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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

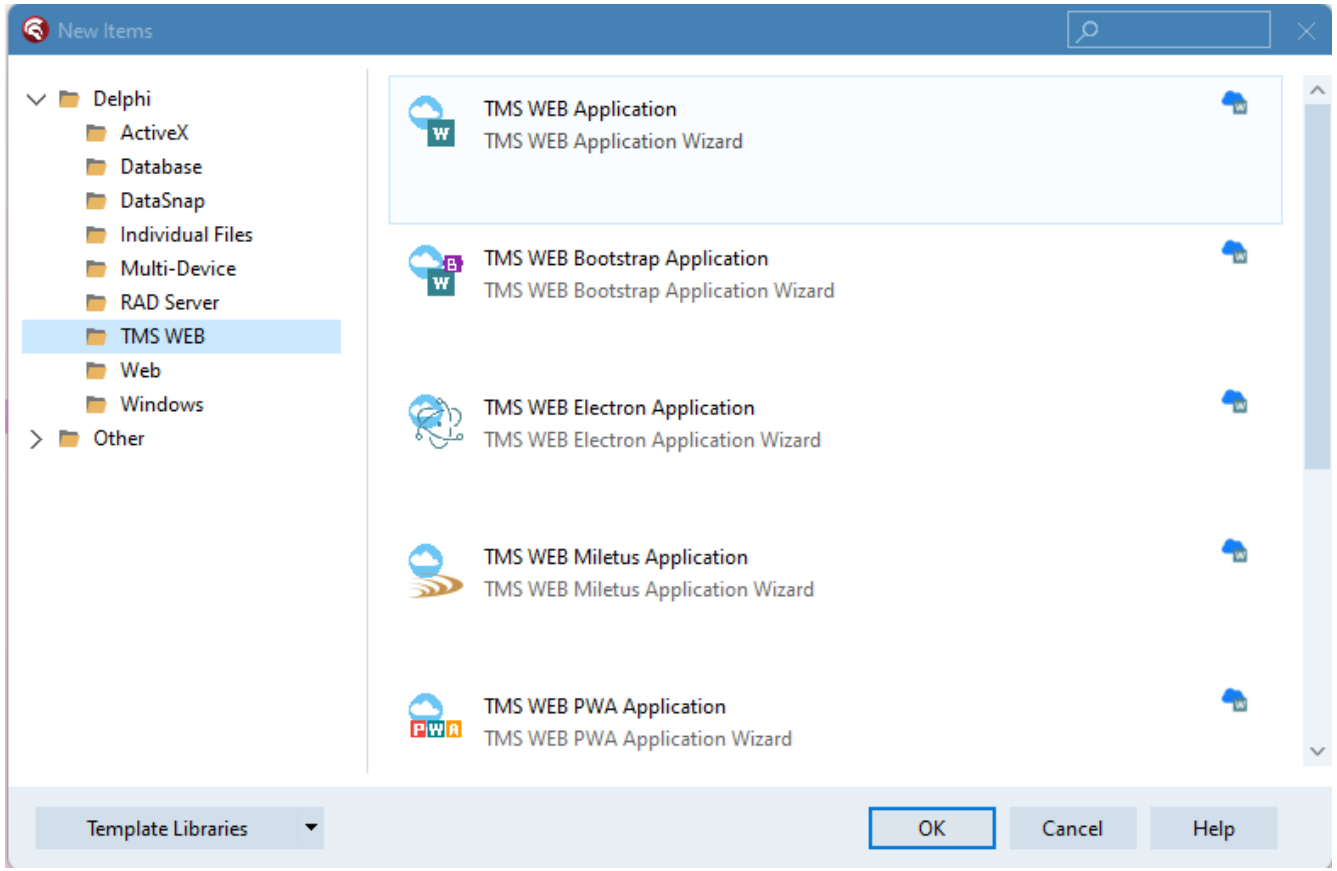
Part 2: Application Development and Features of TMS WEB Core

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

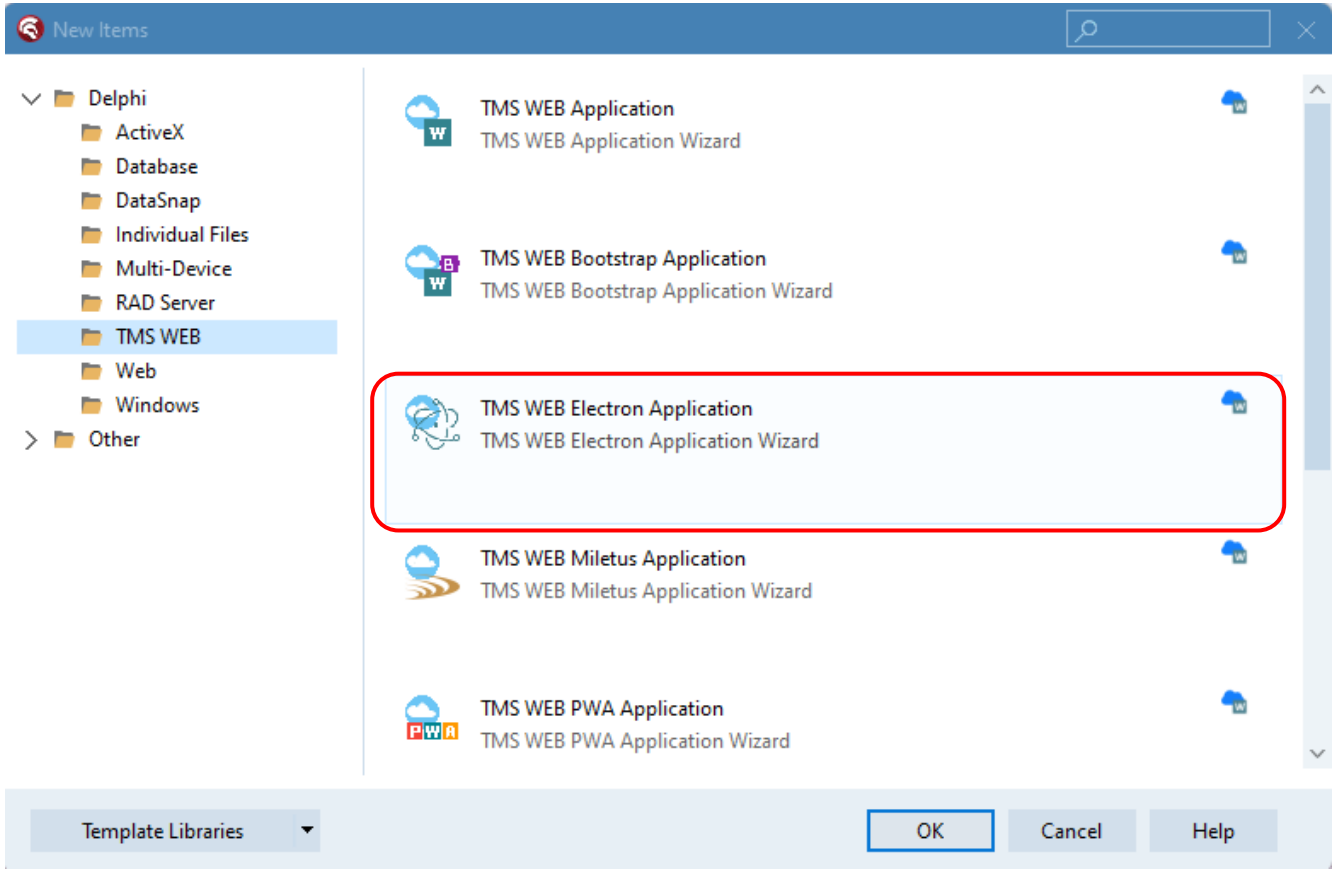


- in addition to the template for a web application, TMS WEB Core offers further project templates:
  - TMS WEB Electron application
  - TMS WEB Miletus application
  - TMS WEB PWA application
  - TMS Web Bootstrap application
- with the Electron and Miletus frameworks, you can create client applications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

Run a web app natively on the target device

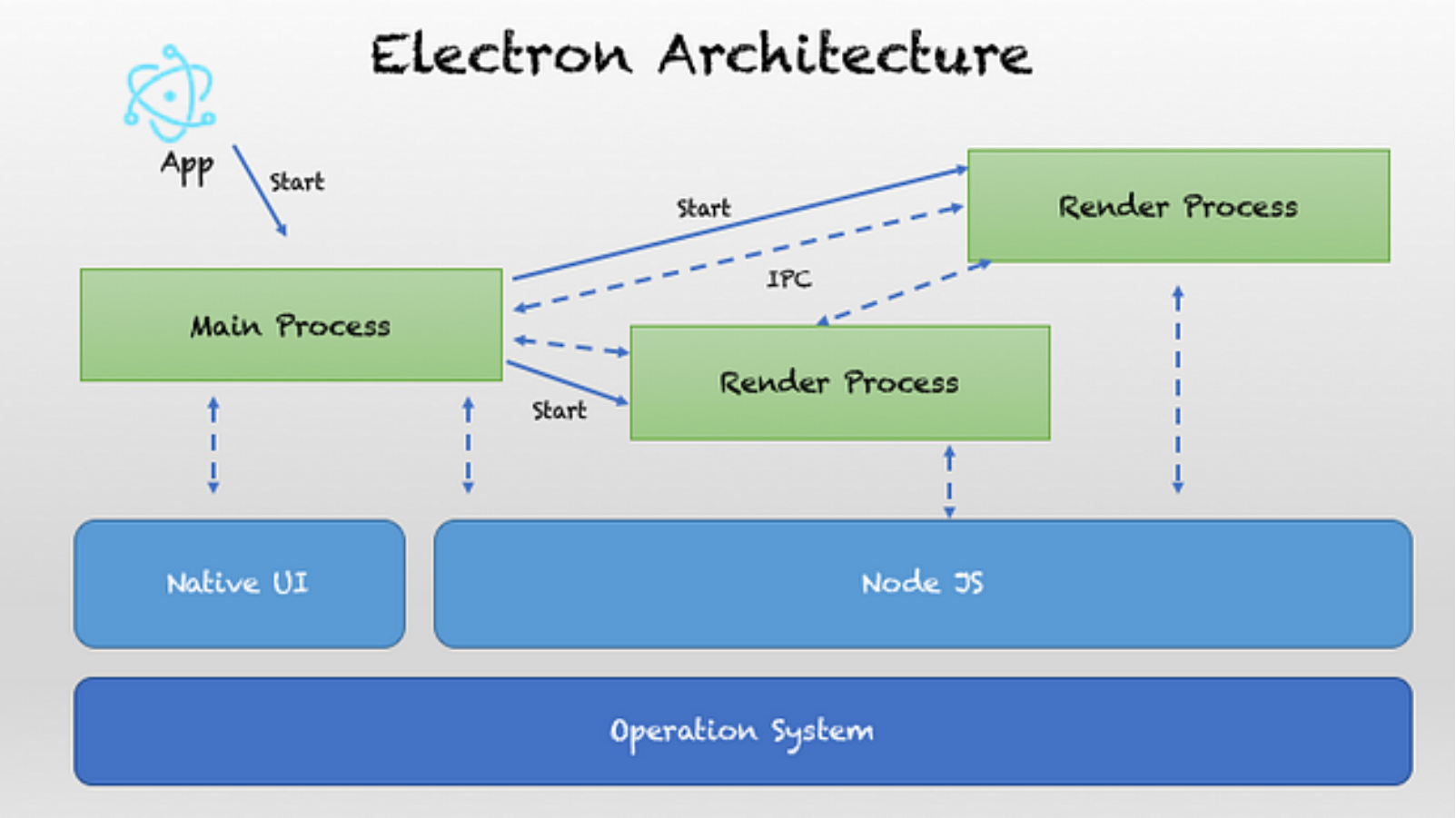
- access to device and system functions, such as local files and folders
- use of local databases
- offline use through installation on the target systems
- no direct execution in the browser, therefore usually better user experience
- cross platform applications, i.e. apps for desktop and web from one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

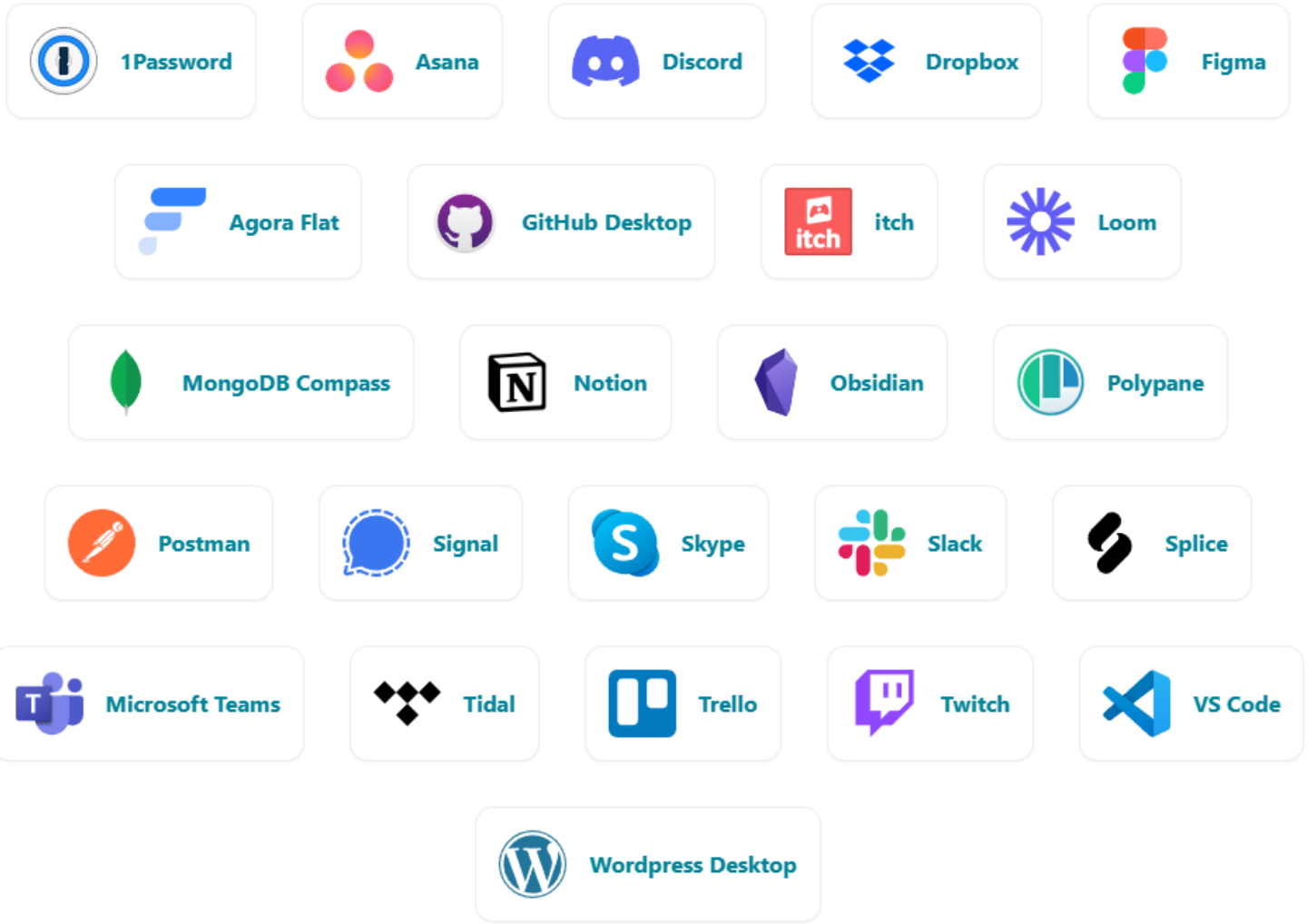
TMS WEB Electron Application
Architektur Electron-Framework



- 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.

Source: https://medium.com/@vishaldwivedi13/electron-things-to-watch-out-for-before-you-dive-in-e1c23f77f38f

Apps created with Electron



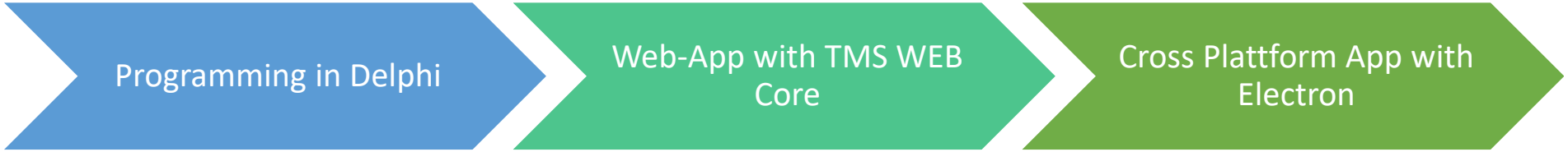
With the help of TMS WEB Core you can create cross-platform apps from the Electron base directly in the Delphi development environment.

HTML, CSS and JavaScript-Code are not necessary.

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

https://www.electronjs.org/de/

TMS WEB Electron Application
Development



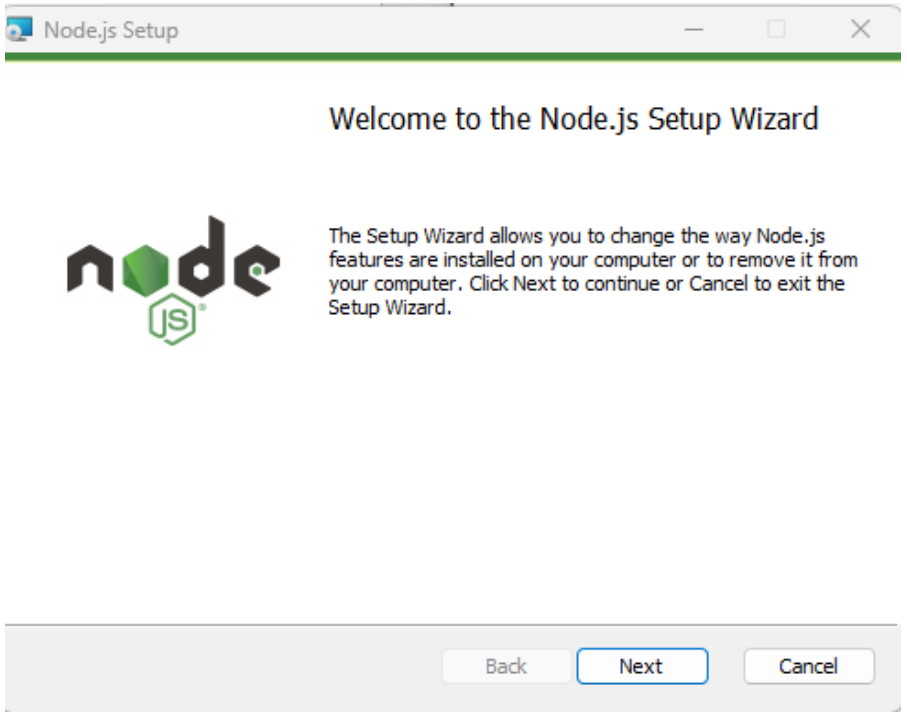
- Delphi/Object Pascal
- graphic designer
- IDE
- visual and non-visual components

- 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

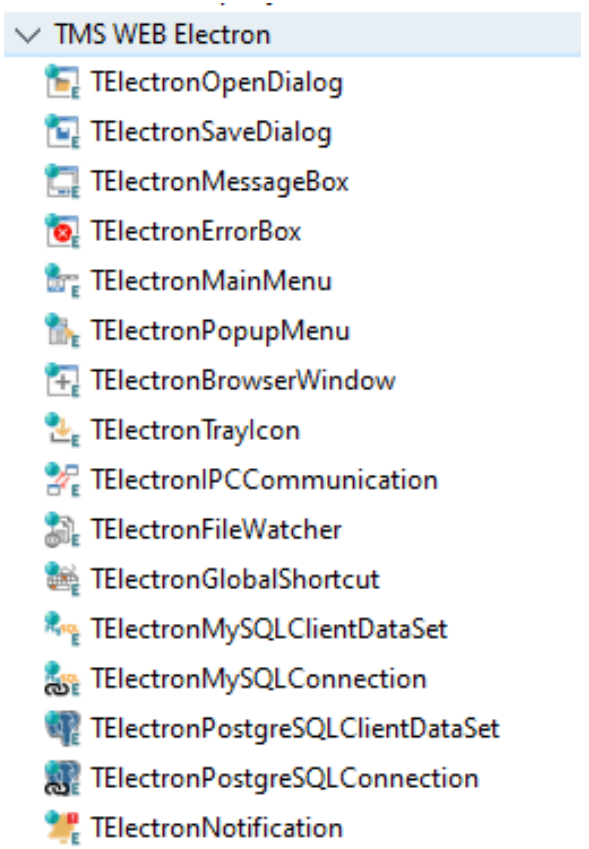
- to use Electron, you need to install Node.js.
- we recommend that you use the latest LTS version available.
- https://nodejs.org/
- testing with *node –v* and *npm –v*
- global installation of Electron with:
  npm i electron -g



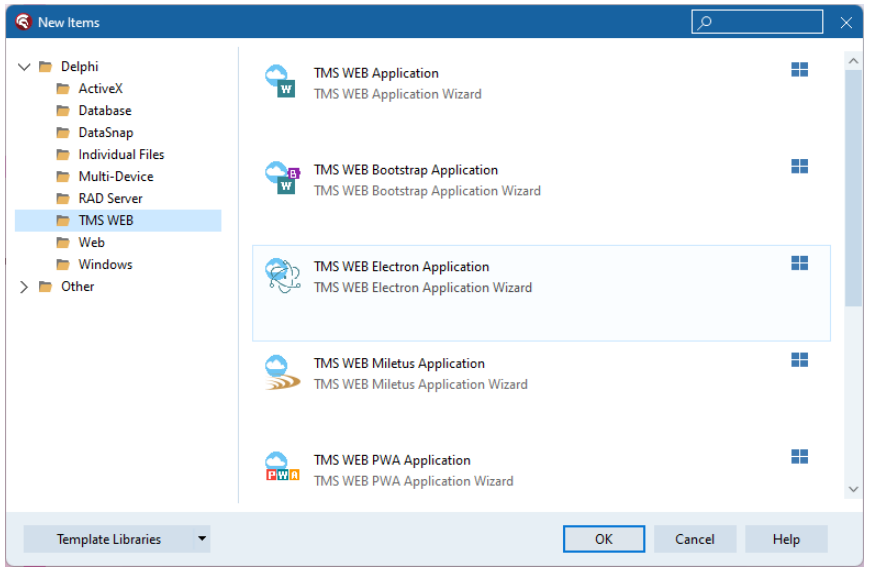
TMS WEB Electron Application
Electron – Features

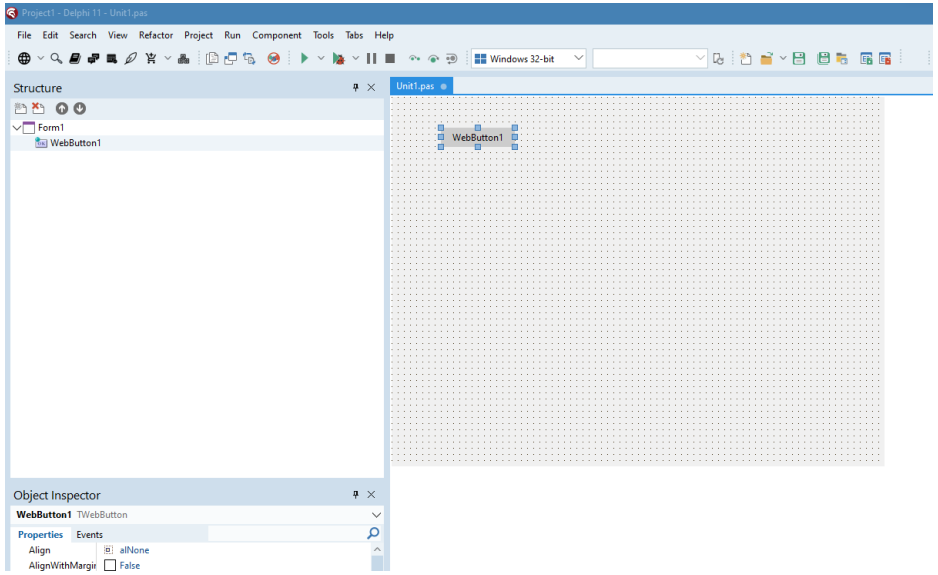
- file open dialog and file save dialog, message dialog and error dialogs
- drag & drop function
- menus (main and popup menu)
- access to MySQL/ PostgeSQL database
- window management
- global shortcuts
- file Watcher

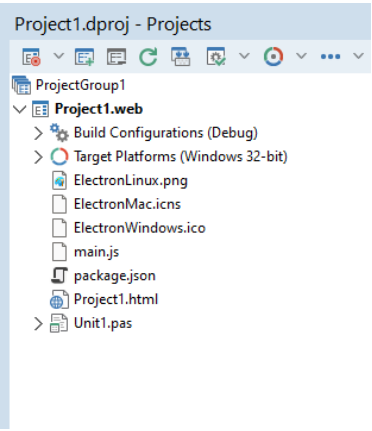
components in the palette for building Electron apps



TMS WEB Electron Application
Example –Delphi

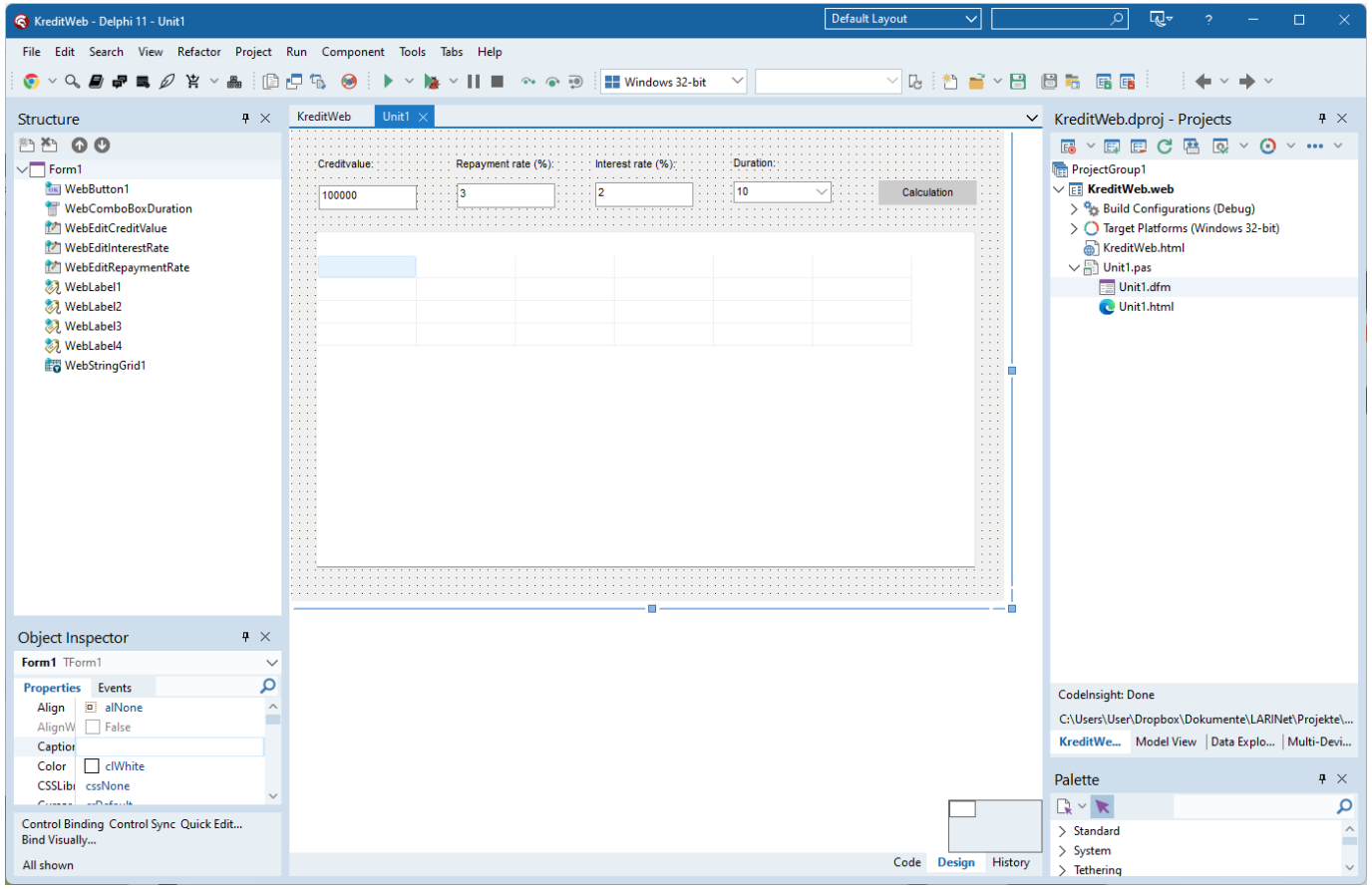






- generates a project similar to a TMS web application with additional icon files and build configurations
- for each supported platform there is a debug platform and a build platform configuration
- in build mode the debugging tools are disabled

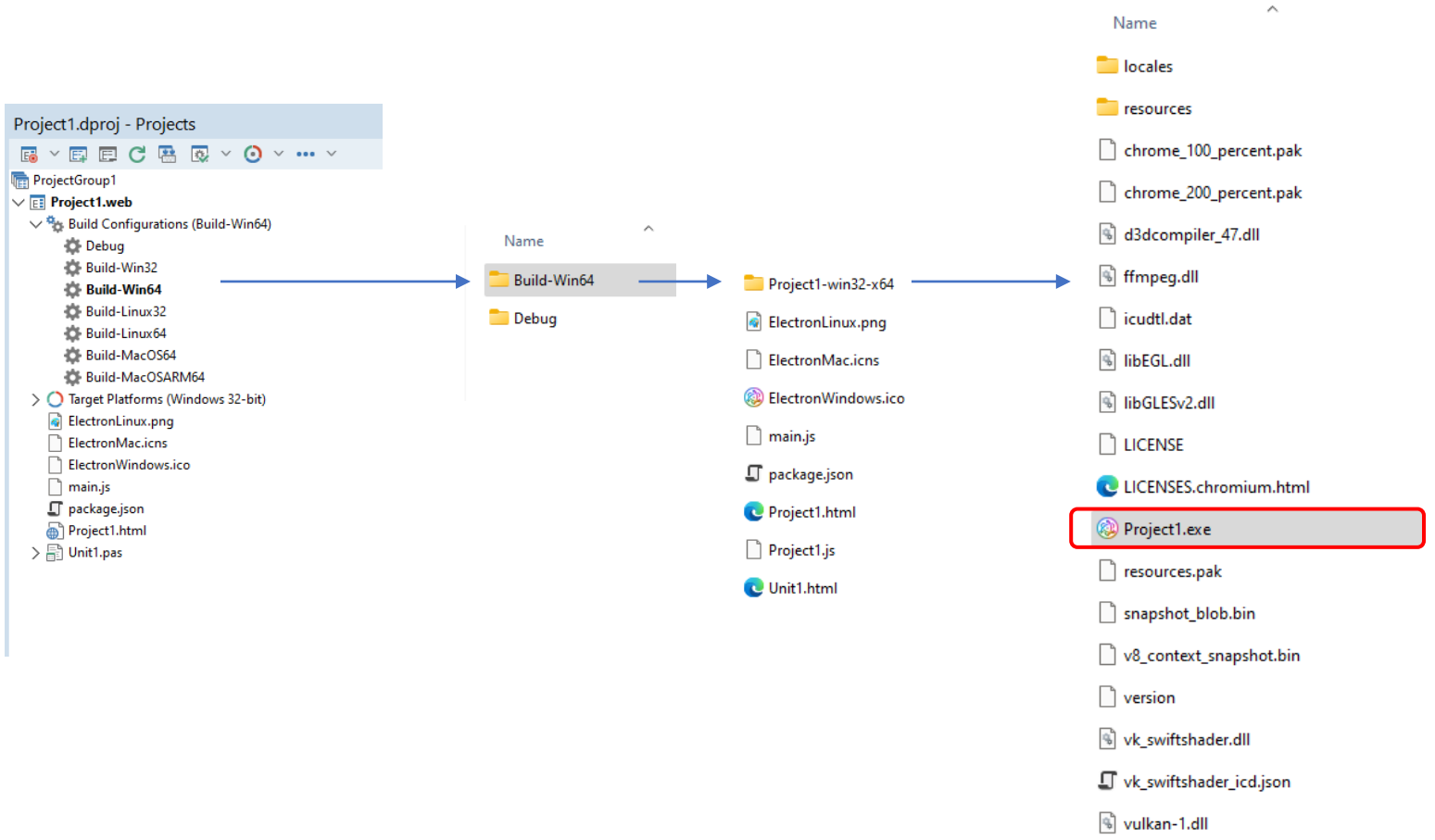
TMS WEB Electron Application
Example – Application Development



- 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

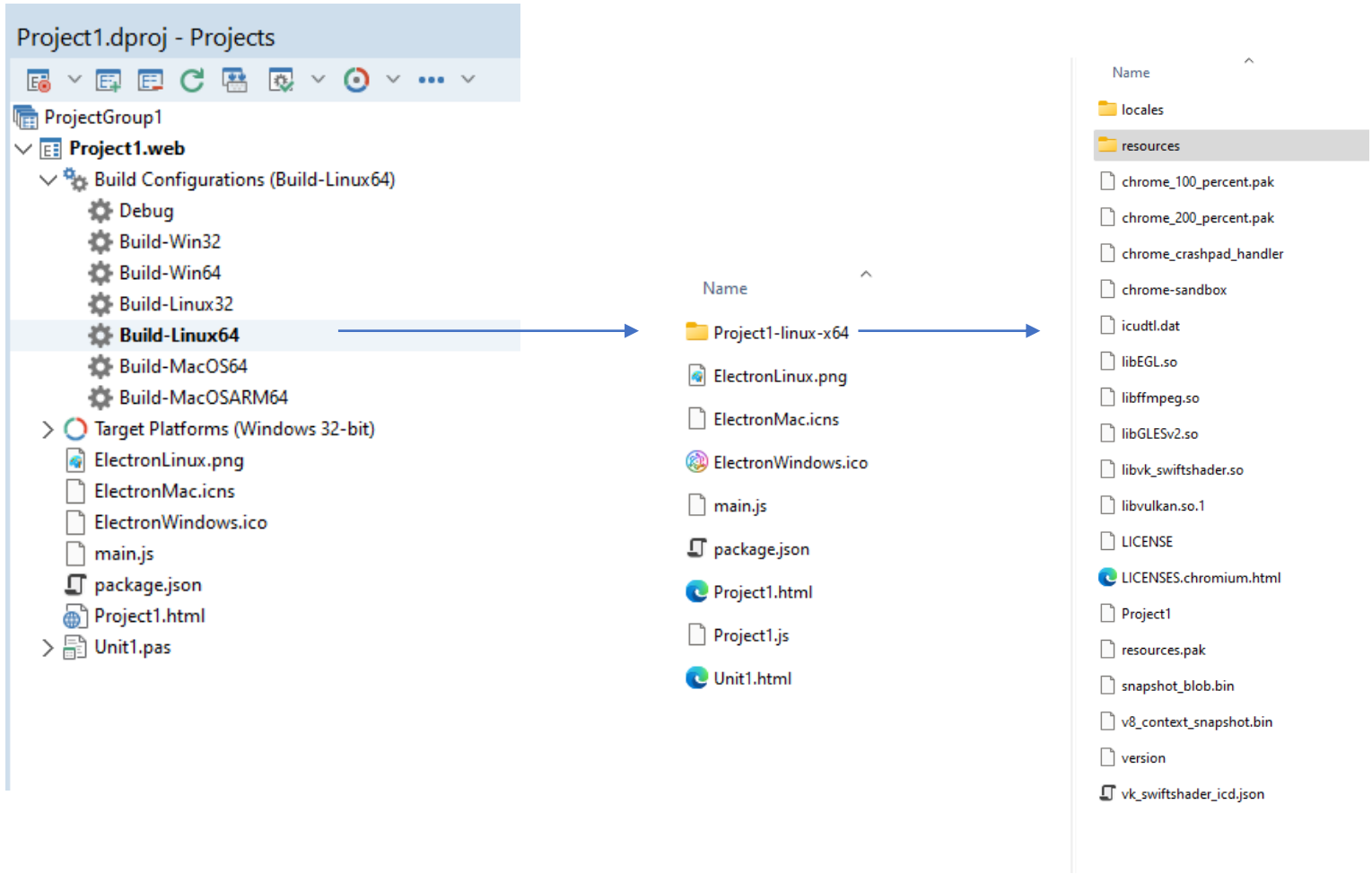
TMS WEB Electron Application

Example – Application packages, here Windows



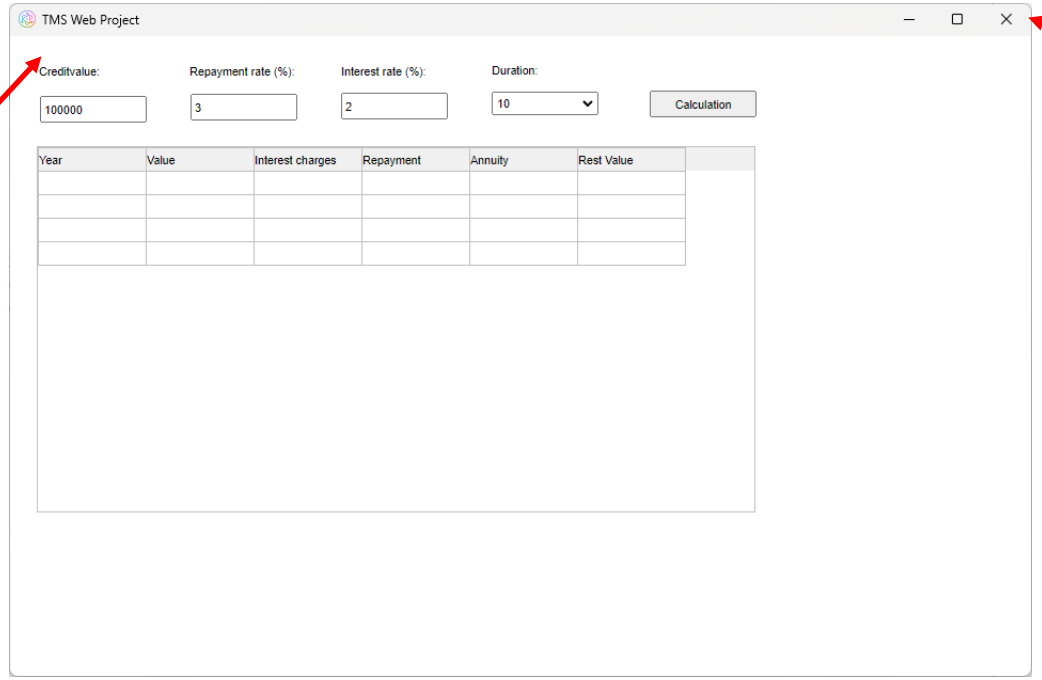
the executable file for Windows (*.exe) is created

TMS WEB Electron Application
Example – Application packages, here Linux



the executable file for Linux is created

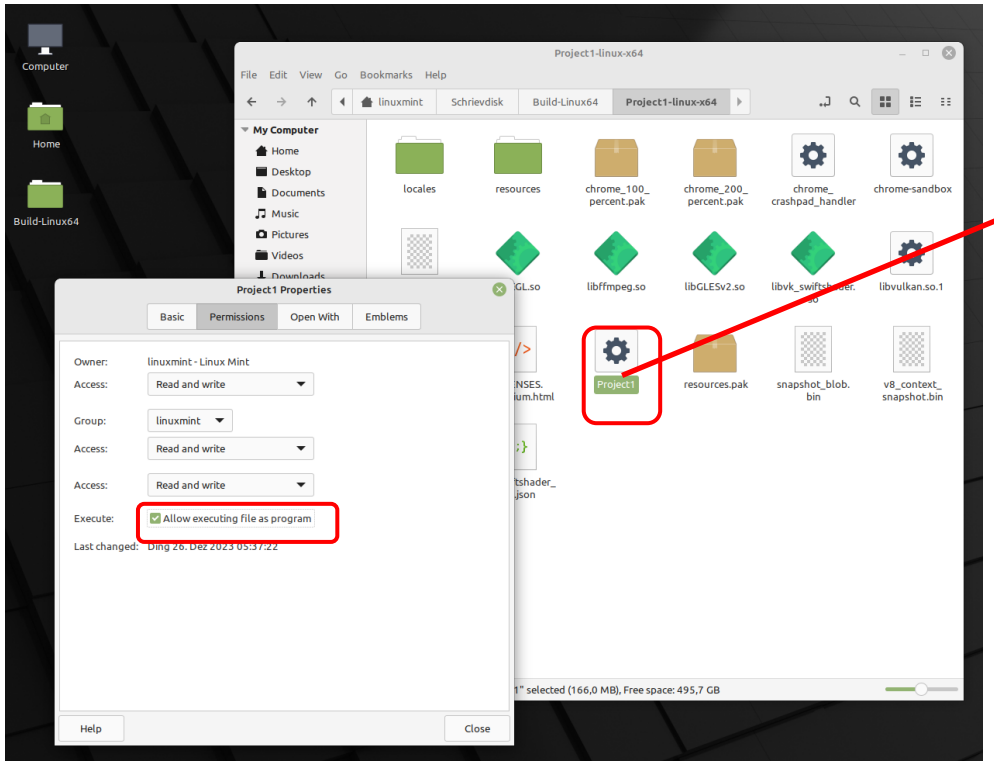
TMS WEB Electron Application
Example – Run as aDesktop Application(Windows)

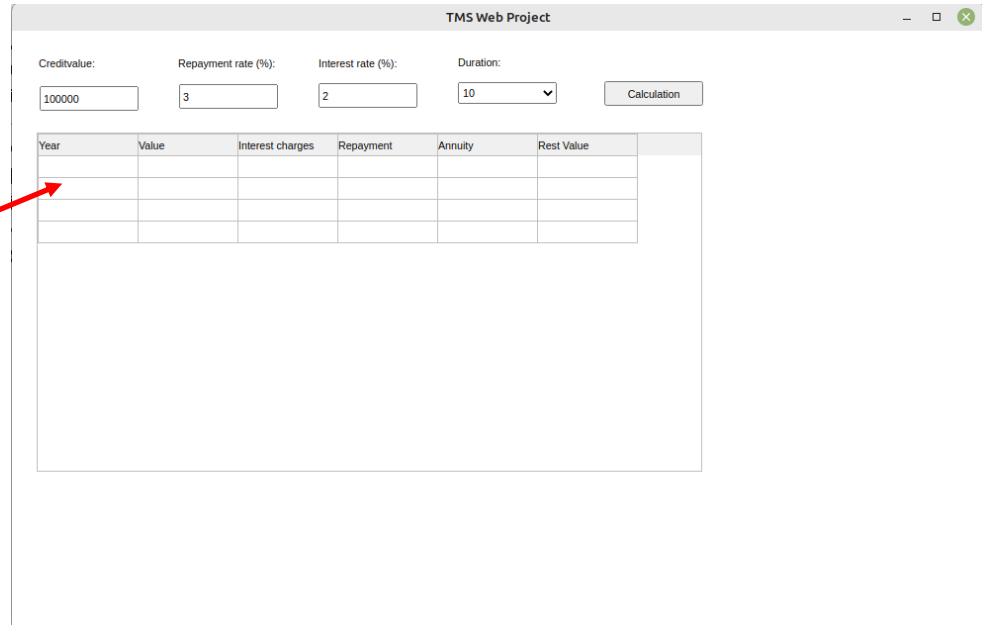


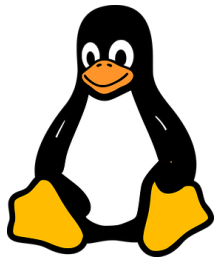
Desktop-Application

supplemented by Electron-Framework (Debug Mode)

TMS WEB Electron Application
Example –Desktop application (Linux)



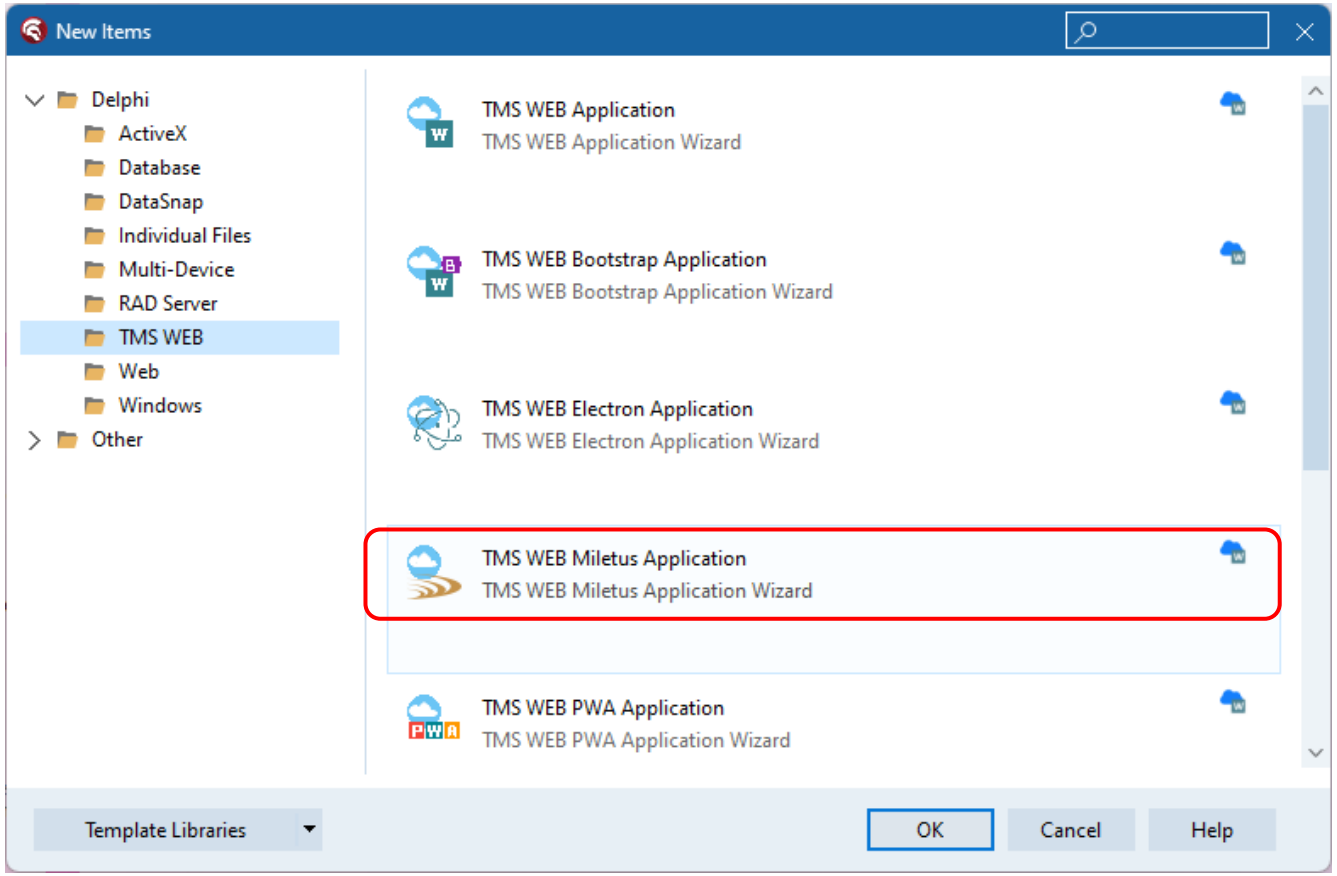




Desktop-Application

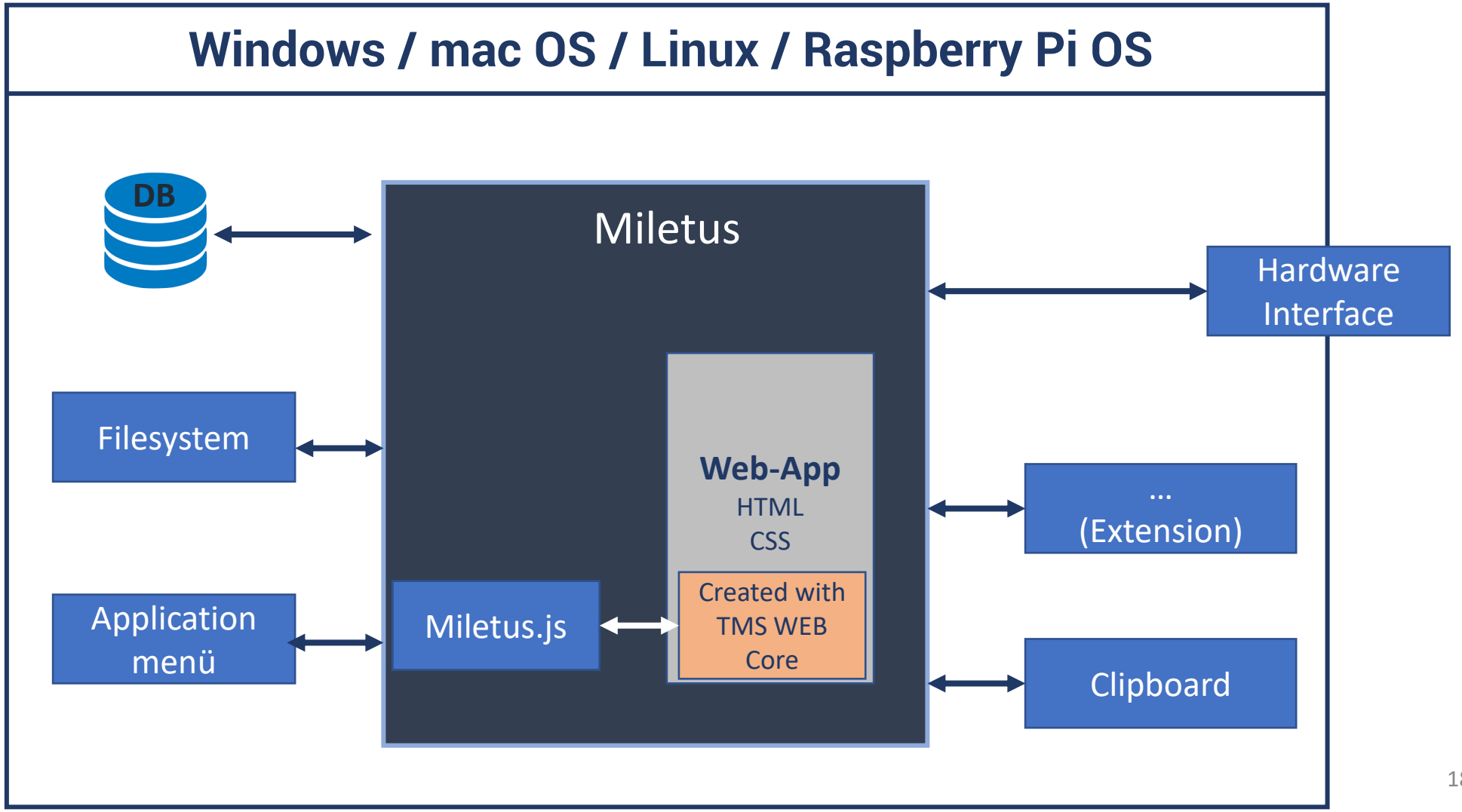
- running the Electron app on Linux
- here: Linux-Mint

TMS WEB Miletus Application

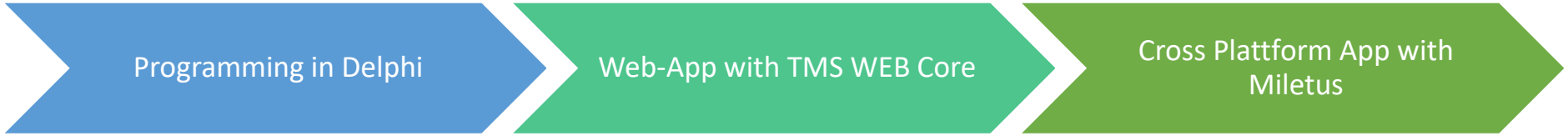


- web application based on the Miletus Framework to create cross-platform desktop applications
- alternative to the Electron framework
- info: https://miletus.org/

TMS WEB Miletus Application
Architekture of Miletus-Frameworks



TMS WEB Miletus Application
Development Path



- 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, Linux and Raspberry Pi
- system access
- application menu, file system, …
- direct configuration in Delphi
- app packages for deployment
- DB access
- extensibility
- small file sizes of the application packages

TMS WEB Miletus Application
Miletus-Features

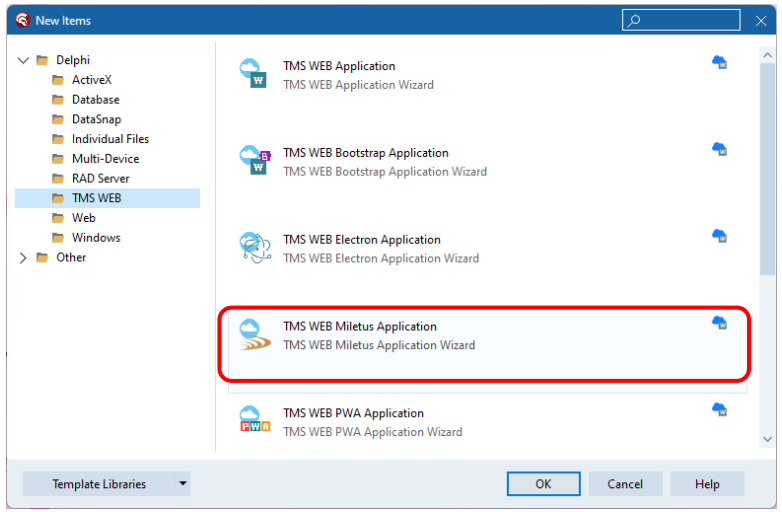
- file access
- file dialogs for opening and saving
- messagebox/ error dialog, application/ popup menu
- system notifications
- application window, tray icon, global application shortcuts
- database access
- clipboard access, shell access
- ini files/ registry (Windows)
- Raspberry Pi Support (Raspberry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

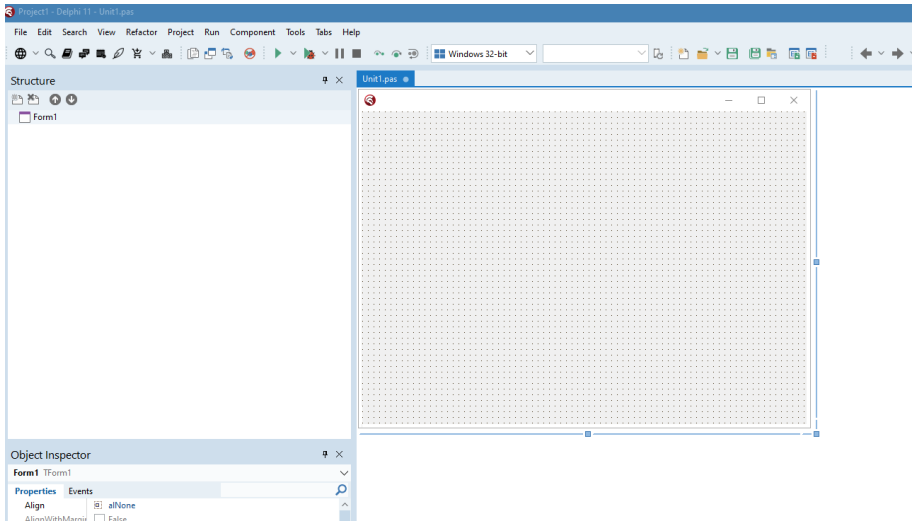
TMS WEB Miletus Application
Advantages/features of the Miletus framework

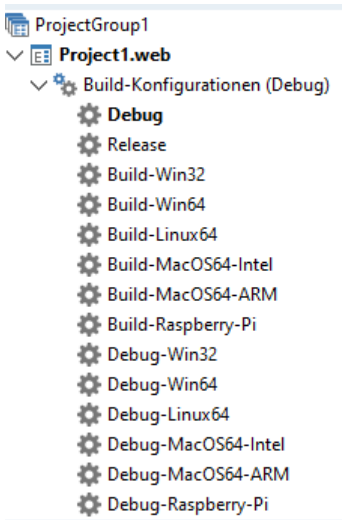
- smaller file sizes of the application packages
- use of the browser engine of the target systems
- updates to the browser engines, e.g. security updates, take effect for the app
- app can run on Raspberry Pi (Raspberry Pi OS).
- access to the Raspberry Pi hardware interfaces, i.e. GPIO, I2C, SPI and 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
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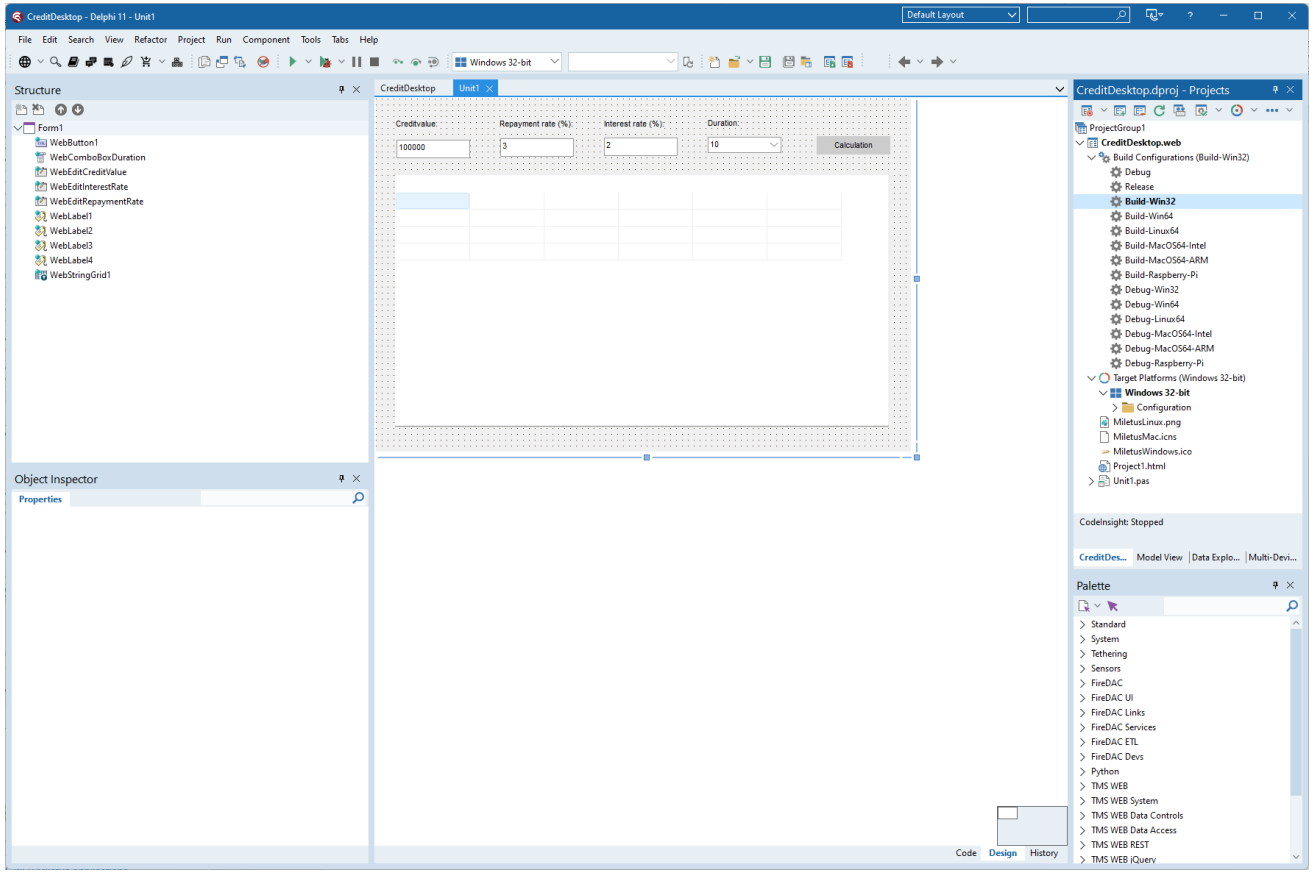
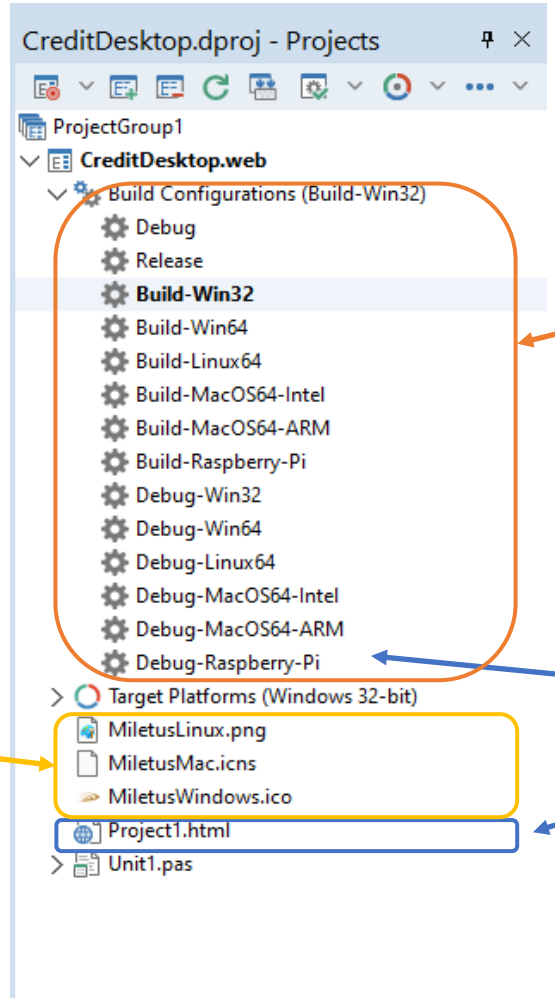
- in build mode, the debugging tools are disabled

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

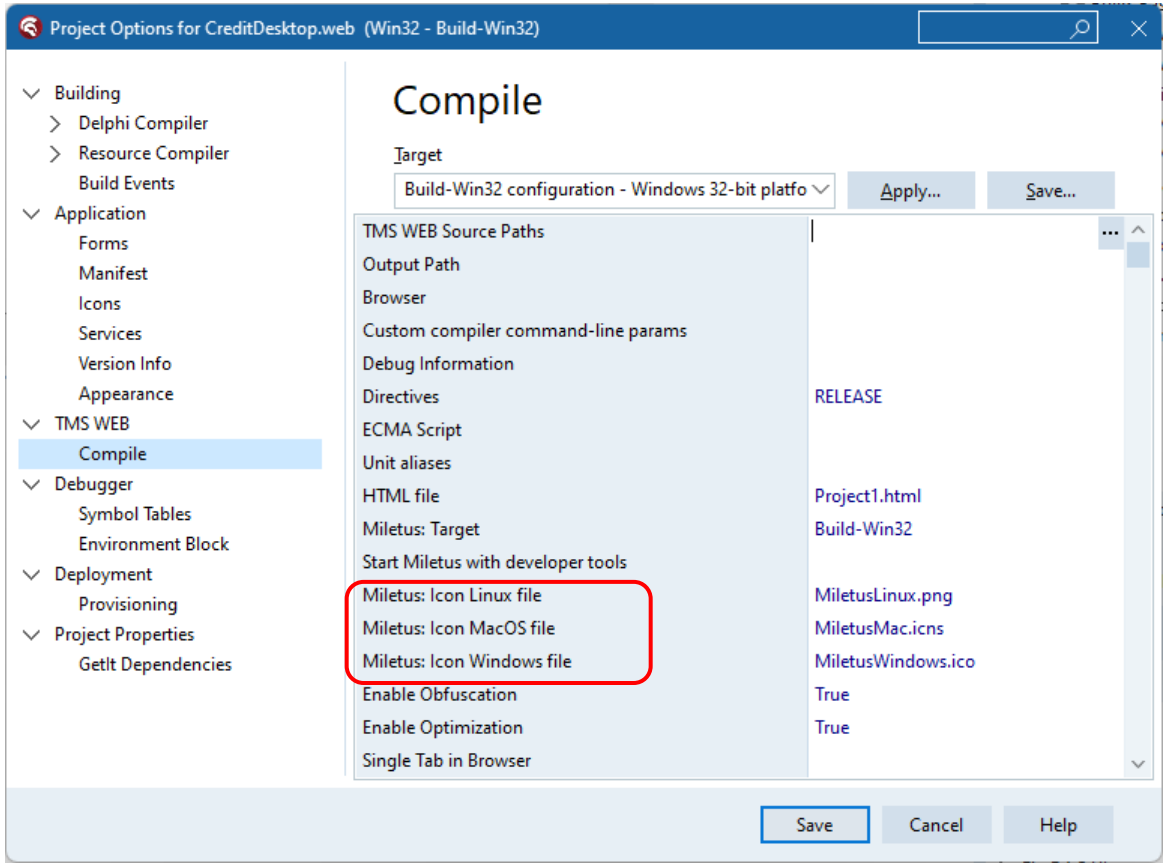


activation of the application package for target System

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

Web-Applikation (automatically generated by TMS WEB Core)

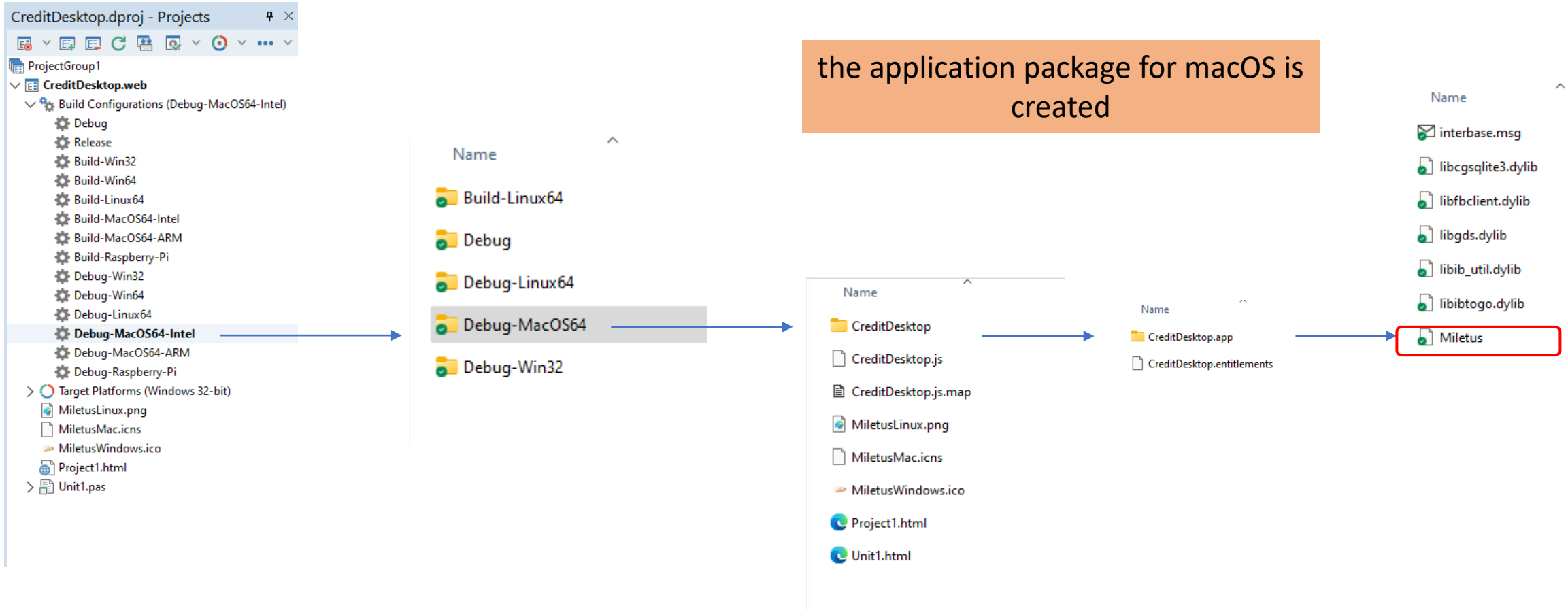
TMS WEB Miletus Applications
Example – Properties of Miletus-Packager



- Application packager configuration
- for example the application icons for Windows, macOS, Linux
- assignment of the *index.html* file
- set output directory

TMS WEB Miletus Application

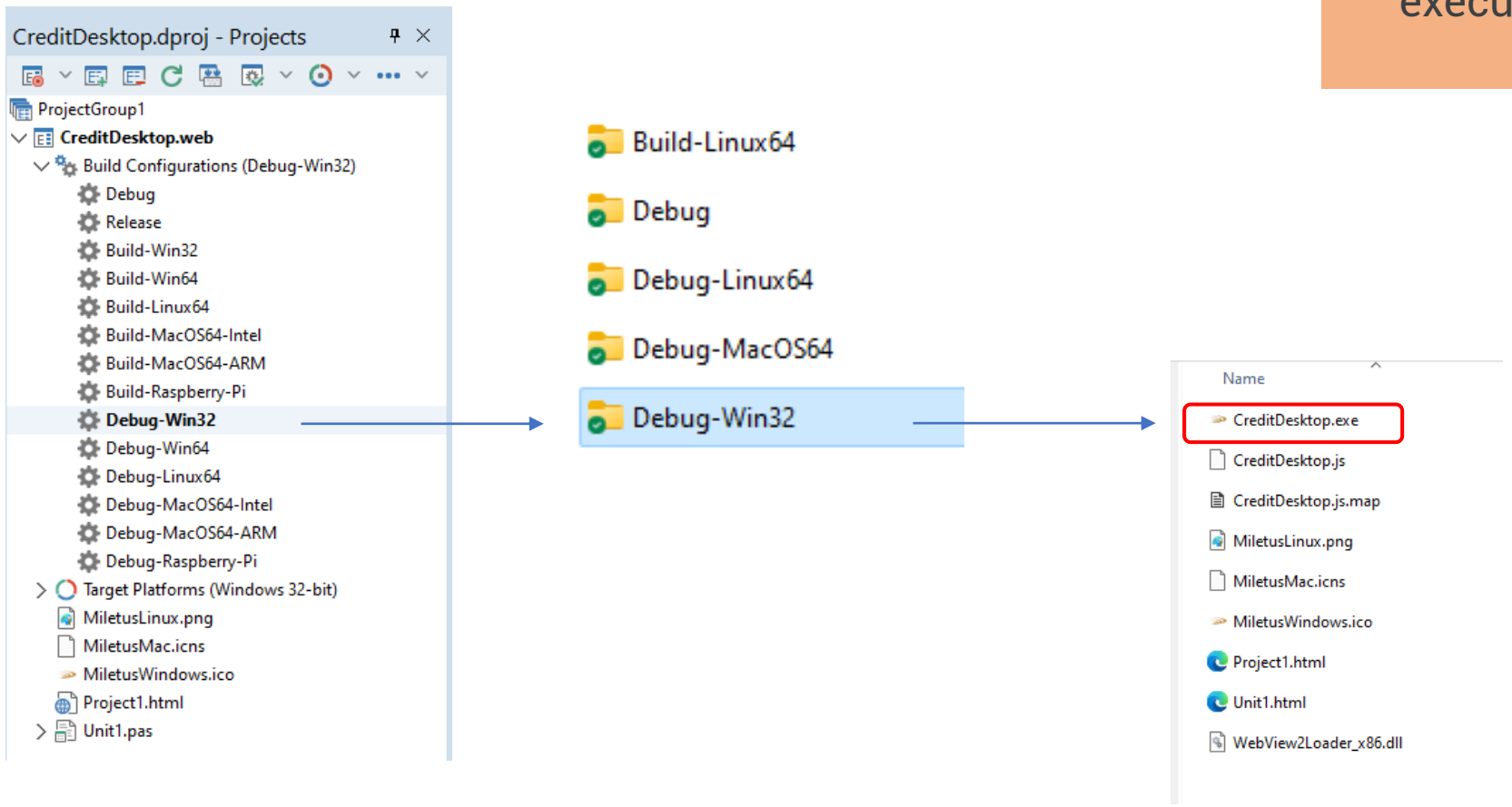
Example – Application Packages, here macOS



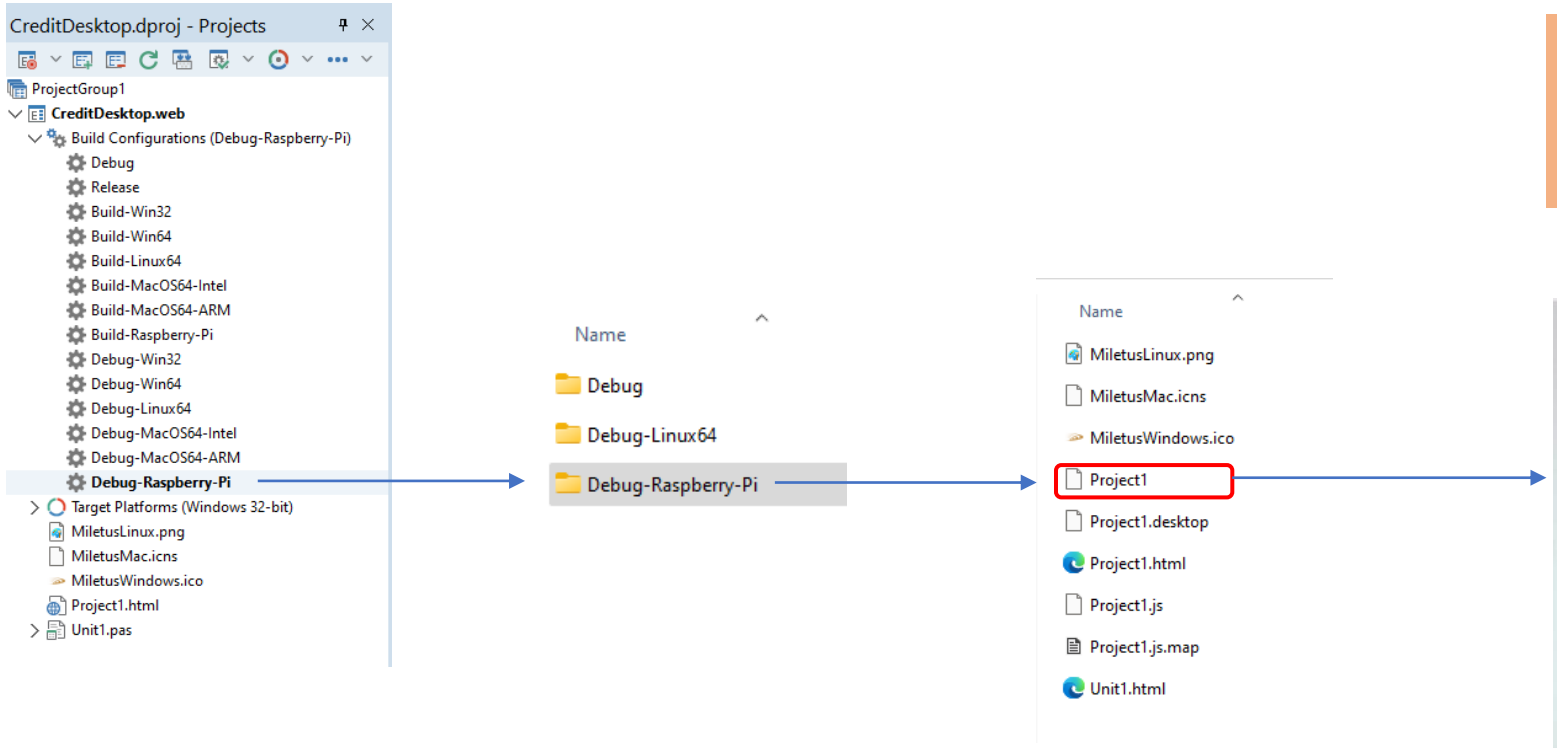
TMS WEB Miletus Application

Example – Application Packages, here Windows

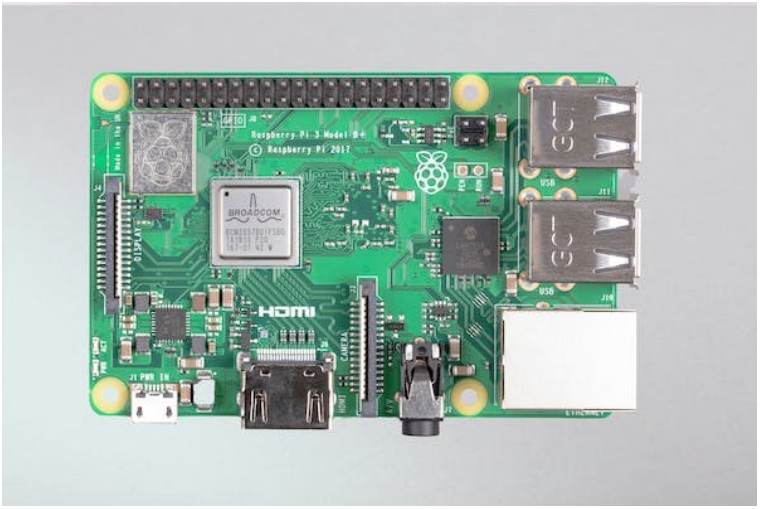
executable file for Windows (*.exe)



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

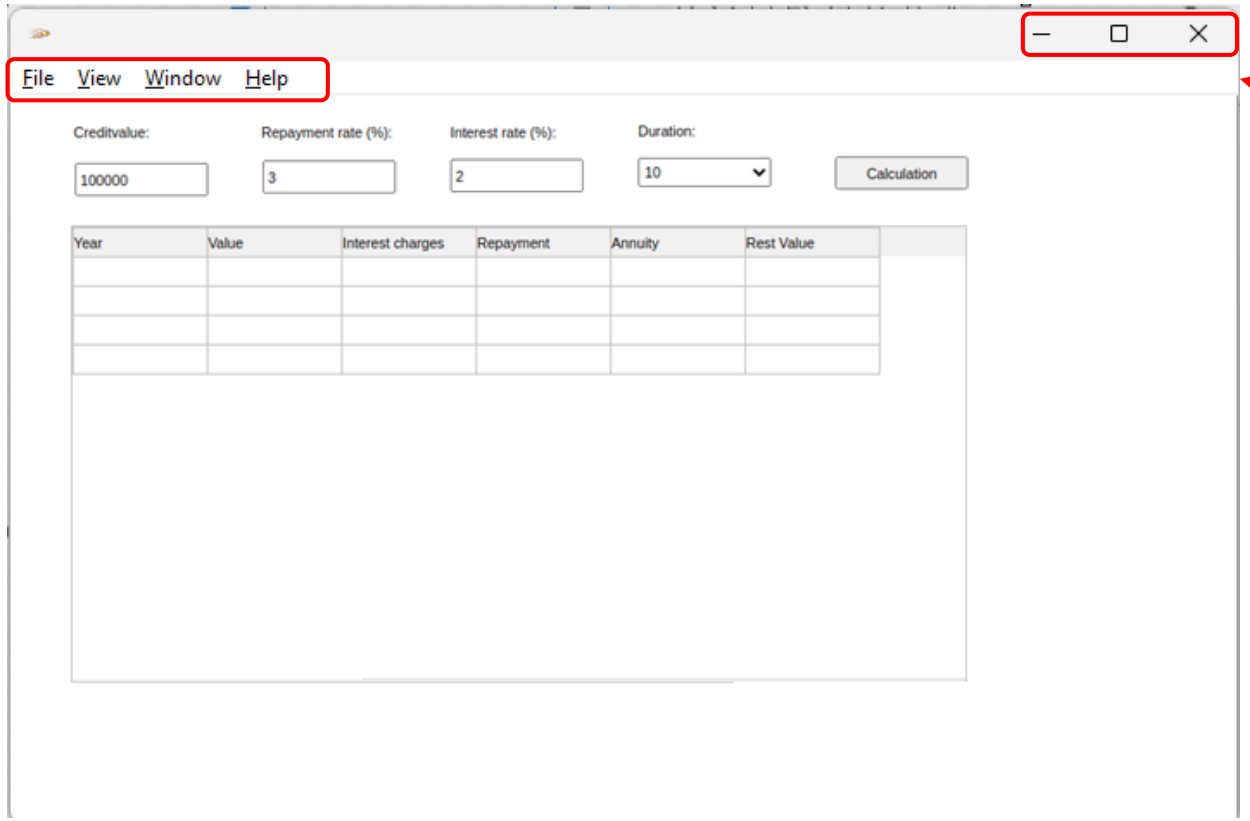


Source: https://www.raspberrypi.com/products/raspberry-pi-3-model-b-plus/

TMS WEB Miletus application

Example – execution as a desktop application: Windows

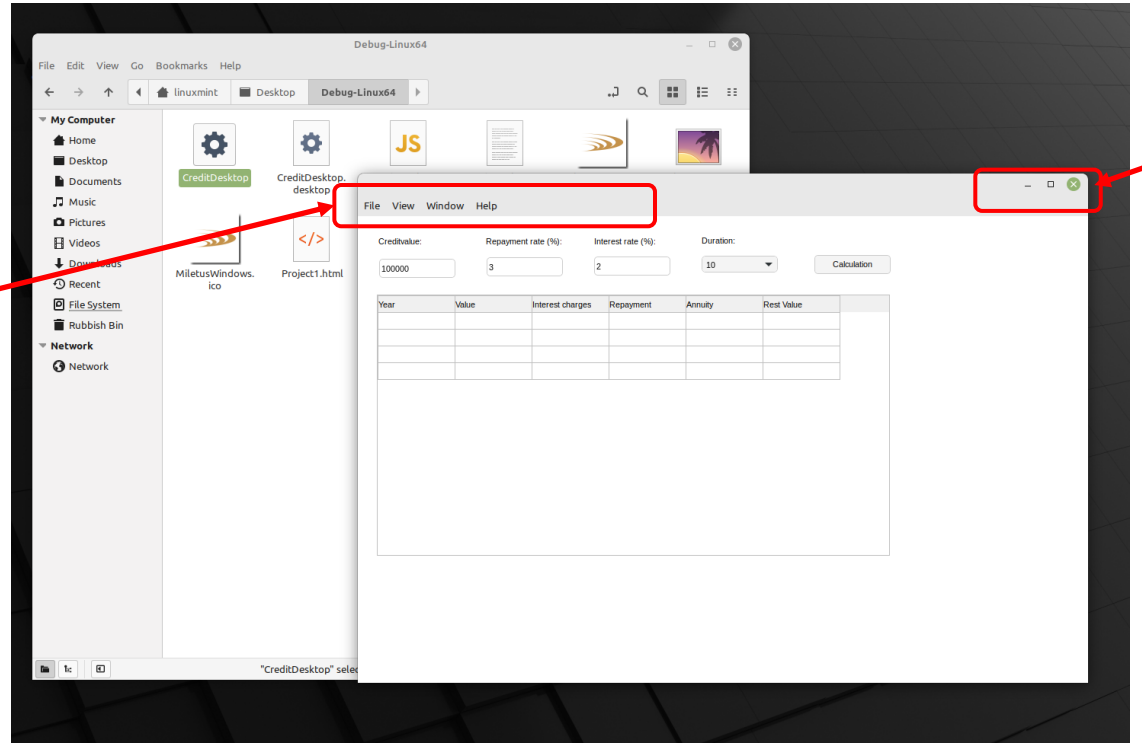
supplemented by Miletus Framework



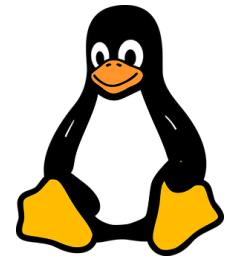
Desktop-Application

TMS WEB Miletus Application
Example –Desktop-Application: Linux

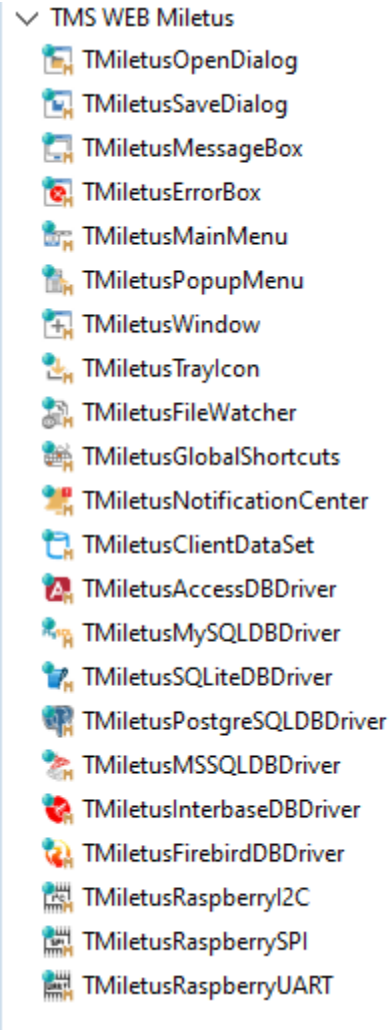
supplemented by
Miletus Framework



Desktop-Application



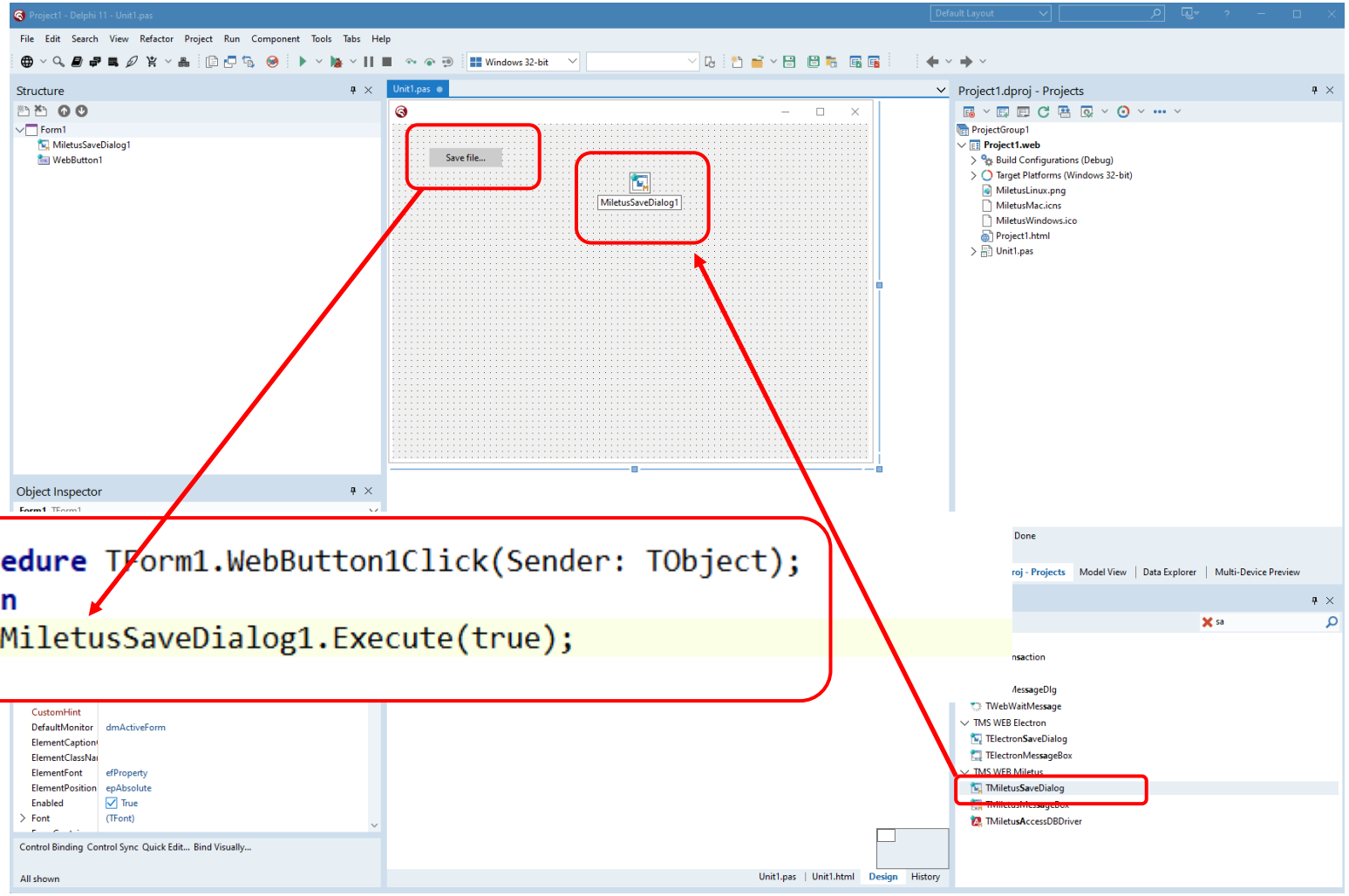
TMS WEB Miletus Application
Miletus-Features



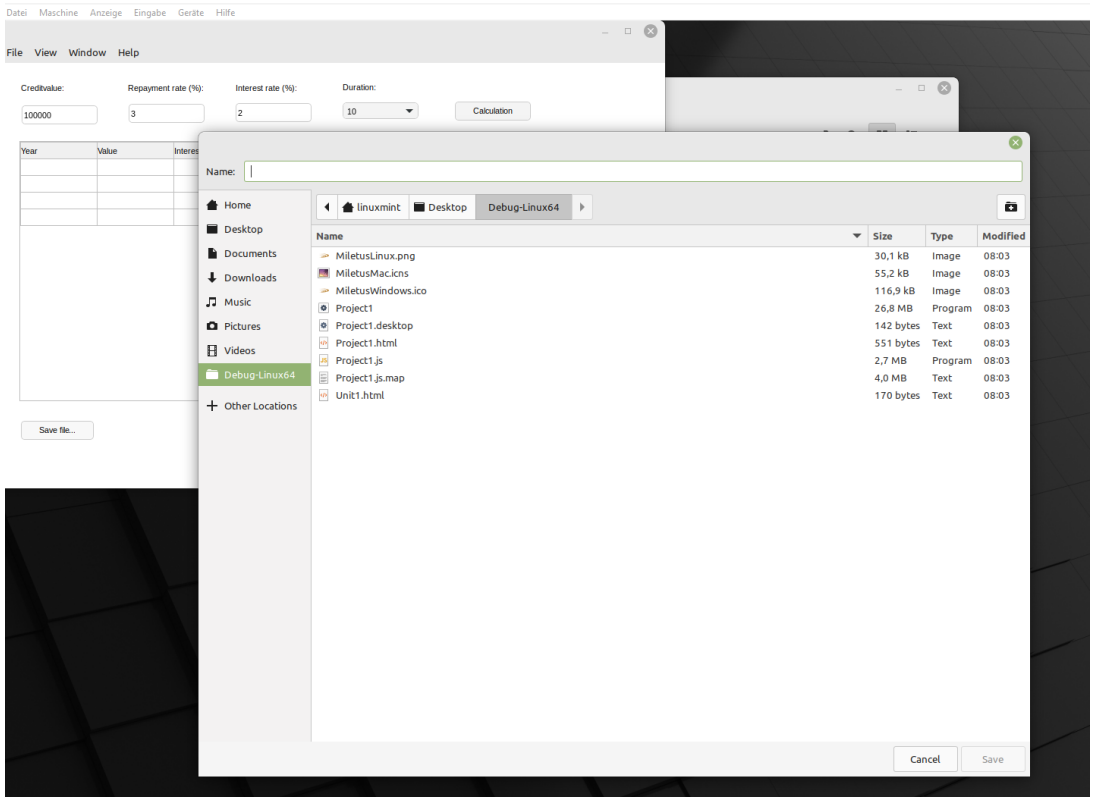
- in the development environment, non-visual controls are available via the tool palette to integrate and use the features of the Miletus framework into the application
- examples
  - *TMiletusOpenDialog* to display the file open dialog on the respective target system
  - *TMiletusSQLiteDBDriver* for accessing a local SQLite database
  - TMiltetusRaspberryI2C: input and output of signals via the I2C port of the Raspberry Pi

TMS WEB Miletus Application

Miletus – Feature: Save File Dialog

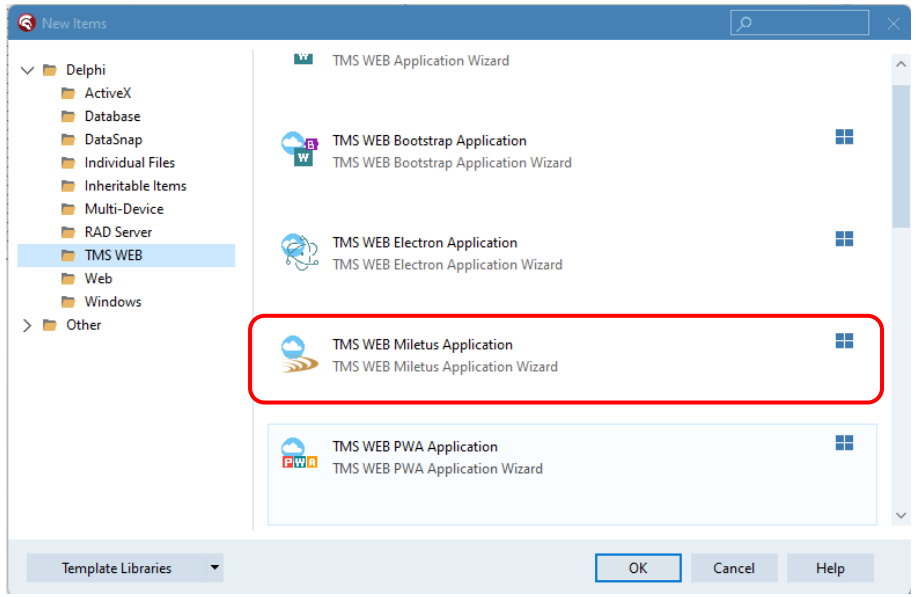


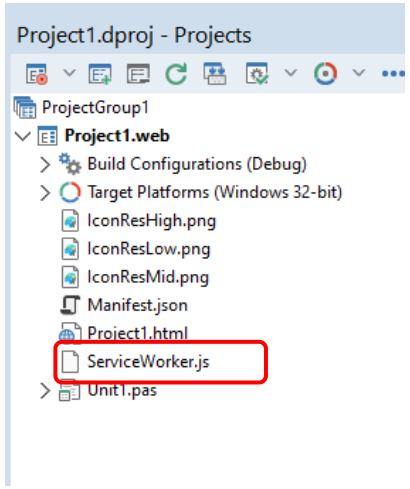
TMS WEB Miletus application
File Save Dialog on Linux

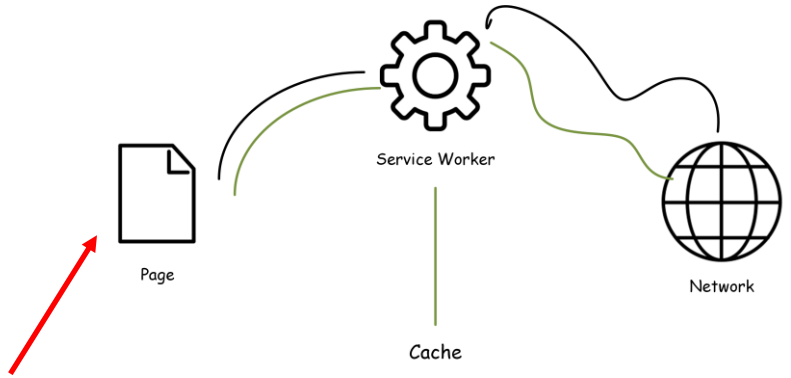


- you create the application package for another operating system and copy it to the target system.
- clicking on the button opens the standard dialog box for saving files.
- here you can see it for Linux-Mint.

TMS WEB PWA Application



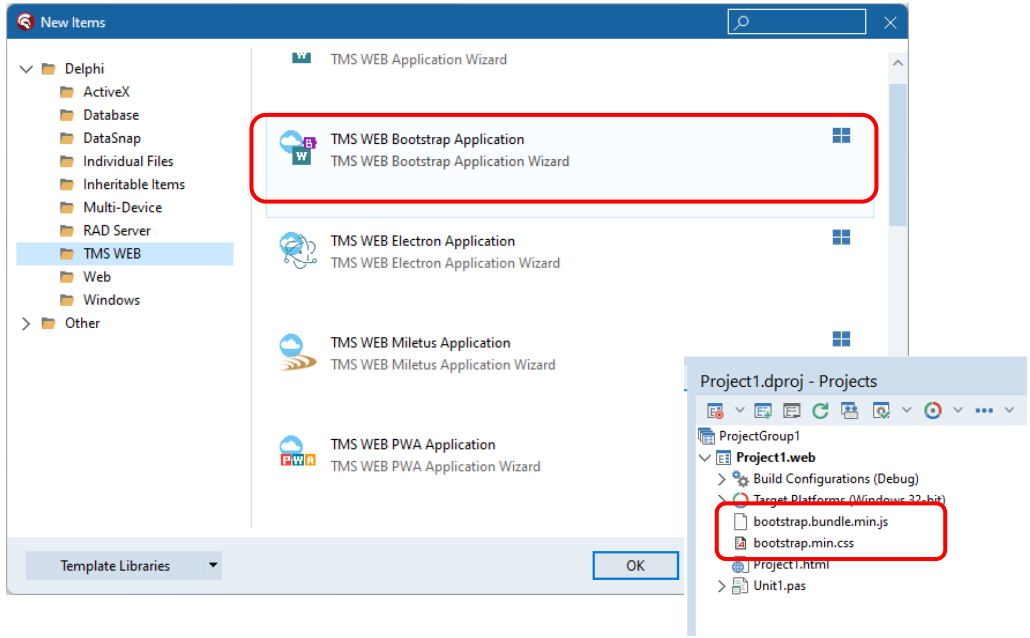


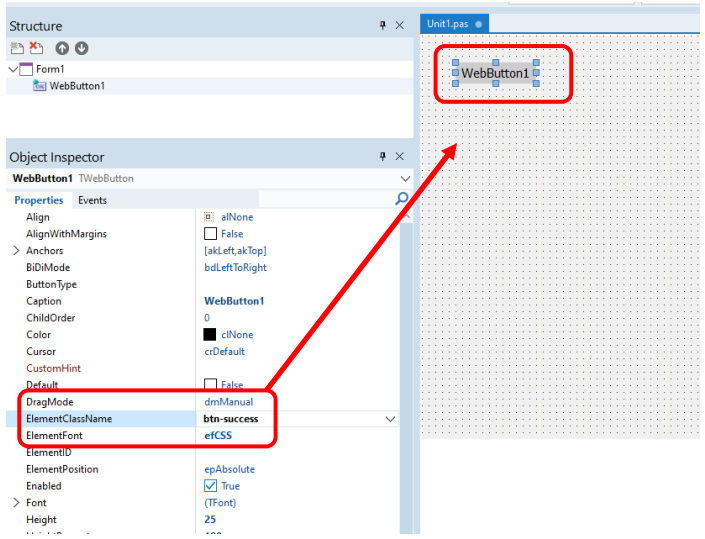


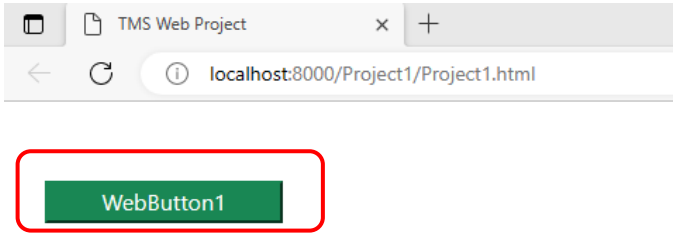
Web-App, created with TMS WEB Core

- 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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