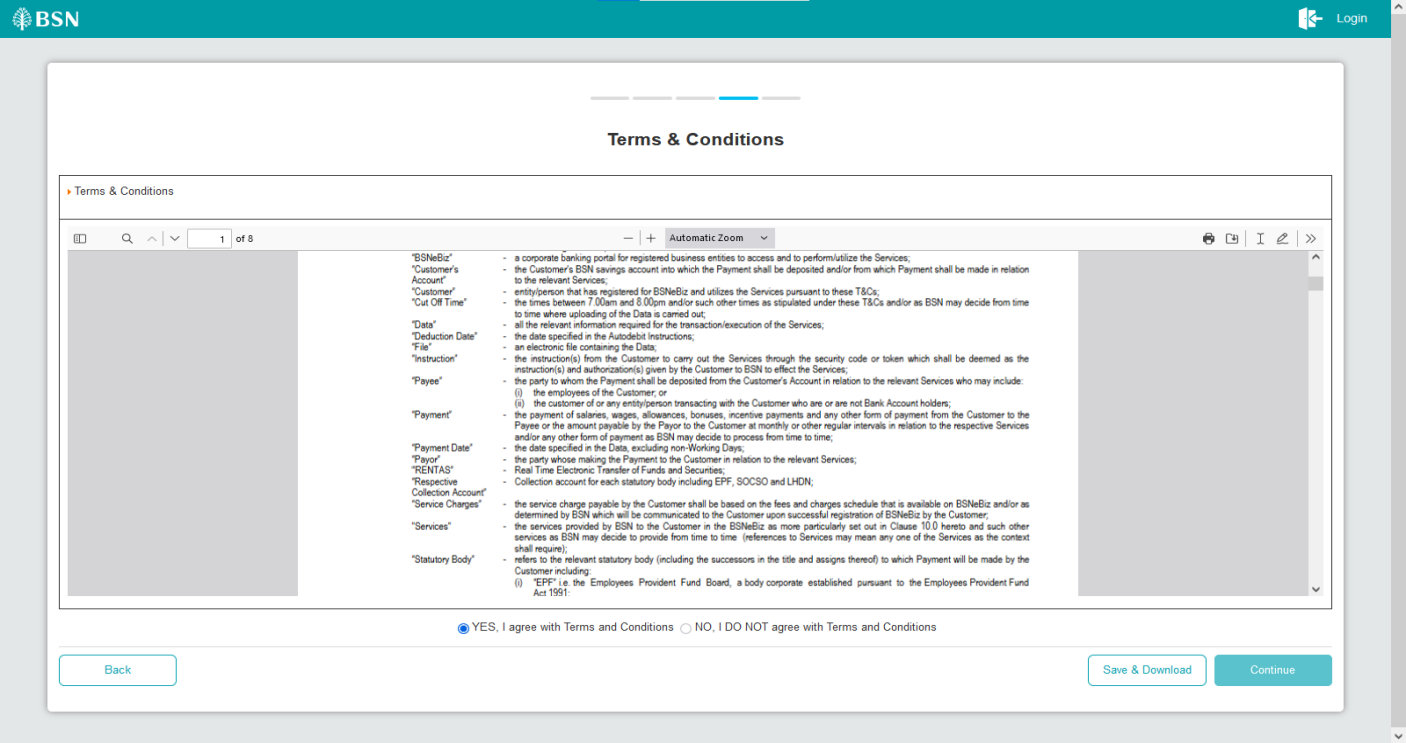


Figure 10: BSNeBiz > New Application > Terms and Condition screen

#### **[TS-CDB-FORM-7] - New Application Confirmation Form Page – Step 7 (ibNewApplicationFormStep7.action)**

In this stage, the CDB connects to:

1. DBO DB Schema

**The DBO fetches:**

* Table BIB\_APPLICATION\_FORM. Table BIB\_APPLICATION\_FORM contains data for New Application Form details.

1. SACDA947 Server

**The SACDA947 fetches:**

* IBApplicationResources\_en.properties. IBApplicationResources\_en.properties contain the Result page details.
* appConfig.file. appConfig file contains the email value inside Result page.

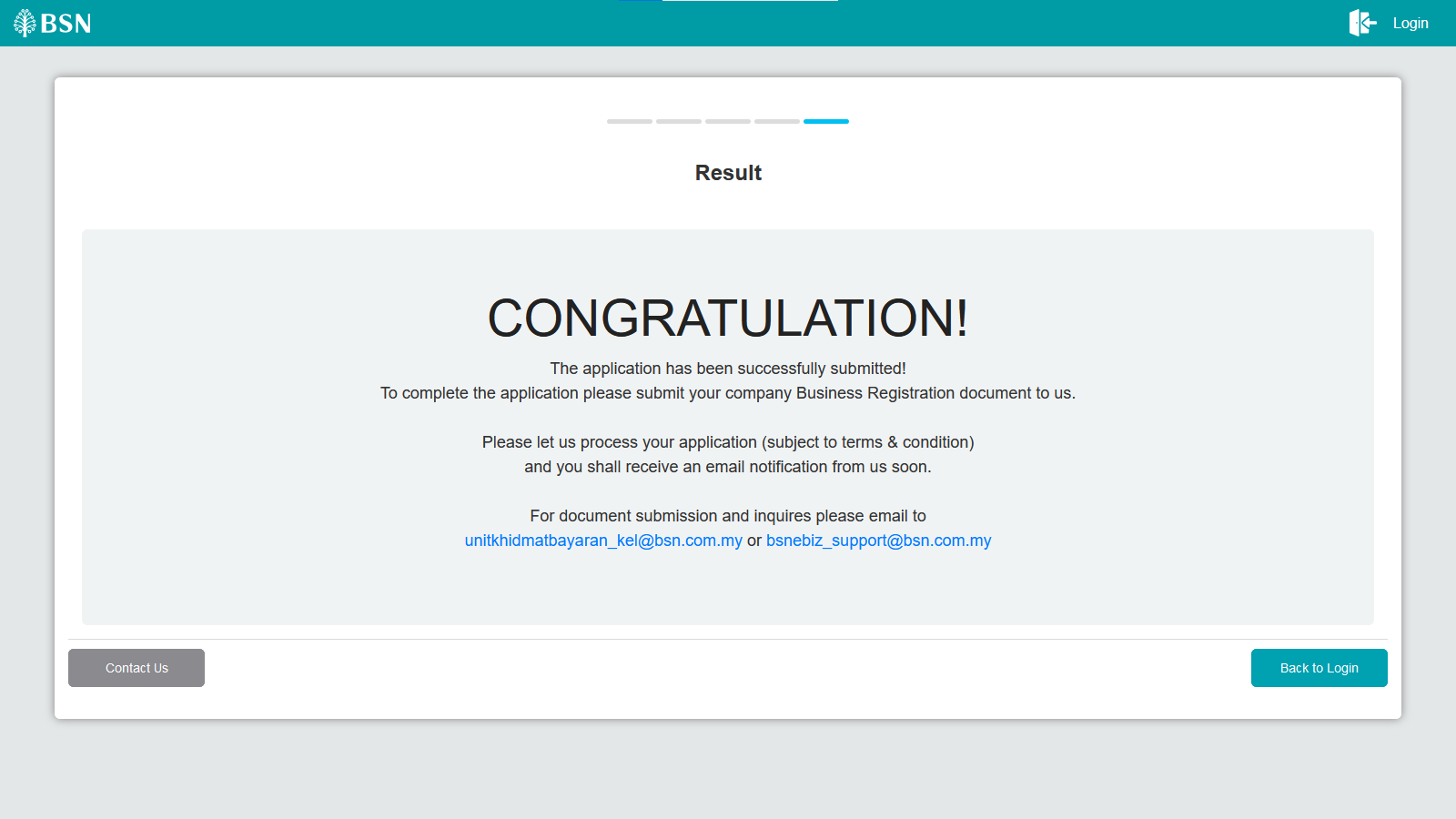


Figure 11: BSNeBiz > New Application > Result Screen

### Tools: Apache JMeter 5.1.1 r1855137

Apache JMeter is pure Java open-source software with the purpose of load testing functional behaviour and measuring performance of web applications. This app is chosen because it is platform independent, easy to install and provides better visualization on test results.

## Business Processes Involved

New Application Process Flow

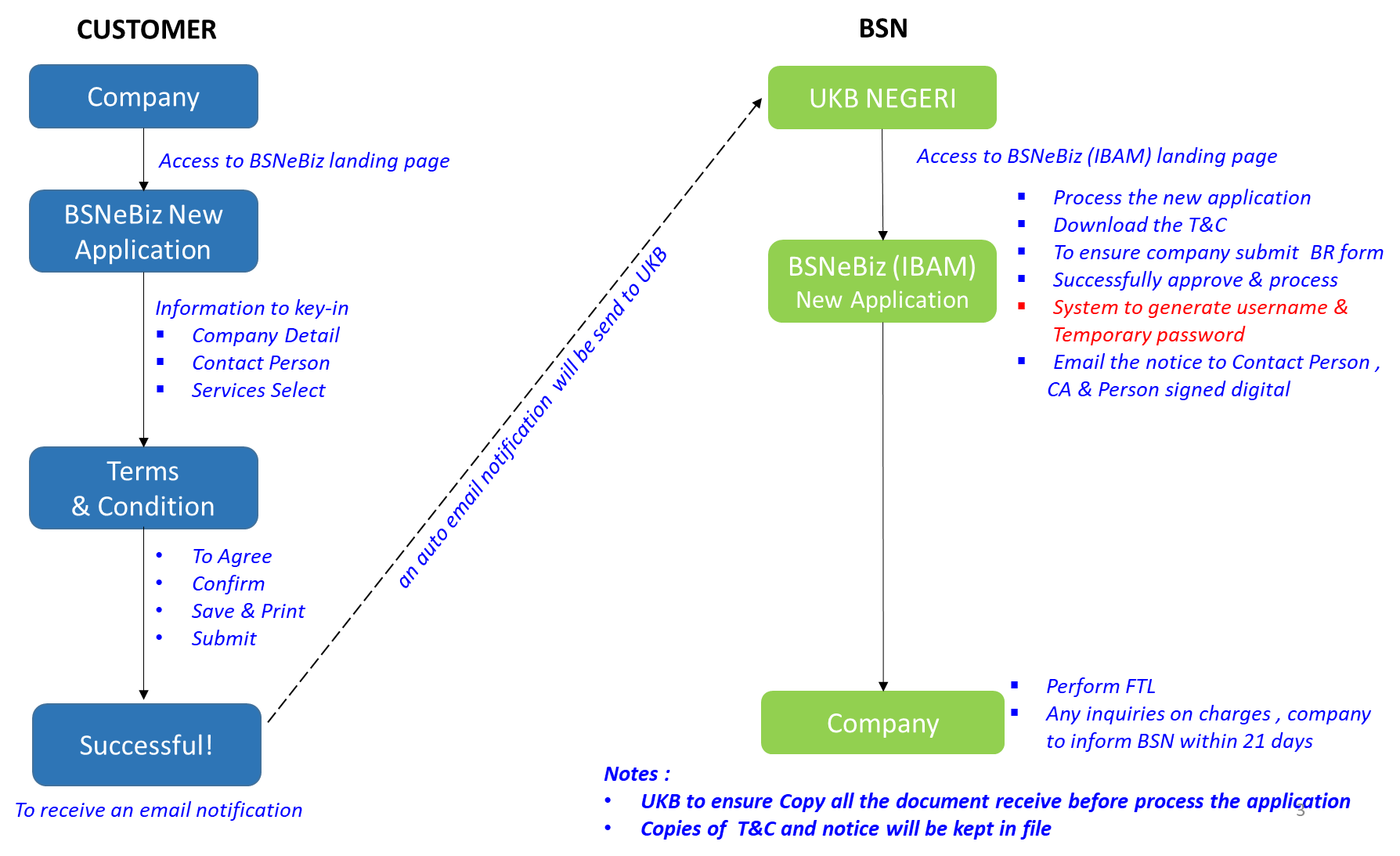


Diagram 1: New Application Process flow (1)

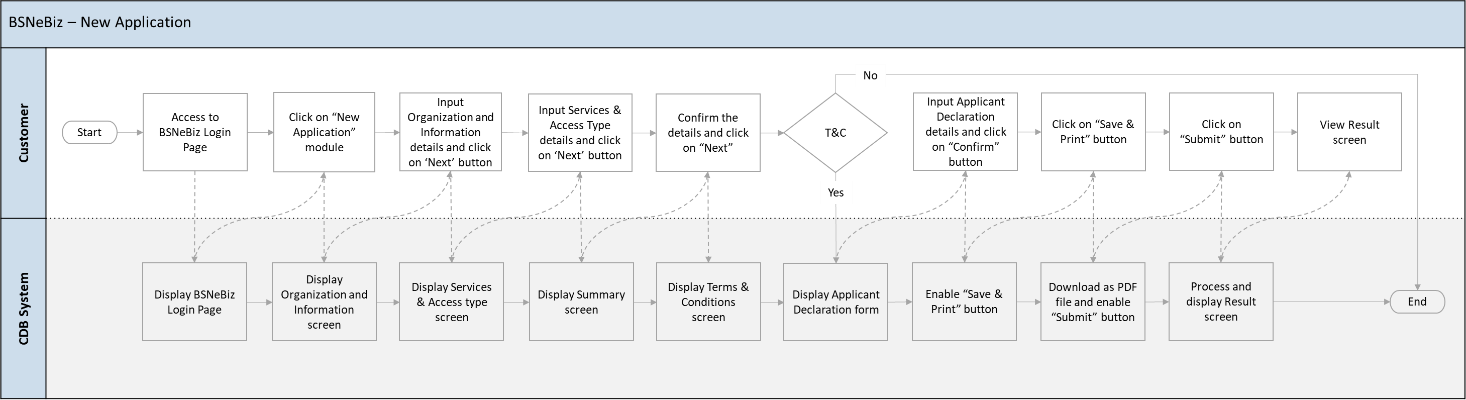


Diagram 2: New Application Process flow (2)

This is a simplified flow diagram of load test flow scenarios representing Corporate Digital Banking Customers performing New Application process.

## Performance Test Environment

|  |  |  |
| --- | --- | --- |
| Test Region | : | SIT Environment |
| Instance Testing | : | BSNeBIZ – SIT Environment  Web : <http://58.27.45.179:8080/bsn-cdb-sit/commonLogin> |
| Apache JMeter | : | Version 5.6.2 |
| Java Version | : | JDK 1.8 |

## Test Scenario & Test Result with Explanation in Layman Terms

|  |
| --- |
| Testing Objective:  Bank would like to establish baseline (no. of concurrent users) of:   1. BSNeBIZ New Application |

|  |
| --- |
| A. BSNeBIZ New Application |
| To simulate the maximum number of requests to perform BSNeBIZ New Application with goal of:   * Error < 1%. * Criteria of throughput (second / request) & TPS for each flow:   + ibNewApplicationFormStep1.action <5 second or >0.2 TPS     - This step is to load the page of IB   + ibNewApplicationFormStep2.action <5 second or >0.2 TPS     - To load the Organization and Information form page   + ibNewApplicationFormStep3.action <5 second or >0.2 TPS     - To load the Services and Access type form page   + ibNewApplicationFormStep4.action <5 second or >0.2 TPS     - To load the Confirmation page   + ibNewApplicationFormModal.action <5 second or >0.2 TPS     - To load the Application Declaration form page   + RegistrationSummaryPdfDownload.action <5 second or >0.2 TPS     - To load the Registration Summary page in PDF format     - To save and download the Registration Summary page in PDF format   + ibNewApplicationFormStep5.action <5 second or >0.2 TPS     - To load the Result page |
| I. Perform login service for 50 concurrent users |
| -Jmeter Execution Date: 15/09/2023   * Test Criteria   + Perform transaction for 50 concurrent users for 1 loop * Summary of Testing   The performance test result has passed/ not passed the test against the benchmarks that have been set above (such as number of concurrent users, error percentage, and throughput).   * Declaration * RegistrationSummaryPdfDownload.action caused error because of the interceptor token cannot capture and modify the HTTP request and responses. As token only allow one click per action, token interceptor cannot be applied at RegistrationSummaryPdfDownload.action while Save and Download button can be click multiple time per action. * Therefore, RegistrationSummaryPdfDownload.action have error in test result. * Test Result   o The JMeter result shows that the system can support 50 concurrent users to perform transactions with 14.9% error. It takes 60 seconds to complete the transaction process for all users.   * Throughput (min/request)   The system is capable of completing a http request within 51.4 s (fastest) and 51.2 s (slowest).   * TPS (Transaction per Second)   The system is capable of performing 1.171 TPS (fastest) and 1.169 TPS (slowest).   * The reasonable ramp-up period without any error is 60 seconds for 50 users.     *Image 1: JMeter Test Result - 50 BSNeBIZ users new application* |