



kaleidescape™

Technical Note

Large System Design Considerations
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1.0 Introduction

While the requirements of most projects can be fulfilled with a single Kaleidescape server, some call for additional storage or streaming capacity. This technical note will help prepare you to properly design and install a Kaleidescape system with more than one server to store a large collection of movies or music or for use with a large number of independent zones.

2.0 Groups

Groups control the behavior of players and servers on networks that contain more than one Kaleidescape server. Content on a server can only be accessed by a player in the same group as the server. When you import a DVD and CD, it is stored on one of the servers in the same group as the component used for the import. When designing and installing a Kaleidescape system with more than one server, it is important that you understand and make correct use of groups.

When you set up more than one Kaleidescape server on the same subnet, they at first appear as separate systems. Each new Kaleidescape server initially defines its own group, but you can join them together so that multiple servers present a single movie and music collection to all movie and music players in the same group. To make the servers act as a single system, they must be grouped using the Installer Web Utility.

1. Open the Installer Web Utility for any Kaleidescape server in a web browser.
 - <http://my-kaleidescape/installer> (PC)
 - <http://my-kaleidescape.local/installer> (Mac)
2. Click the GROUPS tab.
 - To remove a component from a group, click the Remove from Group link to its right. The page reloads and the component now has a drop-down list to add it a new group.
 - To add a component to a group, pick the group you want it in from the drop-down list to its right. The page reloads and the component now has a Remove from Group link to remove it from its new group.

When there's only one group, new music and movie players effectively join it automatically, even though they will not appear as grouped in the GROUPS tab. If there's more than one group, you need to associate each component with a group after you add it to the network and turn it on.

If you are importing content with a Bulk Loader or Speed Reader it is important that you group it with the target server or group of servers. Otherwise, the Bulk Loader or Speed Reader will not import content onto any server.

3.0 Large Movie Collections

For movie collections that are too large for a single server, a group containing more than one server can be created. The capacity of the servers in the group is the sum of the individual capacities. Consider for example two 3U Servers, each fully loaded with fourteen 2 TB Disk Cartridges. Each of these 3U Servers can store about 3,600 DVDs. A group comprised of both 3U Servers can then store about 7,200 DVDs. At time of publication, the customer with the most servers in one system has eleven.

Kaleidescape movie players using KEAOS 3.7 can display 8,000 movie selections. Kaleidescape is working to increase the number of movie selections that can be displayed by a movie player.

The number of movie selections on a Kaleidescape System is almost always different than the number of DVDs that were imported. A long movie like *Gone with the Wind* that spans two DVDs is presented as a single movie selection, as is a two-disc collector's edition with a bonus special features disc. A television series box set containing six DVDs would also be presented as a single selection. Alternately, a single DVD that contains two different movies would be presented as two separate movie selections.

For movie collections of more than 8,000 movie selections, you should create groups that each contain no more than 8,000 movie selections and install one player per group per zone. For ease of use, import similar DVDs to each group (such as one group for movies and another for concert DVDs, music videos and television series).

4.0 Large Music Collections

Kaleidescape movie players using KEAOS 3.7 can display 3,000 music selections. The number of music selections may be different than the number of CDs imported, although this is less common than it is with movie selections. For example, a two-disc CD set may be presented as a single music selection. Kaleidescape is working to increase the number of music selections that can be displayed by a movie player.

Until that time, music collections of more than 3,000 music selections should be approached in the same manner as large movie collections. Create groups that contain no more than 3,000 music selections and install one player per group per zone. For ease of use, import similar CDs to each group (such as one group for classical and jazz and another for pop and rock).

5.0 Large Number of Zones

Each movie player can play either a movie or music to one zone. Each Music Player can simultaneously play to four independent music zones. A single 1U or 3U Server can serve 45 simultaneous independent zones, while a single Mini System can serve 15 zones in addition to serving and playing to the three local zones.

Properly designed and installed systems with more than one 1U or 3U Server can serve more than 45 zones.

Kaleidescape recommends adding one 1U or 3U Server for each set of 15 additional independent zones beyond the initial 45 independent zones. All the servers in the group should have the same capacity and the content should be imported evenly among these servers (see section 6.0, Importing Content to a Group of Servers).

It is not possible for more than 45 zones to play the same selection at the same time, or for 45 zones to all play selections from the same server at the same time. However, even with some variation in the popularity of the movies on the servers, we estimate that the probability of failure when all zones are in use is less than 1 in 1,000.

Multiple Mini Systems should not be grouped to support more than 15 zones – any system with more than 15 independent zones should store all of the content on 1U or 3U Server(s).

The following table indicates the maximum number of independent simultaneous standard definition movie or music zones that we expect a properly designed and installed group of 1U or 3U Servers ought to be able to serve.

Number of 1U or 3U Servers	Independent Zones Served
1	45
2	60
3	75
4	90
5	105
6	120
7	135
8	150
9	165
10	180
11	195
12	210
More than 12	Contact Kaleidescape

At the time of publication, Kaleidescape's largest installation to date has 87 players.

A different approach for providing a large number of independent zones is to create groups that each contain no more than 45 independent zones, and import all selections to each group separately. The advantage of this approach is that all zones can simultaneously watch the same movie, because all content is stored on more than one server. The disadvantage is that content must be imported more than once. Depending on the number of zones, fewer servers may be required using this approach.

Systems designed to stream seven or more simultaneous standard definition movies or two or more simultaneous high definition movies must use a Gigabit network.

When designing a large Kaleidescape System, it is important to remember that paused bookmarks are shared by all the players in the group. For example, if the customer with 61 movie players stops *The Bourne Identity* on one of the movie players, the 60 other movie players will resume the movie at the same position if it is selected before the bookmark expires. The length of time that paused bookmarks are saved can be set in the User Web Utility.

6.0 Importing Content to a Group of Servers

To gain the most benefit from the added streaming capacity of additional servers, you should evenly distribute the content among the servers in the group. To do this, all the servers in the system should have the same capacity, and when importing content, all the servers must be turned on and in the same group. If Disk Cartridges are added to increase the capacity of the servers later, add the same number of Disk Cartridges to each server to maintain the same capacity for each.

Imports are slower when several are in progress at once. Importing four discs at once per server will take the shortest possible total time. A server will not accept more than five imports at once. A Speed Reader or Bulk Loader imports two discs at once.

7.0 Control Systems

When using a control system with a central processor, like AMX or Crestron, care should be taken with Kaleidescape Systems that have a large number of zones to ensure that the control processor is not overloaded. Kaleidescape recommends that no more than 15 independent zones be controlled at the same time from a single AMX or Crestron controller. If your system has more than 15 zones that need to be controlled from the same AMX or Crestron system, you should add processors and subdivide the logic between them.

For more information on best practices when using these control systems, refer to the Kaleidescape Programming Manual for AMX and the Kaleidescape Programming Manual for Crestron.

Controllers without central processors than connect directly to Kaleidescape Players, like Philips Pronto controllers or infrared remotes, decentralize the control function. Since these devices interact with only one Kaleidescape player at a time, no special attention is required when using them with a large number of players.

8.0 Conclusion

With proper care, Kaleidescape Systems can be configured to support very large collections of movies or music, or to allow movies and music to be enjoyed at the same time in a very large number of independent zones. For additional information, contact Kaleidescape Support as described on the [Support section of the Kaleidescape website](#).