

## SMART CONTAINERS

### BACKGROUND OF THE INVENTION

[0001] Content is often thought about as being composed of multiple components that are related in some way—for example, a project can include business planning documents, marketing and product requirement documents, specifications, engineering schedules, cost estimates, etc.; a loan file typically includes an application, supporting documentation such as credit reports and financial statements provided by the applicant, appraisal documents, etc.; and an email may include one or more attachments. It is often desired to interact with or process these multiple components in a defined way, in a defined order, and by defined people. These interactions or processes are typically defined in software application code. This makes it difficult for individual businesses or people who are not programmers to create or modify their interactions or processes with the content components. It would be beneficial to provide a way to define interactions or processes that act on content and its multiple components that does not require creation or modification of application code.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0002] Various embodiments of the invention are disclosed in the following detailed description and the accompanying drawings.

[0003] FIG. 1 is a block diagram illustrating an embodiment of a content management system.

[0004] FIG. 2 is a block diagram illustrating an embodiment of a smart container.

[0005] FIG. 3 is a flow diagram illustrating an embodiment of a process for enabling a smart container.

[0006] FIG. 4 is a flow diagram illustrating an embodiment of a process for designing a smart container template.

[0007] FIG. 5 is a flow diagram illustrating an embodiment of a process for defining membership.

[0008] FIG. 6 is a flow diagram illustrating an embodiment of a process for defining structure.

[0009] FIG. 7 is a flow diagram illustrating an embodiment of a process for defining policies.

[0010] FIG. 8 is a flow diagram illustrating an embodiment of a process for defining roles.

[0011] FIG. 9 is a flow diagram illustrating an embodiment of a process for instantiating a smart container using a smart container template or other instance as a source.

[0012] FIG. 10 is a flow diagram illustrating an embodiment of a process for applying a smart container policy during runtime.

### DETAILED DESCRIPTION

[0013] The invention can be implemented in numerous ways, including as a process, an apparatus, a system, a composition of matter, a computer readable medium such as a computer readable storage medium or a computer network wherein program instructions are sent over optical or electronic communication links. In this specification, these implementations, or any other form that the invention may

take, may be referred to as techniques. A component such as a processor or a memory described as being configured to perform a task includes both a general component that is temporarily configured to perform the task at a given time or a specific component that is manufactured to perform the task. In general, the order of the steps of disclosed processes may be altered within the scope of the invention.

[0014] A detailed description of one or more embodiments of the invention is provided below along with accompanying figures that illustrate the principles of the invention. The invention is described in connection with such embodiments, but the invention is not limited to any embodiment. The scope of the invention is limited only by the claims and the invention encompasses numerous alternatives, modifications and equivalents. Numerous specific details are set forth in the following description in order to provide a thorough understanding of the invention. These details are provided for the purpose of example and the invention may be practiced according to the claims without some or all of these specific details. For the purpose of clarity, technical material that is known in the technical fields related to the invention has not been described in detail so that the invention is not unnecessarily obscured.

[0015] Enabling related content to be created, managed, processed, and used in a desired way, without writing or modifying application code, is disclosed. In one embodiment, a “smart container” template represents a model that defines one or more of the following: how items, such as items of managed content, become “members” of a composite object of a type with which the template is associated; how items comprising the composite object are related to one another; zero or more policies applicable to all or a defined subset of the items comprising the composite object; data indicating how data comprising the composite object is to be viewed or displayed, e.g., depending on context data such as the identity, role, etc. of a user to whom the content is being displayed; and zero or more operations to be performed with respect to content comprising the composite object. A smart container is instantiated using the smart container template. In some embodiments, the smart container is instantiated as a runtime object that implements the membership rules, structural relationships, policies, presentation rules, and operations, as and when applicable, defined by the template. For example, in some embodiments a defined policy is applied. In various embodiments, the policy is applied to managed content associated with the smart container or requested to be associated with the smart container. In some embodiments, smart containers define in a flexible manner objects, a structure for the objects, and policies associated with the objects and the relationships between the objects. In some embodiments, a smart container has a composite object such as a manual for an airplane that includes a corresponding specification for each of the following: the engines, the navigation system, the control systems, the fuel system, etc. In some embodiments, smart containers provide the ability to configure a composite object as a folder hierarchy. For example, a smart container can be used to implement a records management file plan in which a cabinet/folder/object hierarchy where the top-level is a cabinet containing a number of folders, the folders contain files, and the files contain records. In some embodiments, smart containers provide the ability to configure a composite object as a virtual document structure including the following features: 1) ordered members, 2) hierarchical