**SQRCT System Architecture**

**1. Introduction**

This document describes the architecture of the **SQRCT (Strategic Quote Recovery & Conversion Tracker)** system in its **current Excel-based implementation**. It details the major components, data flow, data models, error handling, and security considerations based on the analysis of the Power Query M code and VBA modules found in the user workbooks (Ryan/Ally versions) and the SyncTool workbook.

The primary purpose of this system is to track sales quotes, automate follow-up stage calculation, allow user input for engagement tracking, and synchronize user edits into a master dataset, all within the Microsoft Excel environment. The goal is to refine and improve this existing Excel-based system.

**2. High-Level Overview**

The SQRCT system operates across multiple interconnected Excel workbooks: individual user workbooks (e.g., for Ryan "RZ", Ally "AF") and a central "Automated Master" workbook. A separate "SyncTool" workbook orchestrates the merging of data between these files.

**Core Components:**

1. **Data Sources:** Network folders containing daily CSV quote exports and potentially quote document files (PDFs), plus a local Excel table for historical data.
2. **Power Query Engine (within User/Master Workbooks):** Ingests, cleans, transforms, merges, and prepares quote data (CSVQuotes, ExistingQuotes, MasterQuotes\_Raw, MasterQuotes\_Final).
3. **Excel Data Target (within User/Master Workbooks):** The output of the MasterQuotes\_Final query, loaded into the workbook (likely an Excel Table or connection) for VBA access.
4. **VBA Dashboard Logic (Module\_Dashboard in User/Master Workbooks):** Populates the user-facing "SQRCT Dashboard" sheet using data from MasterQuotes\_Final, handles user interactions (button clicks), saves/restores user edits, applies formatting, and manages sheet protection.
5. **VBA User Edit Capture (Worksheet\_Change on Dashboard Sheet):** Automatically captures changes made by users in specific columns (K-N) and writes them to a hidden "UserEdits" sheet within the *same workbook*, tagging the edit with the user's identity ("RZ" or "AF") and a timestamp.
6. **Hidden "UserEdits" Sheet (within User/Master Workbooks):** Acts as a persistent log of user modifications specific to that workbook.
7. **SyncTool Workbook (VBA Application):** A separate Excel file containing VBA modules (Module\_SyncTool\_Manager, Module\_File\_Processor, Module\_Conflict\_Handler, etc.) that performs the following when manually triggered:
   * Reads the "UserEdits" sheets from the specified RZ, AF, and Master workbooks.
   * Detects and resolves conflicts between these sheets (primarily based on timestamps).
   * Writes the merged and resolved data back *only* to the "UserEdits" sheet in the Master workbook.
   * Logs its operations to sheets within the SyncTool workbook itself.

**Diagram (Conceptual Flow):**

flowchart TD

subgraph UserWorkbook [User Workbook (RZ/AF)]

direction LR

subgraph PQ\_User [Power Query]

direction TB

CSVFolder[("R:\...\\30DayExports\_DailyPull")] --> CSVQuotes

LocalTable[("ExistingQuotes Table")] --> ExistingQuotes

CSVQuotes --> MasterQuotes\_Raw

ExistingQuotes --> MasterQuotes\_Raw

MasterQuotes\_Raw --> MasterQuotes\_Final

end

PQ\_User --> MasterDataTarget[(MasterQuotes\_Final Output)]

MasterDataTarget --> VBA\_Dash[Module\_Dashboard: RefreshDashboard]

VBA\_Dash --> DashboardSheet{SQRCT Dashboard}

DashboardSheet -- User Edits (K:N) --> VBA\_SheetCode[Worksheet\_Change]

VBA\_SheetCode --> UserEditsSheet[(UserEdits Sheet - Local)]

UserEditsSheet -- Read/Write --> VBA\_Dash

end

subgraph SyncToolWb [SyncTool Workbook (Manual Trigger)]

direction TB

SyncUI{SyncTool Dashboard UI} --> SyncMgr[Module\_SyncTool\_Manager]

SyncMgr --> FileProc[Module\_File\_Processor]

SyncMgr --> Conflict[Module\_Conflict\_Handler]

SyncMgr --> Logger[Module\_SyncTool\_Logger]

FileProc -- Reads --> UserEditsSheet

FileProc -- Reads --> UserEditsSheet\_AF[(UserEdits Sheet - Ally)]

FileProc -- Reads --> UserEditsSheet\_Master[(UserEdits Sheet - Master)]

FileProc -- Extracts Data --> SyncMgr

SyncMgr -- Data --> Conflict

Conflict -- Conflicts? --> SyncUI

SyncMgr -- Merged Data --> FileProc

FileProc -- Writes ONLY --> UserEditsSheet\_Master

FileProc -- Triggers Refresh --> MasterWorkbook[Master Workbook]

Logger --> LogSheets[(Log Sheets in SyncTool)]

end

subgraph MasterWorkbook [Master Workbook]

direction LR

%% Contains similar PQ and VBA as User Workbook

%% but its UserEdits sheet is the target of the SyncTool

MasterPQ[Power Query Engine] --> MasterDataTarget\_M[(MasterQuotes\_Final Output)]

MasterDataTarget\_M --> VBA\_Dash\_M[Module\_Dashboard]

VBA\_Dash\_M --> DashboardSheet\_M{SQRCT Dashboard}

DashboardSheet\_M --> VBA\_SheetCode\_M[Worksheet\_Change]

VBA\_SheetCode\_M --> UserEditsSheet\_Master

UserEditsSheet\_Master -- Read/Write --> VBA\_Dash\_M

end

UserWorkbook -- Sync Process Reads --> SyncToolWb

MasterWorkbook -- Sync Process Reads/Writes --> SyncToolWb

%% Optional Separate Flow

subgraph QuoteFileLookup [Quote File Lookup (Separate)]

NetFolderQuotes[("S:\CS Common\\CLIENT QUOTES")] --> PQ\_ClientQuotes[CLIENT QUOTES Query]

PQ\_ClientQuotes --> QuoteLookupOutput[(Quote File Info)]

end

style UserEditsSheet fill:#f9f,stroke:#333,stroke-width:2px

style UserEditsSheet\_AF fill:#f9f,stroke:#333,stroke-width:2px

style UserEditsSheet\_Master fill:#f9f,stroke:#333,stroke-width:2px

**3. Component Breakdown**

* **Power Query Queries:**
  + **CLIENT QUOTES**:
    - **Purpose:** Identify quote document files (PDFs?) and associated metadata (owner, prefix) from a network share.
    - **Technology:** Power Query M (Source: Folder.Files).
    - **Interaction:** Appears largely independent of the main dashboard data flow based on current analysis. Might be used for ad-hoc lookups or a separate process.
  + **CSVQuotes**:
    - **Purpose:** Ingest daily quote data exports from CSV files. Standardize schema, extract pull date.
    - **Technology:** Power Query M (Source: Folder.Files, Csv.Document).
    - **Interaction:** Provides the primary source of new/updated quote information to MasterQuotes\_Raw.
  + **ExistingQuotes**:
    - **Purpose:** Load historical quote data stored within the workbook itself.
    - **Technology:** Power Query M (Source: Excel.CurrentWorkbook).
    - **Interaction:** Provides legacy quote data to MasterQuotes\_Raw. Seems to be a way to manually maintain older records or bridge data gaps.
  + **MasterQuotes\_Raw**:
    - **Purpose:** Combine data from CSVQuotes and ExistingQuotes into a single dataset, tagging the source.
    - **Technology:** Power Query M (Source: References other queries, Table.Combine).
    - **Interaction:** Acts as an intermediate staging query for MasterQuotes\_Final.
  + **MasterQuotes\_Final**:
    - **Purpose:** The core data processing logic. Filters unwanted records, calculates quote age/occurrence, determines automated follow-up stages and notes, and deduplicates records based on priority logic to provide the definitive dataset for the dashboard.
    - **Technology:** Power Query M (Grouping, Filtering, Conditional Logic, Sorting).
    - **Interaction:** Loads its output into the Excel workbook, where it's accessed by VBA (Module\_Dashboard). This is the backbone of the dashboard's core data (columns A-J).
* **VBA Modules (User/Master Workbooks):**
  + **Module\_Dashboard**:
    - **Purpose:** Manages the "SQRCT Dashboard" sheet lifecycle. Handles refresh operations (pulling data via formulas linked to MasterQuotes\_Final), saving user edits *to the local* "UserEdits" sheet, restoring those edits after refresh, managing UI elements (buttons, formatting), and sheet protection.
    - **Technology:** VBA.
    - **Interaction:** Reads from the MasterQuotes\_Final output, reads/writes to the local "UserEdits" sheet, interacts with the "SQRCT Dashboard" sheet objects.
  + **Module\_Identity**:
    - **Purpose:** Defines the unique identifier ("RZ" or "AF") for the specific user's workbook.
    - **Technology:** VBA (Constant).
    - **Interaction:** Provides the identity to Worksheet\_Change and Module\_Dashboard for tagging edits in the "UserEdits" sheet.
  + **Worksheet Code (SQRCT Dashboard Sheet):**
    - **Purpose:** Captures user changes in editable columns (K-N) in real-time using the Worksheet\_Change event.
    - **Technology:** VBA (Event Handler).
    - **Interaction:** Reads the Document Number from the edited row, finds/updates the corresponding record in the hidden "UserEdits" sheet, writing the user's data, identity, and timestamp.
* **VBA Modules (SyncTool Workbook):**
  + **Module\_SyncTool\_Manager**:
    - **Purpose:** Orchestrates the overall synchronization workflow when initiated by the user.
    - **Technology:** VBA.
    - **Interaction:** Calls functions in Module\_File\_Processor, Module\_Conflict\_Handler, Module\_SyncTool\_Logger, and Module\_SyncTool\_UI.
  + **Module\_File\_Processor**:
    - **Purpose:** Handles all interactions with external workbooks (RZ, AF, Master). Opens, closes, reads "UserEdits" sheets, writes merged data back to the Master "UserEdits" sheet, standardizes sheets.
    - **Technology:** VBA (Workbooks.Open, file system operations).
    - **Interaction:** Interacts with the file system and external Excel instances. Called by Module\_SyncTool\_Manager.
  + **Module\_Conflict\_Handler**:
    - **Purpose:** Implements the logic for detecting differences between "UserEdits" data from multiple sources and resolving those conflicts based on predefined rules (timestamp priority, comment concatenation).
    - **Technology:** VBA (Scripting.Dictionary).
    - **Interaction:** Receives data dictionaries from Module\_SyncTool\_Manager, performs comparisons, returns conflict details and resolved data.
  + **Module\_SyncTool\_Logger**, **Module\_SyncTool\_UI**, **Module\_UIHandlers**, **Module\_StartUp**, **MODULE\_CONSTANTS**, **Module\_Utilities**, **Module\_Format\_Helpers**: Supporting modules for logging, UI management, constants, and helper functions within the SyncTool itself.

**4. Data Model**

* **MasterQuotes\_Final** (Power Query Output / Excel Table):
  + **Structure:** Contains the processed and deduplicated quote data ready for display. Key columns include: First Date Pulled, Document Number, Document Date, Customer Number, Customer Name, User To Enter, Document Amount, Salesperson ID, Historic Stage, AutoStage, AutoNote, IsMissing, DataSource.
  + **Storage:** Loaded into an Excel Table or connection within the User/Master workbooks.
* **UserEdits** (Hidden Excel Sheet in RZ/AF/Master Workbooks):
  + **Structure:** Stores *only* the user-modifiable fields and metadata. Columns: DocNumber (Key), Engagement Phase, Last Contact Date, Email Contact, User Comments, ChangeSource ("RZ", "AF", or "MASTER"), Timestamp.
  + **Storage:** Hidden sheet within each respective workbook. Acts as a change log/persistent store for user input between refreshes and syncs.
* **SyncTool Log Sheets (Excel Sheets in SyncTool Workbook):**
  + **Structure:** SyncLog (Timestamp, Status, Message), ErrorLog (Timestamp, Error Code, Description, Module), DocChangeHistory (Snapshot of merged data attributes after sync).
  + **Storage:** Regular sheets within the SyncTool workbook.

**5. Data Flow**

1. **Daily Data Ingestion (Power Query):**
   * CSVQuotes reads new CSV files from the network drive.
   * ExistingQuotes reads the local Excel table.
   * MasterQuotes\_Raw appends these two sources.
   * MasterQuotes\_Final processes the raw data: filters, calculates status (AutoStage, AutoNote), deduplicates based on priority logic.
   * The result of MasterQuotes\_Final is loaded into the workbook.
2. **Dashboard Refresh (User/Master VBA - RefreshDashboard):**
   * **(Standard Mode Only):** Reads current user edits (K-N) from the Dashboard sheet -> Updates/adds rows in the *local* "UserEdits" sheet (SaveUserEditsFromDashboard).
   * Reads data from the loaded MasterQuotes\_Final table using INDEX formulas -> Populates Dashboard columns A-J.
   * Sorts the dashboard.
   * Reads data from the *local* "UserEdits" sheet -> Populates Dashboard columns K-N, matching on Document Number.
   * Applies formatting, protection, updates timestamp.
3. **User Editing (User/Master VBA - Worksheet\_Change):**
   * User modifies a cell in columns K-N on the Dashboard.
   * Event triggers -> Reads Document Number from column A.
   * Finds/creates row in the *local* hidden "UserEdits" sheet for that Document Number.
   * Writes values from Dashboard K-N to UserEdits B-E.
   * Writes user identity ("RZ"/"AF") to UserEdits F (ChangeSource).
   * Writes current time to UserEdits G (Timestamp).
4. **Synchronization (SyncTool VBA - StartSynchronization - Manual Trigger):**
   * Reads RZ, AF, Master file paths from its UI.
   * **Standardizes** "UserEdits" sheets in RZ, AF, Master files (opens/modifies/saves/closes).
   * Extracts data from all three "UserEdits" sheets into dictionaries.
   * Compares dictionaries, identifies conflicts.
   * Displays conflicts (optional user review).
   * Merges data, resolving conflicts (timestamp priority / comment concatenation).
   * Writes the single, resolved dataset *only* to the "UserEdits" sheet in the **Master** workbook.
   * Triggers a refresh in the Master workbook (rerunning its Power Query and RefreshDashboard VBA).
   * Updates log sheets in the SyncTool workbook.

**6. Error Handling Strategy**

* **Power Query:** Primarily relies on default Power Query behavior. Errors might result in null values or query failures. Some try...otherwise is used (e.g., in CleanDocNumber). Limited logging.
* **VBA (User/Master Workbooks):** Uses a mix of On Error GoTo [Label] (in main routines like RefreshDashboard) and On Error Resume Next (often in helper functions or loops). Errors are sometimes logged to a hidden "UserEditsLog" sheet or displayed via MsgBox. Can potentially mask errors or lead to incomplete operations due to Resume Next.
* **VBA (SyncTool Workbook):** More structured use of On Error GoTo ErrorHandler. Centralized logging (Module\_SyncTool\_Logger) to dedicated sheets ("SyncLog", "ErrorLog") provides better traceability of operations and errors during the sync process.

**7. Security Considerations**

* **Hardcoded Password:** The use of Password:="password" in the User/Master workbook VBA for sheet protection is a significant vulnerability.
* **Network Path Access:** Power Query relies on hardcoded network paths (S:\..., R:\...). The process will fail if the user running the refresh or the SyncTool lacks permissions to these locations.
* **SyncTool File Access:** The SyncTool requires read *and write* access to the RZ, AF, and Master workbooks to perform standardization and write back merged data to the Master file.
* **Macro Security:** The entire system relies on users enabling macros in all involved workbooks.
* **Data Exposure:** Sensitive quote data might reside within the Excel files or CSVs. Access control relies on filesystem permissions.

**8. Deployment & Execution**

* **Current State & Target State:**
  + The system operates entirely within Microsoft Excel using Power Query for data transformation and VBA for automation, UI interaction, and synchronization logic.
  + Users (Ryan, Ally) work in their individual Excel workbooks (.xlsm).
  + Data refresh within user workbooks is likely triggered manually (e.g., Data > Refresh All, or clicking VBA buttons).
  + Synchronization is performed manually by opening the separate SyncTool workbook (.xlsm) and clicking the "Sync" button. This requires the user running the SyncTool to have access to all three RZ, AF, and Master files.
  + Improvements will focus on refining the existing Power Query logic, enhancing the VBA code for better performance (e.g., optimizing lookups), improving error handling and logging, addressing security concerns (like hardcoded passwords), and potentially streamlining the manual SyncTool process within the Excel environment. Automation possibilities *within* the Microsoft ecosystem (e.g., using Office Scripts if applicable, Power Automate Desktop) could be explored but the core logic remains Excel-based.