To: Distribution

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Subject: Resource Reservation Facility

Introduction

   This document provides an overview of a proposed Resource
Reservation Facility. It is an attempt to describe the
Reservation Facility in its ultimate form, and does not address
either the questions of implementation detail or interim partial
implementation of the Reservation Facility needed to satisfy
product calendar requirements.

Scope

   The Resource Reservation Facility provides a method for
users to reserve any resources which may be registered on the
system (see MTB-350).

   The following features are provided:

1) Immediate reservation of resources.
2) Future reservation of resources.
3) Automatic reservation of implied resources.
4) Proxy reservation of resources.
5) Pre-emption of reserved resources.
6) Reservation accounting information.

Reservation

   A reservation of a resource is a request to use that
resource for a certain period of real time. By granting a
reservation to a user the system is essentially promising the
user that a certain state of the system will hold in the future
(i.e. a tape drive will be available from 1:00 pm until 3:00 pm
today). Since the system cannot know the future, this promise is

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not a guarantee and functions will be provided to handle unforseen events (see __Pre-emption of Reserved Resources__). Reservation is an indivisible operation, so that if more than one resource is specified in a request all of the conditions for all of the resources must be fulfilled for the reservation to be granted.

Immediate Reservation

A reservation may be made to take effect immediately and last for a specifiable period of time. This will probably be the most common mode of use of the Resource Reservation Facility. For instance, if the assign_resource command is invoked with no prior explicit reservation of the resource, an implicit immediate reservation of the resource will be made for a site specifiable default period of time. Also, the absentee manager may make an explicit immediate reservation of the resources needed by an absentee job (see __Proxy Reservation__) before the job is started if no explicit reservation has been made.

Notice that an immediate reservation may be made either implicitly or explicitly.

Future Reservation

A reservation may be made to take effect at some future time and last for a specifiable period of time. The future reservation must be made explicitly by calls to the Reservation Facility. If an absentee job is entered that is to start at some future time the enter absentee request may be capable of making an explicit future reservation of the necessary resources for the job, to take effect when the job is scheduled to start.

Automatic Reservation of Implied Resources

The Reservation Facility will have the capability to automatically reserve any devices which may be implied (see MTB-350) by a given volume when that volume is reserved. For example, a 9-track 6250 bpi tape volume may imply the need for a 9-track tape drive capable of 6250 bpi, so that reservation of the tape volume will automatically reserve the tape drive.

The use of this feature will be controllable by the user.

Proxy Reservation

It will be possible for one user to reserve resources for
another user or group of users. This capability may be used by
the absentee manager to reserve resources on behalf of an
absentee job prior to starting it for execution. It may also be
useful for an administrator or operator to make proxy
reservations for resources needed by various daemons (i.e.
backup, reload, etc.).

Normally, proxy reservations will be charged to the user
making the reservation. The capability will exist for privileged
proxy reservations to be charged to the user on whose behalf the
reservation is made.

Pre-emption of Reservations

The capability will exist for privileged processes to
pre-emptively cancel reservations made by other processes.
Normally, reservation of a resource promises a process use of
that resource for the period of the reservation. If a process is
still using a resource when its reservation ends it will be
allowed to continue using the resource until another process with
a reservation (immediate or future) requires the resource. At
this time the first process will lose the resource.

Accounting Facilities

The Resource Reservation Facility will be able to supply
accounting information concerning all events which could
potentially be viewed by a site as auditable or billable. For
instance, when a reservation is granted, who made the
reservation, when a reservation is cancelled, if a reservation is
pre-empted, etc. Auditing and security information would be
logged using current facilities. Accounting information would be
transmitted to the Initializer as each billable event occurs, via
the IPC mechanism. The Initializer will charge for these events
according to site defined parameters.