# Requirements

Provide a means to develop a crew list for tasks to be performed. This should take the following into consideration

1. Jobs are defined as requiring zero or more certifications to be performed
2. Tasks are instances of a job that has a specific start and stop time.
3. Tasks have specific start and stop times
4. Tasks require
5. Certifications require a certain set of training to occur
6. Training can expire and will have to be taken when before expiration to keep certifications current
7. A certification is only good until training with the earliest expiration date expires
8. People are available for assignment from a specific start date until an either specified or unspecified end date. An end date is provided end the person is no longer available for assignment.
9. People can take either planned or unplanned leave. Sick time is entered with a start date when the period gets sick and an indefinite end date. The sick leave is updated with an end date when the period returns to work.
10. A leave has specific start and stop dates (except in the case of sick leave). Leave may be things like vacation or TDY.
11. A person is a candidate for tasking only if that person is available during the tasking period, all required certifications are valid until the end of the task, that person is not working on a task whose time overlaps the candidate task, and not on leave during any part of the task period. A leave with an indefinite end date is consider in effect from the start date until forever.
12. A crew rest period is defined as the length of time from the latest task that a person was assigned to the start date of the candidate task that they could be assigned to.
13. People with the longest rest times have the highest priority for assignment.
14. After an assignment has been made to a group of people, substitutions can be made from the list of qualified people. Substitutions can happen for several reasons:
    1. A person calls in sick. In this case, the sick period should be entered as a leave with an indefinite end date until the person returns to work.
    2. A person requests not to be assigned to the task and the request is honored.
15. The supervisor will plan a new task by defining its job and start and stop dates. The system will present a list of qualified candidates ordered by decreasing rest time. The supervisor will then select the crew members for the task.
16. When a crew member calls in sick, the supervisor enters the start of the sick time and will check if that member is assigned any tasks that may be affected by the crew member’s absence. If necessary, the supervisor will select another qualified member for each task affected.
17. When a crew member returns from sick leave, the supervisor will enter the return-to-work date.
18. Crew members will check their assignments to tasks and accept the assignment.
19. After the task has been worked, the crew member will confirm that the task has been completed.
20. After a task has been completed, the supervisor will review its completion and crew assignment. If any substitutions were made that have not been recorded, they will be entered. Offline, the supervisor will review and tasks assignment confirmations or task completion indicators that were not entered with crew members. Those not entered correctly will be entered by the crew member.
21. There are two roles for use of this system. A supervisor role and a crew member role.
22. Different organizations will have different jobs, people, and supervisors. Training and certifications may be common across organizations.

# Database

TODO: For now, this database is designed to work with a single organization. Training and certification records will have to be duplicated between organizations in their own database. People will transfer by entering a leave with an indefinite end in one database and added to the new database. Their training and certifications will have to be re-entered.



## Primary Records

### Organization

A list of organizations. Organizations have jobs to do and people to do them.

### Person

A list of people in the organization

### Job

This define the list of jobs that can be worked by people in the organization. They are uniquely identified by their names.

### Role

A list of roles assigned to one or more jobs. Roles require unexpired certifications.

### Task

There are zero or more tasks for a given job. Each task has a start and stop time. Tasks employee people for roles if those people are qualified, available, and selected.

### Certification

A list of certifications that are required for one or more roles in one or more jobs. A pseudo certification record should be constructed for any training to is not part of a certification.

### Training

A list of all the training requirements for all the certifications. A training requirement may not lead to a certification, in which case a pseudo-certification record should be in place

### Leaves

A list of leaves that people can take, either planned or unplanned

## Link Records

These records implement the many-to-many relationships between the primary records. Each has the foreign key of the primary records that are related to it.

### PersonCertification

The list of certifications that a person has with their expiration dates

### PersonTraining

The list of training that a person has with their expiration dates

# Transactions

Any update to the DB is recorded when the user makes a change. These recordings can be reviewed to understand how the DB contents was assembled.

## User authorization and Identification

Users are either supervisors or workers. Each belongs to a single organization. Supervisors can management updates all records and relationships. Workers can view their task assignment, training, certification, and leave.

### Add, delete, modify organization supervisors and workers (administrator)

## Primary Record Maintenance

These transactions build up the primary records which define the organizations, jobs, roles, people, leaves, trainings, and certifications.

### Add, delete, modify Organization

Delete will cause a cascade of deletion through jobs, roles, people, and tasks along with their associated links. A delete is not allowed if there are any people assigned to the organization.

### Add, delete, modify Job

Add requires the identification of the organization.

Delete will delete associated tasks. Some roles may be left without links to any jobs. This can be cleaned up by deleting the associated Role record.

### Add, delete, modify Role

Add requires the identification of the organization. Certifications and Jobs may be associated with a role either during add or modify. Changes in these relationships do not affect any past task requirements. A warning will be displayed if a future task is affected by certification or role assignments.

Delete is only allowed if the role has not been used in any task. This may leave certifications without any roles assigned. This can be cleaned up by deleting the certifications with no roles assigned.

### Add, delete, modify Certification

Training may be associated with certification during add or modify

Delete is only allowed if it associated roles are not used in any tasks. If deleted, this may leave roles without any certifications. This can be cleaned up by deleting roles with tasks or jobs assigned.

Deletion also affects Person-Certification and should not be allowed if a person has or has had this certification

### Add delete, modify trainings

Delete is only allowed if no certification or person is associated with it.

### Add, delete, modify people

Add requires the organization to be identified

The organization can be changed with modify. This will not affect any previously assigned tasks in another organization.

Delete is only allowed if the person is not assigned to any task. To make a person unavailable for assignment, place them on permanent leave.

### Add, modify, delete leave

Add requires that a person be identify. Leave type may be temporary or permanent, start date is required but end date is not if the end date is not known.

Deletion of a leave may occur at any time; however, it will not affect any tasks assignments. A warning will indicate if the person is assigned to a task during the leave.

## Person, Training, and Certification Relationships

The training and certifications transactions a selectable from a person detail display.

The principal applied here is that roles require zero or more certifications and certifications require zero or more trainings. The certification expiration date must be the same or earlier than the earliest training expiration date.

All training must be associated with at least one certification. A pseudo certification record should be constructed if a training leads to no certification. This is a user responsibility when training records are created.

A certification that has no associated training may have a non-null expiration date depending on the circumstances.

Since one or more trainings lead to a certification, the expiration date of a certification is the same or earlier than earliest of the certification-required training. If there are no associated training records, in which case the certification’s expiration data may or may not be null.

Person-Training records are created once for each person/training pair. When a person takes a training class, the expiration is updated.

Whenever a person-training record is added or modified, the associated person-certification expiration date(s) will be update to the earliest person-training expiration date.

Whenever a person-certification record is added or modified, the expiration date will be checked to be earlier or the same as the associated training-person expiration dates. The certification can only be set to active if all training required for the certification has been completed (person-training records exist that correspond to the training->certification relationship).

## Task Maintenance

These transactions build up the relationships between the primary records

### Roles for a job

#### Add a role to a job.

Check future tasks for this job to identify any roles that do not have a person assigned as an alert.

#### Remove a role from a job

Will not affect past tasks, but future tasks will notify that assigned to that role will be removed

### Trainings for a Certification

#### Add a training to a certification

#### Remove a training from a certification

This will affect the certifications dates in the people-certification records

### Certifications for a role

#### Add a certification requirement to a role

The existing future people assignments to tasks must be reviewed to see if the people still qualify for the task’s job.

#### Remove a certification requirement from a role

This may allow more people to be qualified for roles on future jobs.

## Personnel Transactions

### Person is taking planned leave with known start and end date (leave will include training periods as well)

May cause the person to not be available for the task. Need to take care of this before the leave is added.

### Person is taking leave with no known end date

Sick leave does not have and end date.

### Person is moved from one organization to another

Warn if the person is assigned to a future tasks within the leaving organization

### Person takes training class

This may change the certification dates for the person to the earliest of the remain training requirements for the certification

### Person returns from leave with no known end date

Person may qualify for existing future tasks and could be substituted into those tasks

### Peron’s leave dates need to be modified

Start and end date can be modified. This may make a person available for unassign tasks or unavailable for assigned tasks.

### Person’s leave is deleted

this will not result in any other DB changes but will may qualify the person for an existing task in the future – this could be identified during deletion.

### List all leaves for a person (start date filter)

Could list all leaves for all people in an organization (calendar display?)

### Person leaves all defined organizations

Add leave record with no end date

### Notify person of approaching training needs

Given a look ahead date, list all trainings and certifications that will expire before that date. Could be a single person or all people in an organization

### Provide status of all trainings and certifications for all people in an organization

### List all tasks/roles assigned to a person (start date filter)

## Task transaction

### Add task to a job

### Delete a task from a job

Remove associates People-Tasks records

### Modify a task

requires revalidation that the people assigned to the tasks are still qualified

### Assign people to a role of task

Given the task, construct a list of people who are qualified for each role and available for a task. Order the list in decreasing rest time order. From this list, the operator will assign people to the task and roles.

### Substitute a person assign to a task

Given the display of the people assigned to a task (and any violation flags), list other people qualified for the task/roles and allow a person to be removed and another assign in that slot.

This may be done more than once.

### Provide the tasks for a job (with filtering on start date)

### Display a task and the people assigned to the roles of the task

Given a selected task, list the people and their roles for that task. Flag any people assigned are either not available or not qualified.

# Client Server Design

## Server handles all transactions to the database for all clients and logs activity

## Clients issue database updates and queries, provide user interface