## ACME KM Tool Design

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## Design Spec Overview

The following design spec reflects the understanding of the Knowledge Management (KM) Tool functional requirements. This design is intended to support the knowledge management tasks of the intended users.

## Business Objectives

The following describes the business objectives, as Intuitive Design understands them. The UI design is based on this understanding:

- Identify the fundamental elements, events, tasks, and problems for the key users with respect to adding to, finding, and applying information in the repository of knowledge.
- Promote best-practices approaches to increase user success through use of the knowledge-management product.
- Determine the build-or-buy issues in providing a solution that serves the users, their tasks, and their goals.
- Develop and remain consistent with a “brandable” user experience (if appropriate) or requirements (as necessary).
- Ensure the priorities are technically feasible and fit within the current launch schedule of an August 2006 (or earlier) release.
- Identify long-term product visions that focus and support subsequent research and design efforts.

## Organizational Goals

*Top-Down Objectives*

The initial user research revealed the following broad goals for the organizations involved

- **Increase customer satisfaction** by delivering higher-quality, more credible answers faster.
- **Improve productivity** by minimizing duplication of effort, reducing interruptions, and getting staff the information they need more quickly and efficiently.
- **Increase visibility** of the organization’s output, both internally and externally.
- **Create a better place to work** by supplying tools and practices that build community and promote more sharing of knowledge.

## User Roles

This section contains the results of the initial user research conducted with ACME researchers. This effort considered the needs the main user types as described below. These user types represent the cognitive basis and needs of the most common users, including repeat users and new users. The following descriptions do not necessarily indicate all of the tasks performed by each user role.

### Researcher Ron

Ron is a detail-oriented person. He has spent years building up deep knowledge in a handful of technical areas. He is correct in thinking that he is a recognized authority in these domains, although some of the further-flung groups in the organization don't always seem to know of or take advantage of his expertise.

Ron's goal, above all else, is to provide a well-researched, accurate answer by the given deadline. A dedicated problem solver, Ron likes to be given a single, specific question to chew on. Some assignments need an answer today, others will take 3 weeks, but he enjoys the variety as long as they don't all hit at the same time. Sometimes, though, he suspects he is duplicating work that has already been done before.

As an expert, Ron has a good idea of the limits of his knowledge. To fill in gaps in his expertise, and move beyond to knowledge he never would have found by himself, he relies on a *network* of contacts he's built up over time – experts in fields related to his, who can offer their own perspectives and give him a more complete picture of the problem.

Ron has figured out adequate methods of finding information in his own system and on the Internet. However, he'd like to organize his accumulated knowledge better, perhaps by coming up a new categorization scheme or trying some new tools he's heard about. But he never seems to have the time to do this.

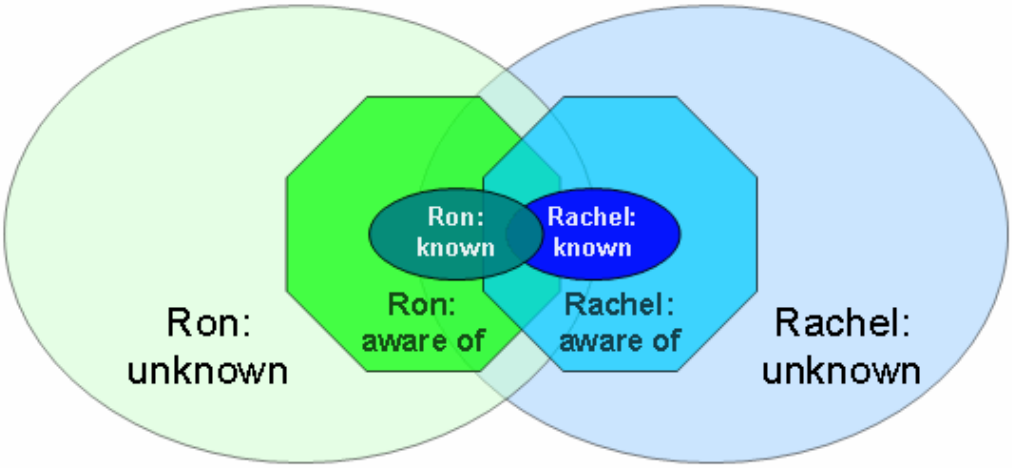
His biggest problem, however, is finding the "gray" knowledge – organizational content that's never been released to the public (and which therefore doesn't show up on Internet searches). This gray information is scattered over many internal systems, in various states of revision, organized in strange ways, and tedious to search (if he can get access to it at all). Even if found, the quality and suitability of intranet documents are often hard to judge.

Ron runs into the same problem when trying to find contacts inside the organizations he works with. He's pretty sure there's someone in the other building who could help him with his current assignment, but with no easy way to search for expertise on a given subject, or even to search org charts and project lists, it may take a lot of phone calls and emails to find that unknown expert.

## General Cognitive Attributes

- Without exception, the computer expertise of these users is higher than in the average population, particularly their skill in detailed text searches.
- In contrast to text searches, most users were frustrated by filing and finding documents in folder trees. The conventional file hierarchy does not match their mental model of items interconnected in several different ways depending on the context of the task.
- While they differ on how they organize their knowledge, all users exhibit similar behavior in searching for it, switching back and forth between browsing/sorting/filtering and searching, using a mixture of keywords, proximity, author, recency, and popularity.
- Most users are "maxed out" in terms of cognitive load and perceived time for overhead activities. This suggests that any additional cognitive burdens on them will further reduce their ability to attend to the task and stay "in flow".
- Researcher and reviewers see themselves as knowledge "detectives", trying to ferret out the information they need for creating or reviewing documents.
- They are constantly seeking to expand their own knowledge by pulling in:
    - new knowledge they are **aware** of (i.e. they've heard something about it)
    - knowledge that is **unknown** to them (i.e. it exists, but they haven't even heard about it yet)

These knowledge domains overlap between people, creating a **network of knowledge**:



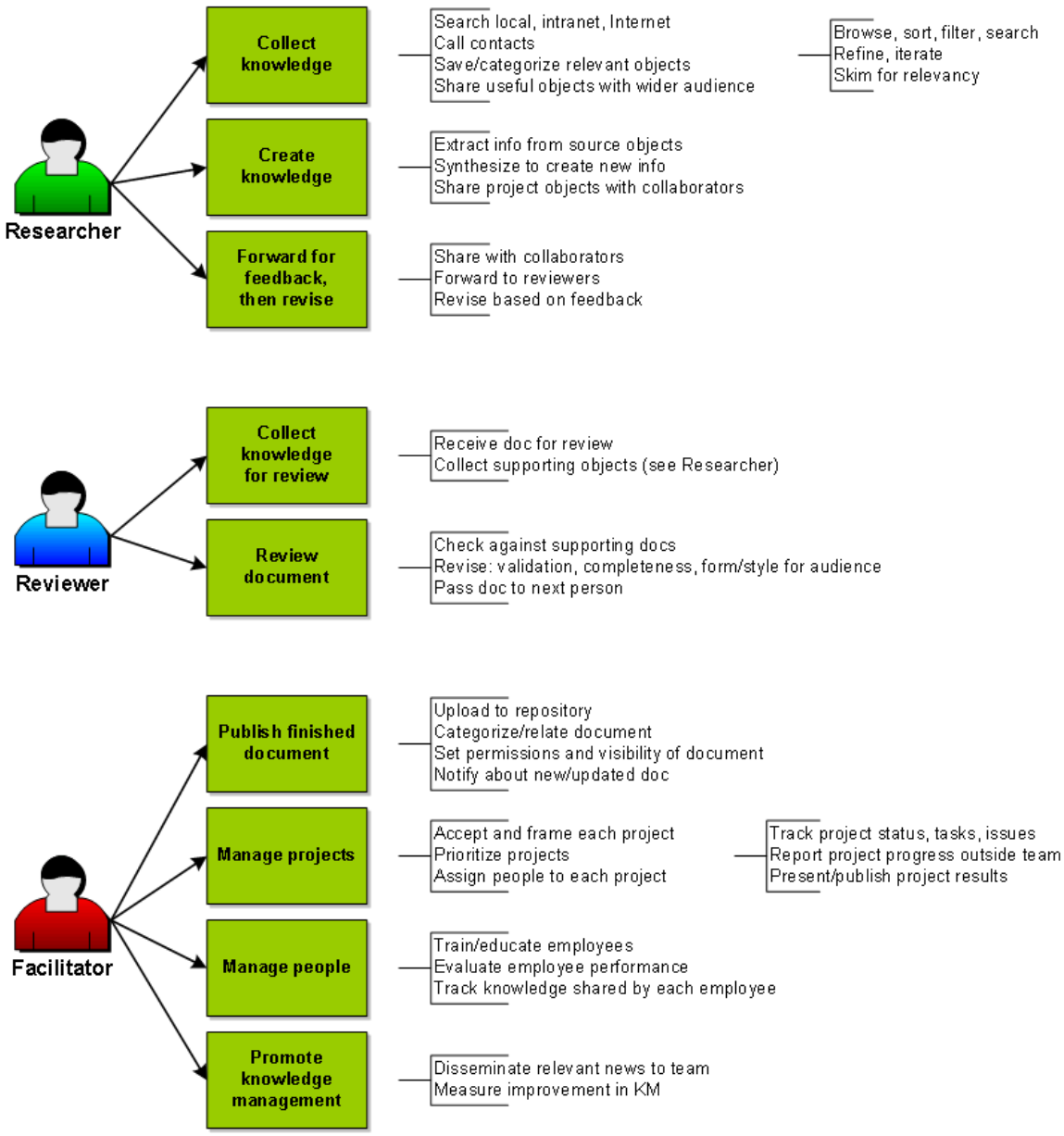
## User Tasks

*Narratives & Diagrams*

The following describes the typical scenarios that we observed. This includes:

- what triggered the action
- the user types involved
- the objects used
- the sequence of events
- the outcomes

### Task Overview



## Collect Knowledge

**Roles:** Researcher, Reviewer

Ron starts working on an assigned problem by collecting all the relevant knowledge he can find. If the assignment is a periodic task (like writing a quarterly report), he starts by contacting the previous authors and getting them to send him (or point him to) the previous report and its supporting documents.

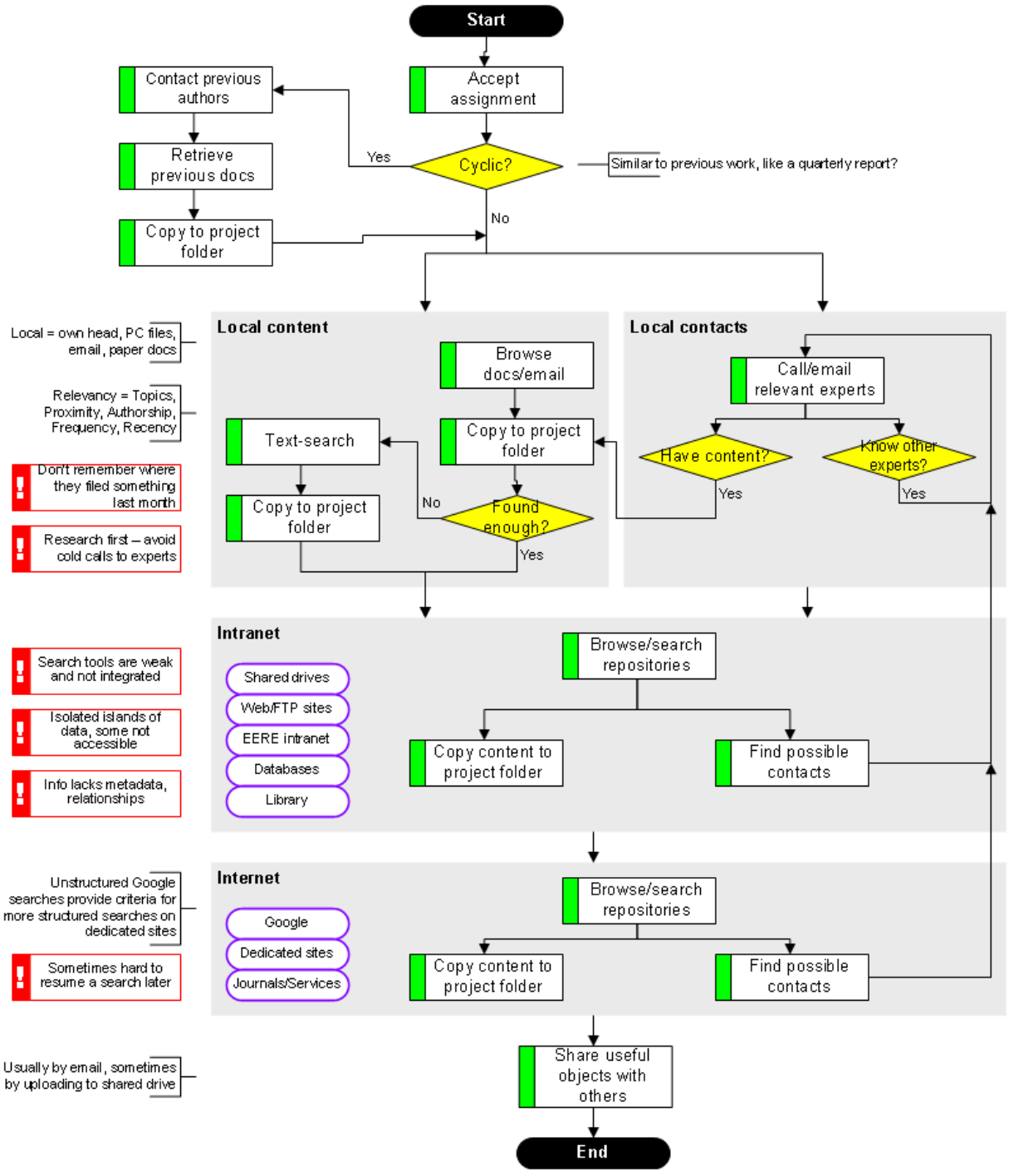
Periodic or not, he then starts a broad search for fresh contributing material. He scours his own local network of knowledge (in his head, in his filing cabinets, and on his PC), then moves outward, searching the organization's intranet collections, specialized sources like journal libraries, and the Internet at large (using Google fishing expeditions, dedicated search engines, and other bookmarked sites). This collects what he knows and what he can easily find by himself.

After some initial research, Ron calls or emails relevant experts (either known beforehand or discovered during the searches) to help him fill in the gaps, either with content or with referrals to other experts.

When searching for information in his own system and on the Internet, Ron judges relevancy by keywords, the author and organization, the frequency of reference, and recency. He mixes various tactics to find what he needs – browsing, searching, sorting, filtering – although sometimes his extended searches are interrupted by other work, and he has to either bookmark his current position or try to remember where he is so he can resume the search later.

The intranet's "gray" knowledge (both content and contacts) is a problem, because it's incomplete (uploading is too much effort for the perceived return), fragmented into islands of data (some of which are hard for Ron to access), semi-organized at best, and largely stripped of context. And because of varying data formats and firewalls, this gray knowledge currently can't be searched with the favored tools that Ron depends on for local and Internet searches.

If Ron finds something particularly useful during the course of his data collection - a web site with conference proceedings, a news item, or the contact info for a new PV company - he may share it with his team and occasionally with a larger group, usually as an email with a link or document attached.


Start
Accept assignment
Cyclic?
Yes
Contact previous authors
Retrieve previous docs
Copy to project folder
Similar to previous work, like a quarterly report?
No
Local content
Local = own head, PC files, email, paper docs
Relevancy = Topics, Proximity, Authorship, Frequency, Recency
Don't remember where they filed something last month
Research first – avoid cold calls to experts
Browse docs/email
Text-search
Copy to project folder
Found enough?
No
Yes
Copy to project folder
Local contacts
Call/email relevant experts
Have content?
Know other experts?
Yes
Yes
Intranet
Search tools are weak and not integrated
Isolated islands of data, some not accessible
Info lacks metadata, relationships
Shared drives
Web/FTP sites
EERE intranet
Databases
Library
Browse/search repositories
Copy content to project folder
Find possible contacts
Internet
Unstructured Google searches provide criteria for more structured searches on dedicated sites
Sometimes hard to resume a search later
Google
Dedicated sites
Journals/Services
Browse/search repositories
Copy content to project folder
Find possible contacts
Usually by email, sometimes by uploading to shared drive
Share useful objects with others
End

## User Task Matrix

This section prioritizes tasks from the 3 critical points of view: user, business and technology.

The sections in gray are the user types (as defined previously in this document). These help identify the priority of the users and this is used to adjust the priority of the tasks.

The matrix uses the following metrics to rate benefit to the users and business:

**User priorities** are primarily based upon need, perceived value, frequency, and motivation to use.

- **1**= high benefit
- **2**= medium benefit
- **3**= low benefit

**Business priorities** are primarily based upon the business objectives, sales, and/or cost-savings potential.

- **1**= must be “nailed” to achieve objectives
- **2**= should be in the product
- **3**= nice to have, but can wait

**Technical Feasibility** is based upon implementation risk and effort.
The tech feasibility metrics are reversed:

- **1**= low risk or effort
- **2**= medium risk or effort
- **3**= high risk or effort

| Function/Task | User Experience | Business | Tech. Feasibility | Overall |
|---|---|---|---|---|
| Researcher | 1 | 1 | | 2 |
| Find previous authors/users | 2 | 1 | 2 | 10 |
| Become aware of files, reports, artifacts | 1 | 1 | 3 | 10 |
| Determine relevancy of information | 1 | 1 | 3 | 10 |
| Collect artifacts in project “folder” | 3 | 2 | 1 | 12 |
| Contact relevant experts/authors | 2 | 3 | 1 | 12 |
| Search shared drives | 1 | 2 | 1 | 8 |
| Search local hard-drives | 1 | 2 | 3 | 12 |
| Search multiple intranets (cross firewalls) | 1 | 2 | 3 | 12 |
| Search email folders | 1 | 2 | 1 | 8 |
| Search the internet | 1 | 2 | 1 | 8 |
| Search pay sites and groups | 2 | 3 | 2 | 14 |
| Search hard copy libraries | 2 | 3 | 1 | 12 |
| Share useful artifacts with others | 2 | 1 | 2 | 10 |
| Keep some content private | 2 | 3 | 1 | 12 |
| Share some content locally (group/dept) | 3 | 2 | 1 | 12 |
| Compile selected data | 2 | 1 | 1 | 8 |
| Create working docs | 3 | 1 | 1 | 10 |
| Pass reports on to reviewers | 3 | 3 | 2 | 16 |
| Attend to Reviewer markups | 3 | 3 | 1 | 14 |
| Track revisions/versions | 3 | 1 | 1 | 10 |
| Search Across Org Boundaries | 1 | 1 | 3 | 10 |
| Reviewer | 2 | 2 | | 4 |
| Collect information sources | 2 | 1 | 2 | 20 |
| Review report for validity | 1 | 1 | 1 | 12 |
| Review/edit report format/language | 1 | 2 | 1 | 16 |
| Mark up report | 2 | 2 | 1 | 20 |

| Function/Task | User Experience | Business | Tech. Feasibility | Overall |
|---|---|---|---|---|
| Publish finished report | 3 | 3 | 1 | 28 |
| Facilitator | 2 | 1 | | 3 |
| Determine request priority | 3 | 3 | 1 | 21 |
| Assign task to appropriate team | 2 | 2 | 1 | 15 |
| Provide access to info sources | 1 | 3 | 3 | 21 |
| Track project status/progress | 3 | 2 | 2 | 21 |
| Raise awareness of info (existence) | 1 | 1 | 1 | 9 |
| Preserve the institutional memory | 1 | 1 | 2 | 12 |
| Improve team communication | 2 | 1 | 1 | 12 |
| Publish final report | 2 | 3 | 1 | 18 |

Select **Overall** column and then hit **F9** to auto-calculate rows.

## Matrix Results Summary

The priority matrix is intended to capture the priorities of the three main design factors – users, business, and development - and serves only as a guideline from which to drive the succeeding design directions. The following are some key points highlighted by the priority matrix that the end result should attempt to address:

- **Make searchers aware of all appropriate information –** Raising awareness is the one high priority goals that transcends all user roles. Combined with the fact that the users will not use a tool that requires the additional overhead inherent to a typical Knowledge Management tool, this further substantiates the conclusion that users don't need a knowledge management tool as much as they need a more robust search tool. This suggests that, unlike typical knowledge management tools, the search tool doesn't need to actually provide the report, file, or other artifact as much as it merely needs to make the artifact known to the users.
- **The who, as well as the what –** This is something that is almost as important as raising awareness. This is just as important to the researchers as it is to the facilitators since it represents the focus on institutional memory. Knowing who was involved with a particular report helps the researchers to get more information than might be provided in a report. It also helps the reviewer validate a report if they see a familiar name. This helps support institutional memory by helping new team members become aware of who the recognized experts are and their contributions to a topic, without having to actually know these experts.
- **Searching across boundaries –** This is as important for the researchers as it is the facilitators, but to different extents. Researchers want a single search source that is indifferent to any domains so that they only need to search once, and the tool will identify all appropriate information, regardless of where it is housed. Facilitators want a tool that can cross organizational boundaries. This suggests that the search tool doesn't necessarily have to find a specific artifact as much as it merely needs to make the existence of that artifact known.
- **To share or not to share –** Not all information is ready for prime time. Typically some artifacts are work in progress and users do not want them disseminated beyond their control. There are three levels of document maturity that match the extent to which someone is willing to share a document and the system needs to support those levels.

## Wireframes & Behaviors

This section provides a visual example of the design and describes any significant or unusual functionality or logic. All traditional functionality, such as how a checkbox works is assumed unless otherwise stated.

### Design Overview

This design is not the Knowledge Management tool that this project initially intended to provide. The research results clearly suggested that knowledge management should happen as a side effect of the users' normal activities, which were more aligned with search tasks. Therefore, this design proposes a more intelligent and integrated search tool that provides knowledge management functionality behind the scenes. Moreover, this project's timeline required a solution that could be implemented in a fairly short time, thus suggesting utilizing tools already available to the project.

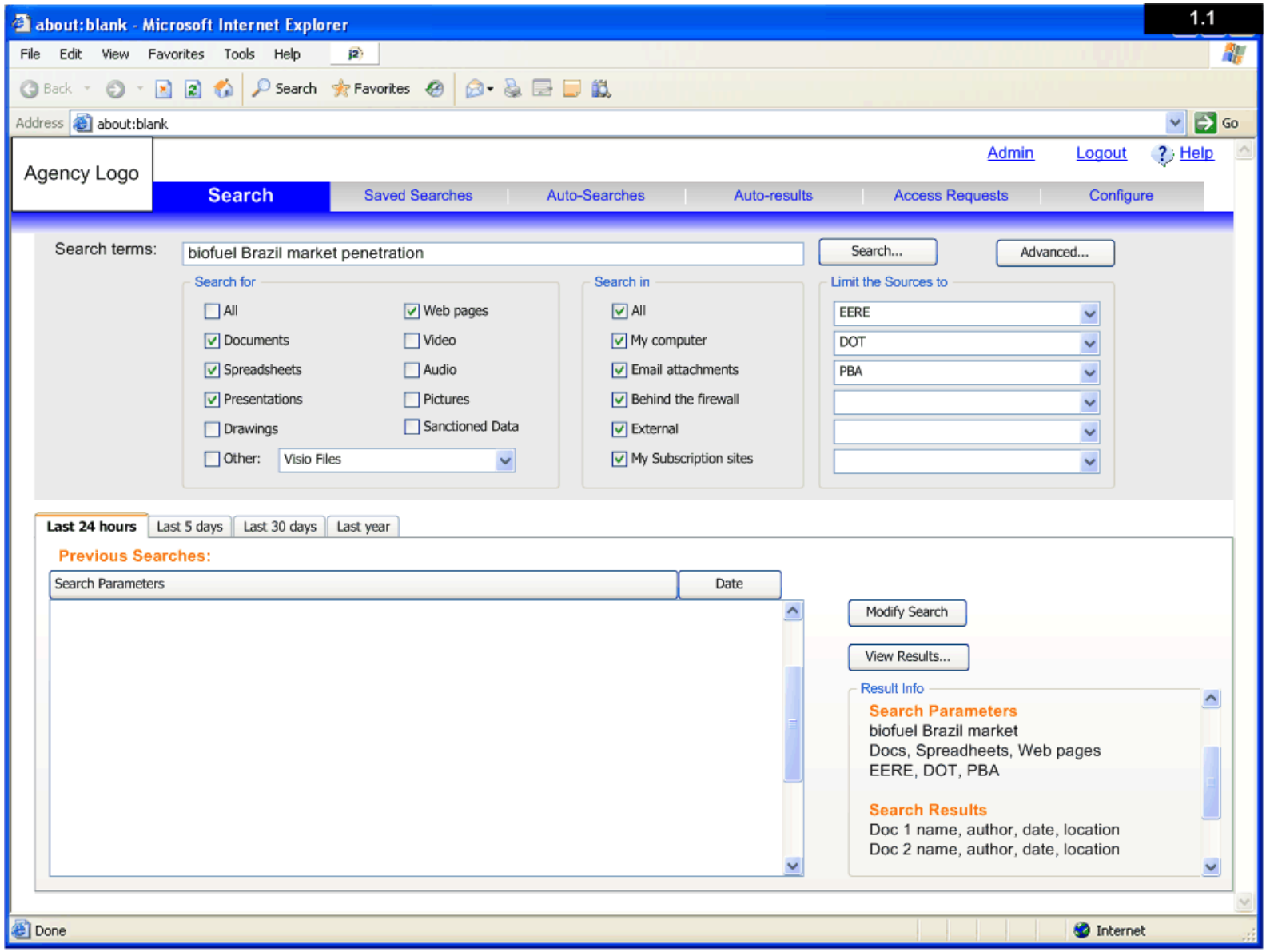
This design provides a search tool that searches the various repositories. This takes advantage of the users' familiarity with search tools and functionality, as well as the fact that ACME has very capable search tool in use already.

### Global Design Issues

Some design characteristics are pervasive throughout the design unless otherwise specifically noted on a page.

| Object | Behavior |
|---|---|
| **List Columns** | All list columns are sortable and sizable similar to Outlook email list columns. |
| **Pages** | Most pages occur in a single instance of the browser. |
| **Lists** | All lists support a progressive look up capability where the user can type in characters and the list goes to the first entry of the closest match. Therefore, typing T-H-E-R would cause the list to go to the first T, then the first TH, then the first THE, then the first THER. This differs from the way many other lists operate in that they would Go to the first T, then the first H, then the first E, then the first H. |

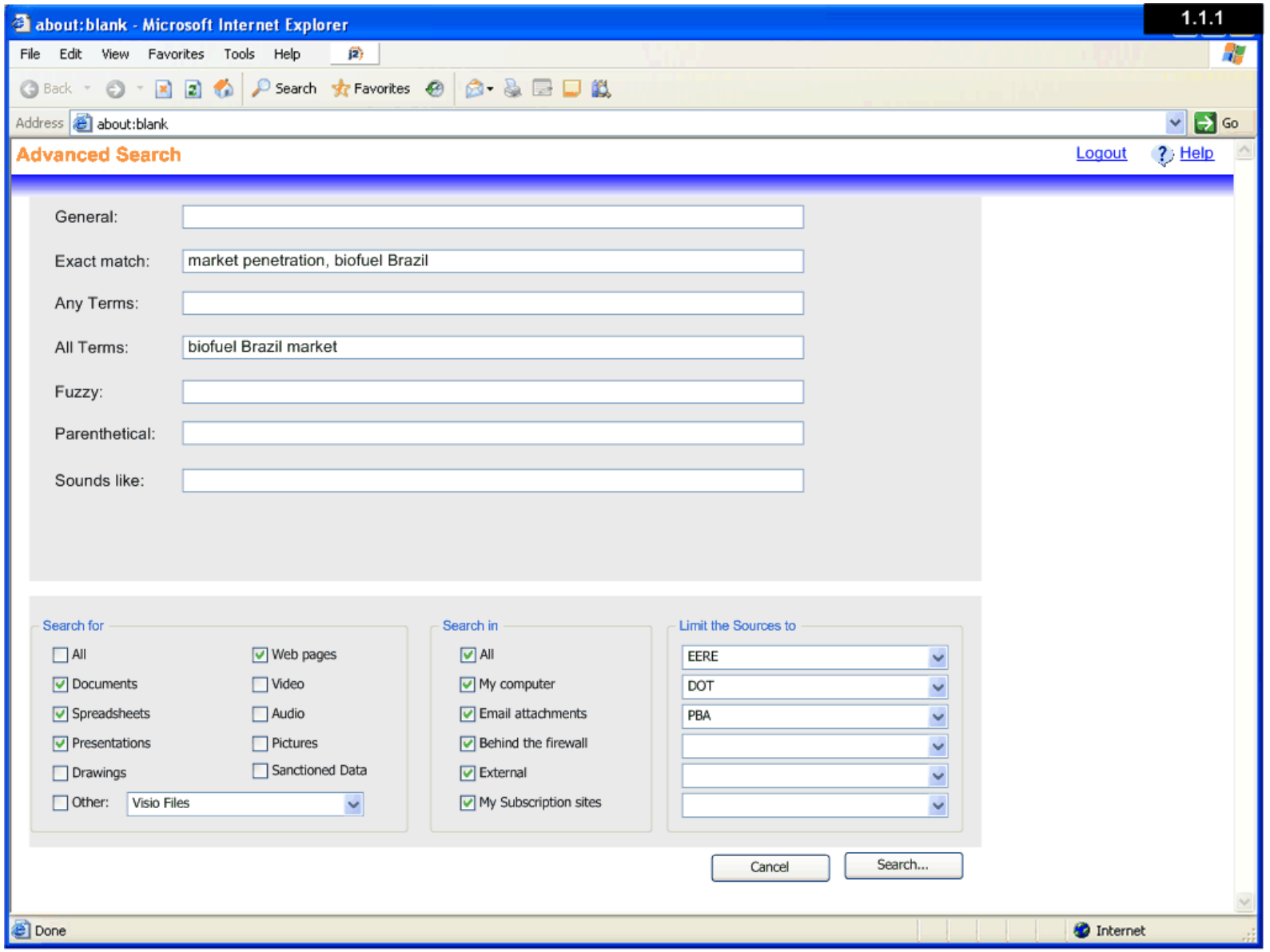
## 1.1 – Search


1.1
about:blank - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address about:blank
Go
Agency Logo
Admin Logout Help
Search
Saved Searches
Auto-Searches
Auto-results
Access Requests
Configure
Search terms:
biofuel Brazil market penetration
Search...
Advanced...
Search for
All
Web pages
Documents
Video
Spreadsheets
Audio
Presentations
Pictures
Drawings
Sanctioned Data
Other:
Visio Files
Search in
All
My computer
Email attachments
Behind the firewall
External
My Subscription sites
Limit the Sources to
EERE
DOT
PBA
Last 24 hours
Last 5 days
Last 30 days
Last year
Previous Searches:
Search Parameters
Date
Modify Search
View Results...
Result Info
Search Parameters
biofuel Brazil market
Docs, Spreadheets, Web pages
EERE, DOT, PBA
Search Results
Doc 1 name, author, date, location
Doc 2 name, author, date, location
Done
Internet

| Object | Behavior |
|---|---|
| **Comes from** | This is what they see after logging in. |
| **Search…** | The system begins a search of the entered keywords and search parameter selections. The results of the search appear in the search results page (1.1.2.1) |
| **Advanced…** | Opens the Advanced Search page (1.1.1) |
| **Modify Search** | Clicking on this button populates the search parameter selections with the selected previous search parameters, including keywords, checkbox, and dropdown selections. |
| **View Results…** | The system runs a search using the previous search parameters (unchanged) and opens the search results page (1.1.2.1) |
| **Result Info** | This area displays the details of the selected previous search. The details include the search parameters used and a list of the returned results. |
| **Previous Search tabs** | These tabs show the searches that were run within the stated time frames on the tabs. |
| **Search Parameters** | These are persistent across sessions. |

| Issues |
|---|
| How does the system Spider the various pay sites that team-members might belong to so that the system can return them as potential search results? |
| Users want to be able to highlight a section of an artifact, such as a word document, and use that to initiate a search. This is an example of a more refined query by example tool. |

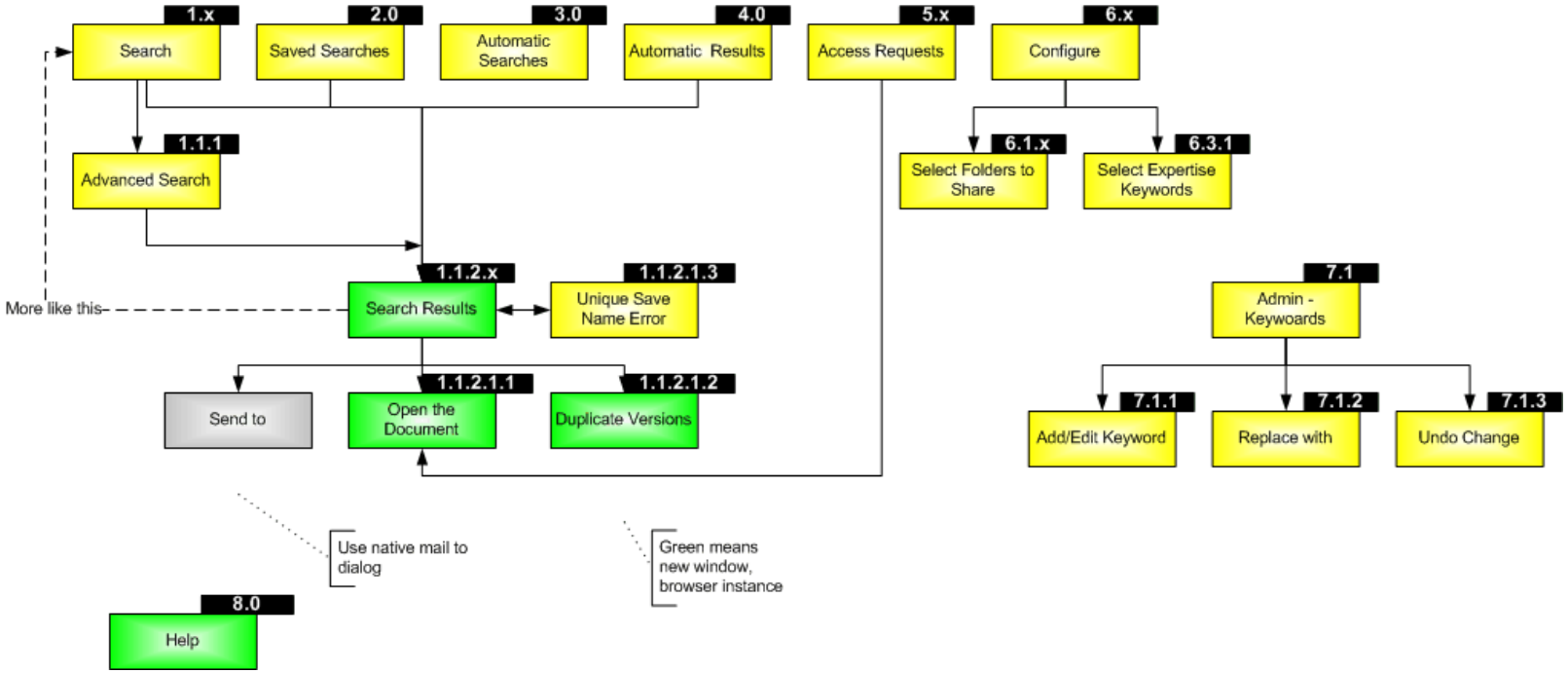
### 1.1.1 Advanced Search



| Object | Behavior |
|---|---|
| **Comes from** | Advanced Button on Search (1.1) |
| **General** | Carries over any selections previously made on Search (1.1). |
| **Search…** | The system begins a search of the entered keywords and search parameter selections. The results of the search appear in the search results page (1.1.2.1) |
| **Cancel** | Closes the browser. |

| Issues |
|---|
| What advanced selections are available? The interface needs to be updated with the options supported by the technology. |
| |

## Screen Map


1.x
Search
2.0
Saved Searches
3.0
Automatic Searches
4.0
Automatic Results
5.x
Access Requests
6.x
Configure
1.1.1
Advanced Search
6.1.x
Select Folders to Share
6.3.1
Select Expertise Keywords
More like this
1.1.2.x
Search Results
1.1.2.1.3
Unique Save Name Error
7.1
Admin - Keywoards
Send to
1.1.2.1.1
Open the Document
1.1.2.1.2
Duplicate Versions
7.1.1
Add/Edit Keyword
7.1.2
Replace with
7.1.3
Undo Change
Use native mail to dialog
Green means new window, browser instance
8.0
Help

## Issues

- Internet searches can suffer from a lag in indexing, where a search engine like Google may not crawl a given site for weeks or months. Can an intranet search engine stay reasonably up to date?
- When knowledge is changed (e.g. a document is updated with new data), what are the ripple effects? How important is it to track the interdependencies?