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Modern web development with TMS WEB Core

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Overview

Part 1: Classification, introduction, setup and the first app with TMS WEB Core

Part 2: Application Development and Features of TMS WEB Core

Part 3: Web, Mobile and Desktop Applications with TMS WEB Core

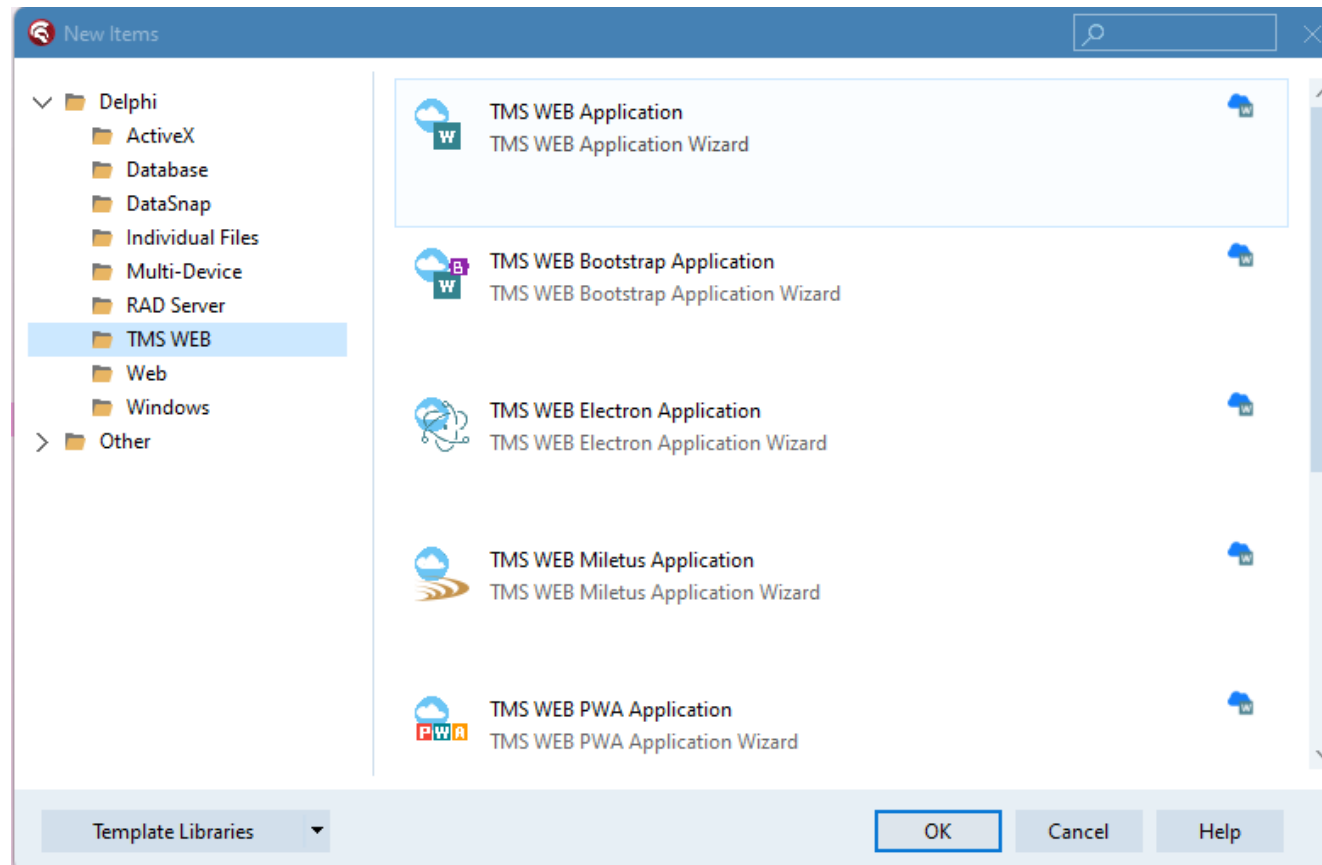
TMS WEB Electron Application

TMS WEB Miletus Application

TMS WEB Bootstrap Application

Note: This set of slides is intended for users of the integrated development environment Delphi. Alternatively, if you would like to use Visual Studio Code, then download the appropriately adapted set of slides.

Other project types from TMS WEB Core

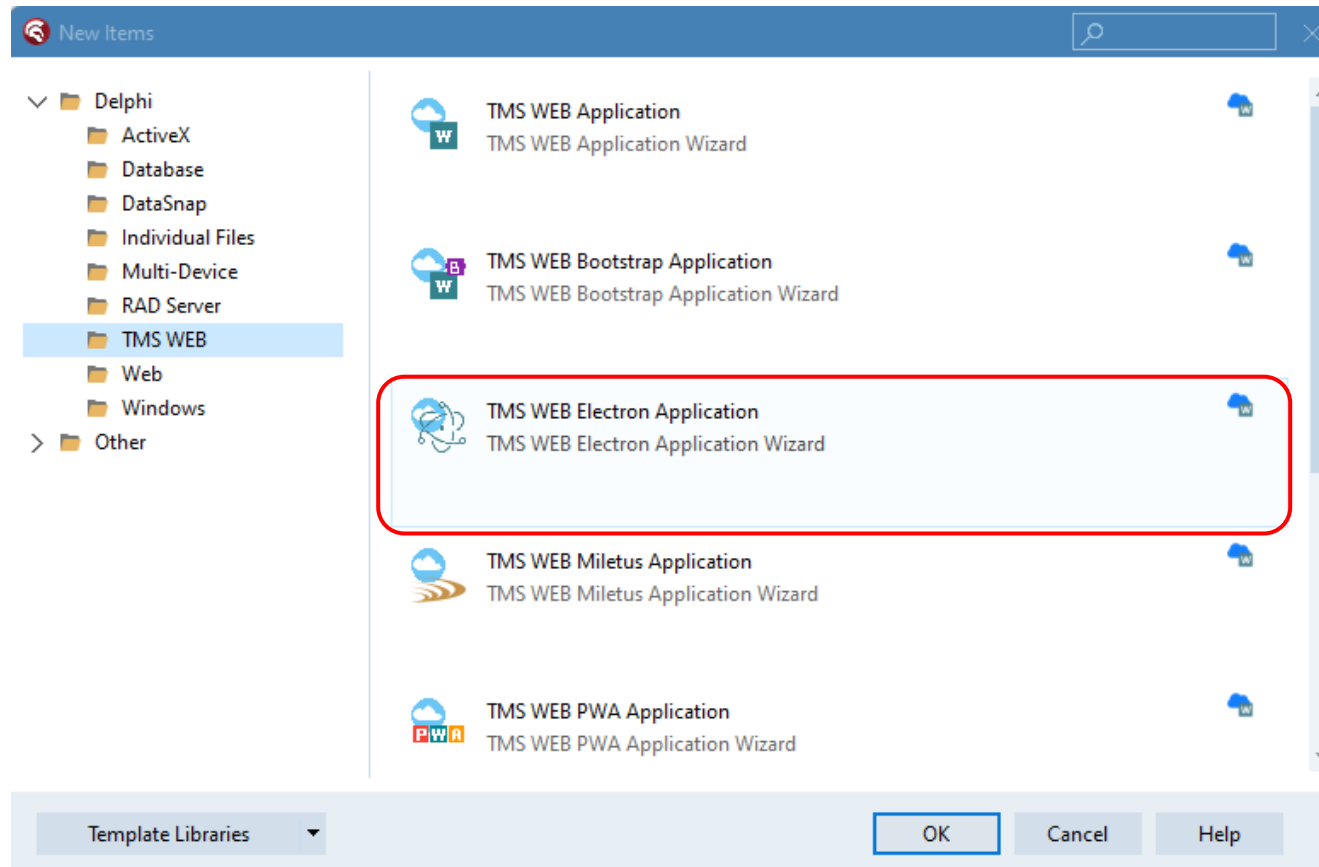


- in addition to the template for a web application, TMS WEB Core offers further project templates:
 - TMS WEB Electron application
 - TMS WEB Miletus application
 - TMS WEB PWA application
 - TMS Web Bootstrap application
- with the Electron and Miletus frameworks, you can create client applications from a web app that can run on Windows, Linux, macOS and Raspberry Pi (Miletus).

Run a web app natively on the target device

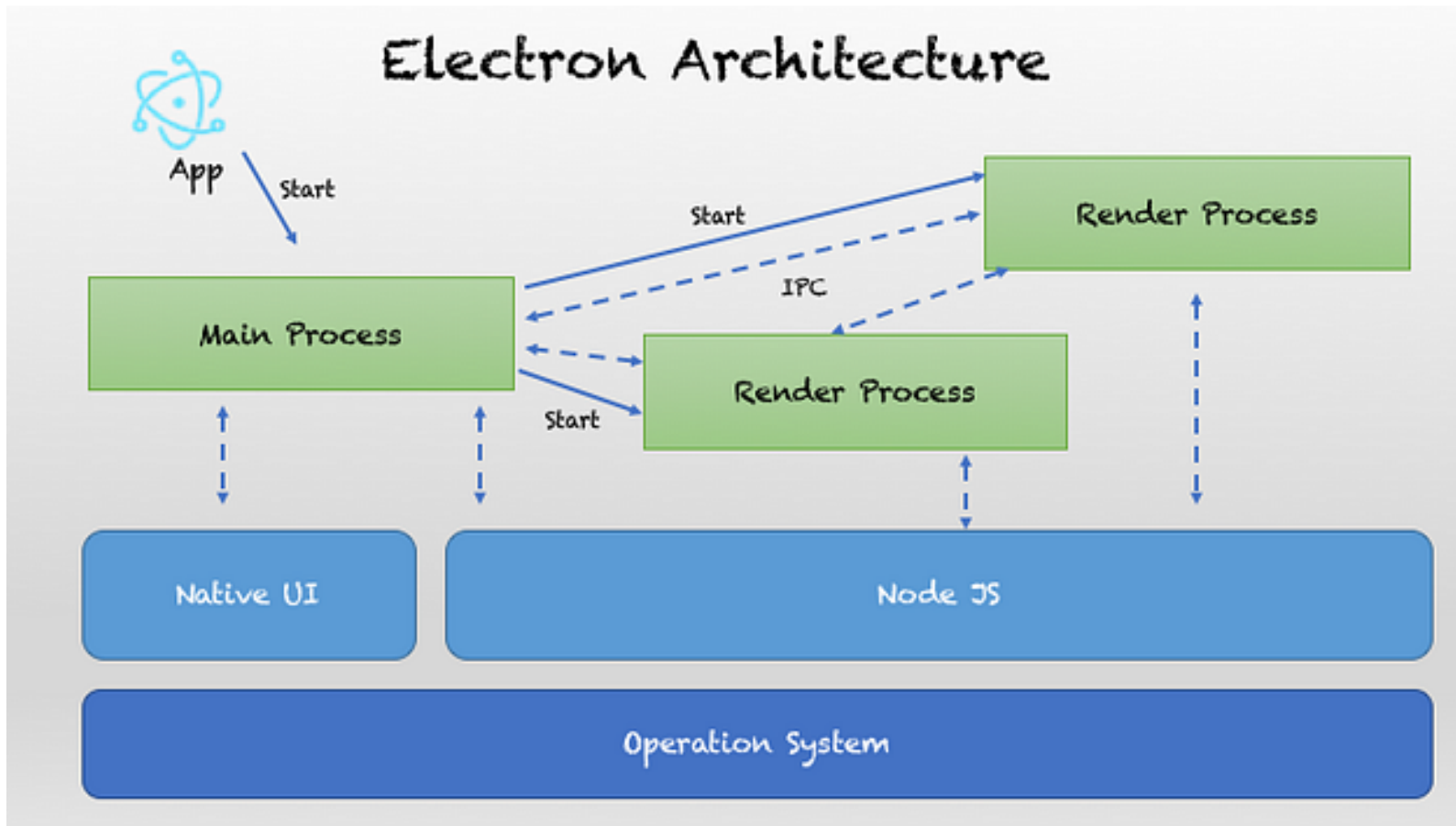
- access to device and system functions, such as local files and folders
- use of local databases
- offline use through installation on the target systems
- no direct execution in the browser, therefore usually better user experience
- cross platform applications, i.e. apps for desktop and web from one source code base
- existing source code can be further developed for new types of applications

TMS WEB Electron Application



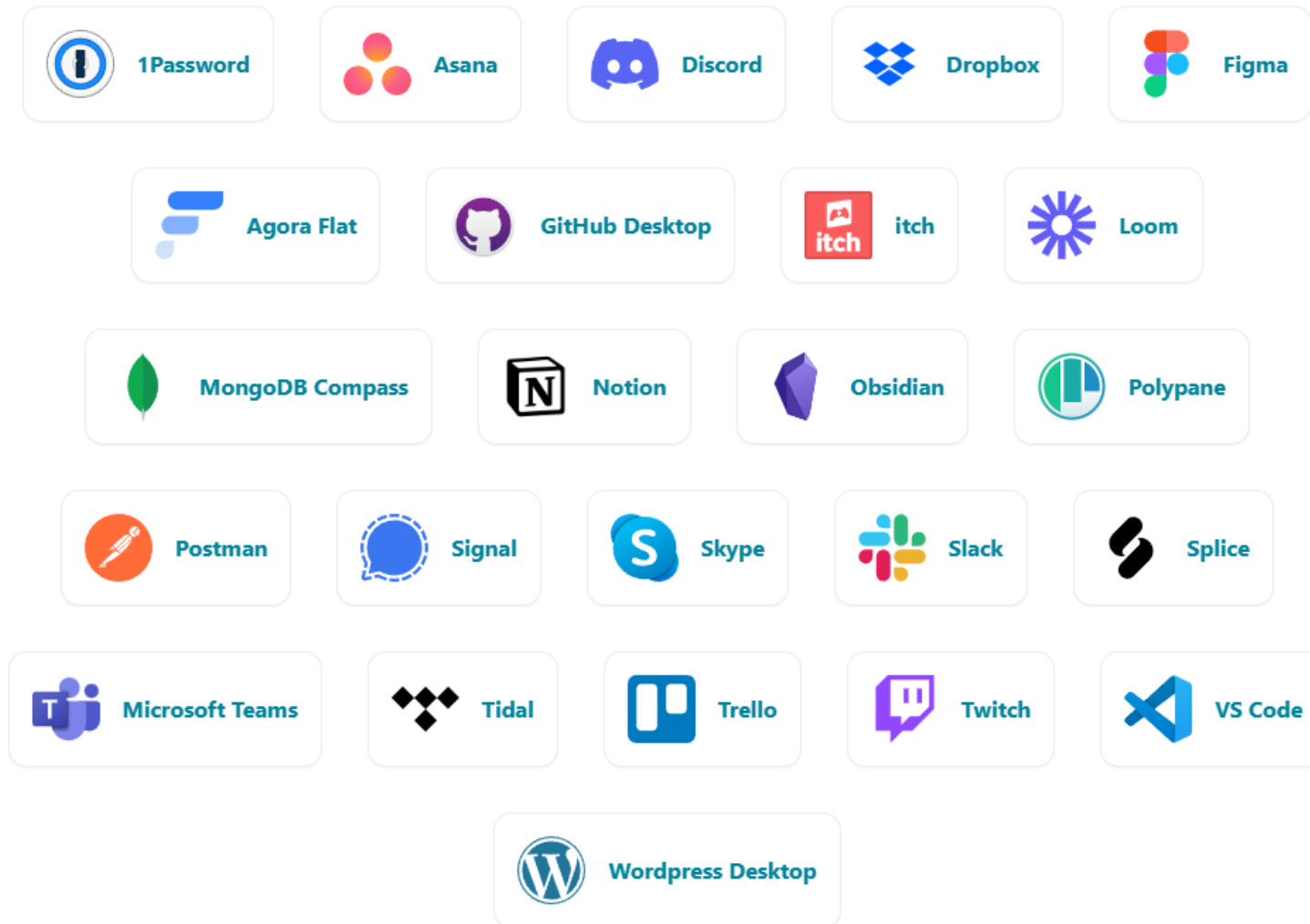
- web application based on the Electron Framework to create cross-platform desktop applications
- native user interface with application menu, windows, dialog boxes, notifications, auto-update function, installer, app store distribution
- info: <https://www.electronjs.org/>

TMS WEB Electron Application Architektur Electron-Framework



- the starting point is a web application based on HTML, CSS and JavaScript
- this is generated here by the TMS WEB Core
- Electron uses the WebKit browser engine for rendering
- Electron allows the web app to have system access to files, create an application window with menu, etc.

Apps created with Electron

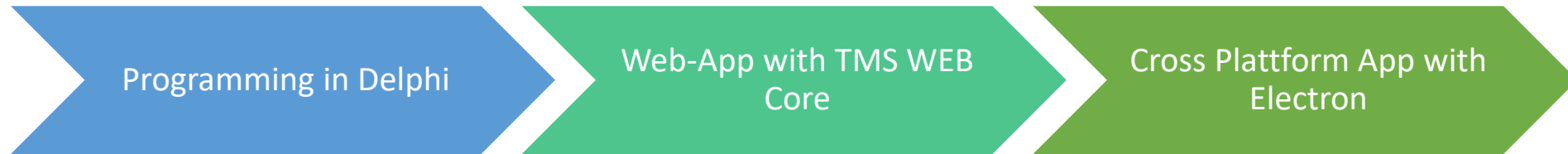


With the help of TMS WEB Core you can create cross-platform apps from the Electron base directly in the Delphi development environment.

HTML, CSS and JavaScript-Code are not necessary.

This technology is also available for developers of Delphi (Object Pascal).

TMS WEB Electron Application Development



- Delphi/Object Pascal
- graphic designer
- IDE
- visual and non-visual components

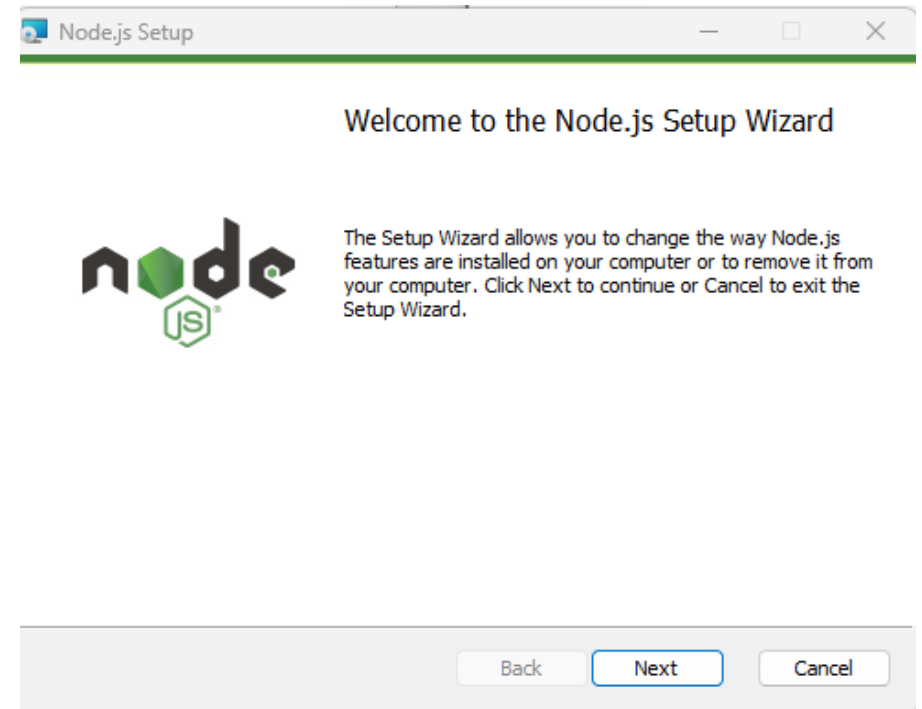
- JavaScript code is automatically compiled from Delphi/ Pascal
- integration of CSS and JavaScript libraries

- Cross platform apps for Windows, macOS and Linux
- system access
- application menu, file system, ...
- direct configuration in Delphi
- App packages for deployment

TMS WEB Electron Application

Electron-Installation

- to use Electron, you need to install Node.js.
- we recommend that you use the latest LTS version available.
- <https://nodejs.org/>
- testing with `node -v` and `npm -v`
- global installation of Electron with:
`npm i electron -g`

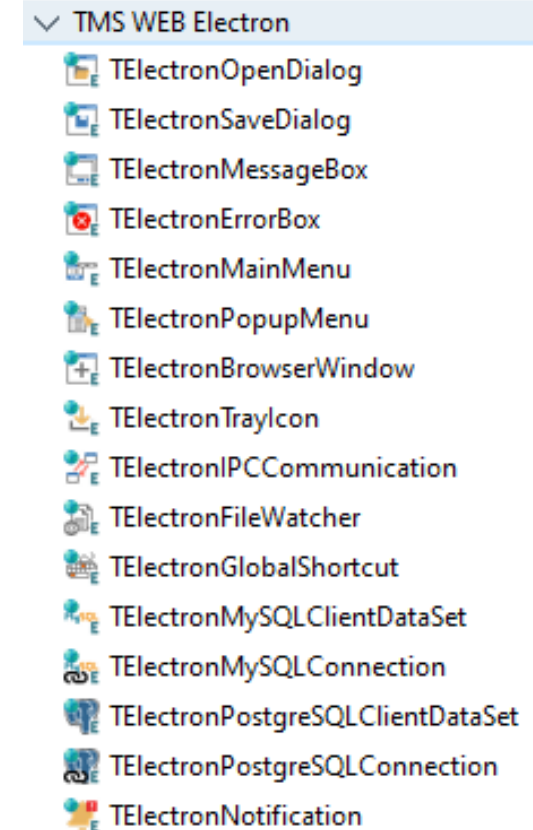


TMS WEB Electron Application

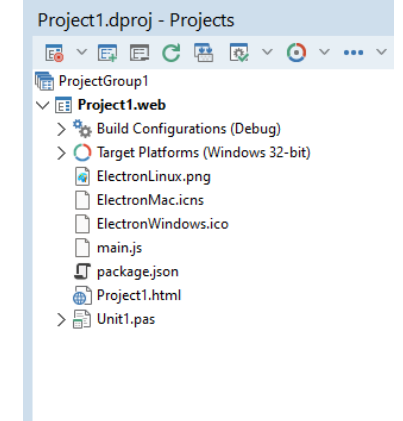
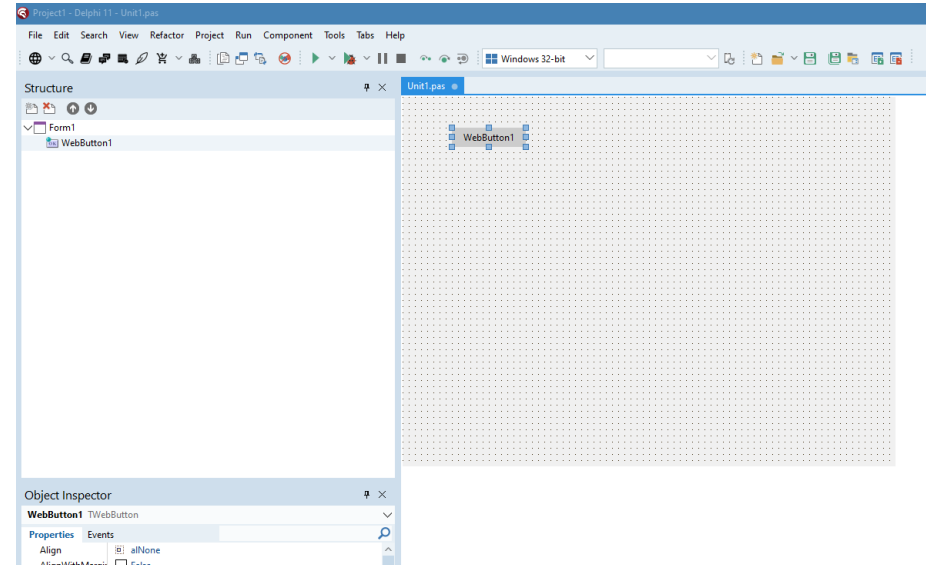
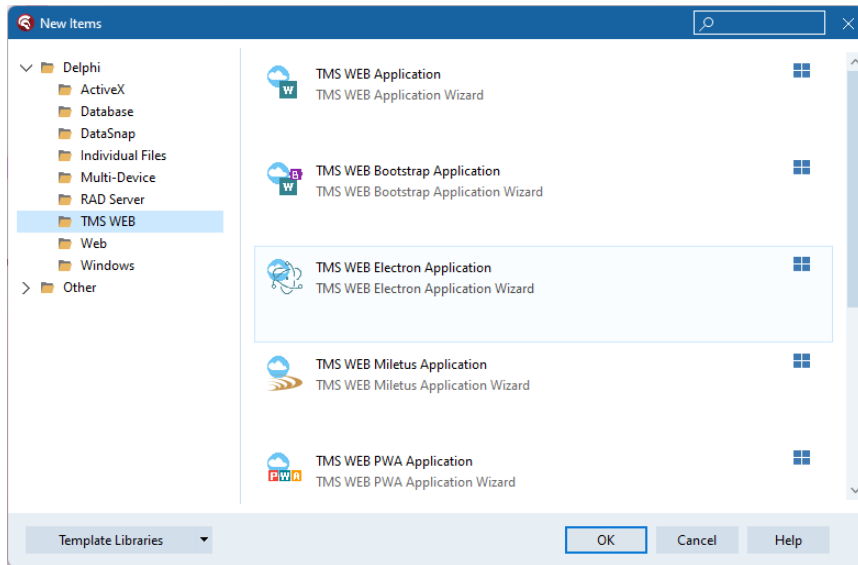
Electron – Features

- file open dialog and file save dialog, message dialog and error dialogs
- drag & drop function
- menus (main and popup menu)
- access to MySQL/ PostgreSQL database
- window management
- global shortcuts
- file Watcher

components in the palette for building Electron apps

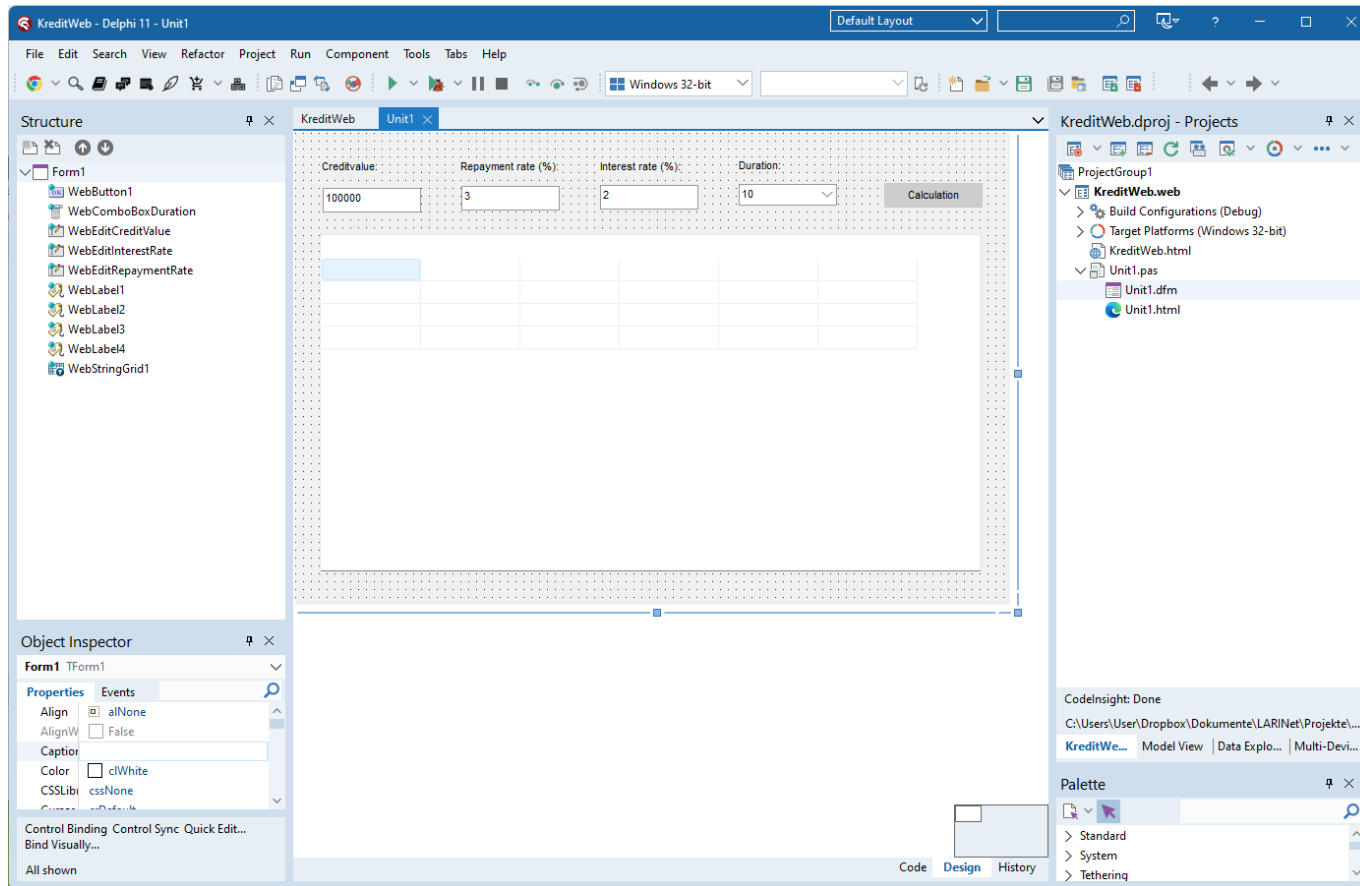


TMS WEB Electron Application Example – Delphi



- generates a project similar to a TMS web application with additional icon files and build configurations
- for each supported platform there is a debug platform and a build platform configuration
- in build mode the debugging tools are disabled

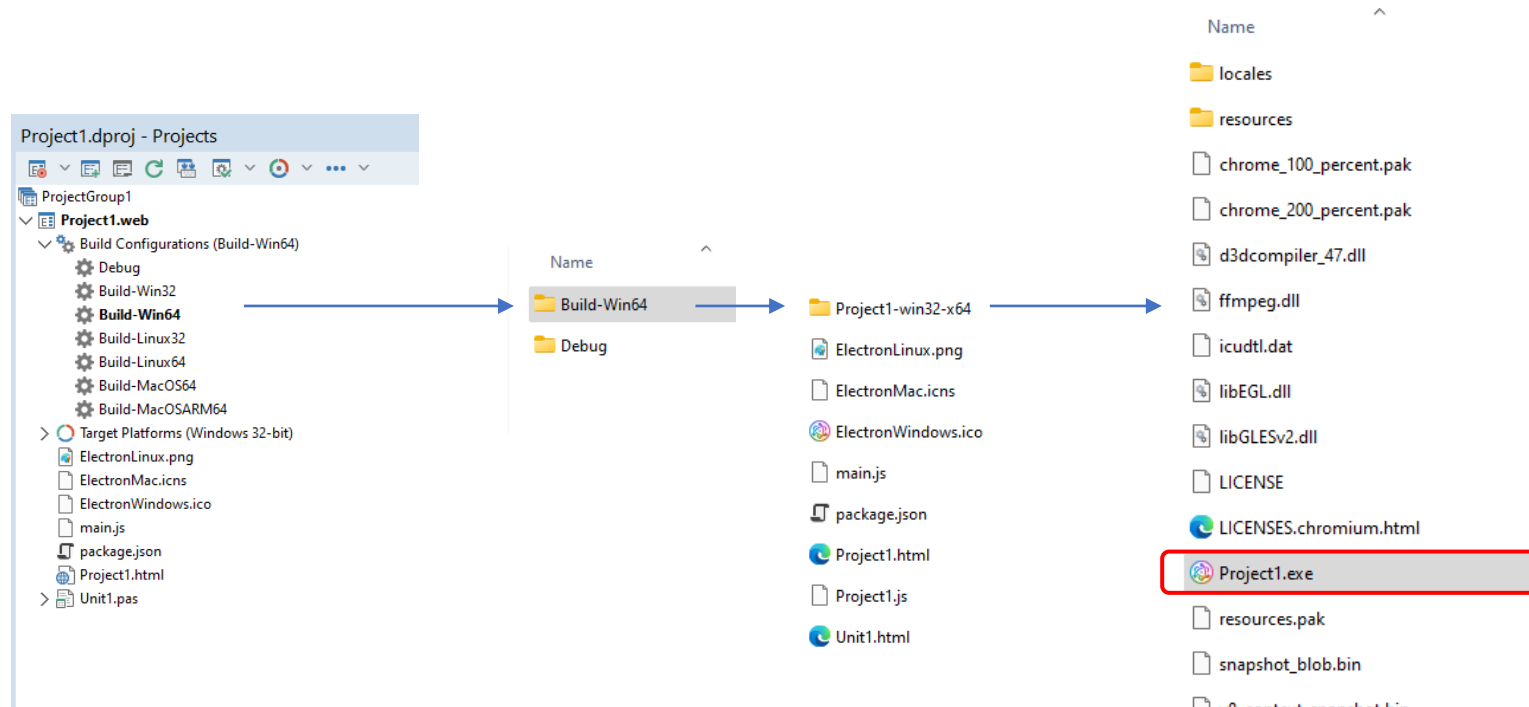
TMS WEB Electron Application Example – Application Development



- develop the application in the Delphi IDE
- use of the TMS WEB Core components
- the difference to a web application is that the deployment is customized
- Electron generates the application packages for the selected target systems

TMS WEB Electron Application

Example – Application packages, here Windows



the executable file for Windows
(* .exe) is created



TMS WEB Electron Application

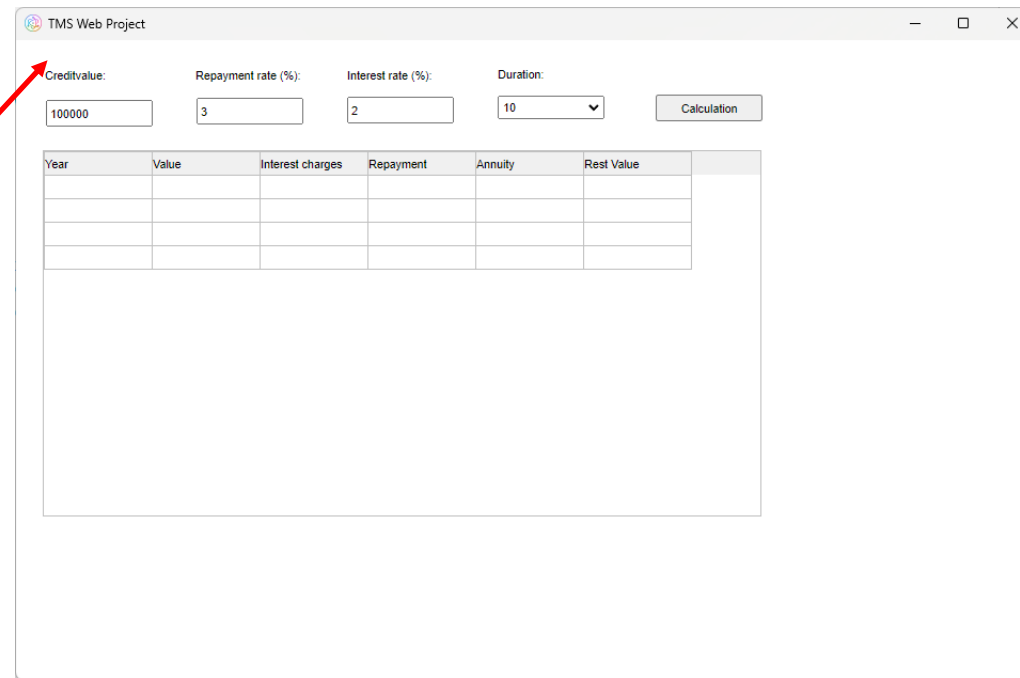
Example – Application packages, here Linux

The screenshot displays the TMS Web IDE interface for a project named 'Project1.dproj - Projects'. The left sidebar shows the project structure under 'ProjectGroup1' and 'Project1.web'. The 'Build Configurations (Build-Linux64)' folder is expanded, with 'Build-Linux64' selected. Below it, 'Target Platforms (Windows 32-bit)' is also expanded, showing files like 'ElectronLinux.png', 'ElectronMac.icns', 'ElectronWindows.ico', 'main.js', 'package.json', 'Project1.html', and 'Unit1.pas'. The main workspace shows a file explorer with a 'Name' column. A folder named 'Project1-linux-x64' is selected, and an arrow points from the 'Build-Linux64' configuration to this folder. Another arrow points from the 'Project1-linux-x64' folder to a detailed view of its contents on the right. This view shows a 'resources' folder containing various files: 'chrome_100_percent.pak', 'chrome_200_percent.pak', 'chrome_crashpad_handler', 'chrome-sandbox', 'icudtl.dat', 'libEGL.so', 'libffmpeg.so', 'libGLv2.so', 'libvk_swiftshader.so', 'libvulkan.so.1', 'LICENSE', 'LICENSES.chromium.html', 'Project1', 'resources.pak', 'snapshot_blob.bin', 'v8_context_snapshot.bin', 'version', and 'vk_swiftshader_icd.json'. There is also a 'locales' folder.

the executable file for Linux is created

TMS WEB Electron Application

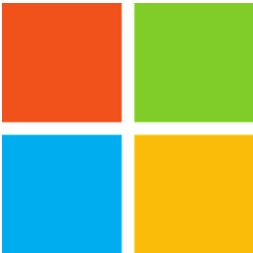
Example – Run as aDesktop Application(Windows)



The screenshot shows a desktop application window titled "TMS Web Project". The interface includes several input fields and a table. The input fields are labeled "Creditvalue:", "Repayment rate (%)", "Interest rate (%)", and "Duration:". The "Creditvalue:" field contains "100000", "Repayment rate (%)" contains "3", "Interest rate (%)" contains "2", and "Duration:" is a dropdown menu set to "10". A "Calculation" button is located to the right of these fields. Below the input fields is a table with the following columns: "Year", "Value", "Interest charges", "Repayment", "Annuity", and "Rest Value". The table has three empty rows below the header.

Year	Value	Interest charges	Repayment	Annuity	Rest Value

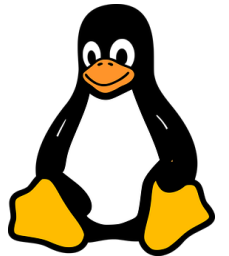
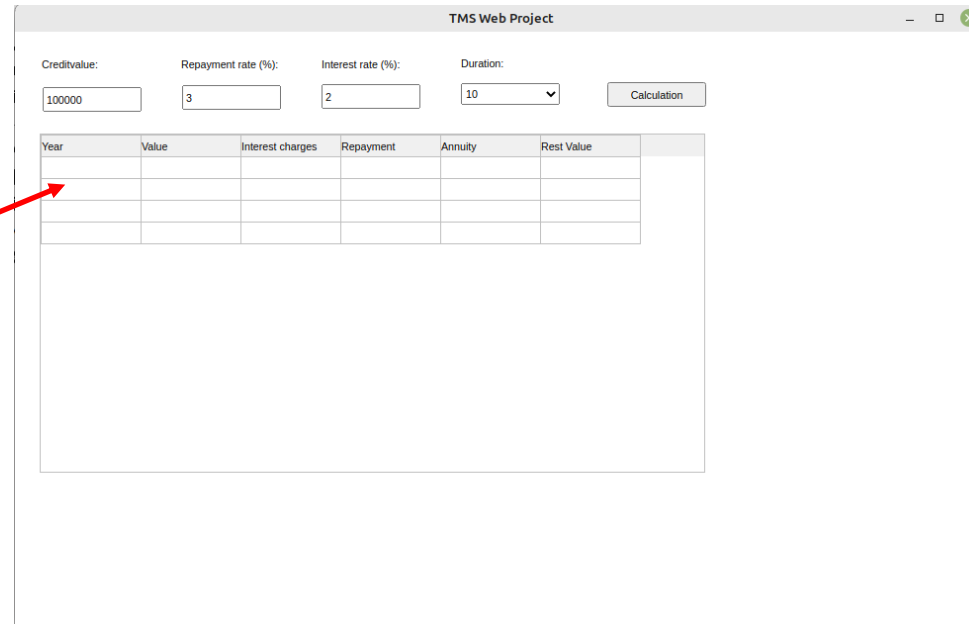
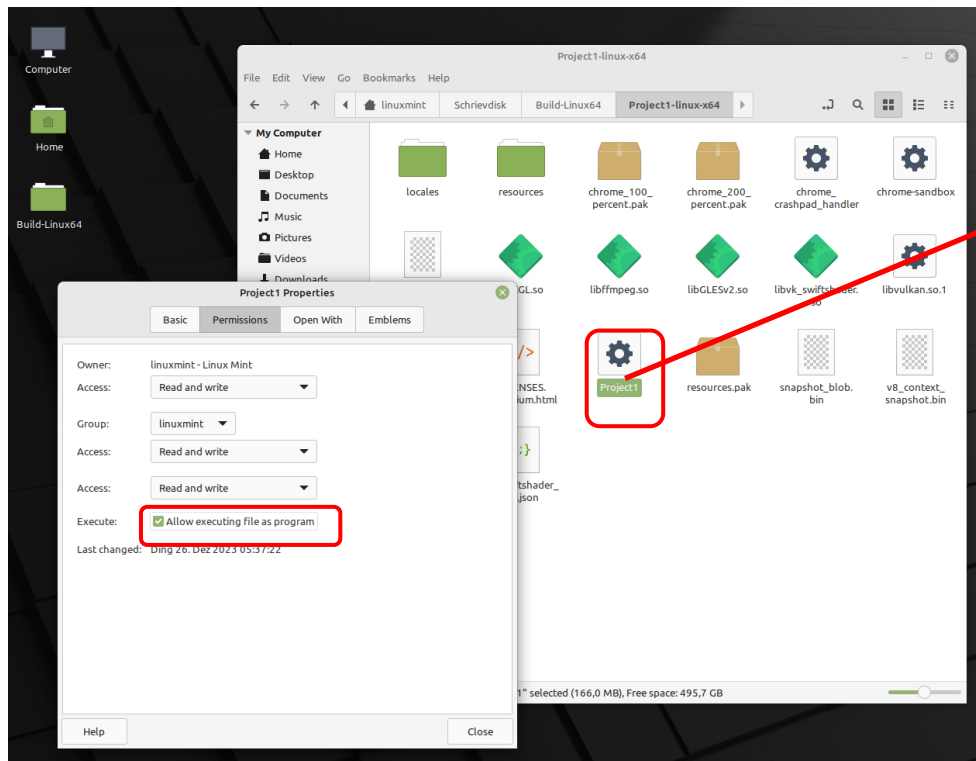
Desktop-Application



supplemented by
Electron-Framework
(Debug Mode)

TMS WEB Electron Application

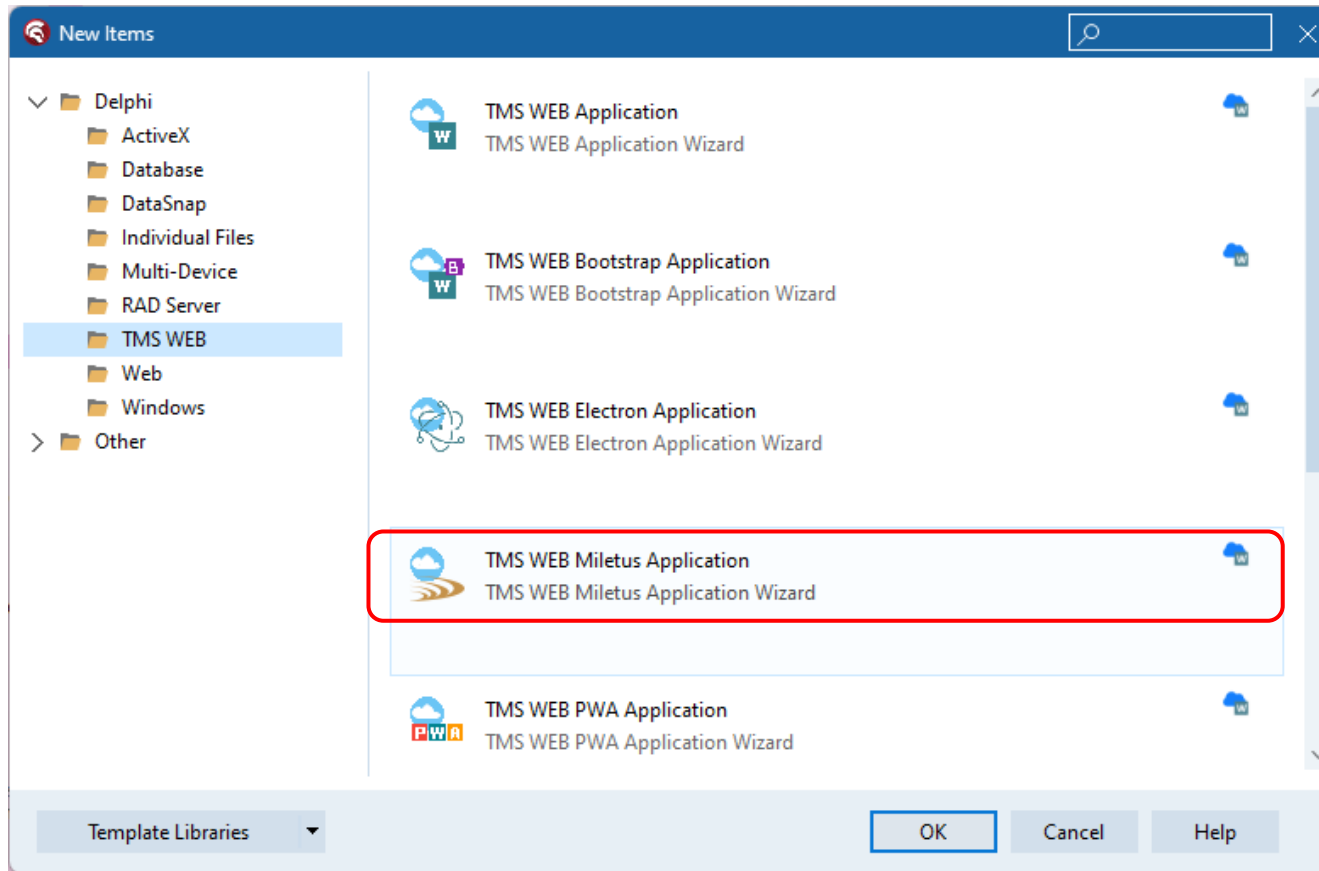
Example –Desktop application (Linux)



Desktop-Application

- running the Electron app on Linux
- here: Linux-Mint

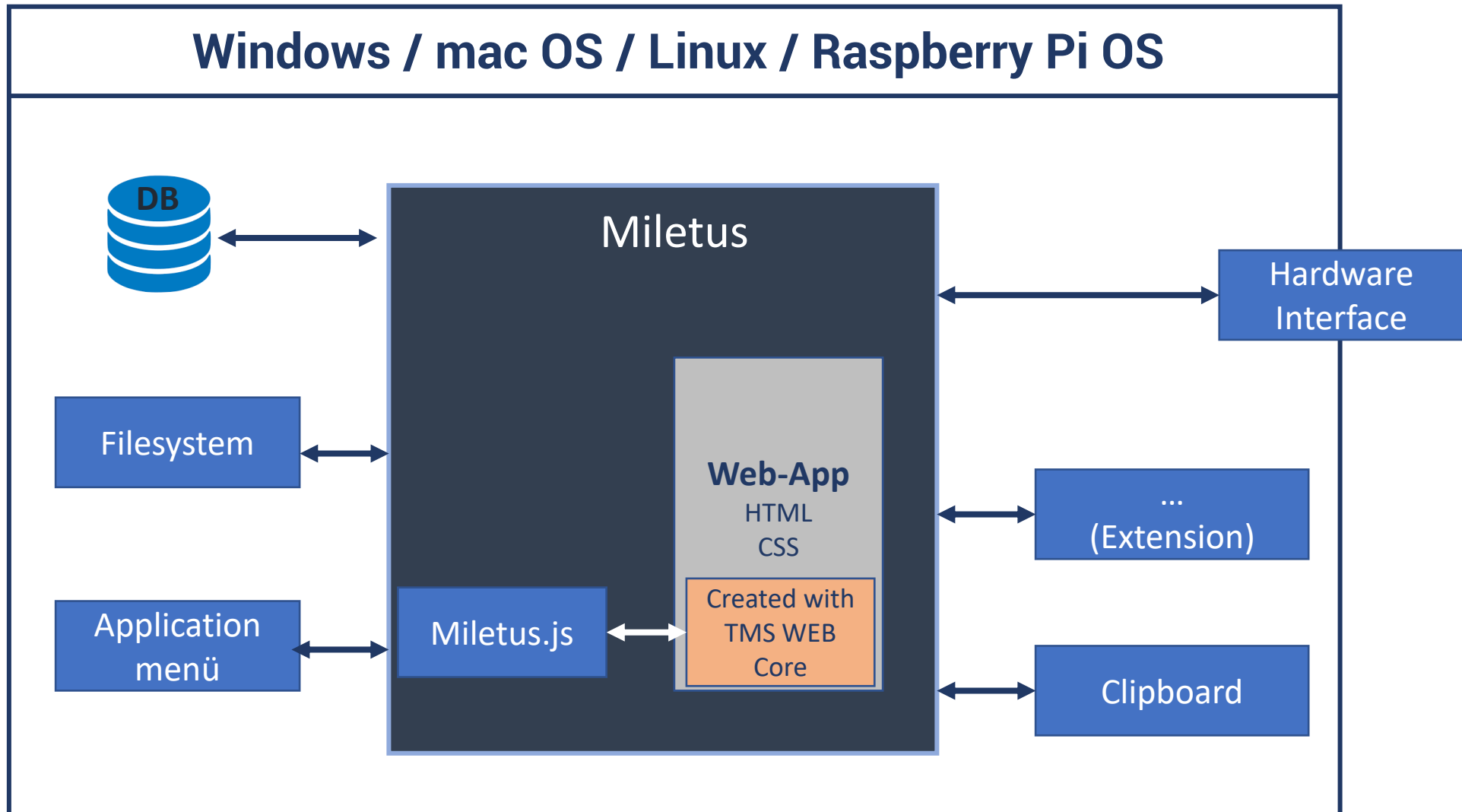
TMS WEB Miletus Application



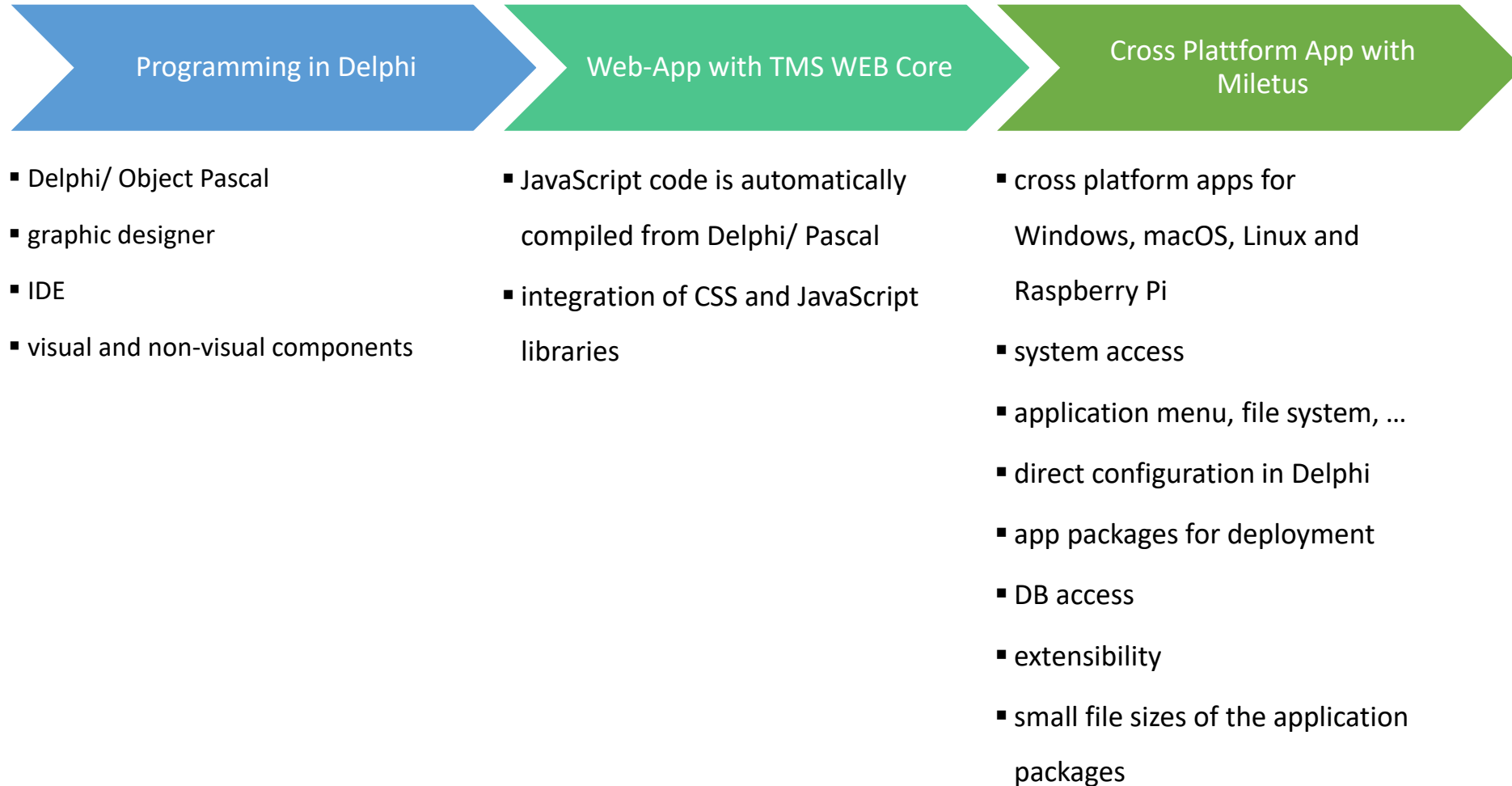
- web application based on the Miletus Framework to create cross-platform desktop applications
- alternative to the Electron framework
- info: <https://miletus.org/>

TMS WEB Miletus Application

Architektur von Miletus-Frameworks



TMS WEB Miletus Application Development Path



TMS WEB Miletus Application

Miletus-Features

- file access
- file dialogs for opening and saving
- messagebox/ error dialog, application/ popup menu
- system notifications
- application window, tray icon, global application shortcuts
- database access
- clipboard access, shell access
- ini files/ registry (Windows)
- Raspberry Pi Support (Raspberry Pi OS, Hardware)

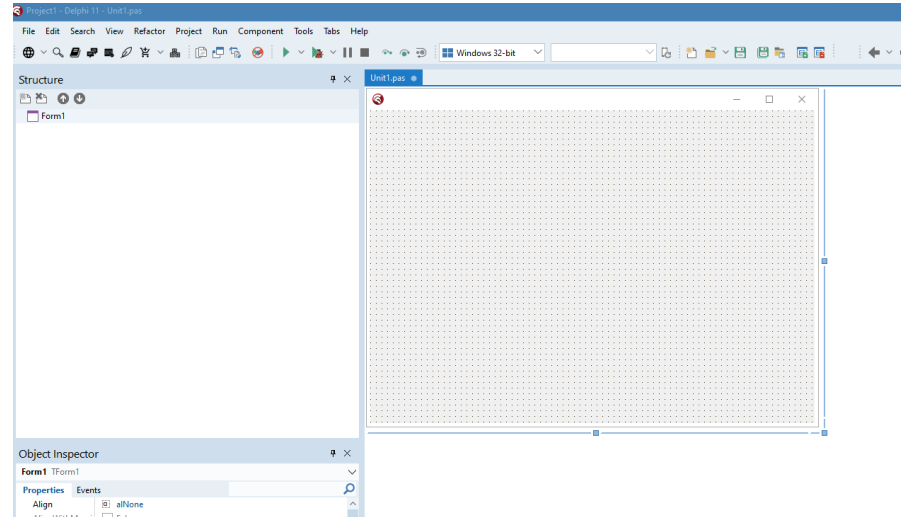
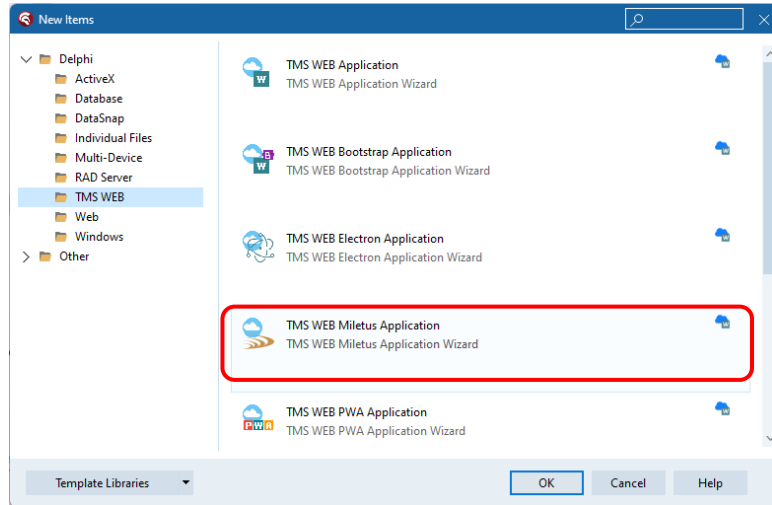
TMS WEB Miletus Application

Advantages/features of the Miletus framework

- smaller file sizes of the application packages
- use of the browser engine of the target systems
- updates to the browser engines, e.g. security updates, take effect for the app
- app can run on Raspberry Pi (Raspberry Pi OS).
- access to the Raspberry Pi hardware interfaces, i.e. GPIO, I2C, SPI and UART and the memory buffer
- expandability of the API, i.e. integration of additional APIs via shared library concept
- support of databases such as SQLite, MySQL, MSSQL, PostgreSQL, MS Access (Windows only), Firebird, Interbase
- professional manufacturer support

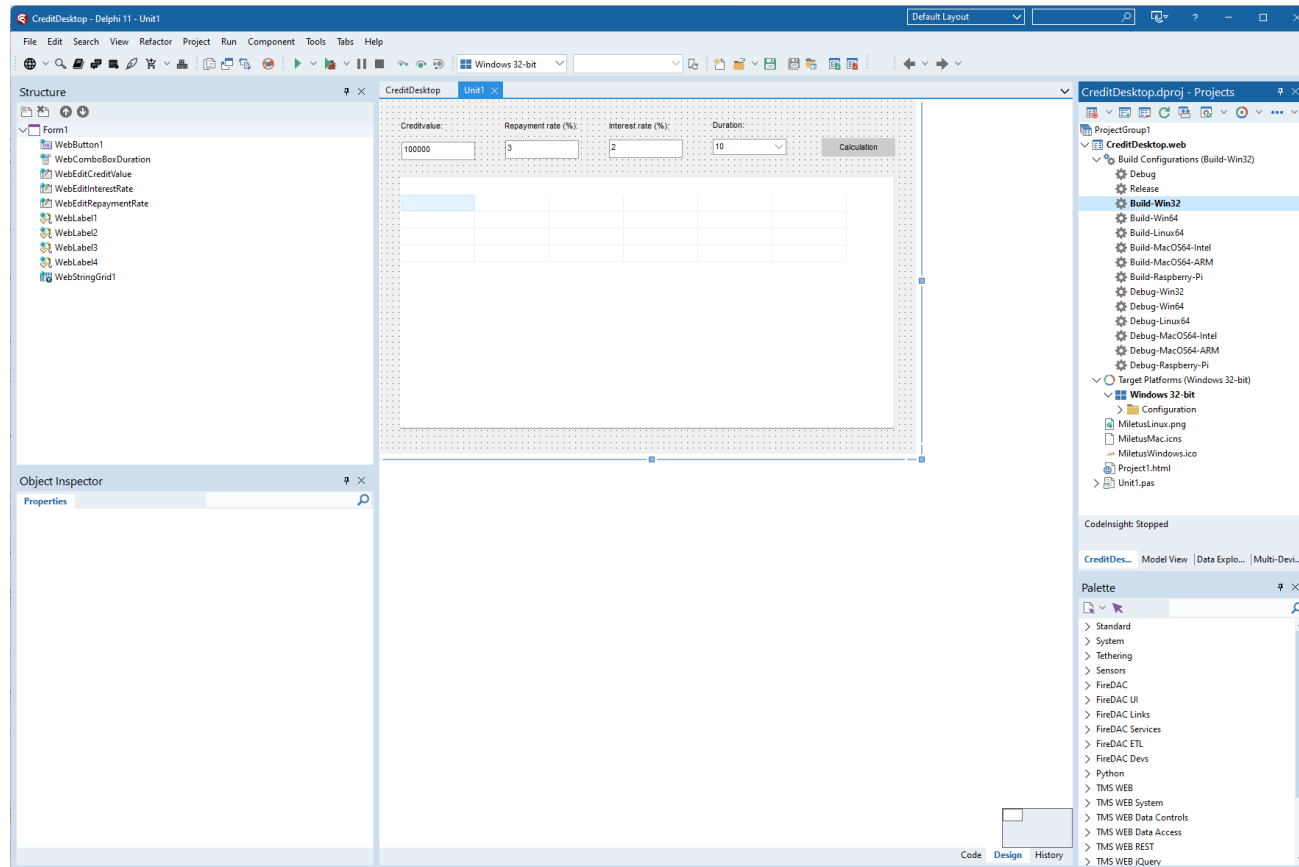
TMS WEB Miletus Application

Example – Delphi



- generates a project similar to a TMS web application with additional icon files and build configurations
- for each supported platform there is a debug platform and a build platform configuration
- in build mode, the debugging tools are disabled

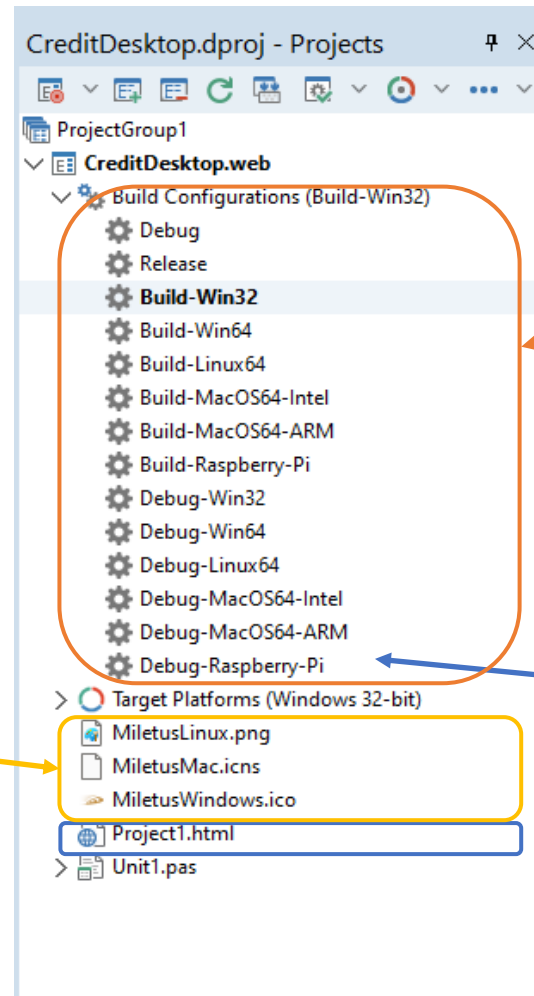
TMS WEB Miletus Anwendung Example- Application Development



- Development of the application in Delphi IDE
- use of the TMS WEB Core components
- the difference to a web application is that the deployment is customized
- Miletus generates the application packages for the selected target systems

TMS WEB Miletus Application

Example – Structure of the Project



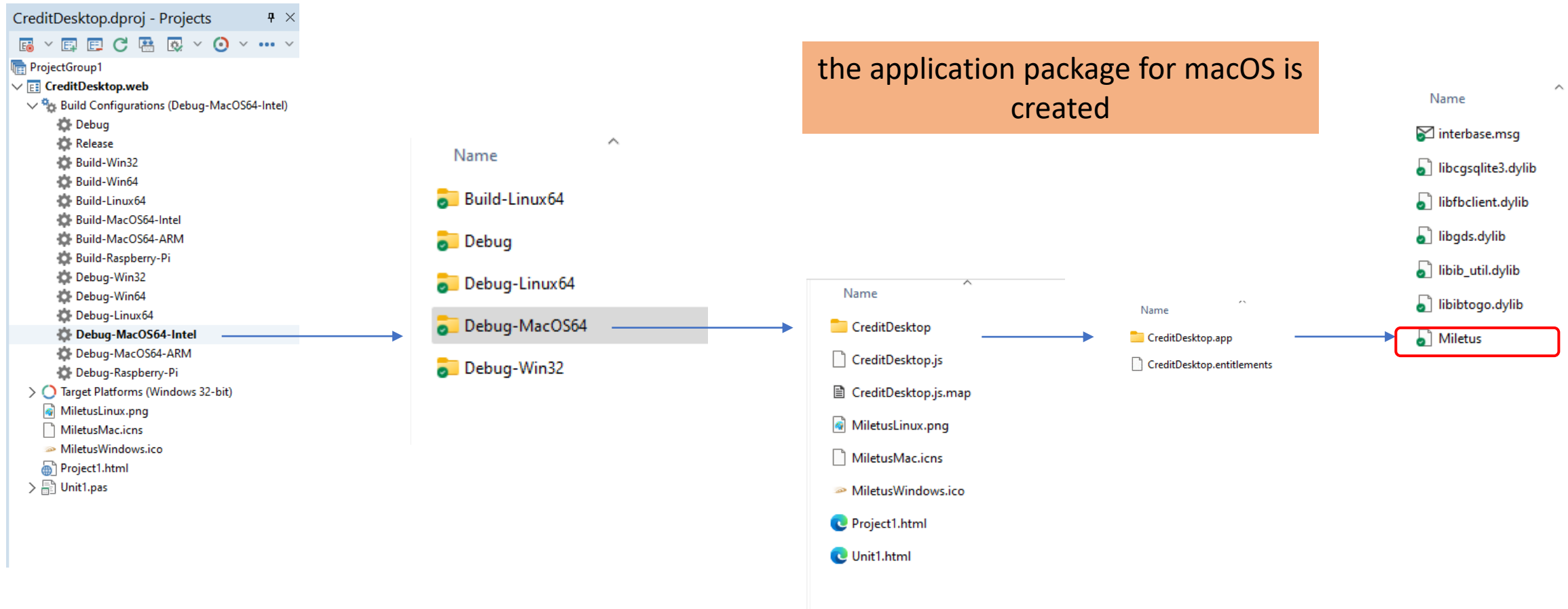
activation of the application package for target System

App-Icons for target Systems (Windows, macOS, Linux)

Web-Applikation (automatically generated by TMS WEB Core)

TMS WEB Miletus Application

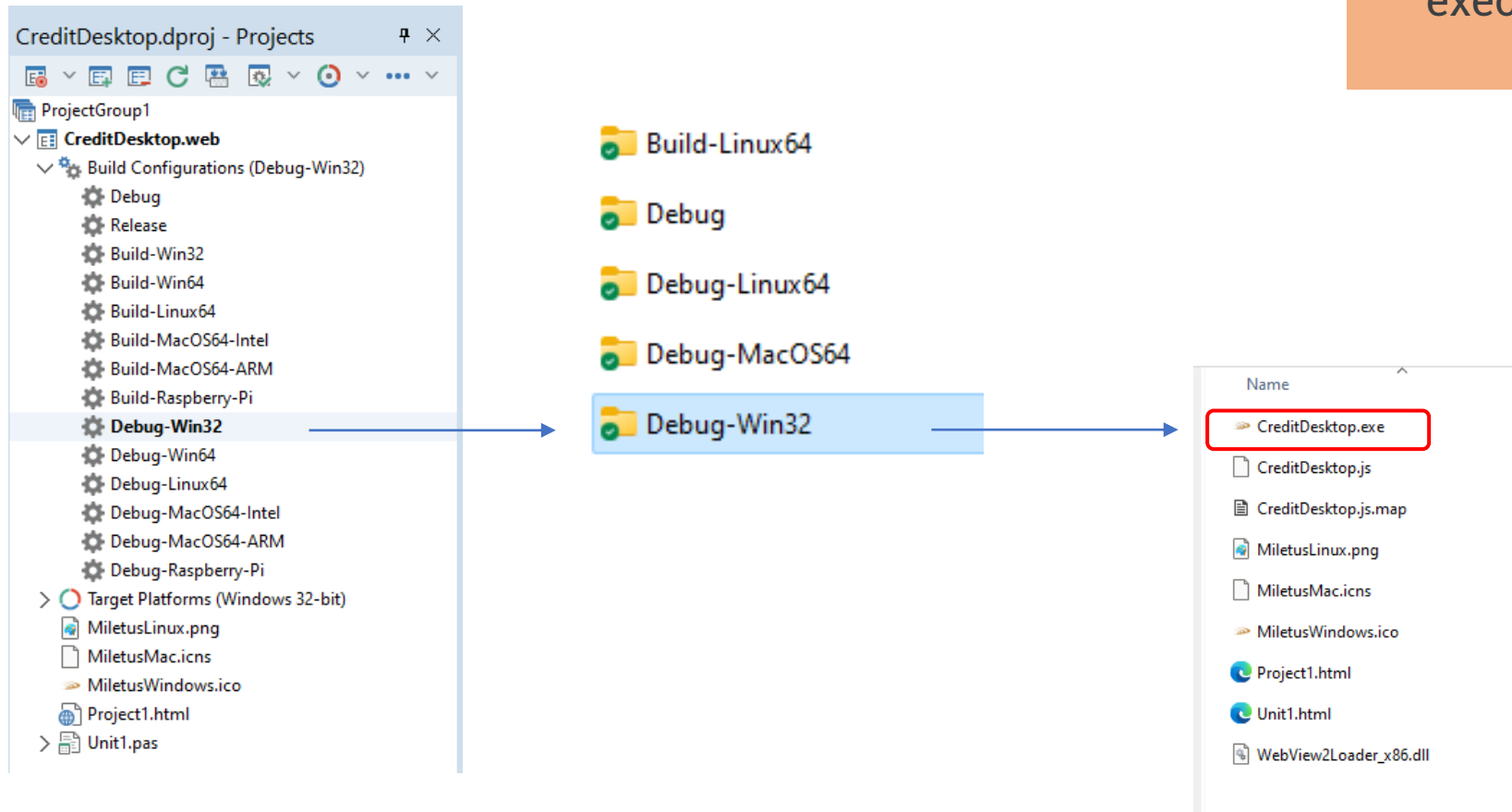
Example – Application Packages, here macOS



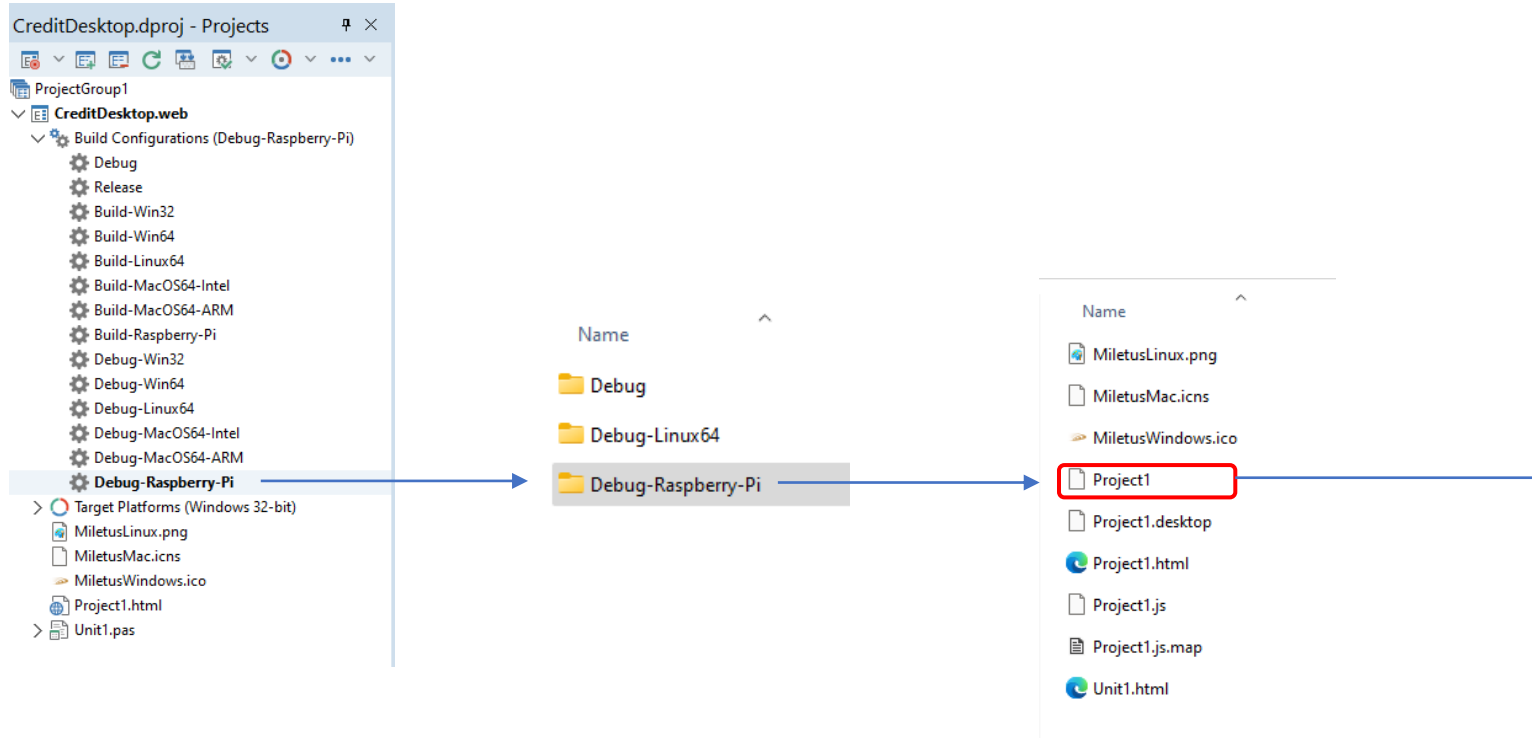
TMS WEB Miletus Application

Example – Application Packages, here Windows

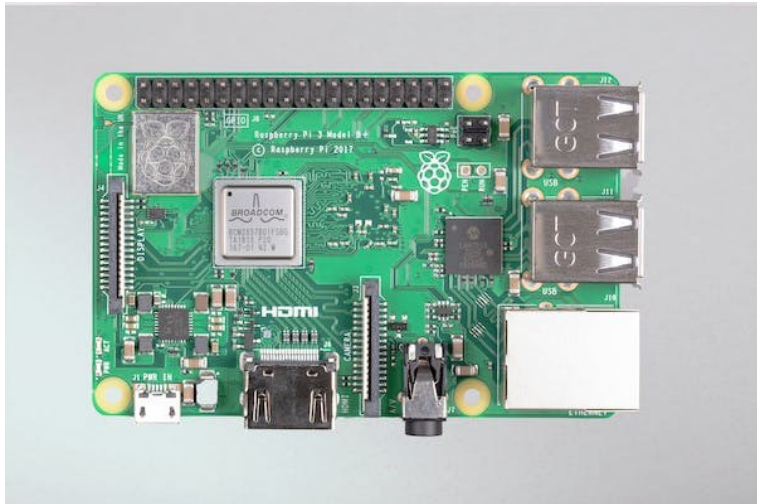
executable file for Windows
(* .exe)



TMS WEB Miletus application example – application packages, here Raspberry Pi



the application package for the Raspberry Pi is generated, which can be executed on Raspberry Pi OS



Source: <https://www.raspberrypi.com/products/raspberry-pi-3-model-b-plus/>

TMS WEB Miletus application

Example – execution as a desktop application: Windows

supplemented by
Miletus Framework

Year	Value	Interest charges	Repayment	Annuity	Rest Value

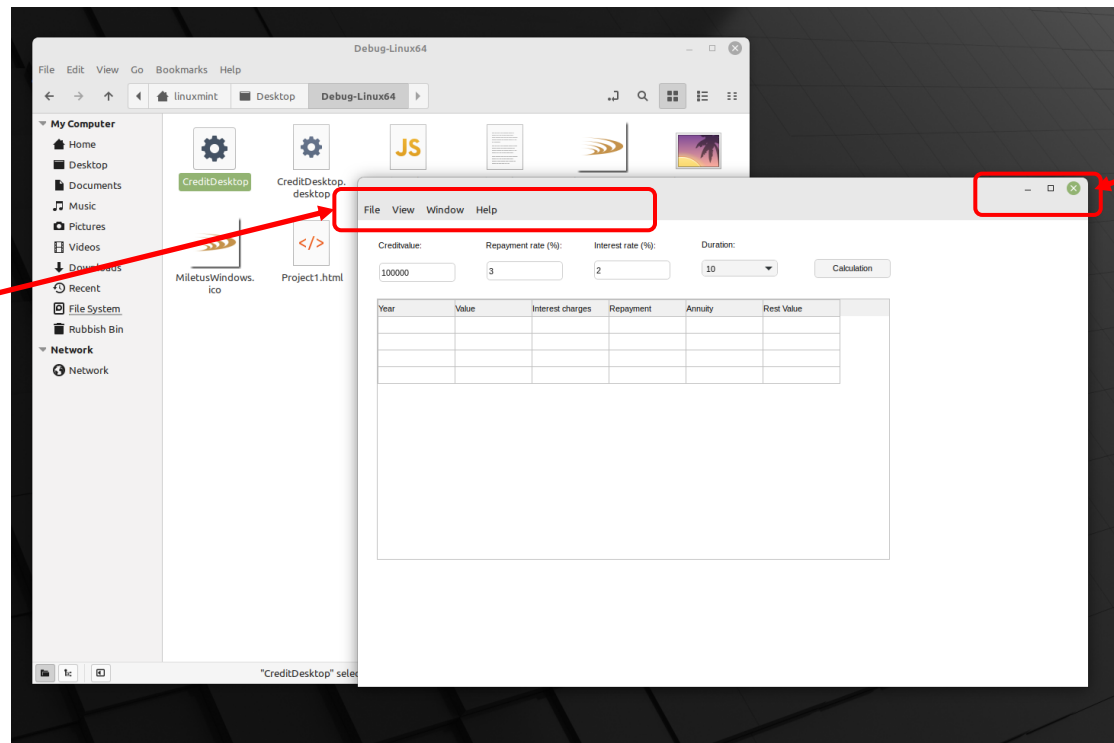
Desktop-Application



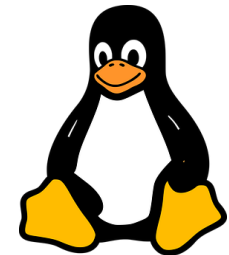
TMS WEB Miletus Application

Example –Desktop-Application: Linux

supplemented by
Miletus Framework

























Desktop-Application



TMS WEB Miletus Application

Miletus-Features

✓ TMS WEB Miletus

-  TMiletusOpenDialog
-  TMiletusSaveDialog
-  TMiletusMessageBox
-  TMiletusErrorBox
-  TMiletusMainMenu
-  TMiletusPopupMenu
-  TMiletusWindow
-  TMiletusTrayIcon
-  TMiletusFileWatcher
-  TMiletusGlobalShortcuts
-  TMiletusNotificationCenter
-  TMiletusClientDataSet
-  TMiletusAccessDBDriver
-  TMiletusMySQLDBDriver
-  TMiletusSQLiteDBDriver
-  TMiletusPostgreSQLDBDriver
-  TMiletusMSSQLDBDriver
-  TMiletusInterbaseDBDriver
-  TMiletusFirebirdDBDriver
-  TMiletusRaspberryI2C
-  TMiletusRaspberrySPI
-  TMiletusRaspberryUART

- in the development environment, non-visual controls are available via the tool palette to integrate and use the features of the Miletus framework into the application
- examples
 - *TMiletusOpenDialog* to display the file open dialog on the respective target system
 - *TMiletusSQLiteDBDriver* for accessing a local SQLite database
 - *TMiletusRaspberryI2C*: input and output of signals via the I2C port of the Raspberry Pi

TMS WEB Miletus Application

Miletus – Feature: Save File Dialog

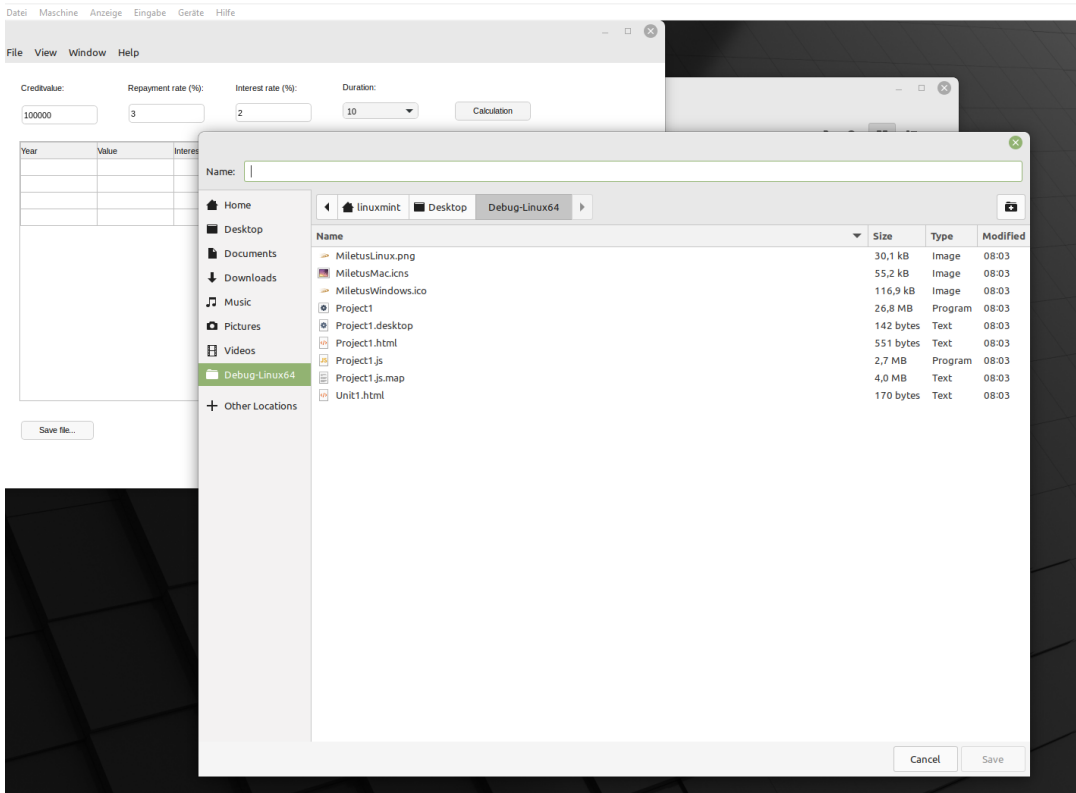
The screenshot displays the Delphi IDE interface for a TMS WEB Miletus application. The main design view shows a form with a 'Save file...' button and a 'MiletusSaveDialog1' component. The 'Structure' pane on the left shows the form's components: 'MiletusSaveDialog1' and 'WebButton1'. The 'Object Inspector' at the bottom left shows the properties of the selected component. The 'Project1.dproj - Projects' pane on the right shows the project structure, including 'Project1.web' and 'Unit1.pas'. A code editor window at the bottom left shows the following procedure:

```
29 procedure TForm1.WebButton1Click(Sender: TObject);  
30 begin  
    MiletusSaveDialog1.Execute(true);  
end;
```

The code editor window is highlighted with a red box, and a red arrow points from the 'MiletusSaveDialog1' component in the design view to the code. Another red arrow points from the 'Save file...' button to the code. The 'Component Palette' at the bottom right shows the 'TMS WEB Miletus' category, with 'MiletusSaveDialog1' selected and highlighted with a red box.

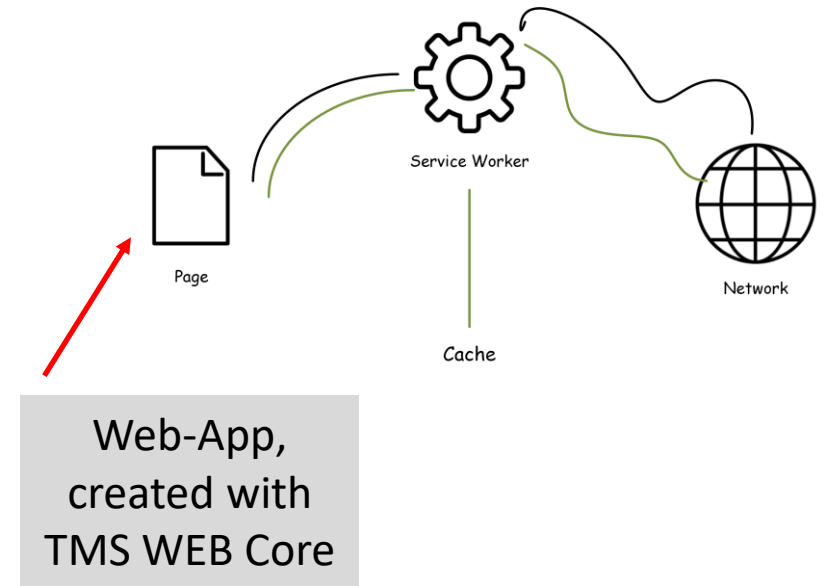
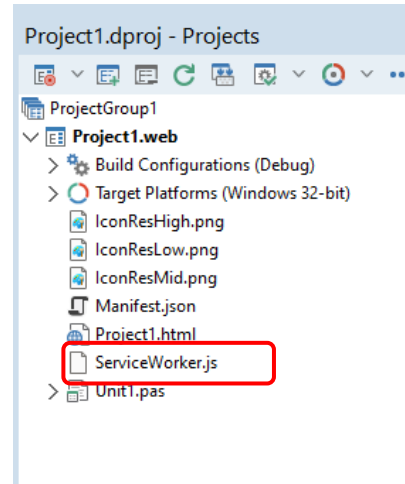
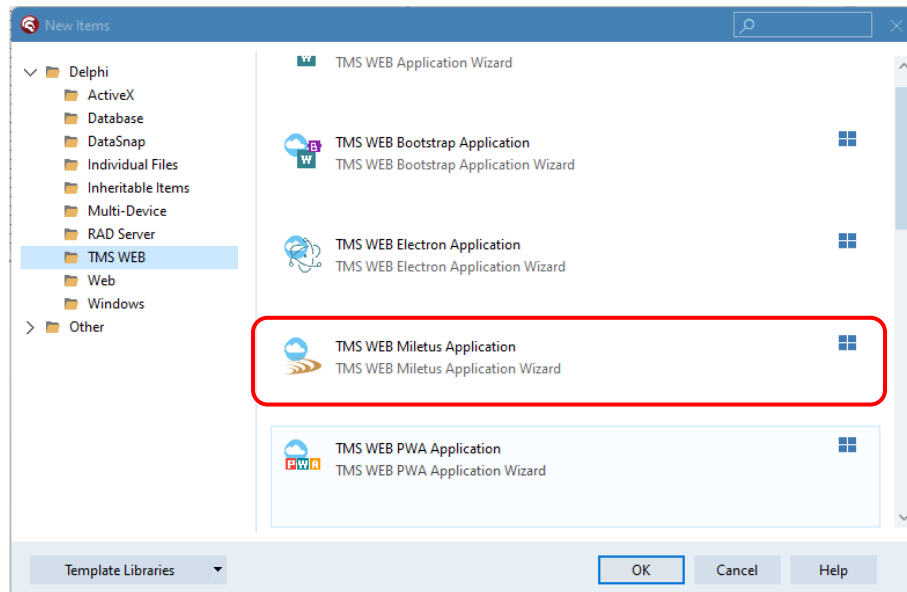
TMS WEB Miletus application

File Save Dialog on Linux



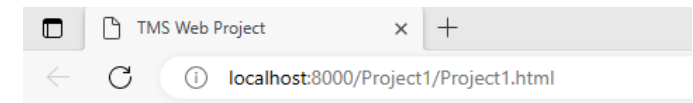
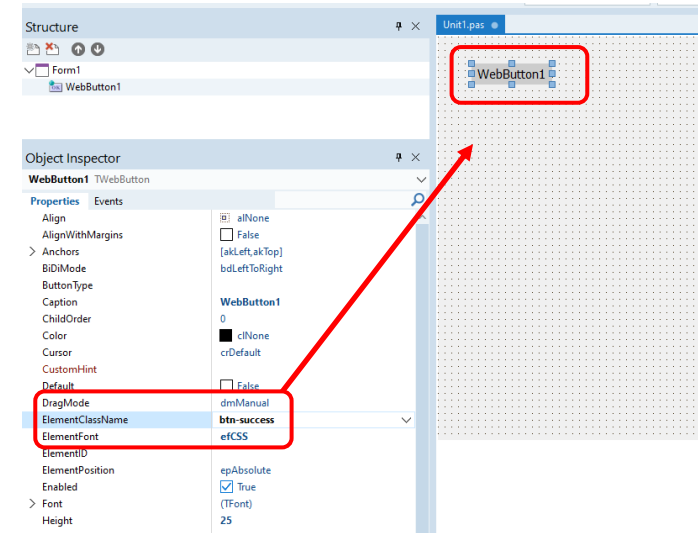
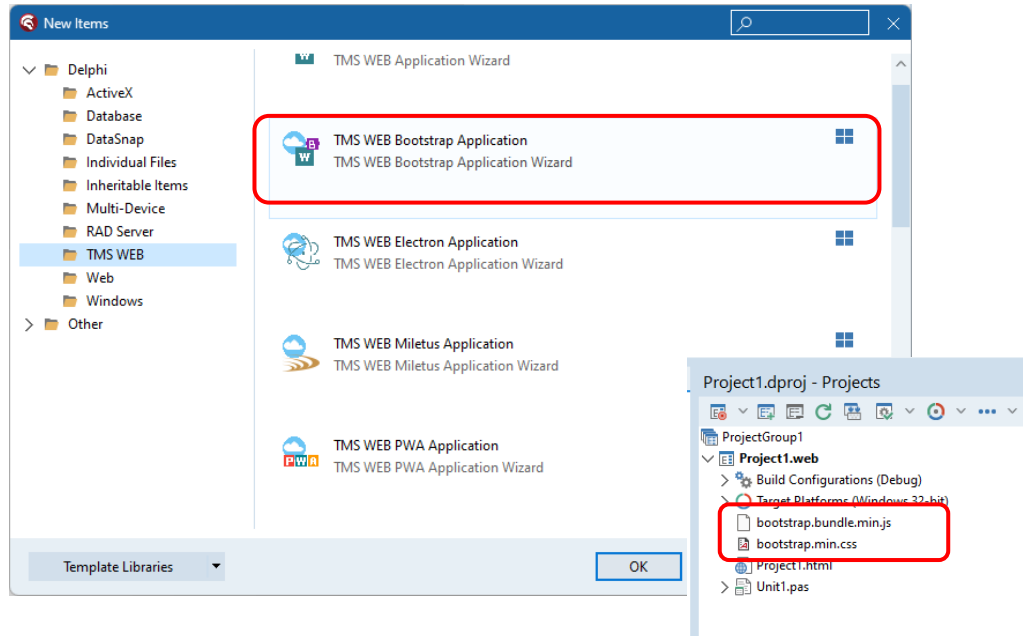
- you create the application package for another operating system and copy it to the target system.
- clicking on the button opens the standard dialog box for saving files.
- here you can see it for Linux-Mint.

TMS WEB PWA Application



- it is also possible to automatically create a progressive web application (PWA) from the IDE wizard
- a progressive web application is a web application designed to adapt to online/ offline situations, to different types of devices and, above all, to be able to be installed on the desktop and launched from a desktop icon, similar to a native application
- you can find more information about progressive web applications here: <https://web.dev/progressive-web-apps/>

TMS WEB Bootstrap Application



- a large number of web applications are designed with the Bootstrap CSS and JavaScript library
- Bootstrap is a framework that can be used to design websites responsively
- Bootstrap offers a large number of classes for designing the layout, styling the components and other design aids
- information (Documentation): <https://getbootstrap.com/>
- you can use this popular library in TMS WEB Core
- with this template you can integrate the library directly into the TMS project
- the objects can then be styled directly using the CSS classes

At runtime the button is styled using the CSS class; in Delphi's designer, the design is not visible at design time. However, there is a live server that can display the form while you customize it in the designer.

Resources

- TMS WEB Core:
<https://www.tmssoftware.com>
- Delphi Community Edition:
<https://www.embarcadero.com/products/delphi/starter>
- TMS Academic License:
<https://www.tmssoftware.com/site/academic.asp>
- Miletus-Framework:
<https://miletus.org/>
- Electron-Framework:
<https://www.electronjs.org/de/>
- TMS Academic License:
<https://www.tmssoftware.com/site/academic.asp>
- Flick, Holger: TMS WEB Core: Webanwendungen mit Delphi entwickeln, independently published, 2020

Outlook

- the “Miletus” technology is also available without being detached from TNS WEB Core
- this makes it possible to create application packages for web applications for Windows, macOS, Linux and Raspberry Pi OS
- all the advantages of the Miletus framework (small application packages, access to Raspberry Pi hardware interfaces, expandability, direct access to local databases, etc.) can then be used by any web app
- a web app can easily become a cross-platform application
- the Miletus API can be accessed from the web app using JavaScript or TypeScript
- information at: <https://miletus.org/>

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Framework for creating modern web applications



More info:

<http://web.tmssoftware.com>