2024

TATA POWER

PROJECT
REPORT

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Project Brief

PROJECT NAME: **AUTOMATION TESTING OF TATA POWER DDL (New Connection)**

TIMELINE: **May 23 – June 23, 2024**

GOALS:	- Ensure Application Reliability.. To verify that the web application operates reliably without unexpected crashes or errors. - To ensure that the application meets all specified functional requirements defined by Tata Power DDL - To confirm that the application functions consistently across different web browsers (e.g., Chrome, Firefox, Edge, Safari). - To manually test scenarios that are challenging to automate, such as OTP verification, CAPTCHA handling, and human-centric workflows.
TIMELINE	1. Initial concepts and mood boards: 2 weeks 2. Design development and revisions: 4–6 weeks 3. Final coding and implementations : 1–2 weeks
FUTURE WORK ..	- **Automating OTP and CAPTCHA Handling:** Exploring ways to automate these aspects while maintaining security. - **Expanding Test Coverage:** Including more test scenarios, especially for edge cases. - **Continuous Integration:** Integrating the automated tests into a CI/CD pipeline for continuous testing and feedback.
IMPORTANCE OF THE PROJECT ..	1. Ensure that the application functions correctly across various browsers and devices 2. Validate that the application meets the functional requirements specified by the stakeholders. 3. Identify and rectify any issues that could impede the user experience.

INTRODUCTION

01 This report documents the work carried out by the intern at Tata Power DDL, focusing on both automation and manual testing of the web application. The goal was to ensure the reliability and functionality of the web application by identifying and fixing bugs and ensuring seamless user experience.

02 This report details the work performed during the internship at Tata Power Delhi Distribution Limited (Tata Power DDL), focusing on both automation and manual testing of their web application. The primary objective of this project was to ensure the reliability, efficiency, and user-friendliness of the web application used by customers to apply for new connections. This entailed thorough testing to identify bugs, performance issues, and usability challenges, thereby enhancing the overall user experience.

Company Background

Tata Power DDL is a leading power distribution company serving North and North-West Delhi. Known for its customer-centric approach and commitment to quality service, Tata Power DDL continuously strives to integrate advanced technologies to streamline operations and improve customer interactions. The web application being tested is a crucial tool for new customers seeking to apply for electricity connections, making its reliability and functionality paramount.

Importance of the Project

In the modern digital landscape, the performance and reliability of customer-facing web applications are critical. Any disruptions or issues can lead to customer dissatisfaction and potential revenue loss. The project undertaken during this internship aimed to:

PROJECT OVERVIEW

01

1. **Ensure Application Reliability:**
   - Validate that the web application operates smoothly without errors or interruptions.
   - Implement automated tests to continuously monitor application stability.
2. **Validate Functional Requirements:**
   - Verify that the application meets all specified functional requirements defined by Tata Power DDL.
   - Develop and execute test cases covering critical use cases such as user registration, data validation, and submission processes.
3. **Enhance User Experience (UX):**
   - Improve the overall usability and accessibility of the application.
   - Conduct usability testing to identify and address user interface design flaws.
4. **Perform Cross-Browser Compatibility Testing:**
   - Ensure consistent performance across different web browsers including Chrome, Firefox, Edge, and Safari.
   - Identify and resolve any browser-specific issues that may affect user experience.
5. **Automate Repetitive Testing Tasks:**
   - Develop automated test scripts using Selenium WebDriver and TestNG framework.
   - Automate regression testing, data-driven testing, and integration testing to increase testing efficiency.
6. **Conduct Manual Testing for Complex Scenarios:**
   - Perform manual testing for scenarios involving OTP verification, CAPTCHA handling, and other human-centric workflows.
   - Validate edge cases and critical paths that automated tests may not cover comprehensively.

SCOPE OF WORK

01

1. Functional Testing:
2. Validate all functional requirements of the web application, including user registration, data input validation, and submission processes.
3. Ensure that the application meets the specified business logic and functional expectations set by Tata Power DDL.
4. Usability Testing:
5. Evaluate the user interface (UI) design for intuitiveness, accessibility, and ease of use.
6. Identify any usability issues that may impact the user experience negatively and provide recommendations for improvement.
7. Compatibility Testing:
8. Perform cross-browser testing across major web browsers such as Chrome, Firefox, Edge, and Safari.
9. Ensure consistent performance and functionality across different browsers to cater to a diverse user base.
10. Performance Testing:
11. Assess the application's response time, load handling capacity, and scalability under varying traffic conditions.
12. Identify performance bottlenecks and optimize application performance to enhance user satisfaction.
13. Security Testing:
14. Conduct security testing to identify vulnerabilities such as SQL injection, cross-site scripting (XSS), and authentication flaws.
15. Implement measures to strengthen application security and protect user data.

AUTOMATION TESTING

01 Environment Setup:

- **Tools Used: Selenium WebDriver, TestNG, IntelliJ IDEA, WebDriverManager**
- **Browsers Tested: Chrome, Firefox, Edge, Safari**
- **Programming Language: Java**

Test Scenarios:

The following scenarios were automated:

1. Startup application and browser setup
2. Visiting the Tata Power DDL website and handling pop-ups
3. Verifying phone number and OTP
4. Filling personal details in the form
5. Entering connection details
6. Providing supply address details
7. Uploading documents and final submission

Test Execution:

Below is the code that was executed to perform automated testing.


```java
        try {
            if (browser.equalsIgnoreCase(anotherString: "edge")) {
                WebDriverManager.chromedriver().setup();
                driver = new EdgeDriver();
            } else if (browser.equalsIgnoreCase(anotherString: "chrome")) {
                WebDriverManager.chromedriver().setup();
                driver = new ChromeDriver();
            } else if (browser.equalsIgnoreCase(anotherString: "firefox")) {
                WebDriverManager.firefoxdriver().setup();
                driver = new FirefoxDriver();
            } else {
                WebDriverManager.safaridriver().setup();
                driver = new SafariDriver();
            }
            // System.setProperty("webdriver.chrome.driver", "D:\\CS STUDY MATERIAL\\selenium webdriver\\ChromeDriver\\chromedriver_win32\\chromedri
            driver.manage().window().maximize();
        } catch (Exception e) {
            System.out.println(e);
        }
    }

    no usages
    @Test(priority = 2)
    public void visitWebPage() {
        try {
            driver.get("https://www.tatapower-ddl.com/");

            // To handle any advertisement / any pop - up
            wait = new WebDriverWait(driver, Duration.ofSeconds(20));
```

```java
        @Test(priority = 2)
        public void visitWebPage() {
            try {
                driver.get("https://www.tatapower-ddl.com/");

                // To handle any advertisement / any pop - up
                wait = new WebDriverWait(driver, Duration.ofSeconds(20));

                // Wait for the pop-up to appear and close it
                try {
                    WebElement closeButton = wait.until(ExpectedConditions.elementToBeClickable(By.id("cboxClose")));
                    closeButton.click();
                    System.out.println("Pop-up closed successfully.");
                } catch (Exception e) {
                    System.out.println("Pop-up not found or already closed.");
                }
                driver.get("https://www.tatapower-ddl.com/myconnection/index.aspx");
                driver.findElement(By.id("connectionRange1")).click();
                driver.findElement(By.id("btnDomestic_E")).click();
            } catch (Exception e) {
                e.printStackTrace();
            }
        }


        // no usages
        @Test(priority = 3)
        public void PhoneNumberVerification() throws UnhandledAlertException {
            try {
                // For, Verifying the OTP and phone number
                driver.findElement(By.id("btnNewConnection_E")).click();
```

```java
        @Test(priority = 4, dataProviderClass = RefrencingPage.class, dataProvider = "create")
        public void Details(String firstname, String lastname, String email, String phonenumber) throws InterruptedException {
            /* STEP - 3 */
            // Here, we will fill all the details in the form
            // driver.findElement(By.id("panelPersonalDetails")).click();
            // Clicking on the dropdown box
            WebElement dd = driver.findElement(By.id("ddlApplicationFor"));
            Select s = new Select(dd);
            s.selectByValue("0");

            /* STEP - 4 */
            // Here, we will repeat the same above steps for drop down menu for Title
            WebElement dd2 = driver.findElement(By.id("ddlTitle"));
            Select s1 = new Select(dd2);
            s1.selectByValue("Mr.");

            /* STEP - 5 */
            // Here, we will fill the first name of the user
            driver.findElement(By.id("txtFirstName")).sendKeys( _keysToSend: firstname);

            /* STEP - 6 */
            driver.findElement(By.id("txtMiddleName")).sendKeys( _keysToSend: "");

            /* STEP - 7 */
            driver.findElement(By.id("txtLastName")).sendKeys( _keysToSend: lastname);

            /* STEP - 8 */
            WebElement dd3 = driver.findElement(By.id("ddlRelationship"));
            Select s2 = new Select(dd3);
            s2.selectByVisibleText("Son Of");
```

```java
    }

// no usages
@Test(priority = 3)
public void PhoneNumberVerification() throws UnhandledAlertException {
    try {
        // For, Verifying the OTP and phone number
        driver.findElement(By.id("btnNewConnection_E")).click();
        // driver.findElement(By.id("txtMobileNo")).click();
        wait = new WebDriverWait(driver, Duration.ofSeconds(10));
        // Input the phone number in the phone number field
        WebElement phoneNumberField = wait.until(ExpectedConditions.presenceOfElementLocated(By.id("txtMobileNo")));
        String phoneNumber = "7669966400";
        Scanner scanner;
        if (phoneNumber.length() == 10) {
            phoneNumberField.clear();
            phoneNumberField.sendKeys(phoneNumber);
            System.out.println("Entered phone number: " + phoneNumber);
            System.out.println("Valid number");
            driver.findElement(By.id("btnLoginContinue")).click();

        } else {
            System.out.println("Invalid Phone number");
        }
        System.out.println("Pause..... Press OTP manually to continue...");
        wait.until(ExpectedConditions.presenceOfElementLocated(By.id("ddlApplicationFor")));
    } catch (Exception e) {
        e.printStackTrace();
    }
}
```

```java
    /* STEP - 14 */
    driver.findElement(By.id("txtLandlineNo")).sendKeys(keysToSend: phonenumber);


    /* STEP - 15 */
    WebElement dd5 = driver.findElement(By.id("ddlOccupation"));
    Select s4 = new Select(dd5);
    s4.selectByIndex(8);        // under-graduate will be selected from drop - down menu


    /* STEP - 16 */
    driver.findElement(By.id("txtPreviousOwnerName")).sendKeys(keysToSend: "Mr. Hansraj Singh");

    /* STEP - 17 */
    WebElement dd6 = driver.findElement(By.id("ddlPreviousOwnerRelationship"));
    Select s5 = new Select(dd6);
    s5.selectByValue("SO");

    /* STEP - 18 */
    driver.findElement(By.id("txtPreviousOwnerRelationshipName")).sendKeys(keysToSend: "Mrs. Hanshika Singh");

    /* STEP - 19 */
    driver.findElement(By.id("txtEmailId")).sendKeys(keysToSend: email);

    /* STEP - 20 */
    driver.findElement(By.id("btnVerifyEmailID")).click();


    System.out.println("Email OTP Generated");

    Alert alert = driver.switchTo().alert();
```

```java
    }

@Test(priority = 5, dataProvider = "create1", dataProviderClass = RefrencingPage.class)
public void ConnectioDetails(String sanctionload, String PAN, String GSTIN, String Bank_Ac_No) {
    try {
        // Now, for the "Connection Details"
        WebElement dd7 = driver.findElement(By.id("ddlCategoryApplied"));
        Select s6 = new Select(dd7);
        s6.selectByValue("EDOM-E-DOMESTIC");

        /* STEP - 27 */
        WebElement dd8 = driver.findElement(By.id("ddlConnectionPurpose"));
        Select s7 = new Select(dd8);
        s7.selectByValue("Residential");

        /* STEP - 28 */
        driver.findElement(By.id("txtKwSanctionedLoad")).sendKeys( _keysToSend: sanctionload);

        /* STEP - 29 */
            WebElement dd9 = driver.findElement(By.id("ddlMeterType"));
            Select s9 = new Select(dd9);
            s9.selectByValue("1");

        /* STEP - 30 */
        WebElement dd10 = driver.findElement(By.id("ddlConnectionDuration"));
        Select s10 = new Select(dd10);
        s10.selectByValue("P");

        /* STEP - 30 */
```

```java
        WebElement dd13 = driver.findElement(By.id("ddlAccomodationType"));
        Select s13 = new Select(dd13);
        s13.selectByValue("02");

        /* STEP - 34 */
        WebElement dd14 = driver.findElement(By.id("ddlMeterProvidedby"));
        Select s14 = new Select(dd14);
        s14.selectByValue("TPDDL");

        /* STEP - 35 */
        driver.findElement(By.id("txtPanNo")).sendKeys( _keysToSend: PAN);

        /* STEP - 36 */
        driver.findElement(By.id("txtGstInNo")).sendKeys(GSTIN);

        /* STEP - 37 */
        js = (JavascriptExecutor) driver;
        js.executeScript( script: "document.getElementById('txtGstValidityEndDate').value='2024-05-30';");

        /* STEP - 38 */
        driver.findElement(By.id("txtBankAcNo")).sendKeys(Bank_Ac_No);

        /* STEP - 39 */
        driver.findElement(By.id("chkElcb")).click();
        driver.findElement(By.id("chkWiring")).click();
        driver.findElement(By.id("chkEarthing")).click();

        /* STEP - 40 */
        WebElement dd15 = driver.findElement(By.id("ddlIsEBillRequired"));
```
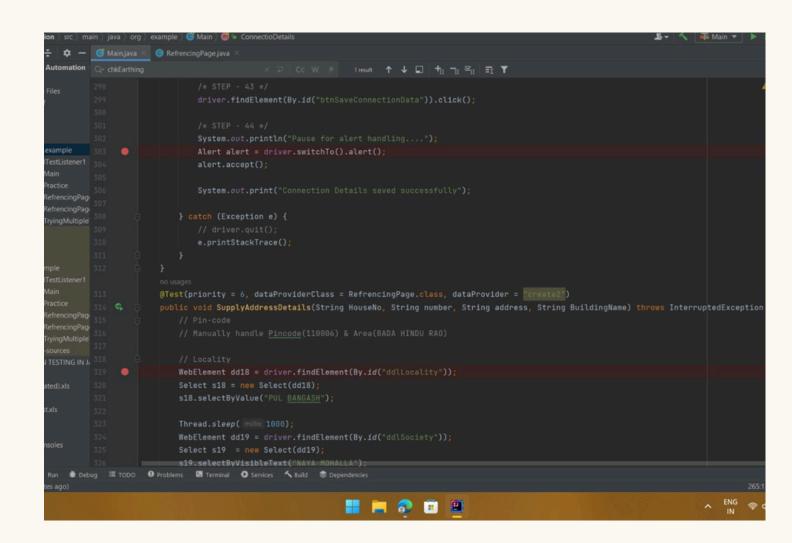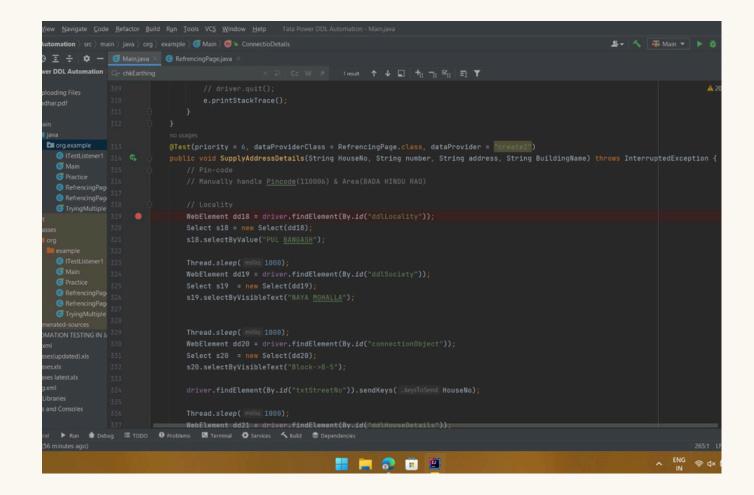
TEST RESULTS

The automated tests successfully covered the following aspects:

- Browser compatibility and navigation
- Form filling and validation
- Handling of alerts and pop-ups
- Verification of data input fields
- Document upload and form submission

```java
            // driver.quit();
            e.printStackTrace();
        }
    }

@Test(priority = 6, dataProviderClass = RefrencingPage.class, dataProvider = "create2")
public void SupplyAddressDetails(String HouseNo, String number, String address, String BuildingName) throws InterruptedException {
    // Pin-code
    // Manually handle Pincode(110006) & Area(BADA HINDU RAO)

    // Locality
    WebElement dd18 = driver.findElement(By.id("ddlLocality"));
    Select s18 = new Select(dd18);
    s18.selectByValue("PUL BANGASH");

    Thread.sleep(1000);
    WebElement dd19 = driver.findElement(By.id("ddlSociety"));
    Select s19 = new Select(dd19);
    s19.selectByVisibleText("NAYA MOHALLA");


    Thread.sleep(1000);
    WebElement dd20 = driver.findElement(By.id("connectionObject"));
    Select s20 = new Select(dd20);
    s20.selectByVisibleText("Block->B-5");

    driver.findElement(By.id("txtStreetNo")).sendKeys(HouseNo);

    Thread.sleep(1000);
    WebElement dd21 = driver.findElement(By.id("ddlHouseDetails"));
```

Manual Testing

Test Scenarios

Manual testing was performed for the following scenarios:

1. Verifying OTP sent to the phone number
2. Handling CAPTCHA inputs
3. Ensuring the user interface is intuitive and user-friendly
4. Cross-checking automated test results for accuracy.
5.

Test Execution

Manual testing involved:

- **Physically entering OTPs received on a mobile device**
- **Completing CAPTCHA challenges**
- **Performing exploratory testing to identify any issues not covered by automated tests**
- **Documenting any discrepancies or bugs found during testing**

```java
driver.findElement(By.id("txtLandmark")).sendKeys( ...keysToSend: address);

driver.findElement(By.id("txtKhasraNo")).sendKeys( ...keysToSend: number);

WebElement dd23 = driver.findElement(By.id("ddlCommunicationAdd"));
Select s23  = new Select(dd23);
s23.selectByValue("Same");

driver.findElement(By.id("txtPlotNo")).sendKeys( ...keysToSend: number);

driver.findElement(By.id("txtBuildingName")).sendKeys( ...keysToSend: BuildingName);

driver.findElement(By.id("txtAdditionalAddress")).sendKeys( ...keysToSend: BuildingName);

Thread.sleep( millis: 3000);
// Total No. of Floors in Building(1), Applied Floor(GROUND) and Premise portion(WEST) have to be done manually
WebElement dd24 = driver.findElement(By.id("ddlTotalArea"));
Select s24  = new Select(dd24);
s24.selectByValue("sqm");


Thread.sleep( millis: 2000);
driver.findElement(By.id("txtAreaInSqMeter")).sendKeys( ...keysToSend: "1200");


Thread.sleep( millis: 1000);
driver.findElement(By.xpath( xpathExpression: "//*[@id=\"btnSaveSupplyAddressData\"]")).click();

Alert alert = driver.switchTo().alert();
alert.accept();
```
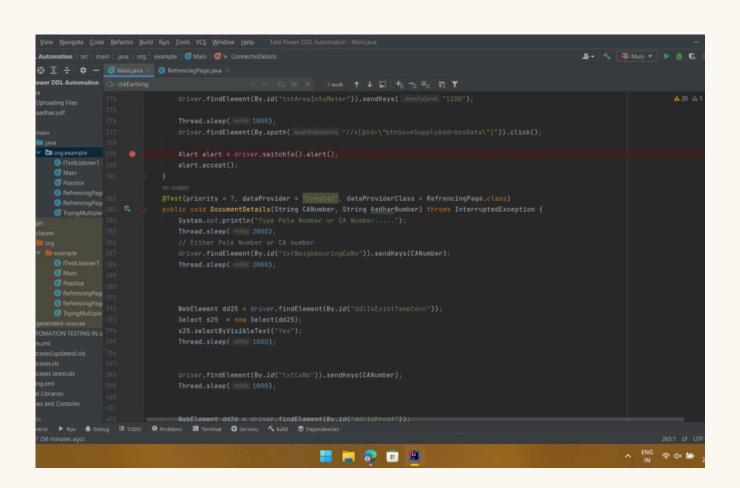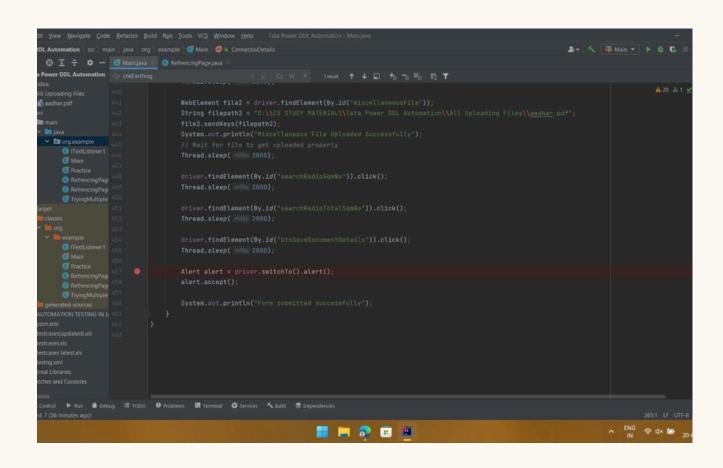
```java
driver.findElement(By.id("txtAreaInSqMeter")).sendKeys( ...keysToSend: "1200");

Thread.sleep( millis: 1000);
driver.findElement(By.xpath( xpathExpression: "//*[@id=\"btnSaveSupplyAddressData\"]")).click();

Alert alert = driver.switchTo().alert();
alert.accept();
}

no usages
@Test(priority = 7, dataProvider = "create3", dataProviderClass = RefrencingPage.class)
public void DocumentDetails(String CANumber, String AadharNumber) throws InterruptedException {
    System.out.println("Type Pole Number or CA Number.....");
    Thread.sleep( millis: 2000);
    // Either Pole Number or CA number
    driver.findElement(By.id("txtNeighbouringCaNo")).sendKeys(CANumber);
    Thread.sleep( millis: 2000);


    WebElement dd25 = driver.findElement(By.id("ddlIsExistTempConn"));
    Select s25  = new Select(dd25);
    s25.selectByVisibleText("Yes");
    Thread.sleep( millis: 1000);


    driver.findElement(By.id("txtCaNo")).sendKeys(CANumber);
    Thread.sleep( millis: 1000);


    WebElement dd26 = driver.findElement(By.id("ddlIdProof"));
```

```java
        WebElement dd28 = driver.findElement(By.id("ddlOwnershipProof"));
        Select s28 = new Select(dd28);
        s28.selectByValue("gsc");

        driver.findElement(By.id("txtNoOfPages")).sendKeys( ...keysToSend: "18");

        WebElement file1 = driver.findElement(By.id("ownershipProofFile"));
        String filepath1 = "D:\\CS STUDY MATERIAL\\Tata Power DDL Automation\\All Uploading Files\\aadhar.pdf";
        file1.sendKeys(filepath1);
        System.out.println("File Uploaded Successfully");
        // Wait for file to get uploaded properly
        Thread.sleep( millis: 2000);

        WebElement file2 = driver.findElement(By.id("miscellaneousFile"));
        String filepath2 = "D:\\CS STUDY MATERIAL\\Tata Power DDL Automation\\All Uploading Files\\aadhar.pdf";
        file2.sendKeys(filepath2);
        System.out.println("Miscellaneous File Uploaded Successfully");
        // Wait for file to get uploaded properly
        Thread.sleep( millis: 2000);

        driver.findElement(By.id("searchRadioSqmNo")).click();
        Thread.sleep( millis: 2000);

        driver.findElement(By.id("searchRadioTotalSqmNo")).click();
        Thread.sleep( millis: 2000);

        driver.findElement(By.id("btnSaveDocumentDetails")).click();
        Thread.sleep( millis: 2000);

        Alert alert = driver.switchTo().alert();
```



```java
        WebElement file2 = driver.findElement(By.id("miscellaneousFile"));
        String filepath2 = "D:\\CS STUDY MATERIAL\\Tata Power DDL Automation\\All Uploading Files\\aadhar.pdf";
        file2.sendKeys(filepath2);
        System.out.println("Miscellaneous File Uploaded Successfully");
        // Wait for file to get uploaded properly
        Thread.sleep( millis: 2000);

        driver.findElement(By.id("searchRadioSqmNo")).click();
        Thread.sleep( millis: 2000);

        driver.findElement(By.id("searchRadioTotalSqmNo")).click();
        Thread.sleep( millis: 2000);

        driver.findElement(By.id("btnSaveDocumentDetails")).click();
        Thread.sleep( millis: 2000);

        Alert alert = driver.switchTo().alert();
        alert.accept();

        System.out.println("Form submitted successfully");
    }
}
```

Challenges Faced:

1. **Handling OTP and CAPTCHA:** These elements required manual intervention as they could not be automated due to security measures.
2. **Browser Compatibility Issues:** Some tests behaved differently across browsers, requiring additional adjustments in the test scripts.
3. **Synchronization Issues:** Ensuring the web elements were loaded before interacting with them to prevent test failures.

Conclusion:

The testing project successfully identified and helped rectify several issues within the Tata Power DDL web application. Both automation and manual testing played crucial roles in ensuring the reliability and functionality of the application.

Future Work:

- **Automating OTP and CAPTCHA Handling:** Exploring ways to automate these aspects while maintaining security.
- **Expanding Test Coverage:** Including more test scenarios, especially for edge cases.
- **Continuous Integration:** Integrating the automated tests into a CI/CD pipeline for continuous testing and feedback.

These goals collectively aimed to ensure the delivery of a high-quality web application that meets Tata Power DDL's standards of performance, reliability, and user satisfaction. By addressing these objectives systematically, the project enhanced the overall efficiency and effectiveness of Tata Power DDL's online service for new connection applicants.

THANK YOU