

## 1. Introduction

The project consists of implementing, in Java, C++ or C, a Court Booking and game party Scheduler protocol, over UDP. The description of the protocol to implement is given in the following section while the requirements are stated in Section 3.

## 2. Court Booking and Game Party Scheduler

The Court Booking and Game Party Scheduler (CBGS) allows a group of players to book a Court for game and schedule a game party without interactions with human beings. Every potential participant has his/her own appointment book, which is accessible locally by the Game Party Scheduler (GPS) entity. The agenda could be a text file or any other form and is not part of the protocol description given here. The central unit in the system is responsible for booking the court and scheduling the game once a request for a meeting has been initiated by a requester (also called organizer).

The group of potential players could be of any size. The protocol should allow any player to book a court and schedule a game party with any number of participants.

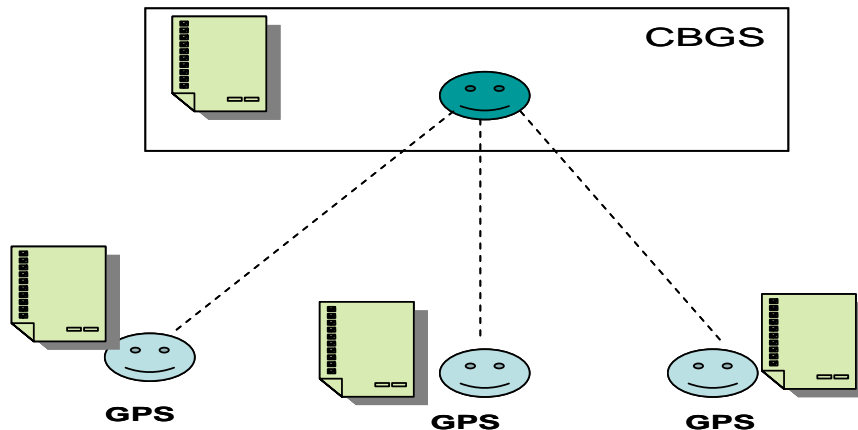


Fig. 1. Overall System

## 2. 1. Booking the court and the scheduling of a game party

The requester (organizer) of a game party sends a message to the CBGS entity for booking the court, providing a game party date, the time, the type of the game party and a list of participants (players) (the IP addresses of their respective game party scheduler). The request message also requests a minimum number of participants for the game party to be held. Notice that minimum is always smaller than the total number of potential participants provided by the requester. Every request is numbered in order to relate responses to requests. Also, a given requester may have more than pending request at a time and the CBGS can handle more than one request at a time. We also assume one participant by IP address, i.e. the IP address identifies the participant.

REQUEST	RQ#	DATE	TIME	NIMUM	LISTE OF PARTICIPANTS	TYPE
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### REQUEST Message

Upon the reception of a request for booking the room and scheduling a meeting, the RBMS entity checks if the room is available for the requested date and time. If the room is not available, the RDMS sends the “Unavailable” response to the requester (RQ# says exactly which request cannot be fulfilled), which then can chose another date and time and restart the request as aforementioned, if he wishes to do so.

RESPONSE	RQ#	UNAVAILABLE
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### Court Unavailable Message

If the court is available, the CBGS entity starts inviting the participants from the list to this meeting. For this it has to contact the GPS entity of each potential participant with message INVITE, which contains the meeting number, date, the time, the duration of the game party and the IP address of the requester.

INVITE	GP#	DATE	TIME	TYPE	REQUESTER
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### INVITE Message

Upon reception of an INVITE, an GPS entity checks the availability of the person it is in charge of (access to the local agenda, etc...) and replies by ACCEPT or REJECT with a reference to the game party number (GP#).

ACCEPT	GP#
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### ACCEPT Message

REJECT	GP#
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### REJECT Message

The GPS entity will update the local agenda accordingly.

Upon reception of responses from potential participants, the CBGS checks if the number of acceptances is equal or higher than the minimum number of participants requested by the organizer of the game party. If yes, a confirmation is sent to all the participants (who accepted the invitation) and a response is sent to the organizer informing him of the positive answers and the IP addresses of the participants, and the game party is scheduled.

<b>CONFIRM</b>	<b>GP#</b>
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CONFIRM Message

<b>SCHEDULED</b>	<b>RQ#</b>	<b>GP#</b>	<b>LIST OF CONFIRMED PARTICIPANTS</b>
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Positive Response to the Requester/Organizer

If the number of positive answers is less than the minimum requested by requester, a message to cancel the tentative game party is sent to all the participants that have answered positively and a response is also sent to the requester informing him/her of the number of participants that have accepted the invitation and their IP addresses. At this point the requester can decide to pick up another date and/or time and send another request.

<b>CANCEL</b>	<b>GP#</b>
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Cancel Message

<b>NOT SCHEDULED</b>	<b>RQ#</b>	<b>DATE</b>	<b>TIME</b>	<b>MINIMUM</b>	<b>LISTE OF CONFIRMED PARTICIPANTS</b>	<b>TYPE</b>
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A Negative response to the Requester/Organizer

## 2. 2. Cancel a Game Party

Only the requester can cancel explicitly a game party by sending the following message to the CBGS entity [and it can do it any time after the game party has been confirmed.]

<b>CANCEL</b>	<b>GP#</b>
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Cancel Message from Requester

At this point the CBGS entity has to inform all the confirmed participants to this game party of the cancellation using the following message.

<b>CANCEL</b>	<b>GP#</b>
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Cancel Message from CBGS to participants

CBGS and GPS entities update their respective agenda accordingly.

### 2.3. Withdrawing from a Game Party

Any time before the date and the time of a scheduled game party, a participant (excluding the requester/organizer) can withdraw from the meeting. For that purpose a participant can send the following message.

<b>WITHDRAW</b>	<b>GP#</b>
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WITHDRAW Message

After receiving a WITHDRAW Message, the CBGS has to inform the game party requester by sending the following message.

<b>WITHDRAW</b>	<b>GP#</b>	<b>IP Address</b>
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Informing the requester of the withdrawal

In the number of current participants to the game party falls below the minimum requested, the CBGS will give a chance to all potential participants who have been initially invited and not currently in the game party to join again by sending them (and only them) again the INVITE message, and wait for their responses (“ACCEPT” or “REJECT”). If with this round of invitations the CBGS did not succeed to make the number of confirmed participants higher or equal to the requested minimum, it sends a CANCEL message to all confirmed participants including the organizer.

<b>CANCEL</b>	<b>GP#</b>
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Cancel Message

### 2.4. Add participants to a game party

A participant, who has previously rejected an invitation to a game party because he/she was busy at the time of this invitation, may become available and may request to participate in the game party by sending the following message to the CBGS.

<b>ADD</b>	<b>GP#</b>
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Addition of participant to the game party

If the game party is currently scheduled the CBGS will inform this participant and confirm his/her participation by sending the following message.

<b>CONFIRM</b>	<b>GP#</b>
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Confirm Message

In this case the CBGS will also inform the organizer of this addition by sending the following message.

<b>ADDED</b>	<b>GP#</b>	<b>IP Address</b>
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Informing the organizer of the addition of a participant to GP#

In this case where the game party is not scheduled, the CBGS will respond to the participant with the “CANCEL” message.

CANCEL	GP#
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Cancel Message

### 3. Requirements

1) Project should be done in teams of 3 students. You should send, by email to [dssouli@ciise.concordia.ca](mailto:dssouli@ciise.concordia.ca) : your group list including student names, ID numbers and email addresses at Concordia.

2) You should be aware that the proposed description doesn't state everything. For instance what happens if a GPS receives a response with a RQ# that doesn't correspond to any of its requests? You have to check the protocol for completeness and ambiguities, and make your assumptions for fixing them. **You need to State and Document clearly any assumption you make beyond made by the instructor.**

3) As already stated in the protocol, a GPS may have more than one pending booking request, a GPS may be involved in more than one game party, and a GPS may have a pending booking request and be involved in an invitation to join a game party....

4) The messages exchanged between the GPSs and the CBGS have to be designed first, i.e. decide for the types of each field and its size. These messages have to be described formally using ASN.1. The PDUs have to be generated automatically using an ASN.1 tool. Your implementation has to rely on these generated data structures and runtime libraries. There is a number of ASN.1 tool in the internet. Here is a good starting point: <http://asn1.elibel.tm.fr/en/index.htm>. You can download the tool of your choice according to your preferred implementation language Java, C++ or C.

5) Design and Implement the GPS and the CBGS that follow the protocol aforementioned.

The local appointment book can be a very simple text file organized into days and each day into hours. You can take a small period of time, like a week. You can use more advanced local appointment books ... You can, for instance, assume that each game party lasts only 2 hours.

6) Reporting: An GPS or CBGS should be reporting their communications to the user using a log file or printing directly into the screen. In other words, during the demonstration, I would like to see the messages sent and received, progress and failures.

7) You should hand in a report, by week 13, where you document clearly your assumptions, design decisions, ASN.1 specification, generated PDUs, your design, code and experiments.

You should also state clearly the contribution of every member of the group. Every student has to contribute **technically** (designing and implementing the protocol) to the project.

8) You also have to submit a signed Expectation of Originality Form, which you can download from <http://www.encs.concordia.ca/scs/Forms/expectations.pdf>

A demo will be held during Week 13 of this fall term. During the demo the members of the group should all be ready to answer questions from the instructor. We will be running 5 to 10 GPSs and one CBGS on different machines and tests all the messages.

During the demo we may also go through the code itself and the report.