Schedule25 Optimizer User Guide

About this document

This document contains all the information you need to understand and successfully use the Schedule25® Optimizer (hereafter referred to as "the Optimizer") to automate class and event location placement.

Document overview

This document provides both conceptual information to thoroughly acquaint you with how the Optimizer processes information so you have the knowledge necessary to most effectively use it and procedural information to teach you how to use the Optimizer.

Before you use this document

This document assumes you have already done the following:

- Prepared your Series25® data, including entering data specifically required to use the Optimizer
- Set up your Series25 functional security, object security, and assignment policies
- Implemented the Series25 LYNX Interface, if you licensed it

If this is not the case or you would like further information about these topics, see the following documents:

25Live Administration Utility documents

- *Data Administration Guide*
- *Security Administration Guide*

These documents are accessible by clicking Help from the 25Live Administration Utility.

LYNX Interface document

- *Implementing and Using the LYNX Interface*

This document is accessible from the Interface Documentation page of Series25 Customer Resources:

http://knowledge25.collegenet.com/display/CustomerResources/Series25+Interface+Documentation

Who should use this document

This document should be used by academic and event schedulers responsible for running the Optimizer and analyzing and using its run results.

What's in the document

This table summarizes the contents of each section of the document.

This section...	***Explains...***
Event Placement Using the Optimizer	The Optimizer class placement process.
How the Optimizer Uses Location Data	The location data the Optimizer uses location data in its processing.
How the Optimizer Uses Event Data	The event data the Optimizer uses in its processing.
Optimizer Default Processing Settings	Default Optimizer processing settings. How to enter default processing settings.
Optimizer Processing	How the Optimizer "thinks"—how it processes location requests and pre-assignments.
Optimizer Results and Run Report	Run results and report.
Preparing to Run the Optimizer	How to prepare for an Optimizer run.
Running the Optimizer	How to run the Optimizer.
Acting on Optimizer Run Results	How to analyze run results and act on them.
Appendix A: Optimizer Functional Security Requirements	The functional security required to set up data for the Optimizer and to use the Optimizer.

Appendix B: Binding Back-to-Back Events	How to bind back-to-back events.

Terminology conventions

For purposes of this document:

- The term ***event*** refers to any activity scheduled and/or managed in 25Live, including classes, exams, special events, and so on.
- The term ***location*** refers to any room or other facility that could be assigned to an event.
- The term ***organization*** refers to any academic department, campus organization, or off-campus group or agency that requests, schedules, and/or sponsors events.

Event Placement Using the Optimizer

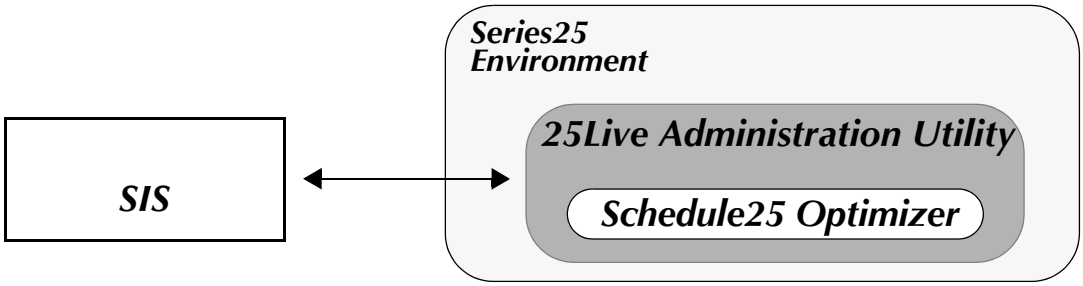
The Optimizer process

Process Overview

An Optimizer ***run*** is a bulk event placement process in which the input data is defined prior to execution. The Optimizer is most commonly used to place classes that have come into the Series25 environment from your SIS via the Series25 LYNX Interface, but can also be used to place events created in 25Live as needed. The entire Optimizer location placement process is controlled from the 25Live Administration Utility.

An Optimizer run works like this:

1. You provide the Optimizer the location and event data you want it to use in its placement processing based on location and event searches.
2. The Optimizer processes the data and generates optimized class placements based on your input data.
3. You analyze the results of the placement run.
   - If you're satisfied with the run, you accept some or all of the placements as location assignments.
   - If you're not satisfied, you modify input data and rerun the Optimizer.
4. You manually assign locations to events the Optimizer wasn't able to place, and to events whose placements you didn't accept.



Optimizer processing

The Optimizer reads the input data that describes your locations and events, builds a model of this configuration in memory, and then quickly decides where the events should be placed.

The Optimizer algorithm has three objectives when placing events:

- To maximize the number of placements
- To maximize organizational satisfaction with placements
- To maximize space utilization

The algorithm and location placement process are described in *Optimizer Processing*.

Optimizer results

After executing the placement algorithm, the results of the Optimizer run are immediately available for review.

For more information about Optimizer results, see *Optimizer Results and Run Report.*

A typical event placement/assignment process

While we recognize that your campus has its own unique event location assignment process and policies, this section describes the way in which the Optimizer typically fits into that process. For complete instructions and recommendations for performing each step, see *Preparing to Run the Optimizer*, *Running the Optimizer*," and *Acting on Optimizer Run Results*.

The steps listed below and the diagram, *Typical Event Placement/Assignment Process*, describe what you do to use the Optimizer:

In 25Live Pro

1. Create, run, and save the location and event searches that will yield the data you want the Optimizer to process.

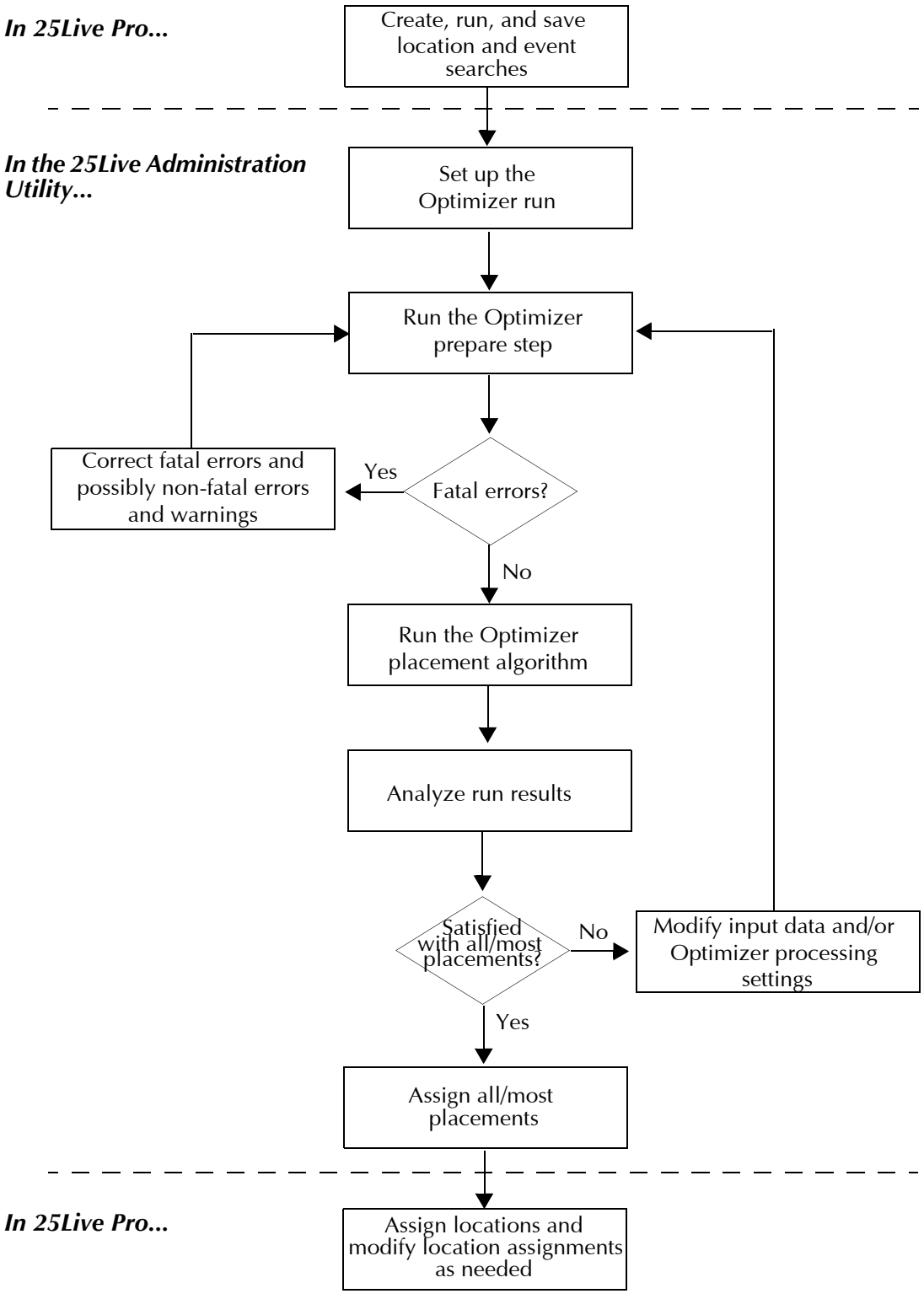
In the 25Live Administration Utility

2. Set up the Optimizer run.
3. Run the Optimizer prepare step.
4. If any fatal errors are discovered during the prepare step, correct them (and possibly non-fatal errors and warnings as well), and re-run the prepare step.
5. Run the Optimizer placement algorithm.
6. Analyze run results.
7. Assign all or a portion of the placements made by the Optimizer.
8. If you didn't accept most or all of the placements, modify input data and/or Optimizer processing settings and repeat steps 2 - 7 until you achieve the placement results you want.

In 25Live Pro

9. Manually assign locations and modify location assignments as needed.

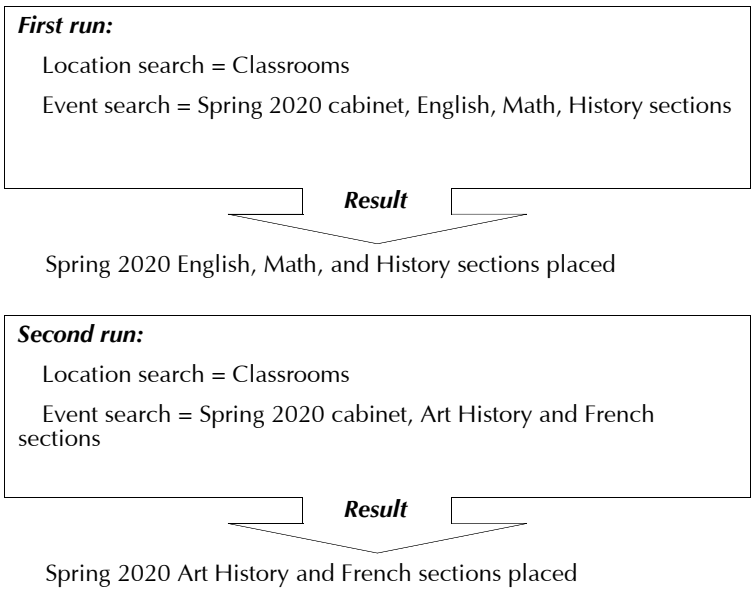
Typical Event Placement/Assignment Process



Searches give you event placement control

Because you use location and event searches to precisely define the data you want the Optimizer to process for each run, you have complete control over the content and order of the event placement process.

If, for example, you want to place academic sections sponsored by some departments before you place academic sections sponsored by other departments, you can run the Optimizer for your first group of departments, then run it again for your second group of departments, as shown in this example:



How the Optimizer Uses Location Data

The Optimizer uses the following location data as input for its event placement processing:

- Locations you've selected using a 25Live Pro location search, including each location's hours of availability (open/close times) and blackout periods
- The features of the selected locations that have been marked for use by the Optimizer
- The campus partitions of the selected locations

See *Preparing to Run the Optimizer* for information about creating and saving location searches.

How the Optimizer uses locations

During Series25 data preparation, your implementation team used the 25Live Administration Utility to create locations that could be assigned to classes and events, and specified each location's hours of availability, and possibly dates/times each location is unavailable for assignment, known as "blackout dates."

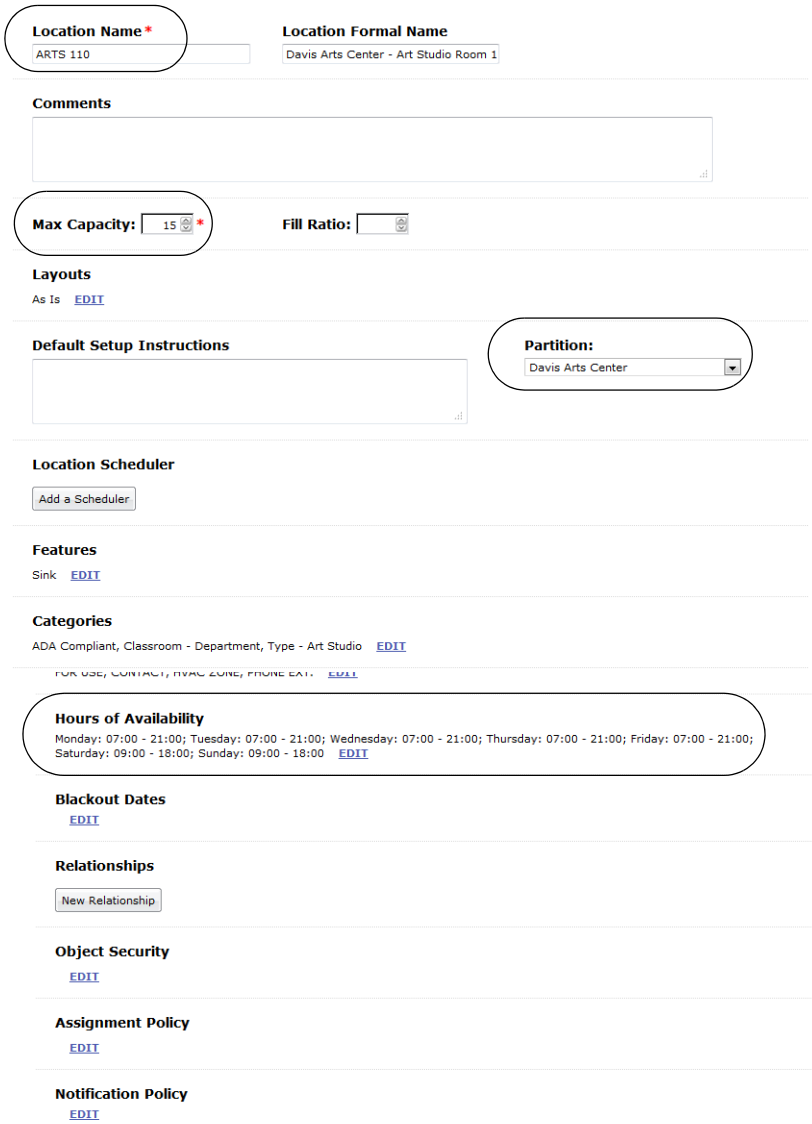
Location information used by the Optimizer

The Optimizer uses only a subset of the information from each location. For Optimizer processing, locations must contain data in each of the required fields listed below, and may contain data in each of the optional fields.

This location data...	***Is used by the Optimizer to...***
Location Name (required)	Identify the location.
Max Capacity (required)	Determine the maximum event head count that can be accommodated by the location.
Partition (required)	Determine the campus partition the location is in.
Hours of Availability (required)	Determine when events can be placed in the location.
Blackout Dates (optional)	Determine dates/times when events can't be placed in the location.
Features (optional)	Identify the physical attributes of the location.

This location data...	*Is used by the Optimizer to...*
Default Layout Capacity (optional)	Determine the event head count that can be accommodated by the location's default layout. If a default layout is specified for a location, the Optimizer uses the default layout's capacity during processing. If no default layout is specified, the Optimizer uses the location's maximum capacity.
Fill Ratio (optional)	Limit placement to only those events whose expected or registered head count meets or exceeds this seat fill percentage.

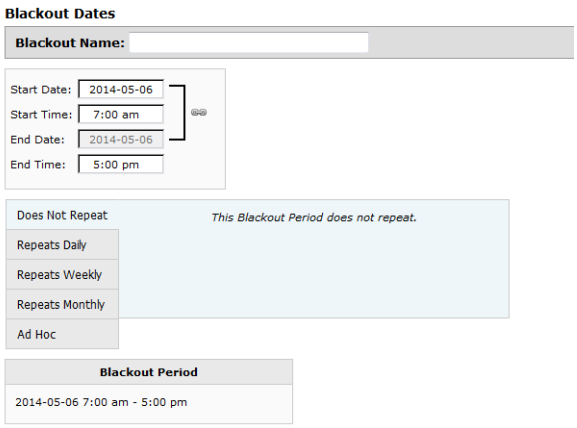
Location with required information used by the Optimizer circled



Location blackout dates

The Optimizer also uses any blackout dates that have been defined for a location. Defining blackout dates for a location prevents the Optimizer from placing an event in the location during dates/times the location is unavailable, such as when it is closed for repairs.

Blackout example

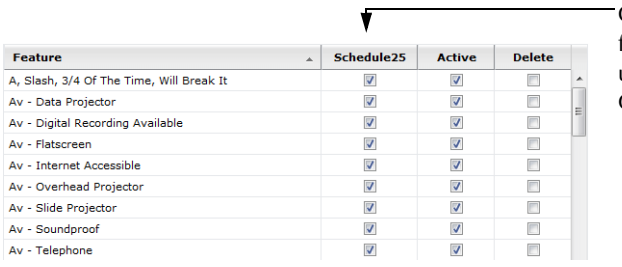


How the Optimizer uses location features

Location Features master definition

The Location Features master definition specifies all the physical attributes present in Series25-defined locations at your school, and which are also used by the Optimizer. This list was created by your implementation team as part of preparing Series25 data.

Location Features master definition



How the Optimizer uses location features

The Optimizer uses the Schedule25-designated features of the locations in your location search results to limit its location search to those locations having the specific features required by individual events, if any.

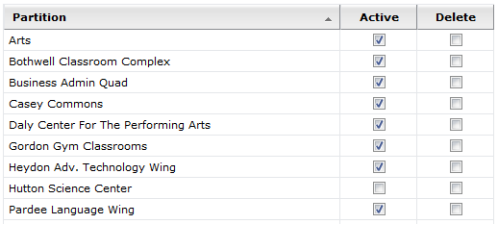
How the Optimizer uses location partitions

Location Partitions master definition

The Location Partitions master definition specifies mutually-exclusive location groupings—a location can be in only one partition. Like the Location Features master definition, this list was created by your implementation team as part of preparing Series25 data.

Typically, partitions correspond to areas of campus—buildings, floors of buildings, or location types (for example, large lecture halls)—that may be preferred by organizations. They provide "geo-political" divisions of space on your campus.

Location Partitions master definition



Partition	Active	Delete
Arts	☑	☐
Bothwell Classroom Complex	☑	☐
Business Admin Quad	☑	☐
Casey Commons	☑	☐
Daly Center For The Performing Arts	☑	☐
Gordon Gym Classrooms	☑	☐
Heydon Adv. Technology Wing	☑	☐
Hutton Science Center	☐	☐
Pardee Language Wing	☑	☐

How the Optimizer uses location partitions

The Optimizer uses the partitions of locations in your location search results to focus its location search on the specific campus areas and location types preferred by organizations. Each partition is simply a grouping of locations that define one of these possible placement preferences.

Placement Hierarchy

When the Optimizer algorithm is determining the best possible placement for an event, it may encounter multiple partition and/or location preferences that originate from various parts of your SIS and Series25. The algorithm uses the criteria below, in this order, to determine which of the available locations is best suited for the event:

1. An individual location preference defined on the meeting pattern
2. A partition preference defined on the meeting pattern
3. The primary organization's first choice partition preferences
4. The primary organization's second choice partition preferences
5. The primary organization's third choice partition preferences
6. The primary organization's fourth choice partition preferences

If none of the above have been defined, the Optimizer chooses any location from the run's location search, based solely on feature requirements and utilization.

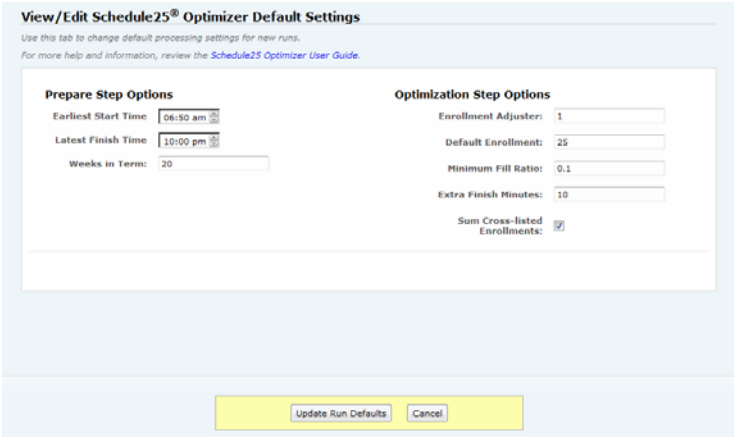
If you have feature requirements associated with an event's meeting pattern in your SIS, the Optimizer tries to place the event in a location with those features and, if it can't find such a location, does not place the event. Because feature requirements are absolute, they represent the foundation of this hierarchy and are critical in determining which available locations the Optimizer considers before it uses the placement hierarchy shown above.

Optimizer Default Processing Settings

The Optimizer Default Settings page

Description of page

The View/Edit Schedule25 Optimizer Default Settings page of the 25Live Administration Utility is used to define default settings used to control Optimizer processing, such as the minimum percentage of seats in a location that must be filled by any Optimizer placement and how the Optimizer should treat the enrollments of events in binding space assignment relationship groups. The page lists those settings that influence the Prepare step of a run and those settings that influence the Optimization step of a run.



Note: *These settings are used as defaults for any Optimizer run.* When you set up a run, you have the option of defining more processing settings and/or modifying these settings for that run only.

Prepare step settings

You can define any of these default Prepare step processing settings:

This setting...	***Defines...***
Earliest Start Time	The earliest valid event start time.
Latest Finish Time	The latest valid event finish time.

This setting...	*Defines...*
Weeks in Term	The maximum span of weeks represented by the events in any Optimizer run.

Optimization step settings

You can define any of these default Optimization step processing settings:

This setting...	*Defines...*
Enrollment Adjuster	The percentage by which the Optimizer should adjust event enrollments prior to initiating the placement process. The value is used internally by the Optimizer; it doesn't change the actual enrollment of events.
Default Enrollment	The default enrollment that should be used in Optimizer processing for events that don't yet have a defined enrollment or have an enrollment of 0 (zero).
Minimum Fill Ratio	The minimum percentage of seats in a location that must be filled by any Optimizer placement. Individual location fill ratios, if specified, override this value (see *Location information used by the Optimizer*).
Extra Finish Minutes	The number of minutes the Optimizer should add internally to the finish time of each event when making placements. You can use this automatic "pad" time to provide enough time between events placed in the same location, if pad time is not already built into the start and finish times of your events.
Sum Cross-listed Enrollments	How the Optimizer treats enrollments for events in binding space assignment groups. If checked, the Optimizer adds the enrollments of the events that overlap the date/time of other events in the group before initiating its placement process, and only selects a location large enough to hold the combined enrollments of those events. If not checked, the Optimizer selects a location large enough to accommodate the enrollment of the largest (highest head count) event of the group.

Using Optimizer processing settings effectively

Enrollment adjuster

The Enrollment Adjuster specifies a percentage by which the Optimizer should adjust event enrollments prior to initiating the placement algorithm. The Optimizer doesn't change or overwrite actual enrollment data; it uses the adjusted value internally during the placement process. To prevent the Optimizer from making any adjustment, enter 1.00 as the value for this parameter.

For example, if you plan to run the Optimizer with estimated or maximum capacity enrollment figures that may be inflated by departments, you could compensate for this by setting the enrollment adjuster to .95 (95%), so the Optimizer will consider the enrollment of each class to be five percent less than the value in the enrollment field and place classes accordingly. A class of 100, then, might be placed in a location that seats as few as 95. On the other hand, if you're working with actual enrollment figures and know that additional students may enroll in classes between the time the schedule is produced and classes begin, you might want to set the enrollment adjuster to 1.05 (105%). A class of 100, then, could only be placed in a location that seats at least 105.

Minimum fill ratio

The minimum fill ratio is a fraction that designates the minimum percentage of seats in a location that must be filled by any Optimizer placement.

For example, you might set a minimum fill ratio of 0.10 (10%) to ensure that the Optimizer places an event in a location only if the event fills at least 10% of the location's seats.

If an individual location includes its own fill ratio, the location's fill ratio overrides the default fill ratio specified on the Optimizer Default Settings page.

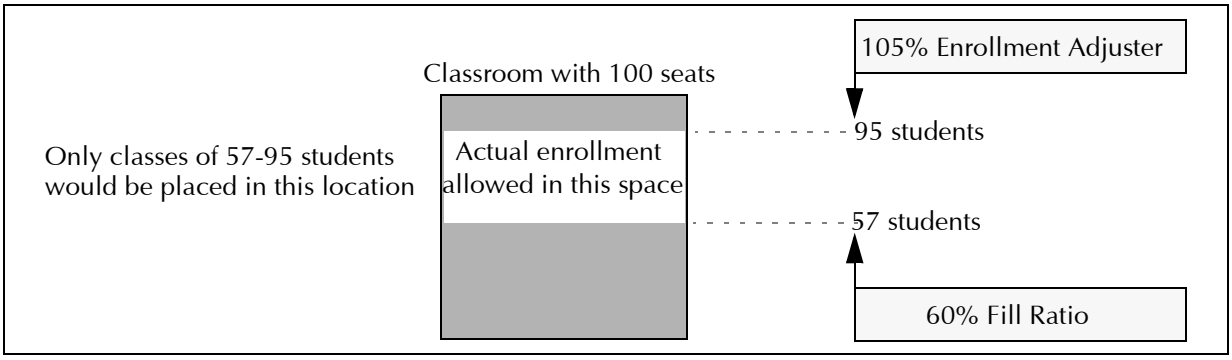
The value of the minimum fill ratio *doesn't affect pre-assignments*. For example, you could preassign an event with 20 participants to a 100 seat location, even if the minimum fill ratio is set at 40%.

In general, don't set a high minimum fill ratio

The decision to set a high minimum fill ratio is usually made solely for the purpose of pushing for higher utilization after all events have been successfully placed. Unless your school has a policy which forbids the use of large locations for small events, we recommend that you *not set a high minimum fill ratio* for your ordinary Optimizer runs. Typically, the default fill ratio should be set no higher than 10%.

Interaction between the minimum fill ratio and the enrollment adjuster

If you set a minimum fill ratio and an enrollment adjuster, you may get unexpected results if you don't know how they mutually affect Optimizer placements. For example, the case below shows what happens when the minimum fill ratio is set to 0.60 (60%) and the enrollment adjuster is set to 1.05 (105%).



Entering Optimizer Default Processing Settings

1. Sign into the 25Live Administration Utility.
2. Click the Optimizer tab, then click the View/Edit Settings task tab.
3. Enter the appropriate settings for your scheduling environment.

Set...	***To...***
Earliest Start Time	The earliest valid start time for any event. Can be any time that is earlier than Latest Finish Time.
Latest Finish Time	The latest valid finish time for any event. Can be any time that is later than Earliest Start Time.
Weeks in Term	The maximum span of weeks of any event. Can be set to any whole number greater than 0 (zero) but less than or equal to 54.
Enrollment Adjuster	Any number between 0.01 and 5.00. Set to 1.00 for no adjustment.
Default Enrollment	Any whole number.
Minimum Fill Ratio	The minimum percentage of seats you want filled by any Optimizer placement. Can be set to any number between 0 (zero) and 1.00 (100%).
Extra Finish Minutes	The number of minutes you want the Optimizer to add internally to the finish time of each event when making placements (pad time). Can be set to any whole number from 0 (zero) to 30.
Sum Cross-listed Enrollments	Checked if you want the Optimizer to sum the enrollments of overlapping events in a binding space assignment group before initiating the placement process. Not checked if you don't want the Optimizer to sum the enrollments.

4. Click Update Run Defaults.

Optimizer Processing

Introduction

This section discusses how the Optimizer "thinks"—the criteria its placement algorithm uses to optimize scheduling, and the actual process it performs to validate input data and place events.

It is important that you have read the previous information in this document before reading this for a thorough understanding of input data and how the Optimizer uses it.

Placement options supported by the Optimizer

The Optimizer can be used to place events that:

- Need a location
- Need a location and have a preferred location
- Need a location and must be placed in the same location as the previously listed event
- Can be placed in a location at the same time as other events
- Are related to (are cross-listed with, share meetings with, are back-to-back with) one or more events

The Optimizer also takes all pre-assignments into account in its placement process. See *How the Optimizer treats pre-assignments*.

How the Optimizer treats pre-assignments

The Optimizer's treatment of pre-assigned events is confined to a syntax and conflict check. The Optimizer accepts a location pre-assignment even if:

- The enrollment of the event exceeds the pre-assigned location's maximum capacity
- The pre-assigned location is blacked out at the times assigned to the event
- The location fill ratio in effect for the pre-assigned location is higher than the fill ratio achieved by the pre-assignment

The Optimizer allows more than one event to be pre-assigned to the same location at the same time if each of the events has been designated as willing to "share space."

Ideally, the majority of the events you send to the Optimizer should be requesting a location; that is, *should not be pre-assigned*. Although you may include pre-assigned events, the placement algorithm performs best when it is asked to do most or all of the work of finding appropriate locations for events

How the Optimizer determines how to process an event

Event data and relationships

The Optimizer determines how to process an event based on:

- The start/end dates, meeting days, and meeting times of the event and its related events (if any)
- The primary organization associated with the event
- Any binding space assignment relationships defined for the event (see *Binding space assignment relationships*)
- The presence of a location assignment for the event
- The presence of a first choice location preference for the event
- The presence of partition preferences for the event
- The presence of feature requirements for the event

Binding space assignment relationships

Binding space assignment relationships allow you to specify that two or more events must be placed in the same location, regardless of their days, dates, and times. For example, the class meeting reservations for a group of cross-listed classes could be linked via binding space assignment relationships defined in your SIS and imported into the Series25 environment, or you could set up back-to-back events in the 25Live Administration Utility that are linked by binding space assignment relationships (see *Appendix B: Binding Back-to-Back Events*).

The placement algorithm

What makes the Optimizer unique

The Optimizer has the only event placement algorithm that effectively addresses the optimization issue underlying space scheduling. Other systems, which use priority sequencing, right-to-schedule schemes, preorderings, and so on, unduly politicize the space scheduling function because they confer artificial and unnecessary placement advantage on those events at the "top" of the list. In such systems, organizations are forced to compete for space.

The Optimizer works so well because it completely discards the preorderings, sortings, and other prearrangements of data that have no bearing on achieving optimization objectives. By discarding preordering schemes, it discards the need to confer advantage during the placement process. As an Optimizer user, you don't have to be concerned about which organizations to place events for first, and organizations don't have to compete among themselves for this critical advantage.

You can control the order in which the Optimizer makes placements, if you want to (see *Searches give you event placement control*).

Optimization criteria

As an Optimizer user, you only need to be concerned with accurately describing the partition preferences of each organization, and optionally the feature requirements and partition preferences of events, no matter how generous or restrictive those requirements and preferences might be or how they might overlap with those of other organizations and events.

Working entirely within these requirements and preferences, the algorithm aims for optimization in these areas:

- Maximization of the number of events placed
- Maximization of placement in the preferred locations of organizations
- Maximization of average utilization (head count per 100 seats)

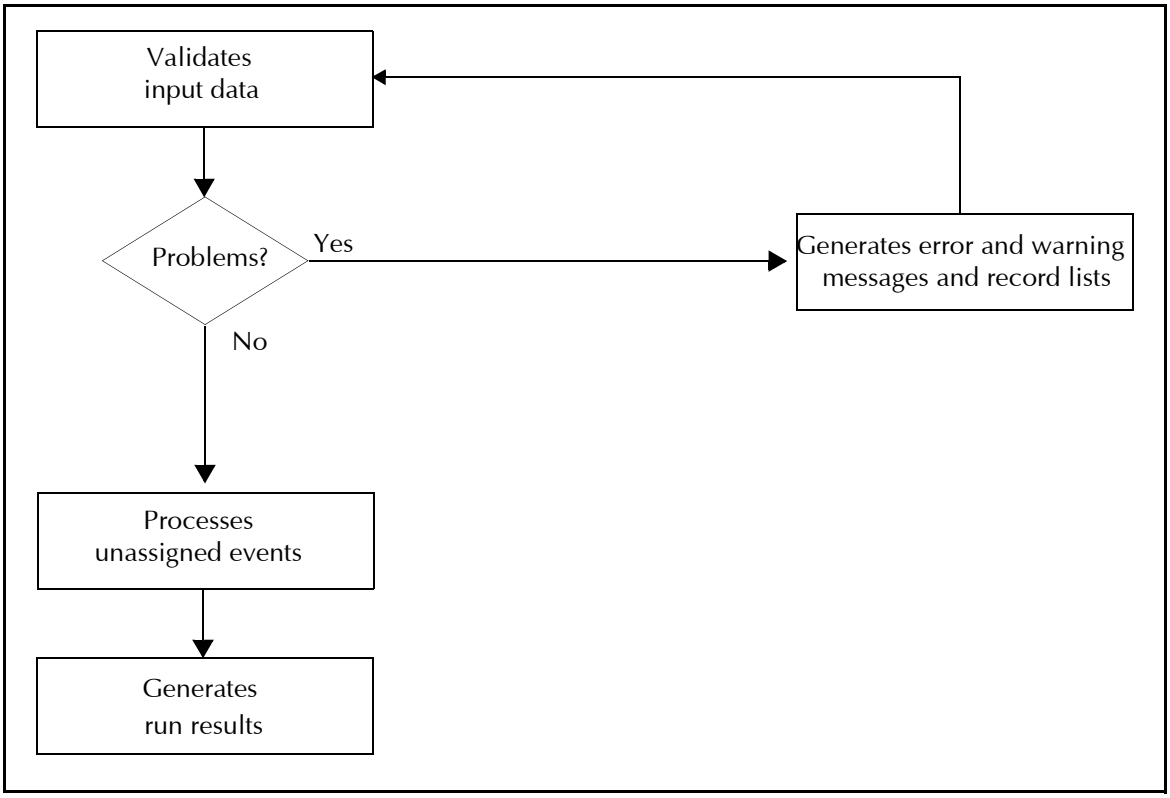
The Optimizer *doesn't change the event data itself to optimize placements.* For example, it doesn't alter event meeting times to better allow events to be placed. The Optimizer operates strictly within the requirements you've defined, seeking the best possible conflict-free schedule for the events and locations described.

Processing overview

The Optimizer processes input information and places events in locations as described below and illustrated in the *Optimizer Processing* diagram below.

1. It validates the location and event data in the search results for the run, and generates fatal error messages, non-fatal error messages, and warning messages if it encounters problems with the input data.
2. If there are no fatal errors or when fatal errors have been corrected, it allows the user to initiate the placement algorithm. (Non-fatal errors and warnings may also be corrected by the user.)
3. It places unassigned events by:
    - Scanning the event's associated primary organization for a match to an organization name.
        - If it finds a match, considering the locations included in the run that match the organization's partition preferences as potential placement candidates.
        - If it doesn't find a match or no organization has been associated with the event, considering all locations included in the run as potential placement candidates.
    - Making placements based on event head count, meeting time, date span (and partition preferences and/or location feature requirements of the event, if specified).
4. It generates run results.

Optimizer Processing



Optimizer Results and Run Report

Introduction

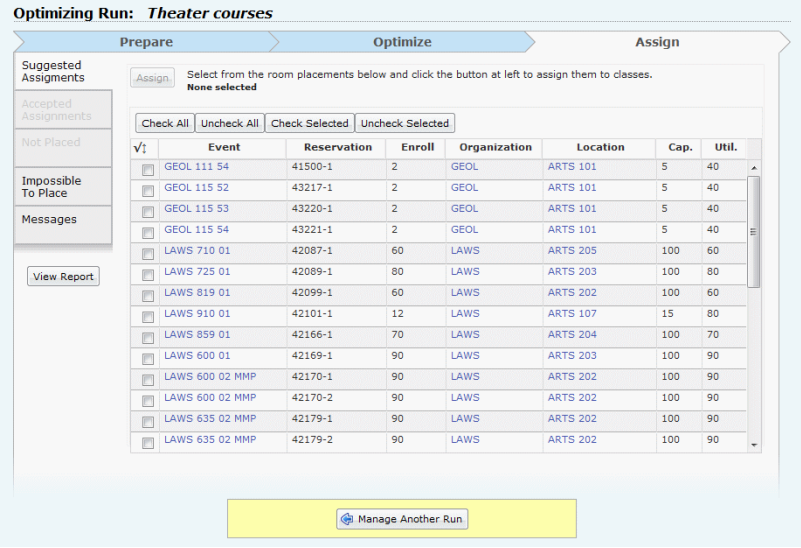
At the end of each Optimizer run, you can view the results of the run and the associated run report.

See *Acting on Optimizer Run Results* for instructions on viewing run results and suggestions for using the results described in this chapter.

Optimizer results

Results location

At the end of an Optimizer run, a summary of the run results is shown on the Optimize page that tells you the number of placed events and the average utilization of those placements, and the number of not placed and impossible to place events. The complete results are shown on the Assign tab of the Optimizing Run page, shown below, where you review and act on Optimizer results.



Results tabs

The Assign tab contains a tab for each of the placement results that may occur in Optimizer processing. You simply click a tab to see the events, locations, and organizations in that section, as shown in the previous example where the "Suggested Assignments" tab that shows the events placed by the Optimizer is displayed. You can click any of the event, location, or organization links to open its associated event, location, or organization.

Suggested Assignments tab

The "Suggested Assignments" tab contains events that were placed by the Optimizer (the Optimizer found a location for them), but that have not yet had the associated location placements assigned to the events.

Accepted Assignments tab

The "Accepted Assignments" tab contains events that have had the associated location placements assigned to the events.

Not placed tab

The "Not Placed" tab contains events the Optimizer couldn't place due to competition for the same kind of location at the same days and times.

Impossible To Place tab

The "Impossible To Place" tab contains events the Optimizer couldn't place because there was no appropriate location in your location inventory—for example, an event with an expected head count of 300 when the largest location on campus accommodates 180.

Messages tab

The "Messages" tab contains information about your last assign or unassign action.

Optimizer run report

The Optimizer run report is an Excel spreadsheet that provides a summary of the run results on the first page and a list of locations from your location search that are still available after the run on the second page.

Report Name	S25 Placement Results
S25 Run Name	Theater Courses
Event Search	Events 2013
Location Search	Arts Spaces
Last Data Preparation Date	Oct 23 2014
Last Optimize Date	Oct 23 2014

	A	B	C	D	E	F	G	H
1	Pattern Start	Pattern End	Duration	ARTS 101	ARTS 102	ARTS 103	ARTS 104	ARTS 105
2	12:00 A.M.	5:00 A.M.	300	-------	-------	-------	-------	-------
3	5:00 A.M.	6:00 A.M.	60	U---H--	-------	-------	-------	-------
4	6:00 A.M.	7:00 A.M.	60	UMTWHFA	------A	----HFA	-----FA	-----FA
5	7:00 A.M.	8:00 A.M.	60	UM-WHFA	------A	-----FA	-----FA	-----FA
6	8:00 A.M.	9:00 A.M.	60	UMTWHFA	-M--H-A	-M----A	UMTWHFA	-M---FA
7	9:00 A.M.	10:00 A.M.	60	UMTWHFA	-M--H-A	-M-W--A	UMTWHFA	-M---FA
8	10:00 A.M.	11:00 A.M.	60	UMTWHFA	UM----A	UM-WHFA	UMTWHFA	-M---FA
9	11:00 A.M.	12:00 P.M.	60	UMTWHFA	-M----A	-M----A	UMTWHFA	-M---FA
10	12:00 P.M.	1:00 P.M.	60	UMTWHFA	-M----A	UM----A	UMTWHFA	-M---FA
11	1:00 P.M.	3:00 P.M.	120	UMTWHFA	-M----A	-M----A	UMTWHFA	-M---FA
12	3:00 P.M.	4:00 P.M.	60	UMTWH-A	-M-W--A	-M----A	UMTWHFA	-M---FA
13	4:00 P.M.	5:00 P.M.	60	UMTWH-A	-M----A	-M----A	UMTWHFA	-M---FA
14	5:00 P.M.	6:00 P.M.	60	-MTWH-A	-M----A	-MT---A	UMTWHFA	-M---FA
15	6:00 P.M.	7:00 P.M.	60	UMTWH-A	-M----A	-M----A	UMTWHFA	-M---FA
16	7:00 P.M.	8:00 P.M.	60	-M-W--A	-M----A	-M----A	UMTWHFA	-M---FA
17	8:00 P.M.	9:00 P.M.	60	---W---	-------	-------	-------	-------
18	9:00 P.M.	10:00 P.M.	60	---WH--	-------	-------	-------	-------
19	10:00 P.M.	11:00 P.M.	60	UMTWHFA	UMTWHFA	UMTWHFA	UMTWHFA	UMTWHFA

Preparing to Run the Optimizer

Before you begin

Before you begin to prepare for an Optimizer run, make sure the following tasks have been completed:

- Your 25Live system administrator has set up the appropriate functional security rights for those who will be using the Optimizer. See *Appendix A: Optimizer Functional Security Requirements*.
- A LYNX user at your school has created back-to-back relationships among events as needed. See *Appendix B: Binding Back-to-Back Events*.
- You've set default processing options for all Optimizer runs (see *Optimizer Default Processing Settings*).
- You've imported class information into 25Live from your SIS using the Series25 LYNX Interface, including all pre-assigned classes. See Interface documentation available here: *http://knowledge25.collegenet.com/display/CustomerResources/Series25+Interface+Documentation*

Search process

Before you run the Optimizer, you must create and save the location and event searches in 25Live Pro you plan to use for the Optimizer run.

Step	*Activity*	*See*
1	Create, run, and save a location search that yields the locations you want the Optimizer to use for this run.	*Creating, running, and saving a location search*.
2	Create, run, and save an event search that yields the events you're submitting to the Optimizer for placement in this run.	*Creating, running, and saving an event search*.

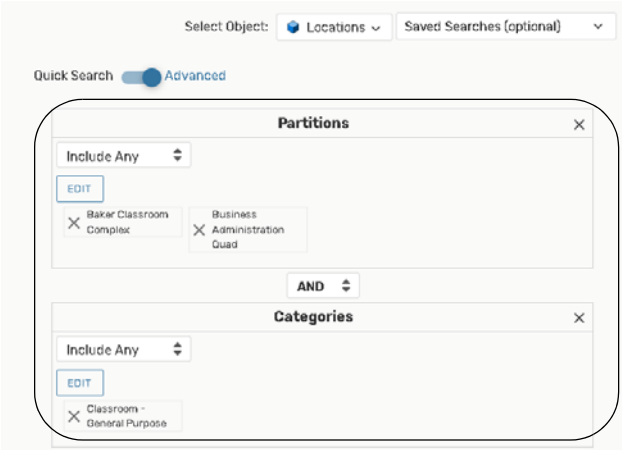
Creating, running, and saving a location search

Each location you plan to submit to the Optimizer must have a name, partition, and maximum capacity. Locations that don't are rejected as errors during the run preparation process. Incorrect values in these fields may result in invalid placement results.

Every location pre-assigned to events occurring during the date/time range you specify for an Optimizer run must have been included in your location search results for the run.

1. From the 25Live Pro Home page, click the Go to Search button.
2. Select Locations from the Select Object drop-down, then click Advanced.
3. Click Add Criteria and choose a search criterion from the drop-down list.
4. Click Edit and select the items for the selected search criterion. Click Done when finished.
5. If applicable to the criterion, choose the Include Any, Include All, or Do Not Include condition from the drop-down list. Include Any specifies that locations must match at least one of the selected items, Include All specifies that locations must match all the selected items, and Do Not Include specifies that locations must not match any of the selected items.
6. Repeat steps ***3*** - ***5*** to add additional search criteria as needed.
7. Choose AND or OR to specify whether you want each location returned from the search to satisfy *all* your search criteria, or *at least one*. The former specifies an "AND" search, the latter an "OR" search.

   In this example, we chose "Partitions," chose Include Any, and selected the Baker Classroom Complex and Business Administration Quad partitions, then chose "Categories," chose Include Any, and selected Classroom - General Purpose. We then chose AND to specify that we want only locations that match all the criteria; that is, that they are either in the Baker Classroom Complex partition or the Business Administration Quad partition *and* that they are General Purpose classrooms.



8. Click Search.

   The search results are displayed below your search definition.
9. Make sure your location search has returned all the locations you want for this Optimizer run, including all those to which events have been pre-assigned. If there are missing locations, modify your search criteria and rerun the search.
10. When your search has returned all the locations you want for this run, click Save As.
11. Enter a meaningful name for your search in the Search Name field, and click Yes to "star" the search to make it easy to find in future.
12. Click Save to save the search.

Creating, running, and saving an event search

Each event you plan to submit to the Optimizer for placement must have:

- An event state of Tentative or Confirmed
- At least one reservation

Each of the event's reservations must have:

- An expected and/or registered head count greater than zero (0)
- Dates/times that fall within the date range of the Optimizer run

Events that don't meet these criteria are reported as errors during the Optimizer prepare step. Incorrect event data may result in invalid placement results.

Guidelines for creating your event search

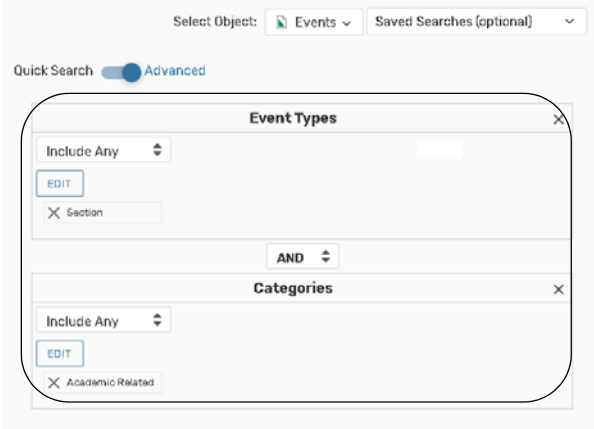
In creating your event search:

- Focus on the events that need placement. The Optimizer takes care of pre-assignments for you, as long as your location search results include all the pre-assigned locations.
- Make sure the primary organization associated with each event has a name and at least a first choice partition preference (each organization can have up to four ranked partition preferences). Missing or incorrect organization partition preferences may result in invalid placement results.
- Don't include date and time criteria in your event search. You'll enter the date range of the events included in the Optimizer run when you set up the run. (See *Adding an Optimizer run*).

To create, run, and save an event search

1. From the 25Live Pro Home page, click the Go to Search button.
2. Select Events from the Select Object drop-down, then click Advanced.
3. Click Add Criteria and choose a search criterion from the drop-down list.
4. Click Edit and select the items for the selected search criterion. Click Done when finished.
5. If applicable to the criterion, choose the Include Any, Include All, or Do Not Include condition from the drop-down list. Include Any specifies that events must match at least one of the selected items, Include All specifies that events must match all the selected items, and Do Not Include specifies that events must not match any of the selected items.
6. Repeat steps ***3*** - ***5*** to add additional search criteria as needed.
7. Choose AND or OR to specify whether you want each event returned from the search to satisfy *all* your search criteria, or *at least one*. The former specifies an "AND" search, the latter an "OR" search.

   In this example, we chose "Types," chose Include Any, and selected Section, then chose "Categories," chose Include Any, and selected Academic Related. We then chose AND to specify that we want only events that match all the criteria; that is, that they have a Section event type and are in the Academic Related event category.



8. Click Search.

   The search results are displayed below your search definition.
9. Make sure your event search has returned all the events you want for this Optimizer run. If there are missing events, modify your search criteria and rerun the search.
10. When your search has returned all the events you want for this run, click Save As.
11. Enter a meaningful name for your search in the Search Name field, and click Yes to "star" the search to make it easy to find in future.
12. Click Save to save the search.

Running the Optimizer

25Live Administration Utility Optimizer pages

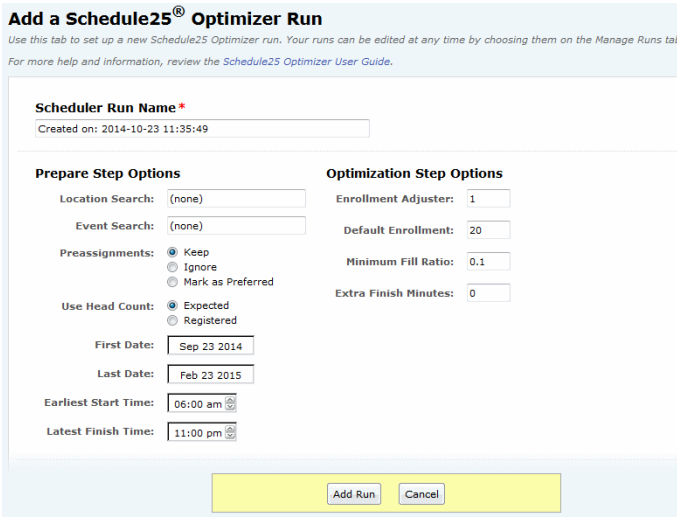
The 25Live Administration Utility provides three pages that make it easy to run the Optimizer and analyze run results.

- Add a Schedule25 Optimizer Run
- Manage Schedule25 Optimizer Runs
- Optimizing Run

Add a Schedule25 Optimizer Run page

The Add a Schedule25 Optimizer Run page is used to create a new Optimizer run. It allows you to:

- Name the run
- Select the location and event searches you want to use for the run
- Define processing settings for the run

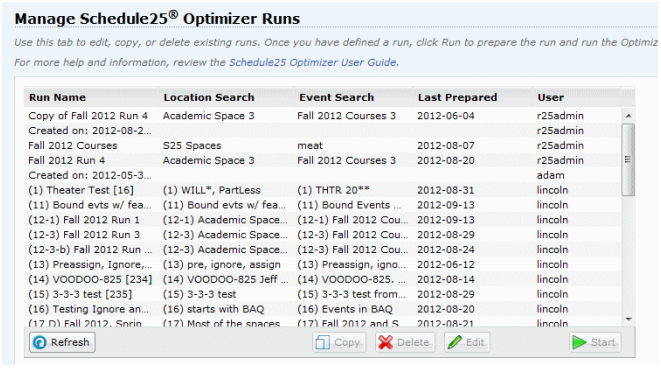


Manage Schedule25 Optimizer Runs page

The Manage Schedule25 Optimizer Runs page allows you to:

- View your own runs and run results and those of others
- Copy your own runs or the runs of others as the basis for creating new runs
- Edit and delete runs you've created
- Execute your own previously added runs

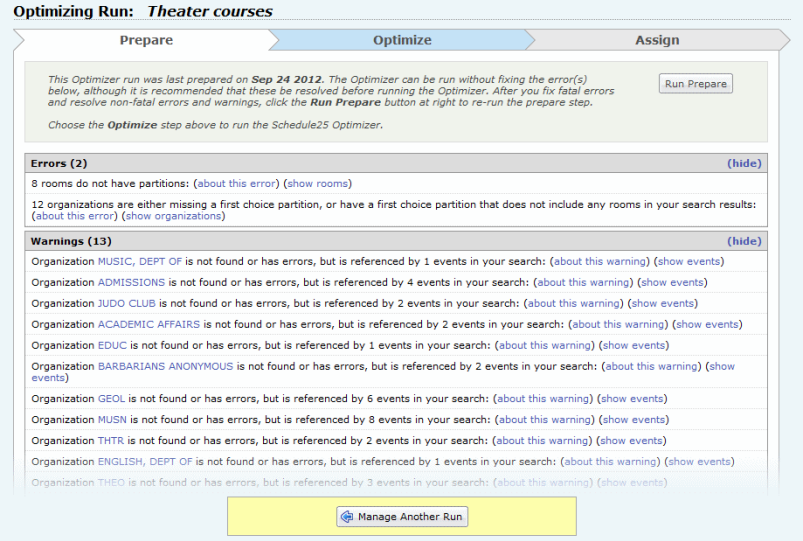
Note: The only security group that can delete the runs of other Optimizer users is the System Administrators (-1) group.



Optimizing Run page

The Optimizing Run page allows you to:

- ***Prepare***: Initiate validation of the input data for a run, view and correct input data problems
- ***Optimize***: Run the Optimizer algorithm and view the results of the run
- ***Assign***: Analyze run results and assign some or all of the placements made by the Optimizer



Optimizer run process

The steps below describe what you do to run the Optimizer. This section tells you how to perform these steps.

Step	*Activity*	*See*
1	Add an Optimizer run.	*Adding an Optimizer run*
2	Run the Optimizer prepare step, correct any input data errors and/or warnings, and run the Optimizer.	*Running the Optimizer*

You can also perform these run-related functions using Optimizer functionality:

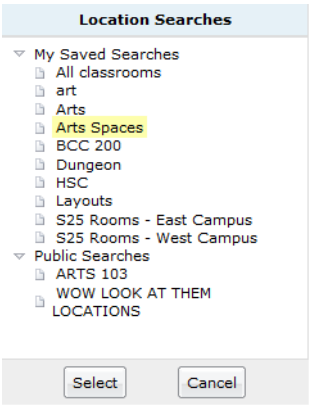
- Edit runs you've created
- Copy your own runs or the runs of others to create new runs
- Delete runs you've created

See *Editing or copying a run* and *Deleting runs*.

Adding an Optimizer run

1. Sign into the 25Live Administration Utility.
2. Click the Optimizer tab, then click the Add a Run tab to open the Add a Schedule25 Optimizer Run page.
3. Enter a name for the run.

4. Specify Prepare Step Options:
   - Click the Location Search drop-down, and choose the location search you want to use for this run from the My Saved Searches drop-down list, as shown in this example:



   - Click the Event Search drop-down, and choose the event search you want to use for this run from the My Saved Searches drop-down list.
   - Select how you want pre-assignments handled by the Optimizer for this run.
   - Select:
     - *Keep* to have the Optimizer keep pre-assigned locations
     - *Mark as Preferred* to have the Optimizer convert pre-assignments to first choice location preferences and attempt to place events in their preferred location and, in cases where it can't, attempt to place events elsewhere

> ***Don't select "Ignore"***
>
> Don't select "Ignore" pre-assignments for production Optimizer runs. This setting should only be used during Optimizer testing prior to going into production.

   - Select whether you want the Optimizer to use the Expected or Registered head count of events for this run.
   - Define the date and time range to be used by the Optimizer to select events and occurrences for the run by entering appropriate information in the First Date, Last Date, Earliest Start Time, and Latest Finish Time fields.

5. Specify Optimization Step Options (see *Optimization step settings* for information about these options):
   - Modify the enrollment adjuster and default enrollment as needed for this run.
   - Modify the Minimum Fill Ratio as needed for this run.
   - Modify Extra Finish Minutes as needed for this run.

6. Click Add Run, then click Add Another Schedule25 Run if you want to add another run.

Running the Optimizer

1. In the 25Live Administration Utility, click the Optimizer tab, then click the Manage Runs tab to open the Manage Schedule25 Optimizer Runs page.
2. Highlight the run you want, and click Start to go to the Optimizing Run page. If this is the first time the run you selected has been executed, click Run Prepare to perform the input data Prepare step of the run. You see the progress of the input data preparation step in a separate window. Depending on the number of assignment requests, this step may take a number of minutes to complete.

Note: You can only execute runs you've created. To execute a run created by someone else, you must first create a copy of their run (see *Editing or copying a run*).

3. Correct any input data errors and/or warnings (click the "about this error" link next to any error or warning for information about it):
   - If fatal errors are reported (shown in red), correct them as indicated below. You can't perform the Optimize step of the run (that is, run the placement algorithm) until all fatal errors have been corrected. You receive a fatal error under any of the following conditions:
     - There was an error running either of your searches
     - Your selected location and/or event search yielded no results
     - Your selected event search results contained only pre-assignments
     - Your Schedule25 Optimizer license is missing or expired

If...	***Do this...***
There was an error running a search, your selected location and/or event search didn't yield any results, or your event search results contained only pre-assignments	Modify and rerun the search in 25Live Pro. See *Creating, running, and saving a location search* and *Creating, running, and saving an event search*.
Your Schedule25 Optimizer license is missing or expired	See your Series25 System Administrator for assistance.

- If non-fatal errors are reported, correct the associated records. Such errors do not prevent you from performing the Optimize step of the run, but may have unwanted effects on run results.

  For example, if you receive this error: "x rooms have zero capacity" you could access each of those locations in 25Live (by clicking the "show rooms" link and then the link of each location) and entering its maximum capacity.

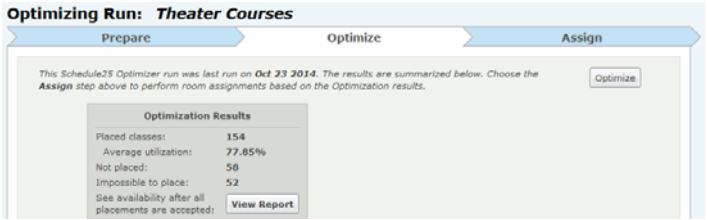
  You receive a non-fatal error under any of the following conditions:

  - There are locations in your location search results that don't have a maximum capacity defined or where the maximum capacity is 0 (zero).
  - There are organizations associated with the events in your event search results that don't have a first choice partition preference defined or have no partition preferences defined.
  - There are events in your event search results that have feature requirements that are not present in any of the locations in your location search results.
  - There are events in your event search results that have a 0 (zero) time span.

- If warnings are displayed, determine which of the associated events and/or organizations you wish you correct (if any), and correct them accordingly. You receive a warning under any of the following conditions:
  - There are events in your event search with a 0 (zero) or missing head count.
  - There are events in your event search that don't have a primary organization.
  - There are organizations associated with the events in your event search results that have errors.

⚠	Be aware that if you choose to correct events in 25Live Pro, the next time those events are imported into your Series25 environment from your SIS, those corrections will be overwritten by the values in the equivalent fields in your SIS.

4. Click Run Prepare to rerun the Prepare step to ensure that you've corrected the errors and warnings.
5. Click the Optimize tab, then click Optimize to run the Optimizer algorithm and report a summary of optimization results as shown below.



6. To see the Optimizer run report which includes rooms from your location search that are still available after the run, click View Report, then open the Excel file (see *Optimizer run report*).

Editing or copying a run

Using the Manage Schedule25 Optimizer Runs page of the 25Live Administration Utility, you can edit runs you've created and copy your own runs or the runs of others as the basis for creating new runs.

1. On the Manage Schedule25 Optimizer Runs page, highlight the run you want to edit or copy, then click Edit or Copy.
2. Modify the run information as needed. If you're copying a run, make sure to name it something meaningful to you.
3. If you're editing the run, click Save Changes to Run. If you're copying the run, click Copy Run.

Note: When you copy the run of another user, the location and event searches of that run are also copied (you have your own copy of them) if the searches have been marked as shared.

Deleting runs

You can only delete runs you've created. Only System Administrators security group (-1) members can delete runs they did not create.

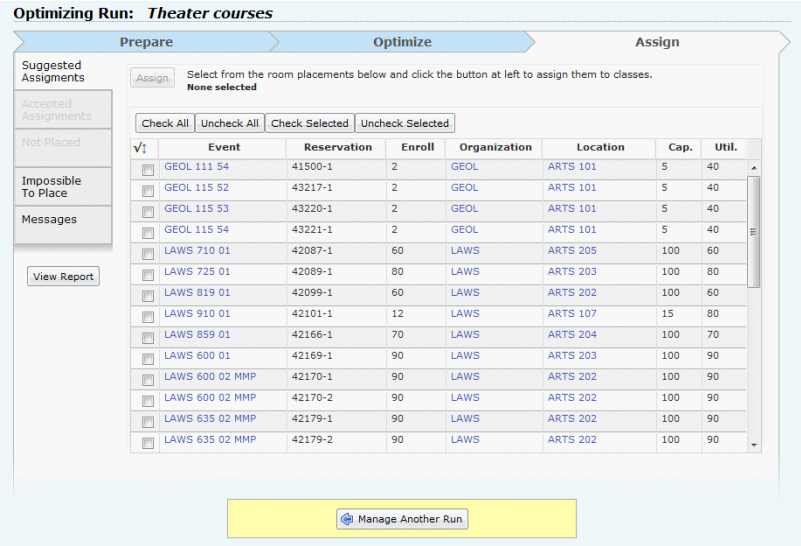
1. On the Manage Schedule25 Optimizer Runs page, highlight the runs you want to delete, then click Delete.
2. Click Delete Run to confirm.

Acting on Optimizer Run Results

Accessing the results of an Optimizer run

To access run results

You review and act on Optimizer run results from the Assign tab of the Optimizing Run page as shown here:



Results tabs

This page contains tabs for:

- ***Suggested Assignments*—**Events placed by the Optimizer, including pre-assignments, that are available for assignment
- ***Accepted Assignments*—**Events placed by the Optimizer that have been assigned to events
- ***Not Placed*—**Events that weren't placed by the Optimizer due to competition for similar locations at the same dates/times
- ***Impossible to Place***—Events that weren't placed by the Optimizer because there was no appropriate location in the locations included in the Optimizer run
- ***Messages***—Your last Assign or Remove Assignment action

Using the Optimizing Run page

The Optimizing Run page contains a number of functions that make it easy to review run results and assign and unassign Optimizer placements.

Acting on records on the Suggested Assignments tab

Contents of the Suggested Assignments tab

The Suggested Assignments tab contains the list of events that have been placed by the Optimizer (the Optimizer has found a location for them), but the locations have not yet been assigned to their associated events.

To act on events on the Suggested Assignments tab

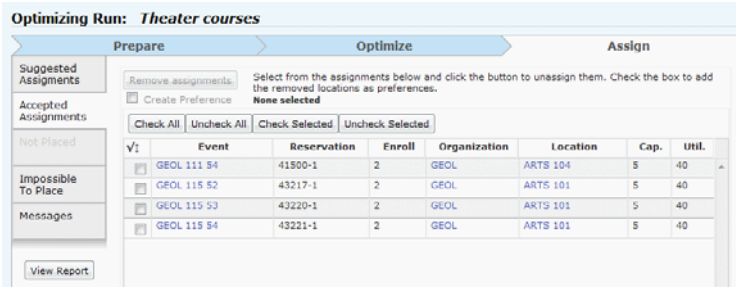
1. Click the Suggested Assignments tab to open the list.
2. Review the Optimizer placements. To view the details of an event that was placed or a location placement, click the event name in the list to open the event in 25Live Pro, or click the location name or organization name in the list to open the location or organization in the 25Live Administration Utility.

- Look for any events that appear to be oddly placed. Is it a satisfactory placement that is just nontraditional, or does it point to missing or erroneous information in the event?
- Look for any events that are unusually small for the location the Optimizer placed them in. Is there a fill ratio for the location? Is the event held only one day a week? (Such events are "tucked" here and there by the Optimizer.)

3. Assign all or some of the placements.

To...	***Do this...***
Assign all placements	Click Check All, then click Assign above.
Assign multiple placements (for example, all the placements for a particular department)	***1*** Click anywhere in a blank area of the row of the first placement you want to assign. ***2*** Scroll to and shift-click anywhere in a blank area of the row of the last placement you want to assign. ***3*** Click Check Selected. ***4*** Click Assign above.
Assign placements individually	Check the box of each placement you want to assign, then click Assign above.
Sort the placement list so all checked placements are at the top of the list	Click the  column header.
Resort the placement list	Click the column header of the column you want to sort by.

The events you've assigned locations to are now listed on the Accepted Assignments tab.



In rare instances, an assignment may fail for one of these reasons:

- Data has changed in 25Live since the Optimizer run.
- A "blocked by" or "scheduled with" related location is causing a location assignment conflict.

5. If you assigned only a small number of locations to events (indicating you're not satisfied with the placement results):
   - Click Manage Another Run.
   - Edit the run settings as needed.
   - Rerun the Optimizer.
   - Repeat steps ***1*** - ***3*** above.

   If you assigned most, but not all, locations to events:
   - Open the Suggested Assignments section.
   - Click the link of an event you haven't assigned a location to. This opens the event in 25Live Pro.
   - Assign a location to the event manually. See the 25Live Pro online help for information on assigning locations to events.
   - Repeat these steps for other events without assigned locations.

To remove location assignments

If you need to remove one or more event location assignments made previously, do the following:

1. On the Accepted Assignments tab, select the assignment(s) you want to remove in the same way you selected them.
2. Check the Create Preference box if you want the assignments you're removing to be handled as location preferences in subsequent Optimizer runs.
3. Click Remove assignments above the list.

Acting on records on the Not Placed tab

Contents of the Not Placed tab

The Not Placed tab contains the list of events the Optimizer couldn't place due to competition for the same kind of location on the same days and times.

It is recommended that you act on events in this list only after you've assigned locations to the events in the Suggested Assignments list, so you can easily see the event "winners" that prevented these events from being assigned.

You may want to use page 2 of the Optimizer run report to see locations that are still available after the run as possible placements for some of these events. See *Optimizer run report*.

To act on events on the Not Placed tab

1. Click the Not Placed tab.
2. Click an event in the list to open it in 25Live Pro.
3. Determine why the event wasn't placed. Check this information in particular:
   - *Dates and times:* Each campus has "peak" or "prime" times during which the largest number of events are scheduled. The demand during these times often exceeds capacity. Review the event dates and times to determine if that might be the reason the event wasn't placed. You may have locations available at these times, but not in the preferred partition(s) or containing the required features.
   - *Head count:* Large events are often competing for only a few large locations, and average-sized events are often competing for a fixed inventory of average-sized locations. The fill ratio for some large locations might be preventing the event from being placed in a larger location.
4. Sign into 25Live Pro.
5. Assign a location to the event manually.

Note: See the 25Live Pro online help for information on assigning locations to events and modifying event information.

6. Repeat steps ***2*** - ***5*** for each additional event in the Not Placed tab.

Acting on records on the Impossible To Place tab

Contents of the Impossible To Place tab

The Impossible To Place tab contains the list of events the Optimizer couldn't place because there was no appropriate location in the locations included in the Optimizer run.

To act on events on the Impossible to Place tab

1. Click the Impossible to Place tab.
2. Click an event in the list to open it in 25Live Pro.
3. Determine why the event was impossible to place. Refer to *Why events become impossible to place* for assistance.
4. Modify the event data as needed in your SIS and re-import the event into your Series25 environment, then assign a location to the event manually in 25Live Pro.

Note: See the 25Live Pro online help for information on assigning locations to events.

5. Repeat steps ***2*** - ***4*** for each additional event in the Impossible to Place tab.

Why events become impossible to place

Here are some reasons why an event may become impossible to place:

- There is no location in the partition preferences of the event's sponsoring organization, or the event itself, that has the location features required by the event. For example, if an event prefers to be in the South Campus partition and requires a map of Spain, and no locations included in the Optimizer run in the South Campus partition have a map of Spain, the event is impossible to place.

  Remember: The Optimizer treats location feature preferences as requirements that must be met for placement.
- An erroneous expected head count has been entered (for example, 2000 instead of 200). If no location exists with a seating capacity of 2000, the event is impossible to place.
- The only logical and valid location for an event is blacked out or has already been pre-assigned to another event on the same dates and times. Under these conditions, the Optimizer doesn't see the location in its inventory, and the event is impossible to place.
- The event is so small that it doesn't meet the minimum fill ratio or so large that it won't fit in any location that is acceptable to the organization sponsor.
- If the "Sum Cross-Listed Enrollments" setting is checked and the sum of a cross-listed set is larger than the capacity of any location in the sponsoring organization's preferred partition(s), the cross-listed records are impossible to place.
- Something is illogical in the sponsoring organization's information. This may be the problem if all the events for one organization are in the Impossible to Place list.

Appendix A: Optimizer Functional Security Requirements

For information on setting functional security, see the *25Live Security Administration Guide* available by clicking Help from the 25Live Administration Utility.

Minimum functional security required to prepare data for and use the Optimizer

The 25Live security group(s) of those who will be setting up data used by the Optimizer and/or using the Optimizer should have, at minimum, the functional security access levels shown in the table below. Any right not included in the table can be set to "Can't View" or "Can't" perform action.

Rights	***Right Name***	***Access Level***
Events	Event Wizard	Can use 25Live Event Wizard to create and edit events
	Location Assignments	Can assign and/or request locations in Event Wizard
	Share Location	Can mark locations as shared when creating/editing events
	Events	Can view, edit, create, and copy
Searches and Master Definitions	Event Search	Can run an event Advanced Search, Keyword Search with More Search Options in 25Live Pro, and search in 25Live Scheduling
	Location Search	Can run a location Advanced Search, Keyword Search with More Search Options in 25Live Pro, and search in 25Live Scheduling
Cabinets and Folders	Cabinets	Can view
	Folders	Can view
Locations	Location Access	Can view, edit and create, Locations tab appears in 25Live
	Layouts and Images	Can view, edit and add images
	Location Open/Close/Blackout Hours	Can view, edit, and create
Organizations	Organization Access	Can view, edit, and create, Organizations tab appears in 25Live

Rights	*Right Name*	*Access Level*
Contacts	Contact Access	Can view, edit, and create
Object Security, Assignment Policy, and Notification Policy	Location Assignment Policy	Can view, edit, and create
Integration	Schedule25 Optimizer	Can view and prepare Schedule25 runs and view output results and reports

Appendix B: Binding Back-to-Back Events

Description of back-to-back events

The Series25 LYNX Interface allows you to create binding space assignment relationships between back-to-back events, indicating that the bound events require the same location assignment. You might use this functionality, for example, to ensure that instructors don't have to change rooms when they have back-to-back classes.

By default, events are considered back-to-back if they satisfy these conditions:

- They have the same instructor in the SIS
- Their starting dates are not more than 1 week apart
- The time between the end time of one and the start time of the other is not more than 10 minutes
- Their expected head counts don't vary by more than 50%.

These default settings or any previously defined settings can be changed using the Reconfigure option, as described below.

Note: Events that otherwise satisfy the conditions will not be bound if they already have an assigned location.

Binding back-to-back events

1. From the LYNX Configuration menu, choose Data Binding.
2. Choose Back-to-Back Sections from the Type drop-down.
3. Click the Term Code edit icon, select the term code of the section meeting patterns you want to include in the back-to-back group, then click Done.
4. If you want to narrow the search results to a specific section or sections, enter the full or partial section name in the Keyword field.
5. Click Search. The back-to-back groups for the term code you selected and the full or partial section name you entered (if you did) are displayed. If no groups are displayed, there are no back-to-back groups based on your search criteria.
6. Click Bind Back-to-Back Sections to open the Bind Back-to-Back Sections window.
7. Choose the import extract set containing the section meeting patterns you want to bind from the drop-down. For information on import extract sets, see the LYNX online help.
8. If you're satisfied with the back-to-back definition settings, click Run.

   If you want to change the current back-to-back definition settings, click Reconfigure, change the settings as needed, click Review and Run, then click Run.

   A status bar showing the progress of the creation/import run is displayed. Prior to the creation and import of the new back-to-back groups, any existing back-to-back groups for the selected term and import extract set are deleted.

9. Once the back-to-back section groups have been created, import the sections into 25Live so the bindings can take effect by doing another import of the whole extract set or by clicking the “Import” link of each group you want to import. For information on importing extract sets, see the LYNX online help.