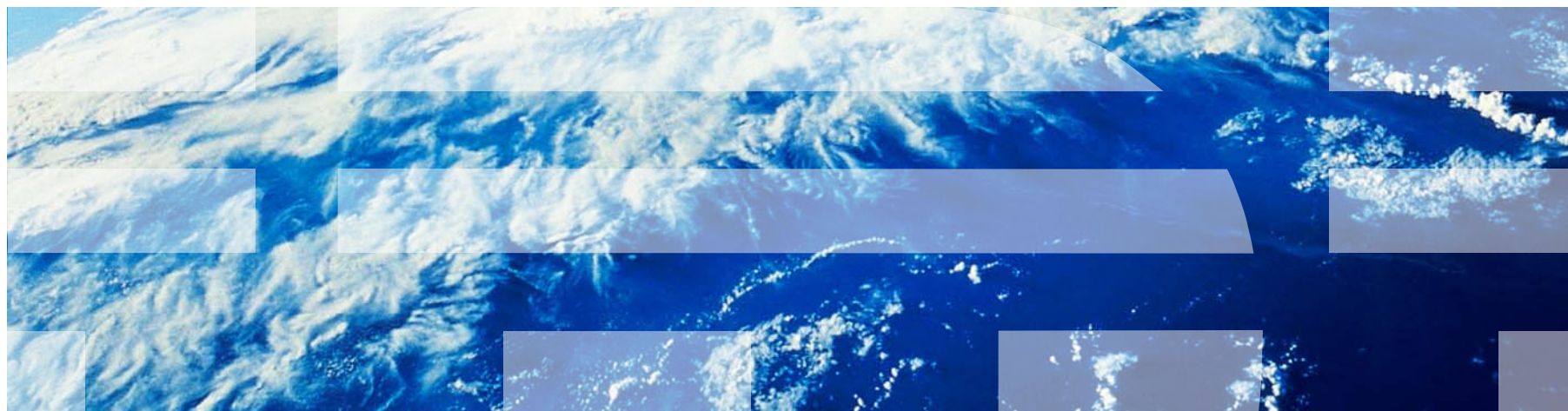


IBM Worklight V6.1.0 Getting Started

Storing sensitive data in encrypted cache



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Agenda

- What is encrypted cache?
- Features
- Supported browsers and devices
- Create and Open
- Read, Write, and Remove
- Close and Destroy
- Change encryption key
- Exercise

What is encrypted cache?

- Encrypted cache is a mechanism for storing sensitive data on the client side
- Encrypted cache is implemented by using HTML5 web storage technology, which allows data to be saved locally and retrieved on subsequent application use or relaunch
- Data is encrypted with a combination of a user-provided key and a server-retrieved randomly generated token, which makes it more secure
- Data is stored in key-value pairs
- Encrypted cache is like a security deposit box – it remains open until you close it, so remember to close the cache when you finish working with it

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Features (1 of 2)

- Encrypted cache is similar to technologies such as:
 - Local web or DOM storage
 - Indexed database API
 - Cordova API: Storage API or File API
 - JSONStore
- The table on the next slide shows how some features provided by encrypted cache compare with other technologies.

Features (2 of 2)

	JSONStore	Encrypted Cache	Local Storage	Indexed DB	Cordova Storage	Cordova File
Android Support	Yes	Yes	Yes	Yes	Yes	Yes
iOS Support	Yes	Yes	Yes	Yes	Yes	Yes
Web	Dev. Only (3)	Yes	Yes	Yes	-	-
Data Encryption (1)	Yes	Yes	-	-	-	-
Maximum Storage	Available space	~ 5 MB	~ 5 MB	> 5 MB	Available space	Available space
Reliable Storage (2)	Yes	-	-	-	Yes	Yes
Adapter Integration (1)	Yes	-	-	-	-	-
Multi User Support (1)	Yes	-	-	-	-	-
Indexing	Yes	-	-	Yes	Yes	-
Type of Storage	JSON Documents	Key – value pairs	Key – value pairs	JSON Documents	Relational (SQL)	Strings

- > (1): These features are further described in the module **JSONStore – Common JSONStore usage**.
- > (2): *Reliable Storage* means that your data is not deleted unless the application is removed from the device or one of the methods that removes data is called.
- > (3): *Dev. Only* means that it is designed only for development. There are no security features and a ~5 MB storage space limit.

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Supported browsers and devices

- Encrypted cache is implemented using HTML5 web storage technology
- Mobile devices HTML5 web storage support chart

Show all versions	IE	Firefox	Chrome	Safari	Opera	iOS Safari	Opera Mini	Android Browser	Blackberry Browser	IE Mobile
								2.1		
						3.2		2.2		
						4.0-4.1		2.3		
	8.0					4.2-4.3		3.0		
	9.0		28.0	5.1		5.0-5.1		4.0		
	10.0	23.0	29.0	6.0		6.0-6.1		4.1	7.0	
Current	11.0	24.0	30.0	7.0	17.0	7.0	5.0-7.0	4.2-4.3	10.0	10.0
Near future		25.0	31.0		18.0					

= Supported
 = Not supported

- For additional information, see <http://caniuse.com>

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Creating and opening encrypted cache

- To create or open previously created encrypted cache, use the following API:
 - `WL.EncryptedCache.open(credentials, createIfNone, onComplete, onError);`
 - `credentials` – string value representing user-provided password
 - `createIfNone` – Boolean value specifying whether new encrypted cache should be created if none is found
 - `onComplete` – a callback function to be invoked when cache opening/creating is complete
 - `onError` - a callback function to be invoked when cache is not successfully opened/created.

```
WL.EncryptedCache.open(key, true, onOpenComplete, onOpenError);  
function onOpenComplete(status){  
    alert("Encrypted cache successfully opened");  
}
```

- Note: The application must be able to connect to Worklight® Server to create a new encrypted cache

Creating and opening encrypted cache

- A callback function can receive one of the following statuses:
 - `WL.EncryptedCache.OK` – Encrypted cache was successfully opened or created
 - `WL.EncryptedCache.ERROR_CREDENTIALS_MISMATCH` – an attempt was made to open existing encrypted cache using wrong credentials
 - `WL.EncryptedCache.ERROR_SECURE_RANDOM_GENERATOR_UNAVAILABLE` – unable to generate random token due to Worklight® Server unavailability
 - `WL.EncryptedCache.ERROR_NO_EOC` – could not open encrypted cache because it was not previously created
 - `WL.EncryptedCache.ERROR_LOCAL_STORAGE_NOT_SUPPORTED` – device does not support HTML5 local storage
 - `WL.EncryptedCache.ERROR_KEY_CREATION_IN_PROGRESS` – an `open()` or `changeCredentials()` request is already running

Creating and opening encrypted cache

```
WL.EncryptedCache.open(key, true, onOpenComplete, onOpenError);
function onOpenComplete(status){
    alert("Encrypted cache succesfully opened");
}
function onOpenError(status){
    busyIndicator.hide();
    switch(status){
        case WL.EncryptedCache.ERROR_KEY_CREATION_IN_PROGRESS:
            alert("ERROR: KEY CREATION IN PROGRESS");
            break;
        case WL.EncryptedCache.ERROR_LOCAL_STORAGE_NOT_SUPPORTED:
            alert("ERROR: LOCAL STORAGE NOT SUPPORTED");
            break;
        case WL.EncryptedCache.ERROR_NO_EOC:
            alert("ERROR: NO EOC");
            break;
        case WL.EncryptedCache.ERROR_COULD_NOT_GENERATE_KEY:
            alert("ERROR: COULD NOT GENERATE KEY");
            break;
        case WL.EncryptedCache.ERROR_CREDENTIALS_MISMATCH:
            alert("ERROR: CREDENTIALS MISMATCH");
            break;
    }
}
```

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Reading, writing, and removing data with encrypted cache

- When the encrypted cache is open, you can perform operations on it such as reading, writing, and removing data
- To store data in encrypted cache, use the following API:
 - `WL.EncryptedCache.write(credentials, value, onSuccess, onFailure);`

```
WL.EncryptedCache.write(key, value, onWriteSuccess, onWriteFailure);
function onWriteSuccess(status){
    alert("Successfully encrypted into cache.");
}
function onWriteFailure(status){
    if (status == WL.EncryptedCache.ERROR_EOC_CLOSED)
        alert("Encrypted cache closed, write failed. error code= "+ status);
}
```

Reading, writing, and removing data with encrypted cache

- To read data from the encrypted cache, use the following API:
 - `WL.EncryptedCache.read(credentials, onSuccess, onFailure);`

```
WL.EncryptedCache.read(key, onDecryptReadSuccess, onDecryptReadFailure);  
function onDecryptReadSuccess(value){  
    alert("Read success. Retrieved value :: " + key + " = " + value);  
}  
function onDecryptReadFailure(status){  
    alert("Encrypted cache closed, reading failed");  
}
```

- To remove data from the encrypted cache, use the following API:
 - `WL.EncryptedCache.remove(key, onSuccess, onFailure);`

```
WL.EncryptedCache.remove(key, onRemoveSuccess, onRemoveFailure);  
function onRemoveSuccess(status){  
    alert("Successfully removed from cache.");  
}  
function onRemoveFailure(status){  
    alert("Encrypted cache closed, remove failed");  
}
```


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Closing and destroying encrypted cache

- To avoid possible undesired access to encrypted cache, close it
- After encrypted cache is closed, access to its data is not possible without the encryption key that was used to create it
- To close the encrypted cache, use the following API:
 - `WL.EncryptedCache.close(onComplete, onFailure);`

```
function closeCacheClicked(){
    WL.EncryptedCache.close(onCloseCompleteHandler, onCloseFailureHandler);
}
function onCloseCompleteHandler(status){
    alert("Encrypted cache closed successfully");
}
function onCloseFailureHandler(status){
    alert("Could not close Encrypted cache");
}
```

Closing and destroying encrypted cache

- Encrypted cache can be wiped from local storage
- After encrypted cache is destroyed, there is no way to return the data that was stored in it
- Destroy encrypted cache only if you are sure that data stored in it will never be required again, or as a last measure if the encryption key is lost
- To destroy an encrypted cache, use the following API:
 - `WL.EncryptedCache.destroy(onComplete, onError);`

```
function destroyCacheClicked(){
    WL.EncryptedCache.destroy(onDestroyCompleteHandler, onDestroyErrorHandler);
}
function onDestroyCompleteHandler(status){
    alert("Encrypted cache destroyed");
}
function onDestroyErrorHandler(status){
    alert("Error destroying Encrypted cache");
}
```

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- **Change encryption key**
- Exercise

Change encryption key

- While encrypted cache is in the open state, it is possible to change the encryption key
- To do so, use the following API:
 - `WL.EncryptedCache.changeCredentials(credentials, onComplete, onError)`
 - `credentials` – new user password to be used.
 - `onComplete` – a callback function to be invoked when complete.
 - `onError` – a callback function to be invoked in case of an error.
- Callback receives a status object with the same structure as `WL.EncryptedCache.open()`

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Exercise

- Create an application that performs the following functions:
 - Creates an encrypted cache with a user-provided encryption key
 - Stores some key-value pair data in it
 - Closes the encrypted cache
 - Tries to access encrypted data while cache is in closed mode
 - Tries to open encrypted cache with an invalid encryption key
 - Opens encrypted cache with the correct encryption key
 - Retrieves previously stored data from encrypted cache
 - Closes encrypted cache
 - Destroys encrypted cache

Exercise

- The sample for this training module can be found in the Getting Started page of the IBM Worklight documentation website at <http://www.ibm.com/mobile-docs>

Encrypted Cache

Encryption key:

Open cache
 Close cache
 Destroy cache

Data to encrypt:
 Key :
 Value:

Encrypt key/value
 Decrypt key
 Remove key

Encrypted Cache

Encryption key:

Open cache
 Close cache
 Destroy cache

Data to encrypt:
 Key :
 Value:

Encrypt key/value

The page at 192.168.1.34:8080 says: ✕

Successfully encrypted into cache.

OK

Encrypted Cache

Encryption key:

Open cache
 Close cache
 Destroy cache

Data to encrypt:
 Key :
 Value:

Encrypt key/value

The page at 192.168.1.34:8080 says: ✕

Encrypted cache closed, reading failed

Prevent this page from creating additional dialogs.

OK

Check yourself questions

- Connectivity to Worklight Server is required only in order to:
 - Create a new encrypted cache
 - Open an existing encrypted cache
 - Read and write values to encrypted cache
 - Destroy encrypted cache
- Which of the following APIs is synchronous and does not require callbacks to be set up?
 - `WL.EncryptedCache.open`
 - `WL.EncryptedCache.read`
 - `WL.EncryptedCache.destroy`
 - All encrypted cache APIs are asynchronous and require setting up callbacks for success and failure
- Which of the following sentences correctly describes the encrypted cache?
 - Encrypted cache is stored in the device native storage. Its size is limited by the free space on a device, therefore large amounts of data can be stored.
 - HTML5 WebStorage is used for storing encrypted cache; therefore the amount of data stored in it is limited to several megabytes
 - Encrypted cache is stored on Worklight Server. Its size is limited by the free space in the Worklight Server database, therefore large amounts of data can be stored
 - Encrypted cache is stored in virtual memory. Its size is limited by the device RAM and it is erased each time the user quits the application.

Check yourself questions

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