

# NP Matching 2 System Overview

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# Table of Contents

<b>1 About This Document.....</b>	<b>4</b>
NP Matching 2 System.....	4
Reference Materials .....	4
<b>2 Components and Terms of the NP Matching 2 System .....</b>	<b>5</b>
User .....	5
Matching Server (Server) .....	5
World .....	5
Session.....	6
Lobby and Lobby Member .....	6
Room and Room Member .....	6
Room Owner .....	6
Slot and Slot Number .....	6
Room Group, Group Label and Group Room .....	6
Attribute .....	6
<b>3 Configuration .....</b>	<b>7</b>
Configuration Example 1: Searching for a Room to Play against an Opponent.....	7
Configuration Example 2: Using Lobbies .....	8
Configuration Example 3: Using All the Levels .....	9
<b>4 Details of the Components .....</b>	<b>11</b>
Matching Server (Server) .....	11
World .....	12
Lobby and Lobby Member .....	12
Room and Room Member .....	13
<b>5 Attributes and Basic Information of the Components.....</b>	<b>20</b>
Lobby Attributes and Basic Information .....	21
Room Attributes and Basic Information.....	21
User Attribute and Basic Information.....	25
Lobby Member Attributes and Basic Information .....	25
Room Member Attributes and Basic Information .....	26
<b>6 Obtaining and Searching Components .....</b>	<b>28</b>
Obtaining Matching Server (Server) ID .....	28
Obtaining a List of Worlds .....	28
Obtaining a List of Lobbies.....	28
Obtaining a List of Rooms and Performing a Room Search .....	28
User Search .....	29
Obtaining a List of Lobby Members .....	29
Obtaining a List of Room Members.....	29
<b>7 P2P Communication .....</b>	<b>30</b>
P2P Communication Procedure .....	30
Signaling Option Parameter .....	30
Timing for Starting the Establishment of a P2P Connection .....	31
P2P Disconnection Timing .....	31
Connection Information .....	32

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Network Information .....	33
NAT Traversal Function .....	33
Search Filter and Room Entry Limitation According to NAT Type .....	34
<b>8 Use Cases .....</b>	<b>35</b>
Displaying the World, and Lobby Names .....	35
Performing Searches Using Information that Are Unique to the Application as the Search Conditions .....	35
Reserving Some Room Slots .....	35
Prohibiting Users on the Block List from Joining the a Room .....	35
Performing Team-vs.-team Game Play (Using the Team ID of the Basic Room Member Information) .....	36
<b>9 Development Process .....</b>	<b>37</b>
Registration .....	37
Server Management Tools .....	37
Development Network Environment .....	38

# 1 About This Document

This document explains the Matching system (NP Matching 2 system) of PSN<sup>SM</sup>. The information provided in this document serves as the basic information necessary for designing applications that make use of online play and chats.

## NP Matching 2 System

The NP Matching 2 system is composed of 4 levels – the server, world, lobby, and room. It provides the following functions.

- Room search
- Dynamic room creation
- In-room chat  
Vulgarity filter (filter to conceal inappropriate language) applied
- Data exchange between users in a room
- Room entrance restriction
- Support for team play
- Static lobby setup
- In-lobby chat  
Vulgarity filter (filter to conceal inappropriate language) applied
- User search using the NP ID
- P2P connection establishment between room members

This document provides a detailed explanation on each of the above functions. It also provides an example to show how the functions can be applied in the design of applications. In addition, the registration required for developing an application, as well as for server management, will also be explained.

For details on the actual programming, refer to the documents "NP Matching 2 Library Overview" and "NP Matching 2 Library Reference".

### Note

As a matter of convenience, this document may refer to functions that are not available yet, together with functions that already are, without clearly distinguishing the two.

## Reference Materials

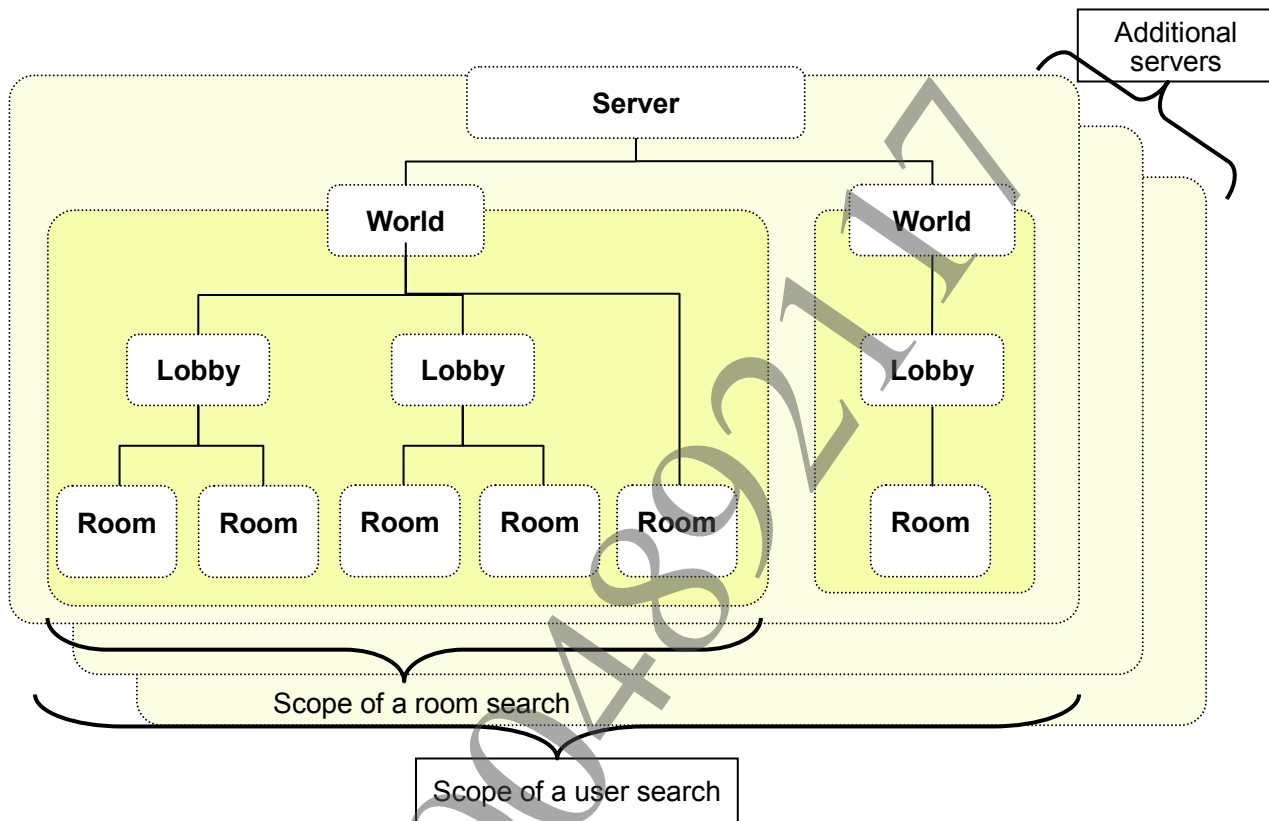
- PSN<sup>SM</sup> Overview  
This document provides an overview of PSN<sup>SM</sup>.
- "NP Matching 2 Library Overview" and "NP Matching 2 Library Reference"  
These documents provide information on the library to be used for utilizing the NP Matching 2 system from an application. For actual programming procedures and implementation examples, refer to these documents.
- Server Management Tools NP Matching 2 Tools User's Guide  
This is a document of the tools related to the NP Matching 2 service of the Server Management Tools (SMT), which are used to make and check various lobby and room settings.

## 2 Components and Terms of the NP Matching 2 System

This chapter explains the components and terms of the NP Matching 2 system.

As indicated in Figure 1, the NP Matching 2 system is composed of four levels - the matching server level, the world level, lobby level, and room level.

**Figure 1 Components of the NP Matching 2 System**



### User

A user refers to the user of the NP Matching 2 system.

### Matching Server (Server)

The matching server (server hereafter) comprises the highest level of the NP Matching 2 system. It provides match making functions to be used by the applications. One or more servers can be allocated to each application (to each NP Communication ID).

### World

A world represents a match making space. Functions of the NP Matching 2 system – such as lobby obtainment and room search – are executed for the lobbies and rooms, respectively, that belong to a world. Multiple worlds can be set under one server.

## Session

A session is a collective term for lobbies and rooms.

## Lobby and Lobby Member

A lobby belongs to a world. It is a space that a user can join, communicate with other members in, and make use of the provided match making functions. A lobby provides functions to enable communication between its members. A lobby can also contain more members than a room. A user in a lobby is referred to as a lobby member.

## Room and Room Member

A room is a space that a user can join, and, for example, play a game against another player. A room belongs to a world or a lobby. A room provides functions to enable communication between its members, and to enable player-vs.-player game play. Entrance to a room can be restricted by a password. A user in a room is referred to as a room member.

## Room Owner

A room owner owns a room. There can only be one room owner among the room members. There are functions and roles that only the room owner can execute and perform. The user who creates a room becomes that room's first room owner. Another member can become a room owner by being explicitly granted with the ownership of the room from the room owner. A member can also become a room owner when the former room owner leaves the room.

## Slot and Slot Number

A slot refers to the area allocated to a user who joins a lobby or a room. The maximum number of users who can join a lobby or room is determined by the number of slots available. Slots are distinguished by slot numbers. Slot numbers are integers in consecutive ascending order, beginning with 1.

## Room Group, Group Label and Group Room

Slots of a room are collectively referred to as a room group. A room group is useful for distinguishing users in a room. A room group can be freely defined by the application. With the group label that is set per room group, it is possible to assign slots to members joining a room or to restrict them. Room groups are distinguished by their group IDs. Group IDs are integers in consecutive ascending order, beginning with 1.

A room with groups set up is referred to as a group room.

## Attribute

Attributes are set for each user, lobby, room, lobby member, and room member. There are flag-type attributes, integer-type attributes, and binary-type attributes. Some are predefined, while others can be freely defined by the application. Some attributes can be used for a search, while others can only be referenced or updated. There are also attributes that can only be referenced or updated by a lobby member or room member, and these are clearly distinguished from the attributes that can be referenced by outside users.

### 3 Configuration

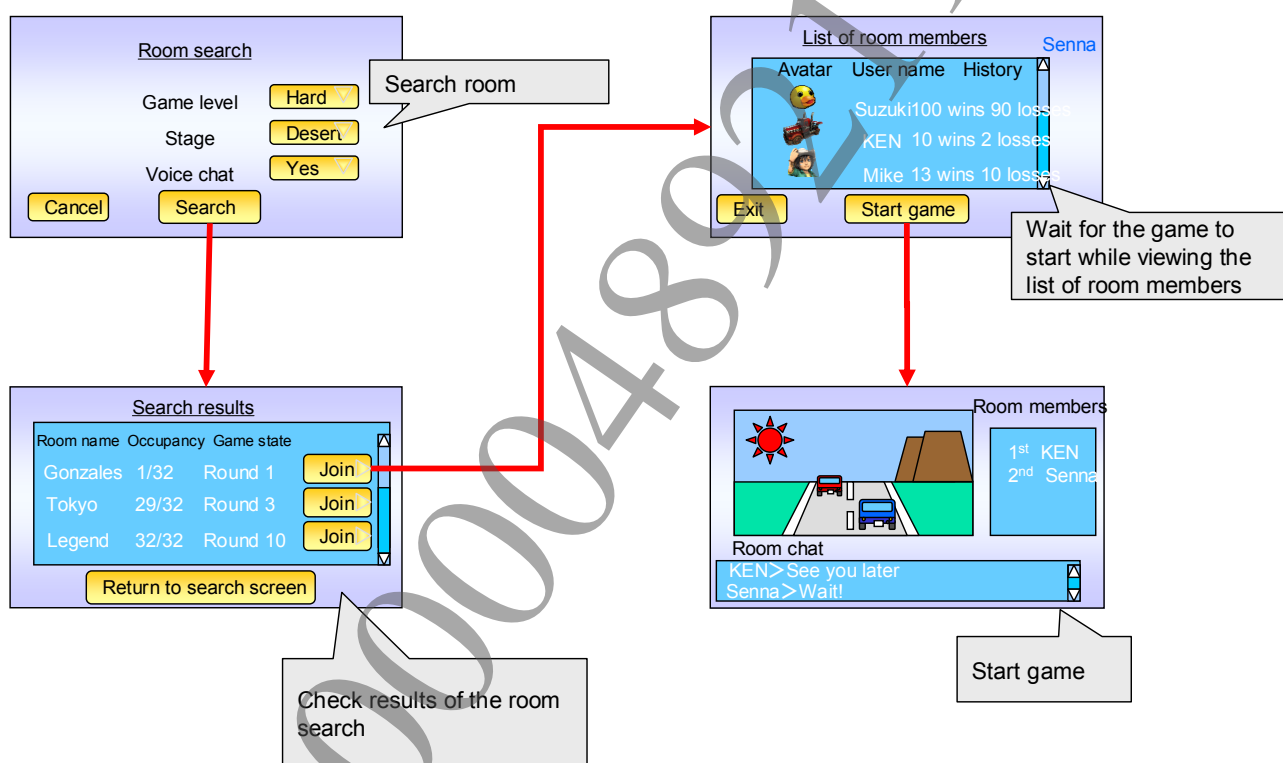
The basic assumption made for network applications of the NP Matching 2 system is that players will join appropriate rooms to perform player-vs.-player game play. Depending on its own design, the application should appropriately configure the components of the NP Matching 2 system. This chapter exemplifies the process of designing an application – up to the point when the appropriate room is joined. This chapter also provides examples of how the NP Matching 2 system can be configured to realize such designs.

#### Configuration Example 1: Searching for a Room to Play against an Opponent

##### Application Design

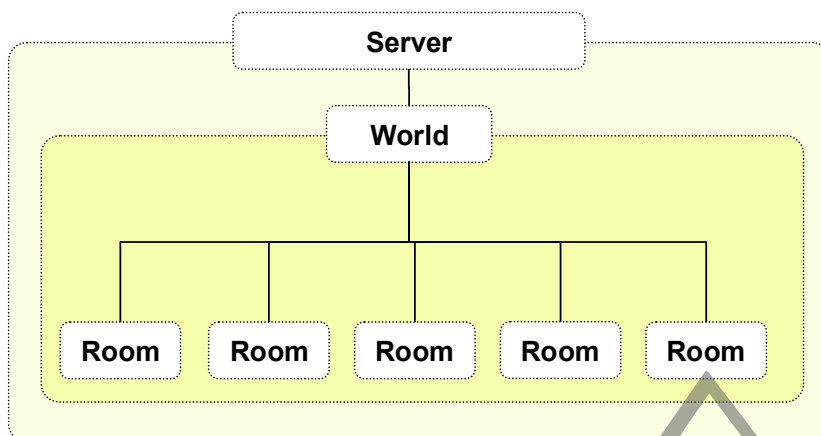
A player creates a room for player-vs.-player game play, or searches for a room that fits this condition and joins it. The player does not take note of the existence of servers or of worlds.

**Figure 2 Configuration Example 1: Design of an Application that Uses the Room Search Function**

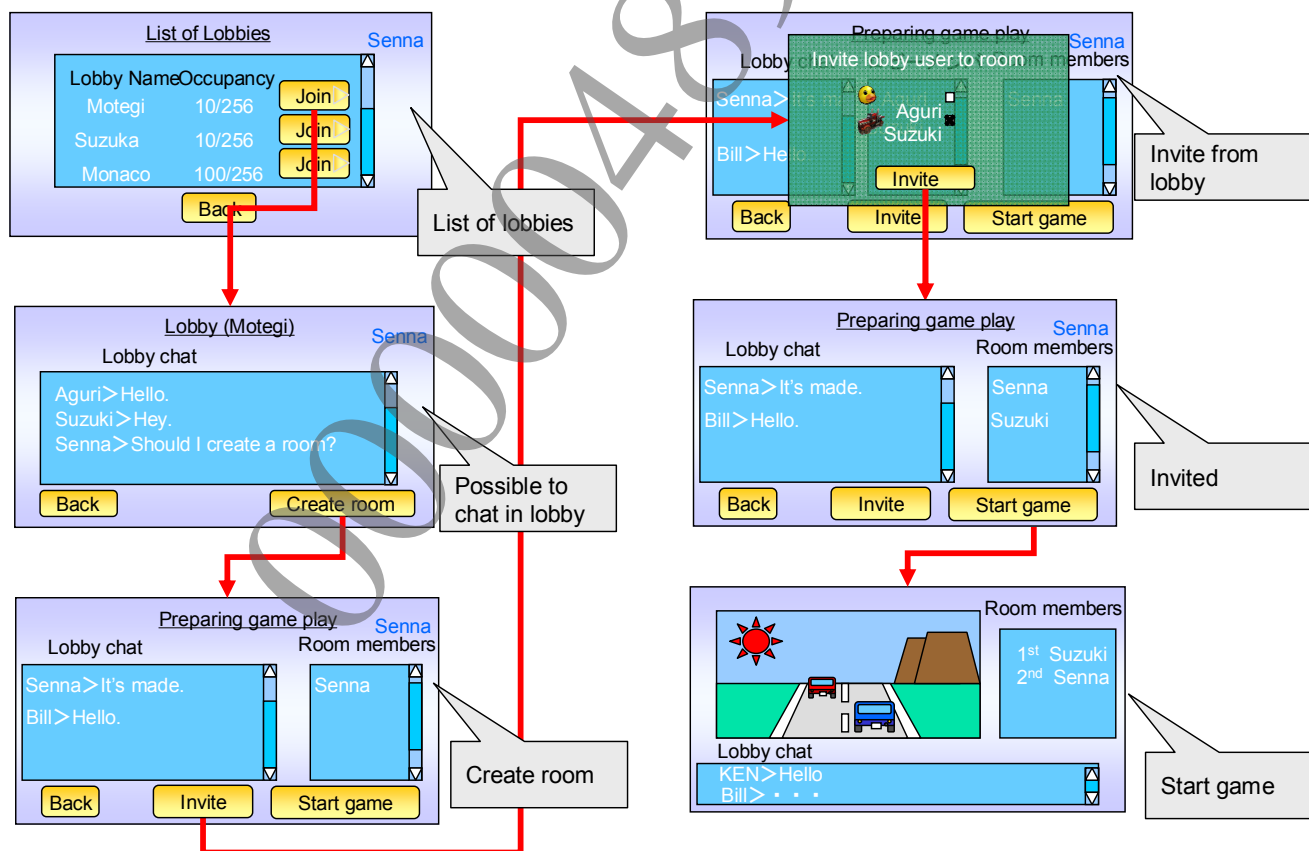


##### Configuration of the NP Matching 2 System

Set up one world under the server, and create a room belonging to this world. Do not set up a lobby. In the above application design, players only acknowledge rooms. The application should thus conceal the existence of the server and the world.

**Figure 3 Configuration Example 1: Configuration When Using the Room Search Function****Configuration Example 2: Using Lobbies****Application Design**

A player first joins a lobby, to chat with other players in the lobby. The player creates a room to perform player-vs.-player game play, or searches for an existing room that fits this condition and joins it. The player can then invite others to his/her room via chats. After the player joins a room, he/she can leave the lobby or stay in it. The player does not acknowledge the existence of servers or of worlds.

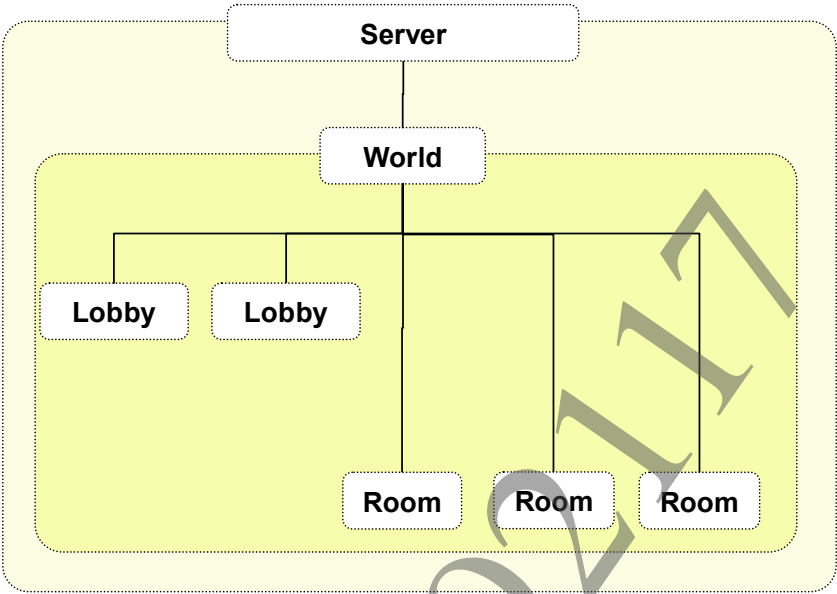
**Figure 4 Configuration Example 2: Design of an Application that Uses Lobbies**



Configuration of the NP Matching 2 System

Set up one world under a server, and set up one or more lobbies under the world. When creating rooms, create them under the same world as the lobbies. In this application design, the player acknowledges lobbies and rooms. The application should thus conceal the existence of the server and the world.

Figure 5 Configuration Example 2: Configuration When Using Lobbies



Configuration Example 3: Using All the Levels

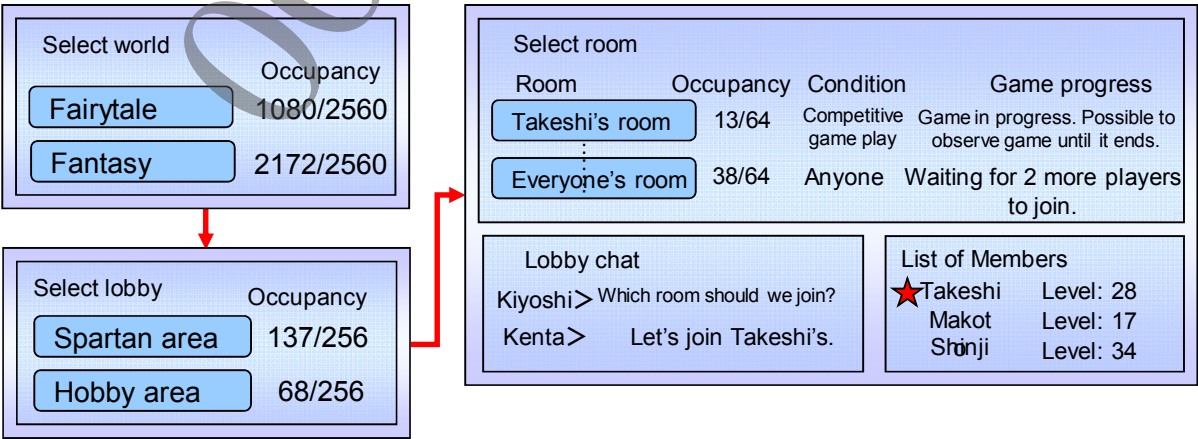
Application Design

The player explicitly selects the world, and session to join, as follows.

- (1) Selects the world from a list of worlds.
- (2) Selects the lobby from a list of lobbies belonging to the selected world.
- (3) Creates a room that belongs to the selected lobby, or selects and joins a room by performing a search among the rooms that belong to the selected lobby.

In relatively large applications, as exemplified above, the levels should be distinguished and utilized to separate each match making space. Also, as indicated in Figure 6, the worlds, and lobbies can be named to enhance the tone or themes of the game.

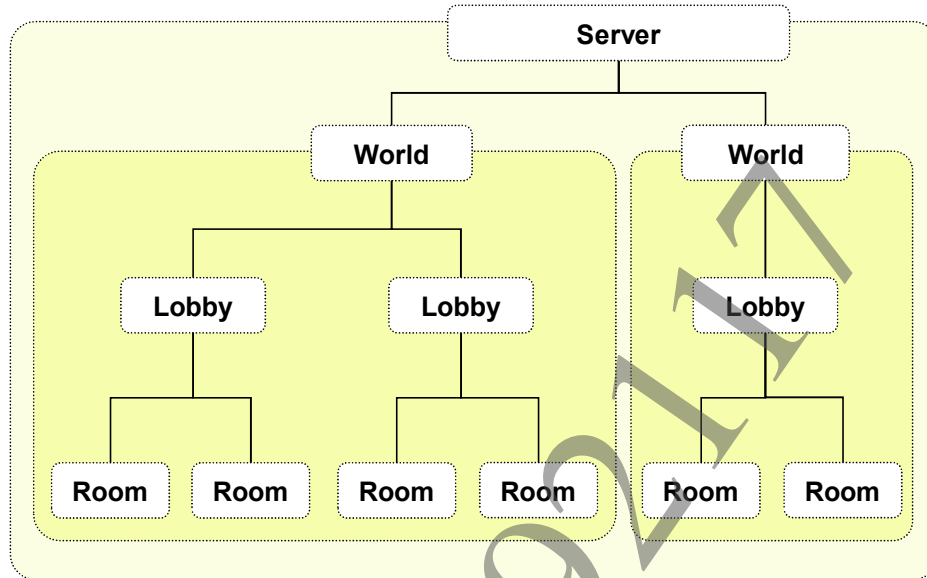
Figure 6 Configuration Example 3: Design of an Application that Uses All the Levels



### Configuration of the NP Matching 2 System

In large-scale applications, Set multiple worlds under a server, and multiple lobbies under each world. Create rooms under each of the lobbies (not directly under the worlds). In this application design, the player acknowledges the hierarchical structure comprised of the worlds, lobbies and rooms, and explicitly makes selections among them.

**Figure 7 Configuration Example 3: Configuration When Using All the Levels**



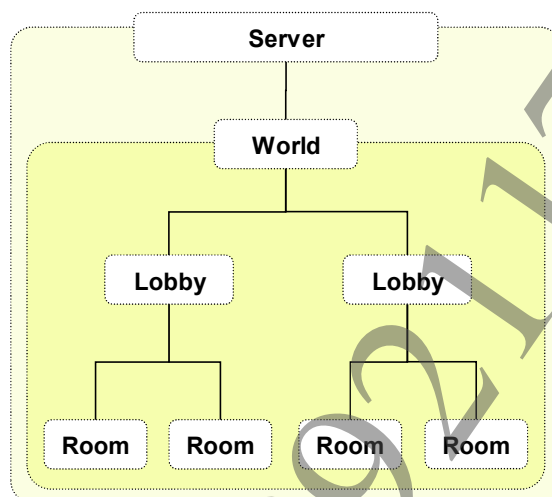
## 4 Details of the Components

This chapter explains the components of the NP Matching 2 system in detail.

### Matching Server (Server)

Basically, one server is assigned to each application (each NP Communication ID).

**Figure 8 Server Settings**



One server can manage approximately 20,000 users. Because no specific upper limit has been set, the behavior of the server may not change significantly even when there are over 20,000 users using one server. However, performance may deteriorate. If the expected number of users exceeds 20,000, please contact SCE in advance.

### Information that Can Be Obtained by the Application

Server information that the application can obtain is as follows.

**Table 1 Server Information that Can Be Obtained by the Application**

Content	Description
Server ID	ID of a set server
Server state	Current state of the servers - Available - Unavailable - Busy - Maintenance

The server ID is a 2-byte ID assigned to each server. The application uses this server ID to identify servers.

The "Busy" state occurs when the server is completely overloaded such that it cannot process additional user requests. (It does not indicate that the maximum number of users has been reached.) The application must handle this state just like it does the "Unavailable" and "Maintenance" states.

## World

A world belongs to a server. It is a unit of space for obtaining a list of lobbies, and for searching rooms. To obtain a list of lobbies or to search for a room, specify a world and obtain the list of lobbies and rooms belonging to that world.

Up to 64 worlds can be set to one server. Each world has a unique number in the server, called the world number. World numbers are assigned in ascending order beginning with 1. In addition to world numbers, there is also the world ID, which can be obtained by the application via the NP Matching 2 library. This world ID is a 4-byte ID that is unique to each application (NP Communication ID). The application distinguishes worlds using this world ID.

Register the number of worlds to set and their world numbers upon developing the application. Make world settings per application according to the contents of this registration. For more details on the registration contents, refer to the chapter "Development Process".

Once the number of worlds and their world numbers are set, they will always remain fixed. Note that after the application's master disc submittal, it will not be possible to make changes to them.

### Information that Can Be Obtained by the Application

The application can obtain a list of world IDs, for the worlds set for it. Other information associated to each world can be obtained as well. World information that the application can obtain is as follows.

**Table 2 World Information that Can Be Obtained by the Application**

Content	Description
World ID	ID of a set world
Number of lobbies	Number of lobbies belonging to the world
Maximum capacity of the lobbies	Total number of members that can be held by all the lobbies belonging to the world
Number of members in the lobbies	Total number of members currently in all the lobbies belonging to the world
Number of rooms	Number of rooms currently belonging to the world
Number of members in the rooms	Total number of members currently in all the rooms belonging to the world
Entitlement ID	Entitlement ID required for using the world (*not currently used)

## Lobby and Lobby Member

A lobby is a communication space that can be joined by a user. It provides functions to enable communication between lobby members.

A lobby belongs to a world. Up to 64 lobbies can be set under each world. Each lobby has a unique number in the world, called the lobby number. In addition to lobby numbers, there is also the lobby ID, which can be obtained by the application via the NP Matching 2 library. This lobby ID is an 8-byte ID that is unique to each application (NP Communication ID). The application uses this lobby ID to distinguish lobbies.

Up to 256 users can join each lobby. The maximum number of members for a lobby can be set freely within this value.

Use the SMT to set the world under which you want to set the lobbies, the number of lobbies to set, the maximum number of members for each lobby, and the lobby numbers. For details, refer to the document "Server Management Tools NP Matching 2 Tools User's Guide".

Once you set the world under which the lobbies are to be set, the number of lobbies to set, and their lobby IDs, they will always remain fixed. Note that after the application's master disc submittal, it will not be possible to make changes to them.

### Information that Can Be Obtained by the Application

The application can obtain a list of lobby IDs, for the lobbies set for it. It can also obtain information associated to each of the lobbies. Lobby information that can be obtained by the application is as follows.

**Table 3 Lobby Information that Can Be Obtained by the Application**

Content	Description
Lobby ID	ID of a set lobby
Number of members in the lobbies	Number of members currently in the lobby

### Joining a Lobby and the Lobby Member ID

The number of slots in a lobby is determined by the value for the maximum number of members set for that lobby. Each slot will have a slot number assigned to it, from 1, to the maximum number of members set. When a player joins a lobby, one of the open slots will be allocated to that player.

A lobby member will have a unique ID called the lobby member ID attached to him/her. The application distinguishes lobby members using this lobby member ID. A different lobby member ID will be allocated every time a player joins a lobby. Thus, if a player leaves a lobby and reenters it, the player will be given a new (different) lobby member ID.

### Obtaining a List of Lobby Members and Being Notified of a Member Joining or Leaving

Once a player joins a lobby, he/she can obtain a list of members in that lobby.

A player can join or leave a lobby at any time. Settings can be made so that other members are notified when a new member joins the lobby, or when a member leaves it. Upon such a notification, information to identify the applicable user, including his/her lobby member ID, NP ID etc., will be notified as well. Make setting to enable or disable notifications using the SMT.

When managing lobby members on the application, first obtain the list of lobby members, save it, and update this list every time a notification is received about a member joining or leaving the lobby.

### Lobby Chat Message

Messages can be exchanged between lobby members via the lobby server. A selection can be made from unicast – targeting a particular lobby member, multicast – targeting multiple lobby members, and broadcast – targeting all lobby members.

In the NP Matching 2 system, data sent in the text format in a text chat between lobby members is referred to as a lobby chat message.

A vulgarity filter will be applied to lobby chat messages, on the lobby server. Only UTF-8 is supported as the text data of a lobby chat message.

### Room and Room Member

A room is a space that a user can join to communicate with other room members, and to perform player-vs.-player game play.

A room belongs to a world or a lobby. Up to 5000 rooms can be created per world. Rooms are not statically created like servers, worlds, and lobbies. An application can dynamically create a room at any time. A created room will automatically be given a room number. In addition to this room number, there is a room ID, which can be obtained by the application via the NP Matching 2 library. This 8-byte ID is unique to each application (NP Communication ID). An application distinguishes rooms using this room ID.

Up to 64 users can join one room. The maximum number of members for each room can be set freely within this value.

### **Information that Can Be Obtained by the Application**

The application can search for a created room and obtain a list of rooms. It can also specify search conditions to narrow the rooms to be obtained on the list. Moreover, information associated to each room can be obtained as well. For details, refer to the chapters "Attributes and Basic Information of the Components" and "Obtaining and Searching Components".

### **Joining a Room and the Room Member ID**

The number of slots in a room is determined by the value for the maximum number of members set for that room. Each slot will have a slot number assigned to it, from 1, to the maximum number of members set. When a player joins a room, one of the open slots will be allocated to that player.

A room member will have a unique ID called the room member ID attached to him/her. The application distinguishes room members using this room member ID. A different room member ID will be allocated every time a player joins a room. Thus, if a player leaves a room and reenters it, the player will be given a new (different) room member ID.

### **Room Owner**

A room always has one room member with the role of being the room owner. When a room is created, the user who created the room becomes that room's first room owner, and joins the number 1 slot of that room.

The room owner can perform the following operations.

- Set and modify room attribute values (some room attributes can also be set by other members of the room)
- Kick out a room member
- Transfer room ownership to another room member
- Reset enable/disable setting of the room password

Note that in order to correctly maintain the state of the room, data may be exchanged between the client - the room owner - and the server.

### **Transfer of Room Ownership**

Room ownership can be explicitly passed onto another room member from the application. If the automatic transfer of room ownership has been enabled upon the creation of that room in its room settings, room ownership will be automatically passed onto another room member when the room owner leaves the room.

If a priority order has not been set by the application, or if all the room members who have been set with priorities no longer remain in the room, room ownership will be transferred to a randomly selected room member.

### **Room Deletion**

When the room owner leaves the room, the room will be deleted automatically and its members will be forced to leave the room. The exception to this, as mentioned above, is when the automatic transfers of room ownership have been enabled in the room's settings. In this case, when the room owner leaves the room, room ownership will be passed onto another room member. This room member will then become the new room owner, and the room will remain in existence.

## Obtaining a List of Room Members and Being Notified of a Member Joining or Leaving

The application can obtain a list of members in a room.

A player can join or leave a room at any time. Other members can be notified when a new member joins a room, or when a member leaves. Upon such a notification, information to identify the applicable user, including his/her room member ID, NP ID, etc., will be notified as well. Notifications of members joining or leaving will always be made.

When managing room members on the application, obtain and save the list of room members, and update this list whenever a notification is received about a member joining or leaving the room.

## Room belonging to a Lobby

When creating a room, specify the applicable world to which the room will belong. If you specify a lobby in addition to the world, the room you create will belong to the specified lobby.

A room search is usually performed per world. If a lobby is specified, the search can be narrowed to cover only the rooms belonging to the specified lobby.

## Room Chat Message and Room Message

Messages can be exchanged between room members via the room server. A selection can be made from unicast – targeting a particular room member, multicast – targeting multiple room members, and broadcast – targeting all room members. In addition to explicitly specifying multiple targets, in multicast, it is possible to specify the team ID and to have the message sent to all room members with the specified team ID. For details on the team ID, refer to the chapters "Attributes and Basic Information of the Components" and "Use Cases".

In the NP Matching 2 system, text data that is exchanged between the room members is referred to as a room chat message, and any binary data exchanged between the room members is referred to as a room message.

A vulgarity filter will be applied to room chat messages, on the room server. Only UTF-8 is supported as the text data of a room chat message.

Message flow limits are applied by the server to room message transmissions. Make sure that room messages sent by each client do not exceed 512 bytes/sec. If room messages continue to be sent with a frequency that exceeds this limit, a request overflow error will be returned, room messages will no longer be able to be sent, and a subsequent 30-second busy state will continue.

Note that the following overhead is applied to the message flow limit of room messages.

- Header: 45 bytes
- When `SCE_NP_MATCHING2_SEND_MSG_OPTION_WITH_NPID` is specified: +28 bytes

## Room Password

1 password, called the room password, can be set to each room. When the room password is enabled, only users with the password matching the room password, or users who have been granted permission to join the room without the password (described in more detail in a subsequent section) will be able to join the room. The use of a room password enables some room slots and room groups – to be reserved for certain users.

A password set to a room can be enabled or disabled per slot. For the later-described group room, this setting can be made per group instead of per slot. In addition, a room owner can change the setting to switch the enabling/disabling of the room password for a room slot or room group at any time.

When the user presents a room password upon joining a room, a check is made to see if that password matches the password set to the room.

If there is a match, that user will have priority in joining a slot or a room group for which the room password is enabled. If all these slots or room groups have already been joined and there is no opening, the user will join, if available, a slot or room group for which the password is disabled.

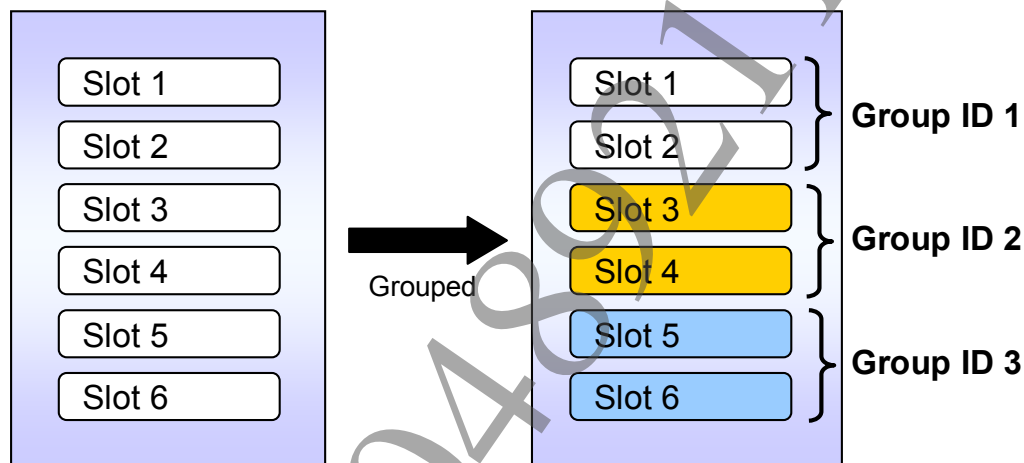
If the passwords do not match, the user will be unable to join any slot or room group in that room, even if there is a free slot or room group for which the room password is disabled.

If the user joins a room without presenting a password, the user will join, if available, a slot or room group for which the password is disabled.

### Group Room, Group Label, and Room Group

A room of the NP Matching 2 system can have groups. When a room is created, multiple consecutive slots can be grouped together. A group ID is attached to each room group. The room group containing slot 1 is assigned with the group ID 1. In the order of increasing slot numbers, the room groups are subsequently given group IDs increasing in value by 1 (see Figure 9). A room with room groups set in it is referred to as a group room. Note that when room groups are set upon the creation of the room, it will not be possible to change this room group configuration later on.

**Figure 9 Room Groups and Group IDs**

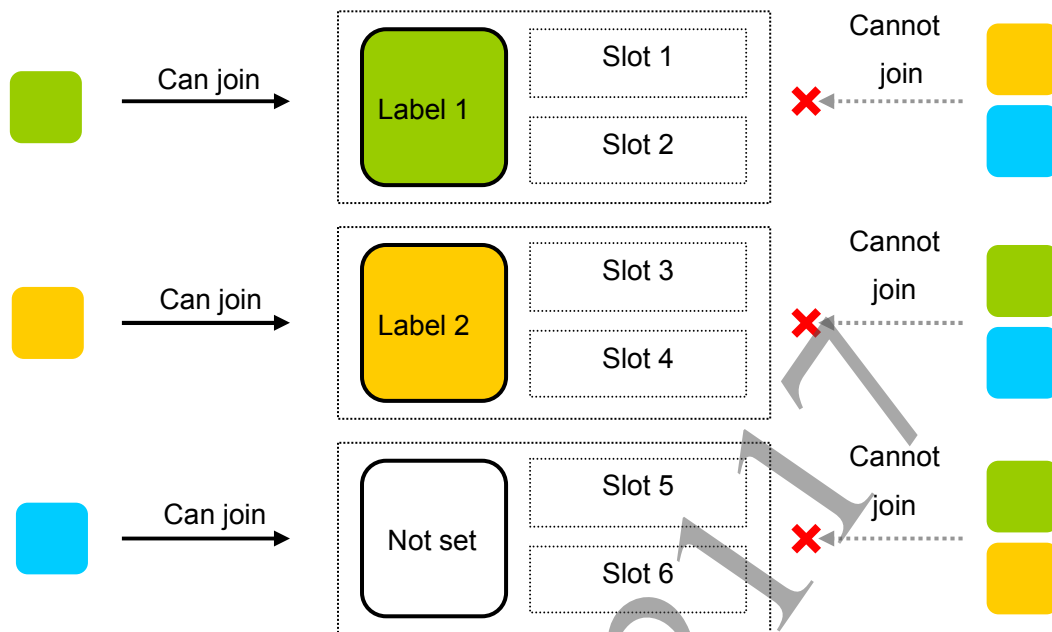


Each room group has a label called the group label. A group label can be set per room group. Upon the creation of a room, there can be a mixture of room groups with group labels set to them, and those without. Each group label must be unique.

A user joining a group room must always present a group label. Only a user with a group label matching the group label set to a room group can join that group. If there are no open slots within that room group, this processing to join the room will result in an error, even if there are room groups without group labels set to them.

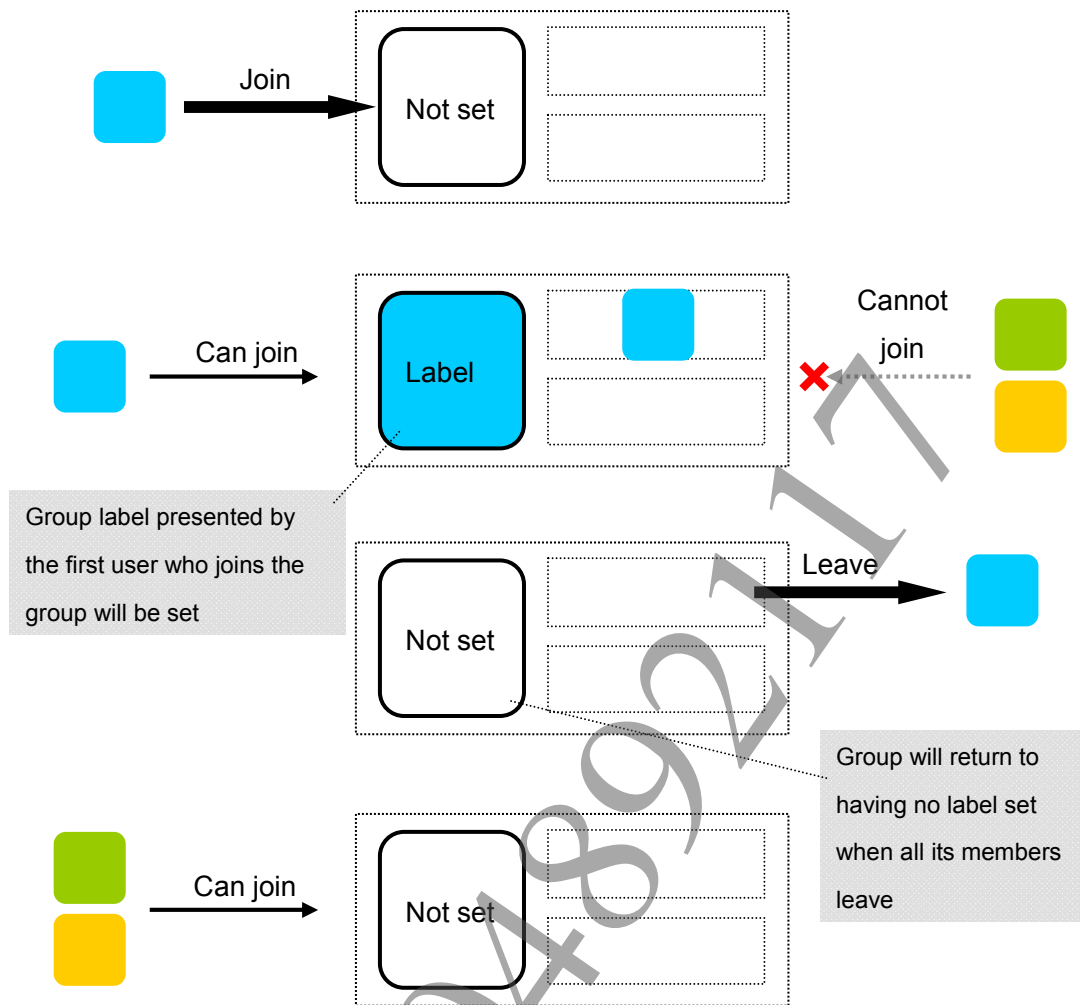
If there is no room group with the group label that matches the one presented by the user upon joining the room, the user will join a room group without a group label set to it. If there are no room groups without group labels set, or if all the slots are full, this processing to join a room will result in an error.



**Figure 10 Room Groups and Group Labels**

When a user joins a room group without a group label set to it, the group label presented by the user will automatically be set as that room group's group label. Subsequently, only users with the same group label will be able to join this room group.

When all the room members joined into a room group that doesn't have a group label set to it, upon the room's creation, leaves the room, that room group will automatically go back to having no group label set to it. On the other hand, a room group with a group label set to it upon the room's creation will always keep that group label, regardless of its members leaving.

**Figure 11 Automatic Setting of Group Labels**

By setting a room group and a group label, restrictions can be placed to ensure that only certain users are able to join a particular room group. Use this function to reserve a room group for a certain user and to invite him/her to that room, or to only permit certain team members to join when performing team-vs.-team game play. For more information on the usage of the room groups and group label, refer to the chapter "Use Cases".

#### **Grant Users with Permission to Join Room without a Password**

When creating a room with a room password, it is possible to specify and grant users with permission to join this room without a password. Note that this specification must be made when the room is created. Up to 100 users can be set.

When a user who has been granted permission to join a room without a password joins a room/group room, behavior will be the same as when a user who presents a matching password joins the room with the matching password set to it.

Use this function to reserve some room slots for certain users, or to only allow the friends of the room creator to have unconditional access to the room.

**Prohibit Users from Joining Room**

It is possible to specify and prohibit users from joining a room. This specification must be made when the room is created. The specified users will then be unable to join that room. Up to 100 users can be set.

Use this function, for example, to prevent users on the block list of the room creator, from joining the room.

**Setting the Priority Order of Room Members for Automatically Transferring Room Ownership**

A priority order among the room members can be set for the automatic transfer of the room ownership. Set this priority order to a room after it is created.

Use this function to prioritize the transfer of room ownership to the appropriate room member in light of the network conditions, and the conditions unique to the application.

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## 5 Attributes and Basic Information of the Components

The components (user, lobby, lobby member, room, and room member) of the NP Matching 2 system each hold various data areas that are called attributes. Values of the attributes can be obtained from, and set by, the application. The application can use these values to synchronize information within the application, or to perform room searches appropriately.

Attributes have various characteristics. These include the datatype of the attribute, whether the data contents are predefined or if the application can freely define and use them, whether the value can be updated from the application or if the value will be updated automatically, and whether or not the attribute can be used as a search condition.

There are 3 datatypes – the flag-type, integer-type, and binary-type, for attributes. A flag-type attribute has information defined to it that can be represented as a flag, such as, whether a room is full or not. An integer-type attribute and a binary-type attribute hold information defined by the application; they are represented by an integer value and a variable data, respectively, and can be used for various purposes.

Each attribute has an attribute ID allocated to it. A constant is defined to represent each attribute ID. The application uses this constant to specify the attribute when obtaining or setting its value. In addition, the constants representing the flag values of the flag-type attributes are defined, and they are used by the application when handle the flag-type attributes.

In addition to the attributes, each component has "basic information" attached to it, which can be obtained or set. For example, a room's basic information includes the maximum number of members set for that room, and the number of members currently in the room. Basic information is defined as members of the data structure for representing each component.

For attribute IDs, constants of flag-type attribute values, and structures representing each component, refer to the document "NP Matching 2 Library Reference".

The attributes and basic information of each component are explained as follows.

The "Setting" column in the tables below represents whether the value of the attribute or the basic information can be set or changed by the application. "External Reference" represents whether the value can be obtained by users who are not joined into the applicable lobby or room. "Search" represents whether the item can be used as a search condition.

## Lobby Attributes and Basic Information

The attributes of a lobby are as follows.

**Table 4 Lobby Attributes**

Attribute Type	Attribute	Description	Setting	External Reference	Search
Flag-type	Flag regarding the notification of a member joining or leaving the lobby	Indicates whether other lobby members will be notified when a new member joins or when a member leaves the lobby. (1: notification enabled, 0: notification disabled)	No *1	No	No

Basic information of lobbies is as follows.

**Table 5 Basic Lobby Information**

Information Name	Description	Setting	External Reference	Search
Server ID	ID of the server to which the lobby belongs.	No	Yes	No
World ID	ID of the world to which the lobby belongs.	No	Yes	No
Lobby ID	ID of the lobby.	No	Yes	No
Total number of slots (maximum number of members)	Maximum number of members set for the lobby	No *1	Yes	No
Number of current members	Number of members currently in the lobby (number of lobby members)	No *2	Yes	No
Lobby member ID list	List of IDs of lobby members who are currently joined.	No	No	No

\*1: Preset by the registration made upon developing the application.

\*2: Value set and updated automatically according to each state.

## Room Attributes and Basic Information

For room attributes, there are attributes that can only be referenced internally (by members in the room) - for synchronizing data between room members; attributes that can also be referenced externally (by users outside the room); and common attributes that can be referenced by users both in and outside the room.

You can enhance performance of the NP Matching 2 system by appropriately using the three kinds of attributes described above. For example, use an attribute that can only be referenced internally when handling data which does not have to be referenced by users outside the room. Make sure the application uses the respective attributes for purposes that befit each of their characteristics.

Common room attributes that can be referenced by users both in and outside the room are as follows.

**Table 6 Common Attributes that Can Be Referenced by Users in and outside the Room**

Attribute Type	Attribute	Description	Setting	External Reference	Search
Flag-type	Automatic room ownership grant flag	Indicates whether the room ownership will be automatically granted to another room member when the room owner leaves the room. (1: automatic granting, 0: manual granting)	Yes *3	Yes	No
	CLOSED flag	Indicates whether the room is accepting members to join it. When the room is closed, users will be unable to join the room. (1: closed, 0: open)	Yes	Yes	Yes
	FULL flag	Indicates whether the room is full. When the room becomes full, this flag will be automatically set and users will be unable to join the room. (1: full, 0: not full)	No *4	Yes	Yes
	Search not applicable flag	Indicates whether the room is applicable for a room search. If it is not applicable for a room search, even when a search is performed and the search conditions match the conditions of this room, it will not be considered a match. (1: not applicable, 0: applicable)	Yes	Yes	No
	NAT type room entry limitation flag	Indicates whether or not room entry is limited by the user's NAT type. If room entry is limited, a user with a NAT type that cannot establish a P2P connection with a room member can no longer join the room. (1: limited, 0: no limit)	Yes	Yes	No

Basic information of rooms is as follows.

**Table 7 Basic Room Information**

Information	Description	Setting	External Reference	Search
Server ID	ID of the server to which the room belongs.	No	Yes	No
World ID	ID of the world to which the room belongs.	No	Yes	No
Lobby ID	ID of the lobby to which the room belongs.	No	Yes	No
Room ID	ID of the room.	No	Yes	No
Total number of slots (maximum number of members)	Maximum number of members set for the room	No *3	Yes	Yes
Number of current members	Number of members currently in the room (number of room members).	No *4	Yes	No
Password slot mask	Information representing the slot for which the room password is set.	Yes	Yes	No
Room owner information	Information representing the room owner. It contains the NP ID.	No	Yes	No
Room member list	List of room members who have joined the room.	No	No *5	No
Room group information	Information about the room group that was set for the room.	No	Yes	No

\*3: Can only be set when the room is created – the value cannot be changed after the room is created.

\*4: Value will be automatically set and updated according to each state.

\*5: If the application executes a request for obtaining room member information, a room member list can be obtained from outside the room.

Room attributes that can only be referenced internally are as follows. Use these attributes if you want to freely define them in the application, and to synchronize data among the members in the room.

**Table 8 Room Attributes that Can only Be Referenced Internally**

Attribute Type	Attribute	Description	Setting	External Reference	Search
Binary-type	Internal room binary attribute 1 *6	Data area of 256 bytes. The application can freely define and use it.	Yes	No	No
	Internal room binary attribute 2 *6	Data area of 256 bytes. The application can freely define and use it.	Yes	No	No

\*6: When this attribute value is set or changed, a message indicating that the change occurred and the new attribute value can be reported to other room members.

The room attributes that can be referenced externally are as follows. Use these attributes if you want to define them freely in the application, and to synchronize information with users outside the room.

**Table 9 Room Attributes that Can Be Referenced Externally**

Attribute Type	Attribute	Description	Setting	External Reference	Search
Integer-type	External room search integer attribute 1	Integer value of 32 bits. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes
	External room search integer attribute 2	Integer value of 32 bits. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes
	External room search integer attribute 3	Integer value of 32 bits. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes
	External room search integer attribute 4	Integer value of 32 bits. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes
	External room search integer attribute 5	Integer value of 32 bits. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes
	External room search integer attribute 6	Integer value of 32 bits. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes
	External room search integer attribute 7	Integer value of 32 bits. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes
	External room search integer attribute 8	Integer value of 32 bits. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes
Binary-type	External room binary attribute 1	Data area of 256 bytes. The application can freely define and use it.	Yes	Yes	No
	External room binary attribute 2	Data area of 256 bytes. The application can freely define and use it.	Yes	Yes	No
	External room search binary attribute 1	Data area of 64 bytes. The application can freely define and use it as a search condition for a room search.	Yes	Yes	Yes



## User Attribute and Basic Information

A user attribute refers to an attribute that all users of the NP Matching 2 system, even those who are not joined into a lobby or a room, have. This user attribute can be set or obtained at any timing, irrespective of the state of the user being joined into a lobby or a room. A user attribute is as follows.

**Table 10 User Attribute**

Attribute Type	Attribute	Description	Setting	External Reference	Search
Binary-type	User binary attribute 1	Data area of 128 bytes. The application can freely define and use it. *Not currently provided.	Yes	Yes	No

The following table shows basic information kept for a user.

**Table 11 Basic User Information**

Information	Description	Setting	External Reference	Search
NP ID	User's NP ID.	No	No	No
Joined session information	Information representing the session that the user has currently joined. It contains the session ID and the date and time the user joined.	No *8	Yes	No

\*7: You can specify whether this information will be used when creating the context in the NP Matching 2 library. If it is to be used, this setting is made automatically.

\*8: This value is automatically set or updated according to the joined state.

## Lobby Member Attributes and Basic Information

These are the attributes and basic information held by each lobby member. This information is valid only while the member has joined the lobby. Some lobby member attributes can only be referenced by lobby members from within the lobby.

The following table shows basic lobby member information.

**Table 12 Basic Lobby Member Information**

Basic Information Name	Description	Setting	External Reference	Search
Lobby member ID	Lobby member's ID.	No *9	No	No
NP ID	Lobby member's NP ID.	No *9	No	No
Joined date/time	Date and time that the member joined the lobby.	No *10	No	No
Joined session information	Information representing the session that the lobby member has joined.	Yes *11	No	No

\*9: Automatically set when the member joins the lobby.

\*10: You can specify whether this information will be used when creating the context in the NP Matching 2 library. If it is to be used, this setting is made automatically.

\*11: This is different from the joined session information in the basic user information in that it is not set automatically. The application explicitly sets and uses this value.

The following table shows attributes that can only be referenced internally by lobby members.

**Table 13 Lobby Member Internal Reference-Only Attributes**

Attribute Type	Attribute Name	Description	Setting	External Reference	Search
Binary type	Lobby member internal binary attribute 1 *12	64-byte data area held by each lobby member. The application is free to use this area in any manner.	Yes	No	No

\*12: When this attribute value is set or changed, a message indicating that the change occurred and the new attribute value can be reported to other room members.

## Room Member Attributes and Basic Information

Each room member holds room member attributes and basic information. These are only valid while the member remains in the room. Room member attributes include common room member attributes, and room attributes that can only be referenced internally.

Common room member attributes held by each room member are as follows.

**Table 14 Common Room Member Attributes**

Attribute Type	Attribute	Description	Setting	External Reference	Search
Flag-type	Room owner flag	Indicates whether the member is a room owner. (1: room owner, 0: normal room member)	No *13	Yes	No

\*13: Automatically set or modified upon room creation or the transfer of room ownership.

Basic information held by each room member is as follows.

**Table 15 Basic Room Member Information**

Information	Description	Setting	External Reference	Search
Room member ID	Room member's ID.	No *14	No	No
NP ID	Room member's NP ID.	No *14	No	No
Joined date/time	Date and time that the room member joined the room.	No *15	No	No
Team ID *16	Area to store any value representing the team ID that was defined by the application at the time of team-vs.-team game play	Yes	Yes	No
NAT type	Represents the client's NAT type.	No *14	No	No

\*14: Automatically set when the member joins the room.

\*15: You can specify whether this information will be used when creating the context in the NP Matching 2 library. If it is to be used, this setting is made automatically.

\*16: This attribute supports an application that separates room members into teams for team-vs.-team play. For details, refer to the chapter "Use Cases".

The attribute that can only be referenced internally, and held by each room member, is as follows.

**Table 16 Room Member Attribute that Can only Be Referenced Internally**

Attribute Type	Attribute	Description	Setting	External Reference	Setting
Binary-type	Internal room member binary attribute 1 *17	Data area of 64 bytes held by each room member. The application can freely define and use it.	Yes	No	No

\*17: Upon setting or changing the attribute value, the change and the new attribute value can be notified to the other room members.

## 6 Obtaining and Searching Components

A list of each of the components of the NP Matching 2 system can be obtained, and a search can be performed by component. This chapter explains the functions for obtaining each of the components, as well as the functions for performing a search.

### Obtaining Matching Server (Server) ID

Execute the server obtaining API to obtain the server ID and server status for the server allocated to the application.

### Obtaining a List of Worlds

Execute the API for obtaining a list of world lists, to obtain a list of all the worlds belonging to the specified server. Specify the server ID to obtaining the worlds belonging to that server.

### Obtaining a List of Lobbies

Execute the API for obtaining a list of lobbies belonging to the specified world. Specify the world ID for obtaining the lobbies belonging to that world.

### Obtaining a List of Rooms and Performing a Room Search

Execute the API for performing a room search, to obtain a list of rooms belonging to the specified world or lobby. It is also possible to specify search conditions and to obtain a list of rooms that match these conditions. Specify the world ID or lobby ID to obtain the rooms belonging to it.

#### List Order

The rooms on the obtained list will be ordered by the date when each room was created, with the room that was created first being first on the list.

#### Specifying the Scope

Of the rooms that currently exist, the index of the oldest room is assigned with the number 1. Thus, the scope of rooms that you want to cover can be specified: specify the index number of the room that you want as the first item on your list, and then specify how many items you want on your list. Up to 20 rooms can be obtained at one time.

#### Attributes that Can Be Specified as Search Conditions

For attributes that can be specified and compared as a search condition for a room search, refer to the "Search" column in the tables under the section "Room Member Attributes and Basic Information" of the chapter "Attributes and Basic Information of the Components".

#### Specifying Multiple Search Conditions

The attributes that can be specified as a search condition can be specified together. When search conditions are specified together, an AND search is performed. Only rooms that meet all the specified search conditions will be returned. Note that an OR search is not supported.

#### Comparison Operator

The attribute value specified as the search condition is compared to arbitrary values in the search. The comparison operators, and applicable attribute types that can be specified in the NP Matching 2 system, are as follows.

**Table 17 Comparison Operator and Attribute Types**

Comparison Operator	Flag-type	Integer-type	Binary-type
Equal (=)	Yes	Yes	Yes
Not equal (!=)	Yes	Yes	Yes
Greater than (>)	No	Yes	No
Greater than or equal to (>=)	No	Yes	No
Less than (<)	No	Yes	No
Less than or equal to (<=)	No	Yes	No

## User Search

In the NP Matching 2 system, the NP ID can be used as a key to perform a user search. The user with the specified NP ID can be searched for. If the user is currently using the NP Matching 2 system, his/her user attributes and information on his/her currently joined-in session can be obtained. Session information includes the world ID, lobby ID, room ID, and the date the user joined that session.

## Obtaining a List of Lobby Members

Execute the API for obtaining a list of lobby members' IDs, to obtain a list of lobby members' IDs in the lobby that you are currently joined into. Also, detailed information regarding the lobby members can be obtained by specifying the lobby member ID and executing the lobby member acquisition API.

## Obtaining a List of Room Members

Execute the API for obtaining a list of room members, to obtain a list of room members.

Note that this list can be obtained externally, for a room that you are not currently joined into.

You can also select the order by which the items on your list are to be listed.

- By the date the members joined the room (oldest first)
- By the slot numbers (smallest first)

## 7 P2P Communication

The NP Matching 2 library provides a function for automatically establishing P2P connections between room members when a member joins a room. It also provides a function for comparing the NAT type of a client and the NAT type of a room member and excluding rooms for which an appropriate P2P connection cannot be made from the room search results preventing members from joining that room.

### P2P Communication Procedure

The procedure for performing P2P communication between room members in the NP matching 2 library is as follows.

#### Set signaling option parameter

To perform P2P communication between room members, set the signaling option parameter when creating a room. The signaling option parameter specifies the P2P connection topology, and either full mesh or star can be selected. If star is selected, also specify the host that will be the hub (the default is the room owner).

The room owner can also change the signaling option parameter at times other than when creating a room.

#### Wait to receive an ESTABLISHED event

A P2P connection is automatically established based on the signaling parameter when a room member joins or leaves the room. When the P2P connection is established, the `SCE_NP_MATCHING2_SIGNALING_EVENT_ESTABLISHED` event is reported together with the peer's member ID to the signaling callback function.

When the P2P connection cannot be established, the `SCE_NP_MATCHING2_SIGNALING_EVENT_DEAD` event is reported.

#### Get IP address and port number

After the P2P connection is established, call `sceNpMatching2SignalingGetConnectionStatus()` together with the peer's member ID to obtain the IP address and port number.

#### Send and receive data using socket APIs

Either the UDPP2P or TCP over UDPP2P protocol is used for P2P communication. For the peer's address and port number, use the values that were obtained by the API mentioned above. For UDPP2P and TCP over UDPP2P, refer to the "Network Overview" document.

### Signaling Option Parameter

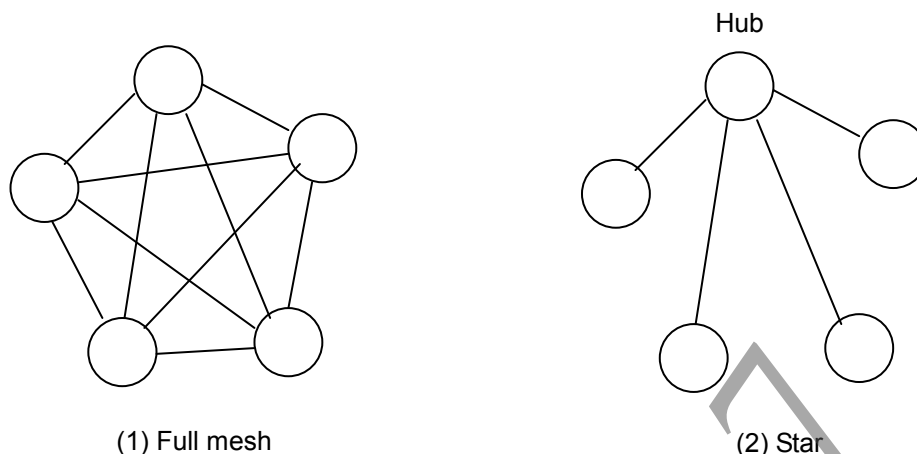
The signaling option parameter specifies the P2P connection topology. The P2P connection topologies that can be specified in the NP Matching 2 library are as follows.

#### (1) Full Mesh

Every room member establishes a P2P connection with every other room member.

#### (2) Star

When a star topology is specified, a room member who will be the hub is also specified at the same time as the signaling option parameter. The room member who is specified as the hub establishes a P2P connection with every other room member. All other non-hub room members only establish a P2P connection with the room member who was specified as the hub.

**Figure 12 P2P Connection Topology**

### Timing for Starting the Establishment of a P2P Connection

The timing when the NP Matching 2 library starts to establish a P2P connection between room members is as follows.

#### (1) Immediately After Joining a Room

If the signaling option parameter is set when a room is created, processing for automatically establishing P2P connections is started immediately after the room is created, and a connection is made whenever a new member joins the room.

If the signaling option parameter is not set when a room is created, processing for establishing a P2P connection is not started until the following operation (2) is performed.

#### (2) When the Signaling Option Parameter is Set or Changed

The signaling option parameter can be set or changed at any time, not just when the room is created. If the signaling option parameter is not set when a room is created, processing for establishing P2P connections is started when the signaling option is set. If the signaling option parameter is set when a room is created and is then set again after processing for establishing P2P connections has already been executed, appropriate P2P connections are rebuilt to match the newly set signaling option parameter.

### P2P Disconnection Timing

An established P2P connection becomes disconnected in the following cases.

#### (1) Upon a Network Error or Other Error

P2P connection with a room member, for whom P2P connection could not be maintained because of an occurrence of a network error or other error, will become disconnected.

#### (2) Upon a Room Member Leaving the Room

P2P connection with a room member who leaves the room you are joined into will become disconnected.

#### (3) Upon You Leaving

P2P connections established with every room member will become disconnected when you leave the room you are joined into.

**(4) Upon the Room's Deletion**

P2P connections established with every room member will become disconnected when the room you are joined into is deleted.

**Connection Information**

Information about an established connection can be obtained by using `sceNpMatching2SignalingGetConnectionInfo()`.

**Roundtrip Time (SCE\_NP\_MATCHING2\_SIGNALING\_CONN\_INFO\_RTT)**

This is the time (in microseconds) required for a UDPP2P packet to make a roundtrip between connected peers. It is measured every 10 seconds when keep alive packets are exchanged. The average of the last six measurements is returned.

**Estimated Bandwidth (SCE\_NP\_MATCHING2\_SIGNALING\_CONN\_INFO\_BANDWIDTH)**

This is the minimum bandwidth (in bits/second) that is estimated on the path from the local host to the peer. A technique known as "Packet Pair" is used to calculate the minimum bandwidth from the difference in arrival times between two packets that were sent consecutively. Immediately after the connection is established, measurements are performed 10 times consecutively and then at 1-minute intervals. The median value of the last 10 measurements is returned.

An estimate based on the Packet Pair technique may be less than the actual bandwidth because it is affected by other traffic. Also, since the bandwidth that is obtained is not necessarily available, this value should only be used as a rough estimate of circuit quality.

Note that when the bandwidth travels through an asymmetric circuit such as an ADSL circuit, the value from the local host to the peer and the value from the peer to the local host may differ significantly. For example, between peer A, which is connected to an optical fiber circuit, and peer B, which is connected to an ADSL circuit, the value that can be obtained at peer B (B -> A) will be less than the value that can be obtained at peer A (A -> B), because the former is rate-limited by the ADSL upstream bandwidth.

**Peer NP ID (SCE\_NP\_MATCHING2\_SIGNALING\_CONN\_INFO\_PEER\_NP\_ID)**

This is the NP ID of the connected peer (destination).

**Peer IP Address and Port Number****(SCE\_NP\_MATCHING2\_SIGNALING\_CONN\_INFO\_PEER\_ADDRESS)**

This is the IP address and port number of the connected peer (destination). These are the same values as `peerAddr` and `peerPort`, which can be obtained using `sceNpMatching2SignalingGetConnectionStatus()`.

**Local IP Address and Port Number as Seen from a Peer****(SCE\_NP\_MATCHING2\_SIGNALING\_CONN\_INFO\_MAPPED\_ADDRESS)**

This is the local IP address and port number as seen from the connected peer (destination). For a connection between peers A and B, the local IP address and port number as seen at peer A are the same as the peer IP address and port number seen at peer B.

**Packet Loss Rate (SCE\_NP\_MATCHING2\_SIGNALING\_CONN\_INFO\_PACKET\_LOSS)**

This is the packet loss rate (percent) when UDPP2P packets make a roundtrip between connected peers. It is measured every 10 seconds when keep alive packets are exchanged. The average of the last six measurements is returned.



## Network Information

The NP matching 2 library provides `sceNpMatching2SignalingGetLocalNetInfo()` and `sceNpMatching2SignalingGetPeerNetInfo()` to obtain local network and peer network information. Network information can be obtained from the `SceNpMatching2SignalingNetInfo` structure.

### Local IP Address

This is the IP address that was assigned to the interface.

### External IP Address

This is the IP address used for an Internet connection. When the connection passes through a NAT router, the address connecting the NAT router to the Internet is the external IP address. When the Internet connection is direct, the local and external IP addresses are the same.

### NAT Characteristic Type

This classifies various NAT router characteristics according to the level that can be supported by the NAT traversal feature of the PlayStation®Vita system.

Type	Description
Unknown	This indicates that the NAT characteristic type is being determined or that determination failed
Type 1	Local and external IP addresses are the same (With a direct internet connection)
Type 2	Local and external IP addresses differ, and the following are true - External port assignment does not depend on communication destination
Type 3	Other than types 1 or 2

## NAT Traversal Function

The NAT Traversal function provided in the NP Matching 2 library is subject to restrictions that depend on the NAT configuration of the network environment (router) in combination with the communication target. The NAT Traversal function is enabled/disabled depending on the combination of the NAT status types of the two parties. Communication is enabled for two hosts when the NAT configurations are as follows.

		Other Host		
		Type 1	Type 2	Type 3
Host	Type 1	enabled	enabled	enabled
	Type 2	enabled	enabled	enabled
	Type 3	enabled	enabled	disabled

Note that it is possible for combinations marked "enabled" to be unable to communicate depending on the behavior of the individual routers. Communication is not necessarily guaranteed for all possible combinations of routers.

### NAT Traversal Information

Information on the NAT traversal function can be checked with **NAT Traversal Information** in **Settings** -> ★ **Debug Settings** of the system software.

#### STUN Status (Failed / Succeeded)

This indicates the usage status of STUN.

#### NAT Type (Type1 / Type2 / Type3)

This indicates the NAT type.

**Mapped Address**

When STUN Status is Succeeded, this indicates the external IP address obtained with STUN.

**Mapping Policy (Endpoint Independent / Address Dependent / Address and Port Dependent)**

When STUN Status is Succeeded, this indicates the external port assignment policy of NAT obtained with STUN.

**Port Preservation (True / False)**

When STUN Status is Succeeded, this indicates whether the external port obtained with STUN is the same as the local port.

**Delta**

When STUN Status is Succeeded, this indicates the difference of the external port assignment obtained when STUN's destination IP address and port are changed.

**Search Filter and Room Entry Limitation According to NAT Type**

The NP Matching 2 library compares the NAT type of a client and the NAT type of a room member and decides whether or not a room allows appropriate P2P connections to be made according to the policy specified by the signaling option parameter. Inappropriate rooms can be filtered from the room search results and users with NAT types that cannot establish appropriate P2P connections can be denied the ability to join a room according to that decision result.

To filter inappropriate rooms from room search results, specify an option when searching rooms. To deny room entry to users who cannot establish appropriate P2P connections, specify a room attribute when creating the room. For details, refer to the "NP Matching 2 Library Reference" document.

## 8 Use Cases

Use cases of an application that uses the NP Matching 2 system will be provided as examples to explain how they can be realized.

### Displaying the World, and Lobby Names

Statically bind the world numbers, lobby numbers and names, which have been set when developing the application, onto the application.

### Performing Searches Using Information that Are Unique to the Application as the Search Conditions

#### When Player-vs.-player Game Play is Desired in Stage 3

For example, the application defines the external room search numeric attribute 1 of the room attributes as the attribute which represents stages.

Then, when the room creator creates a room for player-vs.-player game play to be performed in stage 3, he/she sets 3 to the value for the external room search numeric attribute 1 of the room attributes.

When another user searches for a room in which player-vs.-player game play can be performed in stage 3, the following is specified as the search condition.

"External room search numeric attribute 1 of the room attributes == 3"

Given this room search, a list of rooms in which player-vs.-player game play can be performed in stage 3 will be obtained.

#### Performing a Room Owner Search

The application defines the external room search binary attribute 1 of the room attributes as the attribute for representing the room owner.

Room creators will then create rooms with their own Online IDs set to the external room search binary attribute 1 of the room attributes.

If the user performing the search specifies the Online ID as the search condition, he/she will be able to obtain the room for which the user with the specified Online ID is the room owner.

### Reserving Some Room Slots

Room slots can be reserved by setting a room password, if a room group was not created when the room itself was created. In a normal room, which is not a group room, the room password can be enabled or disabled per slot.

For slots with the password enabled, only users with the matching password will be able to join. Use the game boot message, for example, to notify a user of the room password by which he/she will be able to enter a reserved slot in the room.

If users who have been granted permission to enter the room without a password have been set when the room was created, those users will still be able to join the reserved slots.

### Prohibiting Users on the Block List from Joining the a Room

Use the API of the NP Basic library, to obtain the users registered on the block list, and specify them when creating a room to prohibit them from joining it.

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## Performing Team-vs.-team Game Play (Using the Team ID of the Basic Room Member Information)

When dividing the members in a room into teams and performing team-vs.-team game play, the team ID of the basic room member information can be used.

Dividing members into teams is a process that is performed after the room is created. The application can exchange information necessary for the grouping using room messages and/or P2P communication.

However, using the team ID of the basic room member information will enable the following operations.

- Because a team ID is already defined as a member of the structure for representing room members, when it is updated, the change and the new value can be notified to all the other room members.
- When sending a room chat message or room message, when the team ID is specified for the destination, the message will only be sent to the room members with the specified team ID.

The team ID is an integer of 1 or more. The application must define the team ID as an integer of 1 or more, and set the team ID to a member when he/she joins the room, or any time after that.

## 9 Development Process

This chapter explains the development of applications that use the NP Matching 2 system – including the necessary procedure of registering its use, as well as how to use the server management tool for setting lobbies and testing operation.

### Registration

When starting of development, make a request for PSN<sup>SM</sup> Communication Services through the PlayStation®Vita Developer Network (<https://psvita.scedev.net/>). Specifically, submit a request for an NP Communication ID/NP communication passphrase, request the use of the matching server, and request server settings (number of worlds).

In the default settings, the number of matching servers that will be used is 1. If the number of simultaneous users is expected to exceed 20,000, contact SCE regarding using multiple matching servers. Also contact SCE if 10 or more worlds will be used.

### Registration for the QA Environment

When the development stage is complete and the title is ready for QA, register for the QA environment. This registration should be conducted approximately one week before the master is planned to be submitted.

### Server Management Tools

Settings for the number of lobbies, and the number of members to be permitted in each of the lobbies, must be made with the SMT. The specific functions of these tools are discussed below. For details on its operation, refer to the document "Server Management Tools NP Matching 2 Tools User's Guide".

#### Edit Lobbies

Set the number of lobbies to create under a world, per world. It is also possible to specify the maximum number of members to set for each lobby.

#### Modify the Server Status

The state of the server can be changed to "Busy" or "Maintenance", for example. Use this function to test the behavior in the event of an error, during your development.

#### Register, Reference, and Clear Prohibited Users

It is possible to register users you want to prohibit from using the server. It is also possible to obtain a list of these prohibited users, and to remove them from this list. Use this function to check the behavior, when the registration of a user to prohibit is actually performed, after the title goes on sale.

#### Check Rooms

A list of rooms existing on the server can be referenced from a web page. Various search conditions can be used to perform a narrowed-down search as well.

#### Create Dummy Rooms

Dummy rooms can be created. Note, however, that dummy rooms cannot be entered. The condition, of having multiple rooms exist on the server, can be created to test the speed of a search or to check the validity of the search results.

Of the various matching functions provided, the room search entails extremely high processing costs. Because of this, it is recommended that the behavior of the search process be tested, using this function, in the development stage of the application.

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**Development Network Environment**

For the latest information on the IP addresses and port numbers of PSN<sup>SM</sup> servers, refer to Technical Notes 201108-19 "IP address of servers used by PSN<sup>SM</sup> services" (<https://psvita.scedev.net/technotes/view/132>).

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