

Exploring 4D Ajax Framework Offline Mode

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Abstract

4D Ajax Framework v11 Release 2 (11.2) offers a great new feature: Offline Mode. With the new offline web browser technologies available, users can enter and save data in their browser while not connected to the internet, then automatically synchronize that data when they reconnect. This Technical Note will give a quick overview of the capabilities of Offline Mode, outline the new browser technologies behind the feature, and offer troubleshooting tips for developers implementing Offline Mode in a 4D Ajax Framework application.

Introduction

Offline Mode can be a very powerful tool with web users always on the move and connecting remotely from laptops in coffee shop meetings as well as in the office. 4D developers can limit users' access to Offline Mode so as to minimize any problems which might arise from using it.

Offline mode uses HTML5 in browsers that support it, and Gears by Google when the browser does not support HTML5. If using an unsupported browser without Gears this causes problems with Offline Mode and there will be a section on troubleshooting these problems.

There are also some specific restrictions in using the Offline Mode in a 4D Ajax Framework application. These restrictions will be discussed as well as how to use Offline Mode within the specifications of the feature.

This Technical Note deals with the 4D Web 2.0 Pack v11 Release 2 (11.2). Offline mode is new in this version of the 4D Ajax Framework and will most likely be further expanded on in later versions of the framework.

Introduction to Offline Mode

Offline mode can be implemented in an application using the 4D Ajax Framework Client or 4D Ajax Framework Libraries. It is important to note that in either case Offline Mode is only available for Data Grids. A short description of using Offline Mode in each application type follows:

Using the 4D Ajax Framework Client

First Views must be enabled for Offline Mode in the 4D Ajax Framework Control Panel. To do this check the box for each View that users should have access to in Offline Mode:

| Portlets | | | | | | | Toggle All: Allow access | |
|----------|-------------------------------------|-------------------------------------|-------------|-------------|-------|-------|--|----------|
| Position | V | O | Real Name | DAX Alias | Type | Style | DDW Buttons | Views |
| 1 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Contacts | Contacts | Table | Grid | None | New View |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | SalesPeople | SalesPeople | Table | Grid | None | New View |

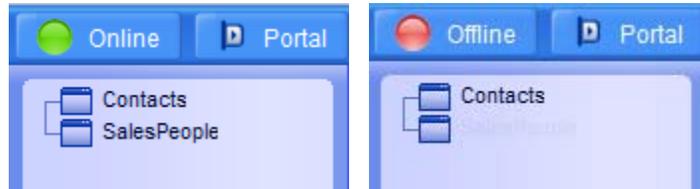
Views that can be accessed in Offline Mode must also have all fields available for input. This is set in access control as shown here:

| Portlets | | | | | | | | | | Toggle All: Allow access |
|----------|-------------------------------------|-------------------------------------|-------------|-------------|-------|-------|-------------|----------|--|--|
| Position | V | O | Real Name | DAX Alias | Type | Style | DDW Buttons | Views | | |
| 1 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Contacts | Contacts | Table | Grid | None | New View | | |
| 2 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | SalesPeople | SalesPeople | Table | Grid | None | New View | | |

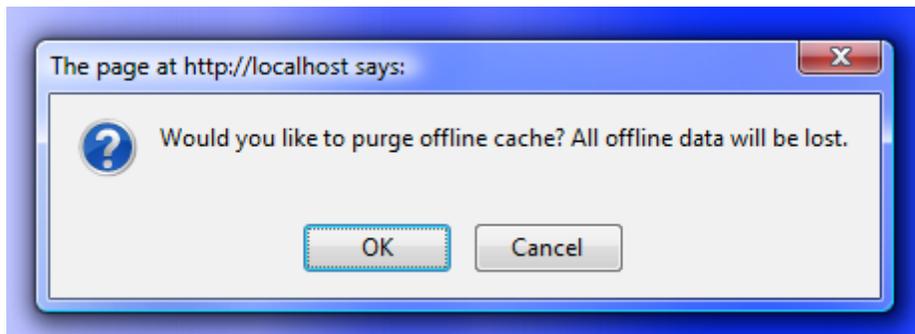
| Properties | | | | | | | | | | Toggle All: Allow Output Allow Input Allow Search | |
|------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------|--------------|------|------------|-------------|--------------------------|---|----------|
| Position | O | I | S | Real Name | DAX Alias | Type | Formatting | Break level | OnLoad Event | OnChange Event | DDW Link |
| 1 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | [Contacts]Name | Name | A | None | None | <input type="checkbox"/> | <input type="checkbox"/> | None |
| 2 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | [Contacts]Phone Number | Phone Number | A | None | None | <input type="checkbox"/> | <input type="checkbox"/> | None |
| 3 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | [Contacts]ID | ID | 2 | None | None | <input type="checkbox"/> | <input type="checkbox"/> | None |
| 4 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | [Contacts]Sales_ID | Sales_ID | 2 | None | None | <input type="checkbox"/> | <input type="checkbox"/> | None |

Important: If a view is set to be available offline but not all fields have the input box checked then it will not function in Offline Mode. Records cannot be added to views that do not have all the fields available for input. Although the view can be accessed in Offline Mode it is effectively useless.

Once the access has been set the administrator must log out of the 4D Ajax Framework Client to see the changes. Reload the page, and log back into the 4D Ajax Framework Client. Now there will be a button to go offline:



The button displays the current state of the database. To change states, just click the button and only views which have been made available offline will still be displayed. Other views are grayed out as with the "SalesPeople" view in the above example. When going offline, the user is prompted to purge the "offline cache" as shown here:



Purging the offline cache clears the offline data. If you have already synced data and are working online it is a good idea to purge the cache. If there is still offline data that has not yet been synced, then the cache should not be purged.

New offline records can be added to a view and only records in the offline cache can be edited or deleted in Offline Mode. After regaining an internet connection and turning off Offline Mode the records are synced. It is possible that when going back to online mode a user's session will have ended. In this case they will be logged out of the 4D Ajax Framework and forced to log back in. The offline records are not automatically synced back into the database in this case. After logging back in the user must toggle from online mode to offline and back again to sync records. It is important when doing this not to purge the offline cache; if this is done the offline records will be lost.

Using the 4D Ajax Framework Libraries

Offline Mode can also be used when using 4D Ajax Framework objects in custom web pages. There are javascript commands in the Ajax Framework Library that allow developers to use the offline feature for Data Grids in custom pages. These are the javascript functions and events which make this possible:

Functions:

- `dax_goOffline();`
- `dax_goOnline();`
- `dax_purgeOfflineCache();`

Events:

- `dax_onOfflineModeSuccess = function() { };`
- `dax_onOfflineModeFail = function() { };`
- `dax_onOnlineModeSuccess = function() { };`
- `dax_onOnlineModeFail = function() { };`

These JavaScript features can be used to set a Data Grid to online or Offline Mode, to purge the offline cache, and to handle what happens when the grid tries to change between online and Offline Mode (whether the toggle is successful or not). For more information on these functions see the "4D Ajax Framework Developer Guide" at the 4D documentation site:

<http://www.4d.com/support/documentation.html>

Offline Browser Technology

HTML5 or Gears are the main tools behind 4D Ajax Framework's Offline Mode. They allow internet browsers to interact with data stored locally on the user's machine. This makes it possible to run a Web 2.0 application without being connected to the internet.

HTML5

HTML5 is specification that actually reaches much farther than the features making Offline Mode possible. It was created by the Web Hypertext Application Technology Working Group, also known as WHATWG. The group was formed in 2003 by a group of browser vendors (Opera, Mozilla, Google, and Apple/Safari) to work on two specifications which together form HTML5:

- Web Forms 2.0: incrementally improves HTML 4's forms
- Web Applications 1.0: takes browser features that have no specifications and standardizes them.

Offline Mode uses the features and applications of Web Applications 1.0 to make it possible for browsers to do work offline. HTML5 is supported by the newest current versions of Mozilla Firefox (version 3) and Apple Safari (version 3). Previous versions of these browsers do not support HTML5, nor does Microsoft Internet Explorer's latest version (version 7) as of the release of this Technical Note.

More information on HTML5 can be found at the following websites:

- WHATWG: <http://www.whatwg.org>
- W3C HTML Working Group: www.w3.org/html/wg/

Gears by Google

Gears is open source software that is officially still in a beta stage, developed by Google. It originated in May 2007. Gears is an open source browser extension which installs a database engine based on SQLite, which the 4D Ajax Framework uses to implement offline web applications if HTML5 is not supported. The 4D Ajax Framework takes advantage of two main features from Gears:

- A local server that caches and serves application data without needing to contact a remote server (the internet or intranet).
- A database that stores and allows users to access data which can later be synced with an online data source.

A link to the Gears homepage follows:

<http://gears.google.com/>

Gears can be downloaded at this site and documentation is there as well.

A few examples of other web applications that use Gears can be found at the following sites:

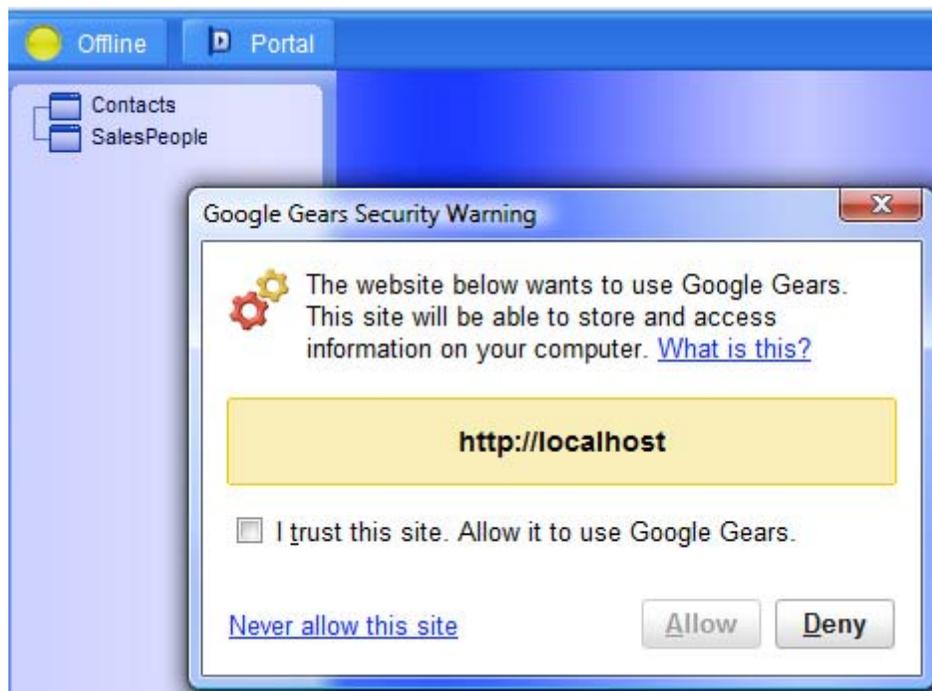
- Google Docs: <http://docs.google.com/>
- Google Reader: <http://reader.google.com>
- Remember the Milk: www.rememberthemilk.com
- Zoho: <http://www.zoho.com/> (the Zoho Writer application uses Gears)

Troubleshooting Offline Mode Problems

Because Offline Mode uses new software that is still in the developmental stage it is possible that some users will not have access to it. There are a few troubleshooting tips that can be helpful in case a user is having problems with Offline Mode.

Allowing Access for Gears

If the browser being used requires Gears, and Gears is installed, the following message will be shown:



This occurs with Internet Explorer and Mozilla Firefox. The user must allow the website access to Gears in order to enter Offline Mode. Once a site has been allowed it can be added to Gears' list of Allowed Sites, which are always allowed access without prompting the user.

Unsupported Browsers Without Gears

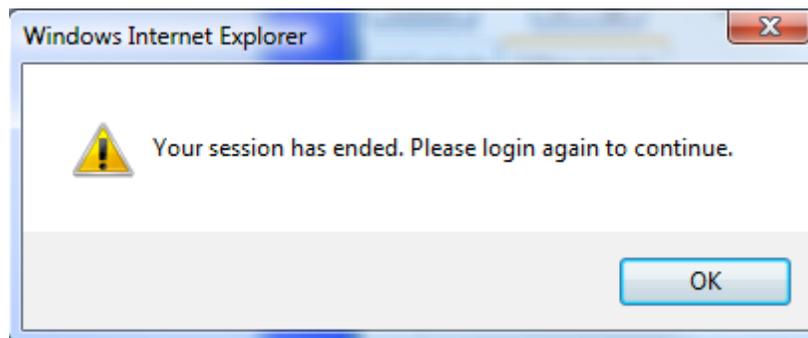
If the user is viewing the web page with a browser that does not support HTML5 and does not have Gears installed the Online/Offline status button still appears in the toolbar. When the button is clicked the browser does not switch into Offline Mode because the browser does not support this. There is no error message shown in this case; the button momentarily changes from online status to offline but then changes back to online.

Offline Mode Status Indicator

When changing to and from Offline Mode the color of the circle next to the Online/Offline status button changes based on status. Green means that the user is currently in online mode, red means that the user is in Offline Mode. When the application is in the process of changing from online to Offline Mode the circle is yellow, and sometimes in this case it turns back to green instead of to red. This happens in situations such as when you deny the website from using Gears or when the browser has no support for Offline Mode.

End of 4D Ajax Framework Session

It is possible for a user's session to end while they are in Offline Mode. This means that the user must log back in to the 4D Ajax Framework when an internet connection is available again. The following alert will be shown when clicking the Online/Offline status button to return to online mode:



In this case the offline records are not synced. The user must toggle between online mode and Offline Mode. Be careful in this instance not to clear the offline cache when going into Offline Mode. Un-synced records will be lost if the cache is cleared.

This can happen if the same user logs in from another browser window, or if the 4D Ajax Framework application is closed, or if the login timeout is reached due to inactivity. The records are still saved in the offline cache until the user toggles between online mode and Offline Mode, when they are saved online. Otherwise the user can clear the offline cache, in which case they lose any records still in that cache.

Conclusion

Offline Mode is a powerful tool for web developers. It allows users to continue adding data when they know they will not have an internet connection. Although Offline Mode does not offer a full web interface, if access is carefully managed it can be used as another tool in the box for every 4D Ajax Framework application. The new technologies involved will become more widely accepted and the small problems users see will be minimized over time. HTML5 and Gears are still growing and can become even more helpful and useful than they already are. Using Offline Mode now will only open up a 4D Ajax Framework application to easier expansion in the future when these tools offer even more features.

For more information on Offline Mode and the 4D Ajax Framework in general go to the 4D PDF documentation page and see the 4D Web 2.0 Pack documents. The Developer Guide, Data Grid Reference API, and Admin Guide will all include information on Offline Mode:

<http://4d.com/support/documentation.html>

A Note about 4D Web 2.0 Pack

The products in 4D Web 2.0 Pack are a departure from most other 4D products. As 4D Web 2.0 pack is a subscription-based product it is expected that incremental releases will be made. Thus please note that this Technical Note is based on the 4D Ajax Framework v11 Release 2 (11.2). As new features are implemented this Technical Note may become obsolete (faster than most other 4D products).

Related Resources

For the latest information on the 4DAF consult the latest documentation:

<http://www.4d.com/support/documentation.html>

Also check the 4D Web 2.0 Pack Wiki:

<http://daxipedia.4d.com>

For the latest news about 4D Web 2.0 Pack or to find out how to purchase it see:

<http://www.4d.com/products/4dweb20pack.html>