CollabTracker

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# Introduction

The Information System architecture is undergoing radical changes in recent decades from thick clients of client-servers to thin clients of distributed systems, and now toward cloud.

Unfortunately, the farther the information layers moved from the end users, the more painful it had become to perform business intense functions such as aggregations from multiple artifacts. The end users have to live with the network latencies and session maintenance while working on remote contents. The difficulties amplify if multiple members have to co-author an artifact without stepping over each other’s work.

Of course, there had been workarounds such as AJAX, PWA to address latencies. But one has to still wade through myriads of unproductive formalities before doing any intelligent decision making while dealing with the data on cloud.

An ideal IT system should extend itself to the users for receiving Information instead of forcing users to stretch up to its portals.

This tool attempts to address two key challenges in information collaboration.

* Assigning single ownership for data elements at enterprise level and rolling up to wider forms with least human intervention.
* Spare the authors from unproductive information transfer and collaboration steps which machines are well apt to handle.

The CollabTracker is an *open-source* framework for effectively defining information at enterprise level and facilitating seamless collaboration. It provides a simple platform for requesting, authoring and publishing information. It is designed such a way that a software engineer can easily add newer content-types by extending the base framework.

It is based on the De-Clouding principle similar to De-Normalization which reverses an overly *normalized* database to a state where data processing is quicker for real life scenarios. The CollabTracker de-clouds i.e. brings the cloud data closer to the users for faster decision making.

It provides a technology-agnostic foundation to integrate with any DocCentral in market and attempts to distribute workload amongst user’s desktop, doc centrals, catalog processors and extended processing servers.

# Building blocks of the framework

1. Doc Central

* Any 3rd party content-repository. Current version is designed to support Google Drive, Windows file system and WebDAV enabled storage services such as Sharepoint. (\*Sharepoint validations pending).

1. Desktop UI
   * Allows requesters to create base templates and assign ownership to specific authors to prepare content.
   * Allows authors to create new content, update and publish.
   * Displays catalog of available contents to subscribe, review and collaborate.
   * Allows authors and requestors to update status and re-assign ownership.
2. Client synch-up Orchestrator
   * Submits contents and requests Doc Central to process it.
   * Downloads refreshed catalogs and the subscribed content from Doc Central.
3. Server orchestrator
   * Processes/aggregates contents received from users and extended processors.
   * Publishes catalog via SQLite file which carries the information of content in Doc Central.
4. Extended orchestrators
   * Transforms contents as per special business requirements.

## How it is structured?

The building blocks are designed with Abstract classes which any software engineer can expand to cater unique needs of his/her organization.

The three processors i.e. client, server and extended orchestrators make the magic happen by leveraging four SQLite database files.

* sysdbfile – provides the characteristics of each content type viz. which handler shall be picked to process the content, whether they are of individual type or roll-ups that provide a grouped view, any extended handling involved etc. The updates on sysdbfile such as introduction of new content types by architects are automatically propagated to all users by the framework.
* catalogdbfile – holds details about the published contents at the Doc Central, their location, author etc. in the form of an Enterprise Resource Locator (ERL) master record. It is refreshed and re-published at a predefined location of the Doc Central by server orchestrator every time a content is published so the clients can pick it up during their periodic checks.
* clientdbfile – holds the details of the local drafts that the user creates or reviews, details of user subscribed ERL contents and the status of their local availability etc. It stays only at client desktops.
* extendedcatalogdbfiles – data related to any extended processing for special content types such as project trackers. This stays only at extended servers.

## Processors’ Action Flow

The processors continuously monitor for updates and take follow up actions specific to each content type.

The client orchestrator reads the latest catalog from the Doc Central and syncs up the local repositories so the users can review and update seamlessly. Also when the user creates a new draft and declares it *ready-for-upload*, the client orchestrator pushes the *content* into the Doc Central’s *content drop box*. It also writes a *request file* into the *request drop box* with details of the corresponding content file.

The server orchestrator reads the request files and moves the corresponding contents into their destination folders *as is* or aggregates to its rollup content. After processing all such requests, it publishes the renewed catalog in the publication folder.

The extended orchestrator mimics a human’s effort for any enrichment viz. sending the task allocation records to team members based on project trackers created by PMs, creating a *Projects* dashboard, combining multiple spreadsheets to provide a summary view and persisting timecards.

## Content Handlers

While the processors handle generic house-keeping functions, they won’t have any clue on the specific needs of the contents. For that they trigger the corresponding *content handlers* at run time.

The framework deploys a lightweight dependency injection function to load content handlers during runtime using the *dynamic class loading* feature of Java.

A content can be either an individual type which is maintained as is, or a rollup type which will sit inside another rolled up content.

The content handlers handle the unique requirements of contents for displaying at client side, for processing by catalog server and for any special processing by extended processor.

# Pre-loaded Content Types

**General Request Generator**

Acts as a general-purpose requests collator for users. Helps to categorize and take actions.

**Idea Generator**

Captures ideas from team members and rolls them up at relevance (i.e. team) level. Captures feedback from reviewers and helps to collaborate.

**Timesheet Capture**

Captures timecards in real time. Allows one to create a new time-capture function to track the time spent at specific interval and start tracking the time expended in real time. This module can be further evolved to interact via mobile devices.

**ToDo Generator**

Team leaders can create a template and assign to team members to author artifacts. All todo items of a team member are rolled up into a single list for easier view.

**Simple Tracker**

Enables members of a team to maintain consistent data sheets which can be merged onto a DeckerLite rollup sheet.

**Decker Lite**

A simple decking process that combines the records of individual contents into a group level view.

**Project Tracker**

Provides an All-in-One Dashboard to project managers that tracks effort, defects, impediments and independent task progress in near real time. (Limitation: doesn’t auto-capture impacts from inter-dependency. Large projects may require an additional Project Planning tool since few aspects like interdependencies and holiday calendars are not covered by this handler.)

**Decker Grouper**

Decks up individual contents into summary view. e.g. one can setup a summarizer of all project trackers to provide a combined view to upper management.

# Software Project/Package Architecture

## Project - ColbTrk (Base Components):

* Contains the base components to handle the Desktop and Doc Central processes.
* Common routines that simplifies the work of business layer
* Abstracts of content handlers with generic functions
* Interface definitions to standardize Remote processing and OS handling
* Dynamic loaders of content handlers, OS handlers and Remote processors.
* Refreshers to synch up newer versions of content handlers without manual intervention.
* ReviewHandlers through which the users can log remarks directly on the artifacts.

## Project - Content Handlers:

* Provides the handling mechanism for each content type at client desktops and at catalog servers.

## Project - OS Handlers:

* File viewing at user’s desktop. Readily available for Windows and can be easily extended on other systems.

## Project - Remote Accessors:

* Enables interactions with different document collaboration tools viz. Windows file system, Google Drives, WebDAV enabled portals in a consistent manner.
* Few remote accessors viz. GoogleDrive accessor incorporate content location caching to speed up the process.

## Project - Extended Server Components:

* Provides the Orchestrators for Extended processing of special contents.

## Project – Extended Handlers:

* Implementations of the extended processing of special contents that require unique enrichments at server side.

**CommonOpenCldFns and XtdCommonOpenCldFns**

* Packages commonly used methods.

# Technology stack

## jdk 1.8

Java

## SWT – Standard windows toolkit

A lightweight framework for desktop UI

## SQLite

A serverless self-contained database engine for tracking the drafts one creates, to publish the available artifacts catalog to all participants, to track the subscriptions at subscribers’ desktops and to hold the Content Type configurations.

## Google APIs

For accessing a Google Drive based doc central

## Sardine

For accessing WebDAV enabled doc central

## Apache POI

For rolling up excel artifacts

## Log4J

Error Logging

## Maven

For version control of external repositories.

## izpack

For packaging and installation

# How to install?

* Choose the infra platforms for the catalog server, extended servers and platform server.
* At the machines where the application component execute, set the java class path where the JRE is located.
* Set up the servers and then the desktop users using the installation package. The installation package is downloadable from GitHub <https://github.com/vibeeshK/CollabTracker> file: CollabTrackerInstaller\_1.x.jar, and it does the following:
  + Captures the Installation folder path, Desktop User name who will be using the application and also the proxy IP and port details.
  + Sets the property files - Common, Client, System, Server and Extendedserver to point to the user’s choices.
  + Stores the executables in the installation folder and maps the working folder to user specific folder (i.e. c:\users\Vibeesh).
* Unless you intend to implement a new custom content type for your own users, you don’t have to set up a platform server. In that case you can suppress the periodic refresh by setting the flag suppressSysCompRefresh in commons.properties.

## Administrator’s initial activities:

* At the root server side replicate the model folders as in DemoRoot and provide access to users as below:
  + 1\_allmembersreadable: contains artifacts, catalog publications and requests’ responses folders. All users shall be provided read access to this folder.
  + 2\_contributorswritable: contains request drop box and content drop box. Provide write access on the request drop box to all contributors to place their requests. Create subfolders within content drop box with the names of the contributors and provide write access to the corresponding personnel to place their contents.
    - <INSTALL\_PATH>\WindowsRoots\DemoWinContentRoot\2\_contributorswritable \contentdropbox\<ApplicationUserName>
    - e.g. C:\Kannan\Java\ColbTrk\WindowsRoots\DemoWinContentRoot\2\_contributorswritable\contentdropbox\DEMOUSER
  + 3\_behindscene (contain housekeeping folders).
* Configure the relevance structure appropriate to the team in the catalog master database. Add contributing users with ADMIN login using the user-maintenance content type. Few common purpose user IDs are factory set e.g. ADMIN, DEMOUSER, XTDSTDPROC, XTDTMSHPROC, XTDDECKERLITE, XTDDECKERGRPR.
* Assign a server processing machine to execute the Server Orchestrator to perform housekeeping operations on the doc central contents.
  + Install the CollabTracker on this machine and configure the trigger mechanism to initiate the Server Orchestrator.
  + Copy the model catalogMasterDb file from catalogMasterDbFileOf<DemoWinContentRoot> into the new root specific file.
  + Update the tables Relevance and Users in the catalogDb as per need.
* Arrive with the Relevance tree structure and update catalog master db as required.
* Admin shall run the server orchestrator first so the catalog publication gets initiated and all other users can initiate sync ups before starting to contribute.
* Set up authorized contributors using User Maintenance content type.
* Assign as many extended machines to execute the Extended Server Orchestrators to handle extended functions of the doc central contents.
  + Install the CollabTracker on this machine and configure the trigger mechanism to initiate the Extended Orchestrators.
  + Copy the folder extdSrvrDeckrLite with its content i.e. its own clientdb file.
  + Ensure the placement of the extended catalog db file such as <catalogXtdTmCapture>DbFileOf<DemoGShContentRoot> in extendedcatalogdbfiles folder.
* Optionally, further customization can be done through updating *properties* files placed in the config folder viz. Common, Client, Server, ExtendedServer etc.

## User desktop side triggering:

* Once the admin completes the server side set up, users can invoke the client UI and view published contents via catalog display.
* The client processor needs to be triggered so the user side contents are in sync with server side.

## Conclusion:

*That’s it. Happy collaborating!*