Fractal Conceptual Prototype: Content Spaces

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Abstract:
Fractal is a research project that seeks to develop on-demand content management as a service, specialising in helping users in different organisations to collaborate. This report describes part of our conceptual prototype, a working system developed to help clarify our vision and understand today's content management platforms. It demonstrates the key ideas of a multi-tenanted content management service that is extensible and allows rapid adoption and customisation. This report introduces the idea of Content Spaces, which are highly-customizable, collaborative workspaces in the cloud related to a particular team, task or topic.

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Fractal is a research project that seeks to develop an on-demand content management service that helps users in different organizations collaborate. This report and its accompanying video [1] present the idea of *content spaces*, which are customizable, collaborative workspaces within Fractal relating to a task, team or topic. In the report we describe an example scenario involving content spaces, and show a screencast of a conceptual prototype in the accompanying video.

Within Fractal, Content spaces provide tenants with distinct repositories, where each Content Space has its own set of users, roles, content and applications. Tenants using content spaces may be organizations, individuals or teams spanning organizations. Content Spaces are places to publish, share and collaborate, and their setup and customization is rapid and low-touch. Using a content space, users can manage collections of content securely and visualize them in different ways. Each content space can be completely customized by adding active behaviors [5] and other extensions that provide new features in the space. Active behaviors and Extensions are described in the following reports and videos in the series [4][5], while this report focuses on describing content spaces.

At the end of 2008 we constructed the conceptual prototype to visualize some of these ideas and identify the technical challenges ahead. This prototype helped clarify our vision and understand today's content management platforms. This is not a real, finished version of Fractal, but it demonstrates the use of content spaces to provide a multi-tenanted content management service that is extensible and allows rapid adoption and customization. The report and accompanying video [1] therefore make use of this prototype to present a scenario that demonstrates content spaces.
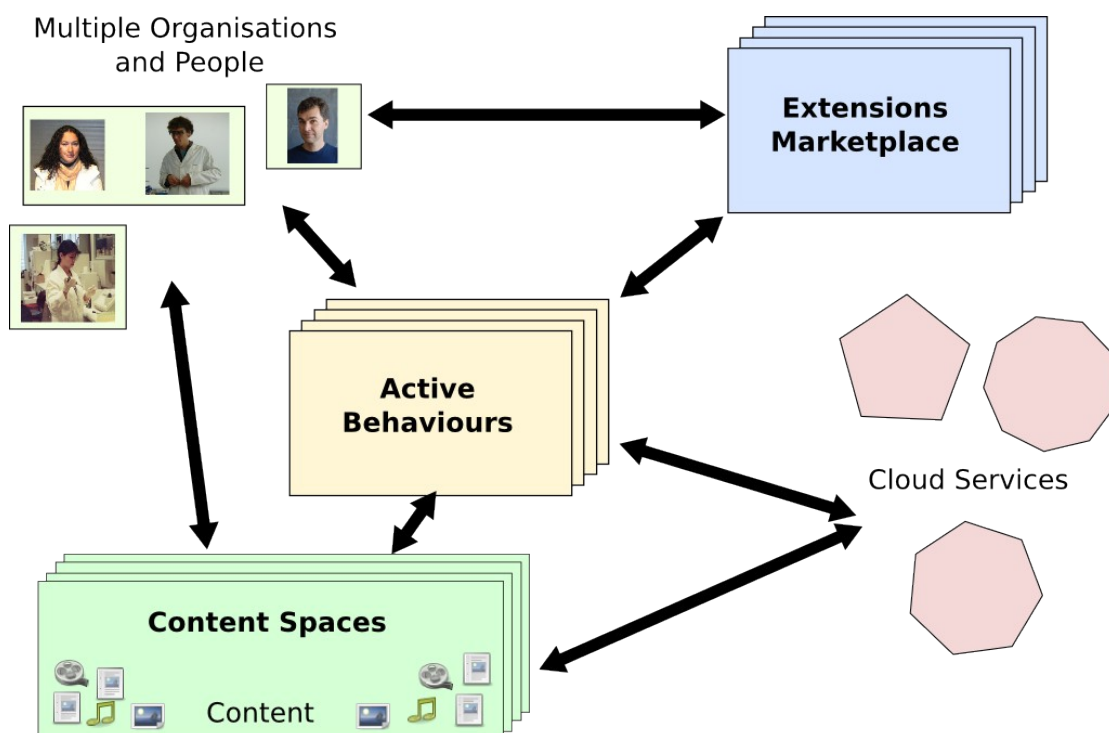

Figure 1: Core parts of Fractal and their relationships

Additional Materials

We created three videos that demonstrate the conceptual prototype, each focused around one core part of Fractal: Content Spaces (introduced in this report), *Active Behaviors* [5] and the *Extensions*

Marketplace [4]. The relationship between these parts is shown in figure 1.

In [2], we describe our experiences creating a conceptual prototype based around current technologies, and give reasons why cloud-based content management services require entirely new technologies.

The ideas we started to develop with this prototype helped us develop our vision for Fractal. This vision is described in more depth in [3].

The Dashboard

This report first considers a scenario where Phil, a Project Manager in a large pharmaceutical company is using a customized content space for collaboration with external organizations. The content space presents a 'dashboard' containing small applications called *dashlets* that present information relevant to Phil Bigg:

- 'My Profile' is a dashlet that presents personal information

- 'Documents I'm Editing' shows documents Phil is working on in other Content Spaces

- 'My Sites' lists all the Content Spaces that Phil actively uses and is a member of.

- The 'Molecular Biology Forum' dashlet shows information from outside Fractal.

In summary, the dashboard is a place to gather and present information in different ways, from various Fractal Content Spaces and external sources .

Phil has just become the manager of a new, large, collaborative research project involving two external organizations as well as his company, Big Pharma Corp. To collaborate, the organizations have to produce and share many documents, such as research papers or experimental results. Phil Bigg wants to use a Fractal Content Space as a place to manage and share these documents, so decides to create a new content space.

Creating new content spaces is a straightforward process: Phil clicks on 'create site' and enters some simple metadata, such as the project name, "UTS-alpha drug trial", which he uses as the content space name. Phil also decides to make the Content Space private, meaning that it is not shown in search results.

He can choose to create a particular type of content space using a template. In the prototype the only choice is 'collaboration site'. However, Content space templates tailored to particular domains, such as pharmaceutical companies, can be developed by end users and third parties like ISVs. Content Space templates are a good example of how Fractal is designed to be extended and customized.

The focal point of the UTS-alpha drug trial Content Space is the Dashboard. We again have dashlets showing information from different sources, such as 'Getting Started', 'Recently Modified Documents' and 'Site Profile'. 'Site Colleagues' will show other members of the Content Space when Phil's colleagues join up. 'Site Activities' will show activities from different applications in this Content Space.

We can also access different types of full-page *application* associated with this Content Space, such as a wiki, blogs, and a document library. The document library shows the documents that reside in this space, although it is empty at the moment because Phil has only just created the space.

Customising a Dashboard

After the simple creation of the new Content Space, Phil can also customize it very rapidly. A key aim of Fractal is to allow the end users themselves to adapt Content Spaces. 'Customize Site' allows Phil to alter the full page applications available in the UTS-Alpha Content Space, for example by

removing the calendar. 'Customize Dashboard' allows him to modify the layout of the dashboard. He can also add new dashlets such as an RSS news feed dashlet to display relevant news for the UTS-Alpha project.

Phil's modifications could in the future be used to create a Pharmaceutical Research Template including a specific set of dashlets and applications. Other projects can use this to make setup faster. Fractal will allow users to capture all customizations and make templates easy to create, share and sell. This will ensure that setting up a content space for a specific industry, project type or other need is a lightweight process.

Next Phil uploads some background material for the UTS-Alpha Trial Project. After it has been uploaded, the document appears with a thumbnail in the document library. The document library allows you to lock files for editing and see who else is editing documents and provides content management features such as versioning and permissions management. We can also see larger previews in context with comments and metadata. Back on the dashboard, the Recently Modified Documents dashlet will show the changes to the document library, as will Site Activities.

Inviting Members

Figure 2: Team members in our example scenario, the UTS-Alpha project

The diagram shows Phil's colleagues from the UTS-Alpha project. He wants to invite them to the Content Space. Fractal is hosted in the cloud, which means that even though these colleagues are not employees of Big Pharma Corp. - like Phil -, they can all access the UTS-Alpha Content Space.

Each user can be assigned a different role that determines whether they can add and modify content, customize the Content Space or invite other users. It is also possible to define new roles that might be more logical in a given context. New roles could be saved as part of a content space template.

The users that Phil wishes to add were already users of Fractal, so he can find them using search. He could also invite external users using their email addresses. In the future Fractal could make it easier to find colleagues by connecting to an LDAP server or social network.

The invitations are sent by email so that users receive them in a familiar way. Fractal will in future make it possible for users to choose how they receive notifications, allowing them to build Fractal into the way they want to work.

After accepting the invitations, the dashboard will show all the people Phil invited as members of the content space.

Summary

Content Spaces in Fractal's multi-tenanted platform can be collaborative like the UTS-alpha Content Space, or private like Phil's personal content space. They provide various applications and dashlets for viewing and interacting with content along with a content repository. As an end user, Phil is able to customize his Content Space by modifying the dashlets, applications, members and roles.

Fractal will allow users to create rich content space templates to reproduce specialized content spaces. External services such as LDAP and email could also be integrated with content spaces to make setup and management easier.

Finally, Fractal intends to provide APIs that allow external applications - as well as people - to rapidly set up and use Fractal Content Spaces. This will help integrate Fractal into enterprise applications and processes.

You may now like to look at our other reports and videos [1][4][5] showing the Extensions Marketplace, and Active Behaviors.

References

[1]   **Fractal Conceptual Prototype Videos : Content Spaces** (2008), accompanying materials of this report, http://www.hpl.hp.com/techreports/2009/HPL-2009-64-demo.swf

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[3]   John Erickson, Susan Spence, Michael Rhodes, David Banks, James Rutherford, Edwin Simpson, Guillaume Belrose, Russell Perry (2009), **Content-Centered Collaboration Spaces in the Cloud**: http://www.hpl.hp.com/techreports/2009/HPL-2009-11.pdf

[4]   Edwin Simpson, Guillaume Belrose, James Rutherford, (submitted March 2009), **Fractal Conceptual Prototype: the Extensions Marketplace,** HP Labs Technical Reports, http://www.hpl.hp.com/techreports/2009/HPL-2009-65.html

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