Integration with Time Machine

Jim Dovey
aka Alan Quatermain of AwkwardTV

http://alanquatermain.net/

What we'll cover

- Who will use this?
- Concepts and design
  - UI elements, events
- Public API (a whole *two* functions!)
- Private API
- An example Cocoa controller class

What we won't cover

- Snapshots
  - Used by Xcode ?
  - Useful for managing non-bundled collections of discrete files
- Triggering backups programatically
  - BUBackUpNow( ) function

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- Apps with a desire to handle partial dataset restorations
- CoreData

Concepts and Design

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- Time Machine scrolls through these windows for you
- Your app is alerted when a real window is required, and your app handles display & input for that window.

Events and Callbacks

Time Machine handles the interface for you— you only have to provide some callback routines.

```
BURegisterStartTimeMachineFromDock(...);
BURegisterRequestSnapshotImage(...);
BURegisterTimeMachineDismissed(...);
BURegisterTimeMachineRestore(...);
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The ‘events’ posted by Time Machine include the startup request, actions, dismissal (cancel), restore (one or all), activate/deactivate snapshot windows, and requests for snapshot or thumbnail images.

API

Public API

Apple has released two functions:

```
CSBackupIsItemExcluded(CFURLRef item, Boolean * byPath);
CSBackupSetItemExcluded(CFURLRef item, Boolean exclude,
Boolean byPath);
```

These routines allow you to inform the backup system of cache files or other oft-changed data which need not be backed up.

Anything further than this requires that we resort to accessing the private API…

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- Handle activation and deactivation of individual snapshots
- Restore if so requested, or else revert to prior state upon dismissal.

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```
typedef void (*BUStartTimeMachineCallBack)(void);
void BURegisterStartTimeMachineFromDock(BUStartTimeMachineCallBack
        cb);
void BUStartTimeMachine(int windowNumber, CFURLRef urlForWindow,
        BUAction flags);
```

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```
typedef void (*BURequestSnapshotImageCallBack)(void * token,
        CFURLRef backupURL);
void BURegisterRequestSnapshotImage(void * token,
        BURequestSnapshotCallBack callback);
void BUUpdateSnapshotImage(int windowNumber, CFURLRef url);
```

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```
typedef void (*BUActivateSnapshotCallBack)(void * token, CFURLRef
        backupURL, CGRect workingBounds);
typedef void (*BUDeactivateSnapshotCallBack)(void * token, CFURLRef
        backupURL);
void BURegisterActivateSnapshot(void * token,
        BUActivateSnapshotCallBack callback);
void BURegisterDeactivateSnapshot(void * token,
        BUDeactivateSnapshotCallBack callback);
void BUActivatedSnapshot(int windowNumber, CFURLRef url);
void BUDeactivatedSnapshot(int windowNumber, CFURLRef url);
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- To programatically dismiss, call `BUTimeMachineAction(1);`

```
typedef void (*BUTimeMachineDismissedCallBack)(void * token);
typedef void (*BUTimeMachineRestoreCallBack)(void * token, CFURLRef
        backupURL, CFURLRef liveURL, Boolean restoreAll,
        CFDictionaryRef userInfo);
void BURegisterTimeMachineDismissed(void * token,
        BUTimeMachineDismissedCallBack callback);
void BURegisterTimeMachineRestore(void * token,
        BUTimeMachineRestoreCallBack calback);
void BUTimeMachineAction(BUAction action);
```

Cocoa Controller

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- You implement a delegate to provide application-specific data
- Ideally this delegate should be concerned only with Time Machine, and should be your *only* Time Machine-handling class

Properties

- @property(assign) id<AQTimeMachineDelegate> __weak delegate;
  - Synchronized access, non-retaining
- @property NSRect workingBounds;
  - The current snapshot bounds set by Time Machine
- @property BOOL changedItemsOnly;
  - YES if the UI should only show changed items
- @property BOOL inTimeMachine;
  - Check to see if Time Machine actions should be performed

General Functions

- + (AQTimeMachineController *) timeMachineController;
  - Fetch the singleton instance
- - (BOOL) canEnterTimeMachine;
  - A simple check, will call the delegate
- - (IBAction) browseBackups: (id) sender;
  - When you want your own Time Machine button
- - (void) dismissTimeMachine;
  - Close down the Time Machine UI
- - (void) invalidateSnapshotImages;
  - When your UI has changed, updates snapshots

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- Activates and deactivates snapshots, notifying delegate
- Calls delegate when a restore action is requested

AQTimeMachineController Code

Delegate Tasks

- Determines whether the app can enter Time Machine
- Creates and returns controllers and data paths for the live window and any snapshot windows requested
- Implements data restoration
- Optionally:
  - Performs setup before & after entering Time Machine
  - Performs actions before & after snapshot activation/ deactivation
  - Makes any changes required for ‘show changed items only’
  - Any app-specific cleanup when Time Machine is dismissed

An NSDocument-based Delegate

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- Keep track of the current document
- Store any document user-interface state which is likely to change while in Time Machine
  - Search box contents, list selections
- Ensure that no documents are editable while in Time Machine

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- No sheet should be attached:
  - [[ctrl window] attachedSheet]

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  - Create using -[NSDocumentController makeDocumentWithContentsOfURL:ofType:error:]
  - Use -makeWindowControllers to setup the controllers, rather than letting NSDocument put itself onscreen

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- Also install your own handlers to invalidate & update snapshots in response to user activity
  - Notifications, delegates, KVO

Example Delegate Code

…now, only the future awaits

For more information and updates to this material,
visit my website:
http://alanquatermain.net/