eBay Search Service

Preliminary Draft

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Overview

Problem Statement

In the last few months, eBay users have reported increasingly slow response times from eBay's website when searching for auctions. Application log analysis for the eBay Master Service has confirmed that our FindAuctions API for the eBay Master service takes significantly longer to return a response when we search for auctions using keywords. It also takes longer to search for a large number of auctions. This is negatively impacting

eBay's user experience for existing users and is hindering the website's chances of being adopted by new users.

Performing further analysis on the eBay Master service schema shows that the FindAuctions API must scan the entire table to first find active auctions. Then it must scan those active auctions to find auctions that have titles with the keywords we are looking for.

Temporary Solution

As a bandaid solution to temporarily address this problem, we have added an AuctionStatus index to the Auction table of the eBay Master Service database. This allows us to immediately access all active auctions instead of being forced to scan the entire Auction table to find active auctions before querying with keywords.

This speeds up the FindAuctions API enough to fix the poor user experience temporarily, but this will not be enough as the company grows. The number of records in the Auction table, and subsequently, the number of active auctions will increase at an exponential rate.

Next Steps

To solve this more permanently, we want to create a separate search service that will handle searching for auctions by keyword and/or category. We will call this new service 'AuctionSearch'.

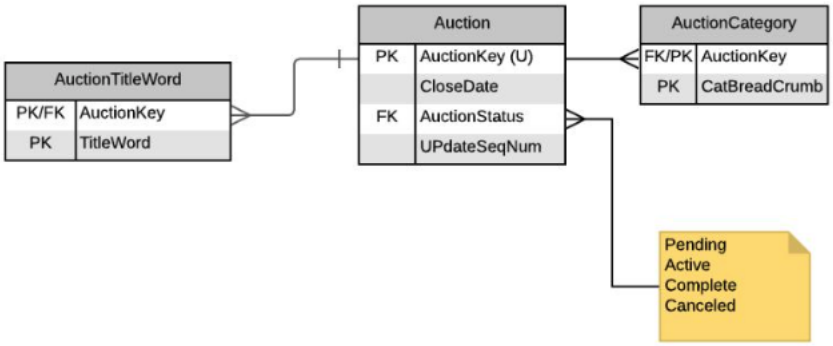
This search service will have its own database that can only be changed by external users via its API. Whenever a new FindAuction API request is made, this service will perform the required business logic and databases accesses instead of the eBay Master service.

eBay Search Service API Specification

API List

API Name	Description
createSearchableAuction	Creates an auction.
updateSearchableAuction	Updates an auction.
findAuctions	Finds auctions based on the given keywords and/or category.

Schema



API Descriptions

createSearchableAuction

Creates an auction that is searchable by keywords and category.

Input

- **title** - Title of the auction
- **closeDate** - Closing date of the auction (ISO-8601 timestamp)
- **category** - Category breadcrumb

```
{
    "title": <string>,
    "closeDate": <string>,
    "category": <string>
}
```

Output

Scenario	Response
Successfully created an auction	{ "success": true, "auction_key": <string> }

updateSearchableAuction

Updates the auction that corresponds with the given auction key.

Input

- **auctionKey** - Key that uniquely identifies the auction
- **title** - Title of the auction
- **closeDate** - Closing date of the auction (ISO-8601 timestamp)
- **status** - Status of the auction (closed, open, pending, cancelled)
- **category** - Category breadcrumb

```
{
    "auction_key": <string>,
    "title": <string>, // optional
    "closeDate": <string>, // optional
    "status": <string>, // optional
    "category": <string> // optional
}
```

Output

Scenario	Response
Successfully updated an auction	`{ "success": true }`
The given auction key does not correspond to an auction.	`{ "success": false, "exception": "auctionkeynotfound" }`

findAuctions

Finds biddable auctions based on the given category and/or keywords.
Entries will be ordered from oldest to newest, starting from the pageIndex if given.
If no pageIndex is provided, findAuctions will return numResults number of results starting from the first result.

Input

- **keywords** - Keywords that auction results will be matched to
- **category** - Category breadcrumb
- **status** - Status of the auction (closed, open, pending, cancelled)
- **pageIndex** - Index where pagination begins. If given, results will be returned starting from this page.
- **numResults** - Number of auctions returned per page

```
{
    "keywords": [ <string>, ...], // optional
    "status": <string>, // optional
    "category": <string>, // optional
    "pageIndex": <number>, // optional
    "numResults": <number>
}
```

Output

scenario	response
Successfully search with found results.	{ "success": true, "results": [auctionKey: <string>, ...], "pageIndex": <int> }
Successfully search with no results.	{ "success": true, "results": [ ] }

eBay Search Service Intervals

createAuction

This creates an entry in the AuctionSearch database for the auction, all of the auction's keywords, and the auction category.

updateAuction

Update searchable auction will update fields, keywords, and categories of an existing auction in the search table.
New keywords will be generated if a new title is provided. The new keywords will be added to the database, and keywords associated with they auction key but were not again generated from the updated title will be removed from the database. The fields will be based on the auction key, therefore the auction key may not be updated. Any optional fields not included in the message to the service will not be changed.

findAuctions

The parameters search by "anding" the results together (e.g. if you ask for a keyword "red", "LG" with the category "ELE:PHO" signifying phones in electronics, red LG phones will be returned, but not red Nokia phones, or red LG refrigerators). To perform searches that "or" search terms, multiple searches must be made.

Changes to eBay Master Service

createAuction

Creates an auction as it did before, although now the createAuction service is responsible for calling createSearchableAuction to create a search entry for the auction.
The impact on the database from createAuction is documented in the master api documentation. The impact on the database from createSearchableAuction is documented in section createSearchableAuction.
If three calls to the search service fails, the call will be queued up to be attempted again with other failed calls at a regular interval.

updateAuction

Update auction will work as it did before. Except, now, update auction will call updateSearchableAuction with the updated parameters it will receive.
The impact on the database from updateAuction is documented in the master api documentation. The impact on the database from updateSearchableAuction is documented in section updateSearchableAuction.
If three calls to the search service fails, the call will be queued up to be attempted again with other failed calls at a regular interval.

Logging

This section describes a suggested format for this service's application logs.

```
{
    "start": <string>,
    "duration": <string>,
    "api": <string>,
    "params":
        {
            "original": {
                "auctionkey": <string>,
                "title": <string>, // optional
                "closeDate": <string>, // optional
                "status": <string>, // optional
                "category": <string> // optional
            },
            "updated": {
                "auctionkey": <string>,
                "title": <string>, // optional
                "closeDate": <string>, // optional
                "status": <string>, // optional
                "category": <string> // optional
            }
        }
}
```

- **start** The time the service first receives the call.
- **duration** The amount of time it takes from when the service receives the call to when the service responds.
- **api** The name of the API that is called.
- **params** The original and updated data that the API changed. Optional data that was not changed is not included in either the updated or original logs.