

Cyrano 2.0 protocol

Ethernet fencing protocol for communication between nodes of the Information System of Fencing Competitions

Protocol Cyrano 2.0 is designed for the use on the Information System of Fencing Competitions, matching the requirements of SEMI 1.0. standard

Protocol Cyrano 2.0 is the development of a protocol Cyrano 1.0.

Protocol Cyrano 2.0 includes all the formats, commands and protocol algorithms of Cyrano 1.0 without modification.

Protocol Cyrano 2.0 introduces additional commands and algorithms.

All Global Information System of Fencing Competitions nodes are joined in a single local network based on the number of protocols TCP/IP.

Address space 172.20.x.x is used with the mask of sub-network (255.255.0.0).

The detailed allocation of IP addresses is given in **SEMI 1.0. Standard Appendix A. IP addresses map.**

Family of protocols Cyrano is based on the exchange of messages using UDP. The UDP protocol is used: **it is light**, it sends information without establishing connection and without **reception acknowledge**. When acknowledge is required, it is done inside the messages.

Features Protocol Cyrano 2.0

The protocol Cyrano 1.0 describes the communication between the Apparatus and the Cyrano server.

The protocol Cyrano 2.0 describes the communication between all nodes of Information System of Fencing Competitions, matching the requirements of SEMI 1.0. standard The Nodes of the Information System of Fencing Competitions:

- **Master** – The Main Apparatus on the piste
- **Additional devices(additional devices on the piste)**– devices or systems which are connected directly to the main apparatus (Master) and receive data directly from it (without use of any intermediate nodes)
- **Scoring machines Server** - system which joins all the main apparatus (Masters) and provides communication between them and other Nodes in a real-time mode.
- **Backup Scoring Machines Server** - backup Scoring machines server, which takes control in the event of failure of the Scoring machines Server.
- **Manager(s)** – node in the Management of fencing competition software.
- **Server of the results** - system of distribution of the current status of the competitions between nodes. Server of the results of Green and Yellow levels provide the information about the tournament in a real-time mode. It saves and distributes the information about the participants (lists, photos, pictures with the flags, e.t.c), lists of the groups and tables, current status of all the bouts at all the pistes; intermediate and official results, e.t.c.
- **Clients**– is a system or a device which is registered in the Server of the results in order to get the information about the situation on the pistes or the results of the competitions in a real-time mode.

The Protocol Cyrano 2.0 includes all the formats, commands and protocol algorithms of Cyrano 1.0 without modification and introduces additional commands and algorithms, which allow to complete the most important functions:

- Data transfer about the composition of the teams
- Requests transfer for the call of the specialists (technicians, doctors, video and DT)
- Transfer of the text message (composition of the next match, urgent announcement e.t.c.)
- E.t.c.

Principle of interaction between the nodes is the same as in 1.0 version. In order one node transfers information to the other one it must form and transfer UDP package with a corresponding command of Cyrano 2.0. protocol.

Command syntax is the same as Cyrano 1.0. Any command is – a string of symbols in ASCII encoding, consisting of the fields divided by «|» symbol.

First command field - Name of the protocol. Commands of Cyrano 1.0 protocol have this value equal to EFP1, and commands of Cyrano 2.0 protocol equal to EFP2.

Second command field – the name of the command and all the following fields – parameters of the command.

For example,«|EFP2|HELLO|ALL|».means that HELLO command is received in the format of Cyrano 2.0. protocol and has one parameter «ALL».

Pistes Code and Pistes Name

Each fencing piste has a code a name. The code of the piste is used only in commands and must conform with the requirements of the present protocol.

The name of the piste is demonstrated to the spectators and athletes and has a free-style form (it should not contain delimiting character «|» in coding ASCII)

Piste codes:

- **1** – Piste 1
- **2** – Piste 2
- ...
- **59** – Piste 59
- **BLUE** – Piste blue in final area
- **YELLOW** – Piste yellow in final area
- **GREEN** – Piste green in final area
- **RED** – Piste red in final area
- **FINAL** – Piste final podium

Remark: If you have two or more colored areas, then apply the following principles:

- **59** – Piste final podium in the second color area
- **58** – Piste red in the second color area
- **57** – Piste green in the second color area
- **56** – Piste yellow in the second color area
- **55** – Piste blue in the second color area
- **54** – Piste final podium in the third color area
- **53** – Piste red in the third color area
- **Etc**

Competition Code.

- **EIM** – men individual epee
- **EIW** – women individual epee
- **ETM** – men teams epee
- **ETW** – women teams epee
- **FIM** – men individual foil
- **FIW** – women individual foil
- **FTM** – men teams foil
- **FTW** – women teams foil
- **SIM** – men individual sabre
- **SIW** – women individual sabre
- **STM** – men teams sabre
- **STW** – women teams sabre
- **MIX** – mix team.

Protocol Cyrano 2.0 commands. *review*

Protocol prefix	Command	Description	Direction	Comment
EFP2	HELLO	Tells the recipient node, the node sending is online.	<ul style="list-style-type: none"> • Master→Scoring machines Server; • Master→Backup Scoring machines Server; • Scoring machines Server →Master; • Backup Scoring machines Server →Master; • Additional devices→Master; • Manager →Scoring machines Server • Client → Server of the results 	
EFT2	DISP	New bout to display the match	<ul style="list-style-type: none"> • Manager →Scoring machines Server • Scoring machines Server →Master; 	
EFP2	INFO	Piste state: score, stopwatch, light, etc.	<ul style="list-style-type: none"> • Master→Scoring machines Server; • Master → Additional devices; • Scoring machines Server→ Manager; • Scoring machines Server→ Server of the results; • Server of the results→ Client 	Changed field ⁹¹ (Time). The new format (with the thousandths of a second): hh:ss.ddd examples: 10:00.000 3:00.000 0:01.432 0:00.004
EFP2	ACK	acknowledges reception of the end of a match or round	<ul style="list-style-type: none"> • Scoring machines Server →Master; 	
EFP2	NAK	indicates the reception of an incorrect end of a match	<ul style="list-style-type: none"> • Scoring machines Server →Master; 	
EFP2	NEXT	asks Software to send the next round or the next match	<ul style="list-style-type: none"> • Master→Scoring machines Server; • Scoring machines 	

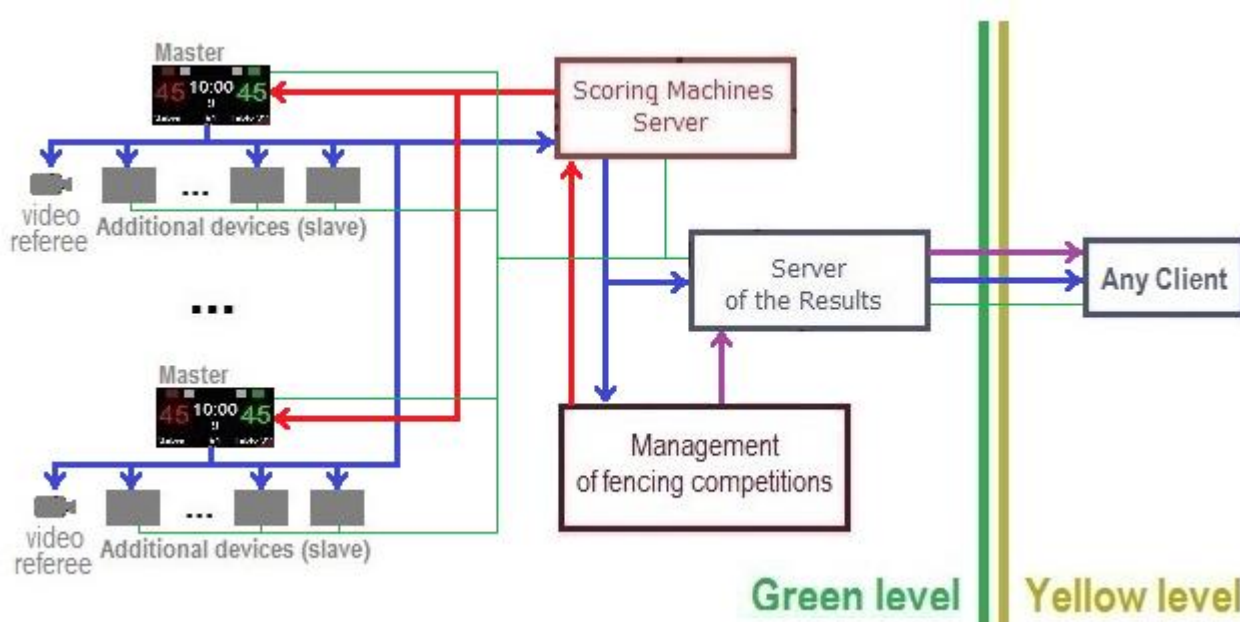
¹ In Cyrano 1.0 version

			Server→ Manager;	
EFP2	PREV	asks Software to send the previous round or the previous match	<ul style="list-style-type: none"> • Master→Scoring machines Server; • Scoring machines Server→ Manager; 	
EFP2	STOP	tells the recipient node, the node sending does not want to receive piste state	<ul style="list-style-type: none"> • Client → Server of the results 	
EFP2	BROKEN	reports that lost contact with the device	<ul style="list-style-type: none"> • Scoring machines Server→ Manager; • Scoring machines Server→ Server of the results; • Server of the results→ Client 	
EFP2	DENY	denial to execute the request	<ul style="list-style-type: none"> • Master→ incorrect node; • Scoring machines Server→ incorrect node; • Server of the results→ incorrect node; 	
EFP2	TEAM	List of team members	<ul style="list-style-type: none"> • Manager →Scoring machines Server • Scoring machines Server →Master; • Master → Additional devices; 	
EFP2	GETTEAM		<ul style="list-style-type: none"> • Client→ Server of the results; 	
EFP2	REPLACE	Replacing a team member on reserve	<ul style="list-style-type: none"> • Master→Scoring machines Server; • Master → Additional devices; • Scoring machines Server→ Manager; 	
EFP2	UPDATED	informs that the modified XML data file competitions	<ul style="list-style-type: none"> • Manager → Server of the results; • Server of the results→ Client 	
EFP2	BOUTSTOP	Sets that the current bout on this piste finished by a decision of the Directorate.	<ul style="list-style-type: none"> • Manager →Scoring machines Server • Scoring machines Server →Master; 	
EFP2	PING	The request for the	<ul style="list-style-type: none"> • Any node→ Any node; 	

		network node present.		
EFP2	STANDBY	Show a caption or set a sleeping mode on the apparatus ²	<ul style="list-style-type: none"> • Manager→Scoring machines Server; • Scoring machines Server→ Master • Master → Additional devices; 	

² It is convenient in e.g. in foil, so that the apparatus will not beep during the pause. Manager can automatically switch apparatus in stand by regime after the end of the bout.

Direction of information transfer



Direction	Command or information
→	Commands: DISP, TEAM, BOUTSTOP, MSG, STANDBY
→	Commands: INFO, NEXT, PREV, REPLACE
→	Commands: UPDATED
—	The ability to download images with national flags and pictures of athletes from the Server of the Results (use HTTP protocol).

Command PING

Any node must implement the support of PING command. While getting this command the node must send HELLO command without parameters in response.

|EFP2|HELLO|

PING command should be used for checking of the presence of the node in the network.

Master

The **Master** is Main Apparatus on the piste.

IP addresses

172.20.x.1, where x-is a number of the piste Master and $x \in \{1, \dots, 60\}$ ³

UDP ports

50100 – a port for receiving messages from the Scoring machines Server.

50101 – a port for receiving messages from Additional devices.

On port 50100 only accept messages from the sender:

- 172.20.0.1:50100 – Scoring machines Server,
- 172.20.0.2:50100 – Backup Scoring machines Server.

On port 50101 only accept messages from the sender:

- 172.20.x.y where x is a number of the piste Master and $y \in \{1, \dots, 255\}$. Any UDP Port.

Messages from other combinations IP:Ports are ignored.

Communicates with nodes

- Scoring machines Server
- Backup Scoring machines Server
- Additional devices

Communicating with the Scoring machines Server and Backup Scoring machines Server

Master connects to the Scoring machines Server (and Backup Scoring machines Server) and receives data bouts.

If the command from the Scoring machines Server and Backup Scoring machines Server are different and contradict each other, then execute commands Scoring machines Server.

Next Master sends to the Scoring machines server (and Backup Scoring machines Server) bout status information in the online.

Additionally, the Master sends to the Scoring machines Server (and Backup Scoring machines Server) specific commands, such as calling a technician or medic to automate and speed up the operation

Communicating with the Additional devices

Additional device must connect to the Master.

³ 1 – Piste 1, 2 – Pistre 2, ..., 59 – Piste 59, 60 – Podium, 61 – Blue, 62 – Yellow, 63 – Green, 64 – Red.

Master must remember a list of all Additional devices connected to it. Master must remember additional device IP and UDP port. When the Master is necessary to send a message to the additional device, it must use the stored value IP and UPD port.

Every time there are important events, the Master must send a message to all devices in its list

Additional device must send a command HELLO to the Master every second

Received commands

HELLO, DISP, TEAM, ACK, NAK, BOUTSTOP, MSG, STANDBY, PING

Send commands

HELLO, INFO, TEAM, NEXT, PREV, REPLACE,

Master states

Master has several internal conditions which influence on the order of processing of the external events:

Standalone - network communications are disabled, the interaction with the network competition is not possible.

Indefinite - network communication available, but the bout is not set.

Not active - the bout is set but not activated.

Activated states - the bout is set and activated:

Fencing - the timer is running.

Halt - the timer is stopped (between referee command “halt” and “aller”).

Pause - between two periods, the stopwatch is running;

Ending -between the end of a match (or round for Team competitions) and the acknowledge receipt.

Waiting: a match/round is finished (still displayed on the Master) or a match/round has not yet started (already displayed on the Master) or there is no match/round.

Switching states Masters

Enable or disable state **Standalone** possible manually only and using the interface Master(not from network).

A state after disable state **Standalone** Master automatically switches to **Indefinite**.

Master switches from state **Indefinite** only to state “**Not active**” and only after receiving the command DISP.

Master switches from state “**Not active**” to any activated states manually only and using the interface Master (not from network). Activated state of Master depends on the timer (stopwatch), as the match can already begin at the time of activation of the Master (timer is running). Possible states: **Fencing, Halt, Pause, Waiting**.

Master switches from state **Halt** or **Waiting** to **Ending** states manually only and using the interface Master(not from network).

After switching to the state **Ending** Master starts every second to the Scoring machines server to send a message INFO (during 4 seconds).

If the server responds with the ACK, the master switches to state "**Not active**".

If the server responds with the NAK or does not respond within 4 seconds, the Master switches to state **Waiting**.

State of Master	Event	Behavior of the Master	New state
<u>Network event</u>			
Standalone	Any command from network.	Ignored all network event	Standalone
Any state other than Standalone	HELLO is received from Scoring machines Server	sends a INFO message to the Scoring machines Server	The state does not change
Any state other than Standalone	HELLO is received from Backup Scoring machines Server	sends a INFO message to the Backup Scoring machines Server	The state does not change
Any state other than Standalone	has not been received or sent any message from Scoring machines Server or Backup Scoring machines Server for more than 4 seconds	Send HELLO message to Scoring machines Server and Backup Scoring machines Server	The state does not change
any state other than Standalone	HELLO is received from new additional devices	Saves a new additional device in the list and sends to it: sends a INFO message	The state does not change
	HELLO is received from exists additional devices	Update last message time for this device in the list and sends to it: sends a full INFO message	
	Has not received the HELLO message from the some additional device more than 255 seconds.	Delete this additional device from the list	
Indefinite,	DISP is received	Set the parameters	Not active

Not active	from Scoring machines Server or Backup Scoring machines Server	obtained (fencers name, nations, team name, etc) in Master. Send a INFO message to the Scoring machines Server, Backup Scoring machines Server and the all additional devices.	
Any state other than Standalone	TEAM is received from Scoring machines Server or Backup Scoring machines Server	Stores the list of athletes and use it at the discretion of the developers of equipment. Command TEAM must be resend to all additional device	The state does not change
Fencing, Halt, Pause, Ending, Waiting	DISP, TEAM, ACK or NAK is received from Scoring machines Server or Backup Scoring machines Server	Ignored	The state does not change
Ending	ACK is received from Scoring machines Server or Backup Scoring machines Server	Bout interface inactive.	Not active
Ending	NAK is received from Scoring machines Server or Backup Scoring machines Server	Show error message or signal in Master`s interface to the referee	Waiting
Ending	DISP or TEAM is received from Scoring machines Server or Backup Scoring machines Server	Ignored	The state does not change
Indefinite, Not active	BOUTSTOP is received from Scoring machines Server or Backup Scoring machines Server	Clear fencers name, reset all bout parameters (time, score, cards and other)	Indefinite
any state other than Standalone			

Any state other than Standalone	UPDATED, STANDBY or MSG is received from Scoring machines Server or Backup Scoring machines Server	Resend to all additional device. These commands Master processing at its discretion	The state does not change
Any state other than Standalone	PING is received from any Node	HELLO sends a response.	The state does not change
<u>Important event on the piste⁴</u>			
Standalone	any important event on the piste	ignored	The state does not change
any state other than Standalone	any important event on the piste	send a INFO message to the Scoring machines Server, Backup Scoring machines Server and the all additional devices.	The state does not change
<u>Events interface apparatus (manual events)</u>			
Standalone	disable state Standalone	Clear fencers name, reset all bout parameters (time, score, cards and other)	Indefinite
Standalone	any event other than disable state Standalone	Ignored	Standalone
Indefinite, Not active	Bout activate	Bout interface active	Halt
Fencing, Halt, Pause, Ending, Waiting	Bout activate	Ignored	The state does not change
Halt, Waiting	Bout deactivate with send result to Servers	Waits Server solution	Ending
Indefinite, Not active, Fencing, Pause, Ending,	Bout deactivate with send result to Servers	Ignored	The state does not change
Halt, Waiting	Bout deactivate without send result to Servers	Bout interface inactive	Not active

⁴ A list of important events, see the Appendix C to the SEMI standard

Indefinite, Not active, Fencing, Pause, Ending,	Bout deactivate without send result to Servers	Ignored	The state does not change
Indefinite, Not active,	Press NEXT button	Send command NEXT to Scoring machines Server and Backup Scoring machines Server	The state does not change
Indefinite, Not active,	Press PREV button	Send command PREV to Scoring machines Server and Backup Scoring machines Server	The state does not change
Fencing, Halt, Pause, Ending, Waiting	Press NEXT or PREV button	Ignored	The state does not change
Pause, Waiting	Press REPLACE button	<i>Individual competitions:</i> ignored <i>Team competitions:</i> Requests side(left, right) and number (1..3) is replaced by the fencer and sends a command REPLACE to Scoring machines Server and Backup Scoring machines Server	The state does not change
Indefinite, Not active, Fencing, Pause, Ending	Press REPLACE button	Ignored	The state does not change
Indefinite, Not active, Pause, Waiting	Press CALL button	Requests type of the specialist (technician, doctor, video or TD) and sends a command INFO with flag ⁵ to Scoring machines Server, Backup Scoring machines Server and the all additional devices.	The state does not change

⁵ The flag is reset after the referee canceled the call specialist, or the timer will start the bout.

Additional devices

Additional devices (additional devices on the piste)– devices or systems which are connected directly to the main apparatus (Master) and receive data directly from it (without use of any intermediate nodes). As the additional devices it is recommended to use only those devices and systems where the efficiency of receiving the Master's condition is critically important for the athletes on the piste and the referee.

Additional devices include, for example, slave, video refereeing system, e,t,c,

Communicates with nodes

- Master

IP addresses

172.20.x.y, where x-is a number of the piste Master and $x \in \{1, \dots, 60\}$ ⁶ and $y \in \{1, \dots, 255\}$

UDP ports

Additional device may use any UDP port.

On UDP port only accept messages from the sender:

- 172.20.x.1 where x is a number of the piste Master.

Messages from other combinations IP:Ports are ignored.

Received commands

INFO, TEAM, MSG, STANDBY, PING

Send commands

HELLO

Events and processing

Event	Behavior of the Additional device	Received	Sent
Every 4 seconds	Sends a message HELLO to Master		HELLO
Receive command INFO, TEAM, MSG or STANDBY from Master	Uses received data on internal algorithm	INFO, TEAM, MSG or STANDBY	
PING is received from any Node	HELLO sends a response.	PING	HELLO

⁶ 1 – Piste 1, 2 – Pistre 2, ..., 59 – Piste 59, 60 – Podium, 61 – Blue, 62 – Yellow, 63 – Green, 64 – Red.

Scoring machines Server

Scoring machines Server is system which joins all the main apparatus (Masters) and provides communication between them and other Nodes (Manager(s) and Server of the Results) in a real-time mode.

Manager send commands (DISP, TEAM) with bout data form each piste to the Scoring machines Server. The Scoring machines Server stores it and forwards Masters.

Master send messaged with bout state (INFO) to the Scoring machines Server. The Scoring machines Server stores it and forwards Managers and Server of the Results.

Additional, Master send messaged with commands (service messages (NEXT, PREV and REPLACE) to the Scoring machines Server. The Scoring machines Server stores it and forwards Managers.

Communicates with nodes

- Master
- Manager
- Server of the Results

Communicating with the Master

Scoring machines Server by using must store a list of all Masters. For each should be stored:

- piste code,
- the last received state (last INFO message),
- time of last received state
- last command with the bout parameters (DISP, TEAM)
- Piste states:
 - **connect** - connection with the Master is installed and serviceable,
 - **broken** - Connection with the Master is lost

Scoring machines Server send to the Master message DISP to set new bout and receive from Master message INFO with state of the bout in real time. Scoring machines Server resend all information from Masters in real time.

Communicating with the Managers

Scoring machines Server must remember a list of all Managers connected to it. Scoring machines Server must remember Managers IP and UDP port. When the Scoring machines Server is necessary to send a message to the Manager, it must use the stored value IP and UPD port.

Manager must send a command HELLO to the Scoring machines Server every 4 second or sent STOP for disconnect.

The Server having received any command/message (INFO, PREV, NEXT, REPLACE) from Master resends it to all connected to it Managers in real time mode.

Communicating with the Server of the Results

Resends INFO there. There is no connection. No HELLO. Пересылает туда INFO Нет никакой связи. Никаких HELLO. Server of the machines always automatically resends INFO to Server of the Results as soon as it receive them and broken if the connection is lost.

It does not check and does not control if there is such server of the results in network or not.

IP addresses

172.20.0.1

UDP ports

50100 – a port for receiving messages from the Masters,
50103 – a port for receiving messages from the Managers.

On port 50100 only accept messages from the sender:

- 172.20.x.1 where x is a number of the piste Master.

Messages from other combinations IP:Ports are ignored.

On port 50103 only accept messages from the sender:

- 172.20.0.y where $y \in \{1, \dots, 255\}$. Any UDP Port.

Messages from other combinations IP:Ports are ignored.

Received commands

HELLO, INFO, DISP, TEAM, NEXT, PREV, REPLACE, BOUTSTOP, UPDATED, STANDBY, MSG, STOP, PING

Send commands

HELLO, INFO, DISP, DENY, TEAM, NAK, ACK, NEXT, PREV, REPLACE, BOUTSTOP, UPDATED, STANDBY, BROKEN, MSG

Events and processing

Event	Behavior of the Scoring machines Server	Received	Sent
Every 4 seconds	Sends a message HELLO to each		HELLO

	Master known		
Has a piste status "broken"	Every 4 seconds Send messages BROKEN with this piste code to all Managers and Server of the Results		BROKEN
Receive command HELLO from Master unknown ⁷	Saves a new Master in the list with piste state set to "connect"	HELLO	
Receive command HELLO from Master known	No action	HELLO	
No message from the some Master more than 8 seconds.	Piste state set to "broken".		
Receive command HELLO from Manager unknown	Saves a new Manager in the list	HELLO	
Receive command HELLO from Manager known	No actions	HELLO	
Receive command STOP from Manager known	Delete Manager from the list	STOP	
Receive command DISP or TEAM from Manager for some Master	If this Master does not exist in the list, send DENY to Manager	DISP, TEAM	DENY (reason: "Piste does not exists")
	If this Master does exist in the list, forward message to Master and store in the piste state.		DISP, TEAM
Receive command BOUTSTOP from Manager for some Master	If this Master does not exist in the list, send DENY to Manager	BOUTSTOP	DENY (reason: "Piste does not exists")
	If this Master does exist in the list, forward message to Master		
Receive command INFO from Master known	Forward message to all Managers and Server of the results and store in the piste state.	INFO	INFO

⁷ Known Master - a Master who is in the Masters list in the Scoring machines Server. Otherwise - the unknown Master.

Receive command INFO from Master unknown	Forward message to all Managers and Server of the results; saves a new Master in the list with piste state set to "connect" and store bout state in the piste state.	INFO	INFO
Receive command INFO from Master known with bout state – "Ending"	Forward message to all Managers and Server of the results and store in the piste state. Check the validity of the result of the match. if the result is not valid, it sends a message NAK to the Master; if the result is valid, it sends a message ACK to the Master	INFO	INFO, NAK, ACK
Receive command NEXT, PREV, REPLACE from any Master	Forward message to all Managers and Server of the results	NEXT, PREV, REPLACE,	NEXT, PREV, REPLACE,
Receive command UPDATED from any Manager	Forward message to each Master known	UPDATED	UPDATED
Receive command , STANDBY, MSG from Manager for some Master	If this Master does not exist in the list, send DENY to Manager	STANDBY, MSG	DENY (reason: "Piste does not exists")
	If this Master does exist in the list, forward message to Master and clear bout data in the piste state.		STANDBY, MSG
PING is received from any Node	HELLO sends a response.	PING	HELLO

Backup Scoring machines Server

By internal installation and functioning algorithms the reserved file is equal to the main one.

The logic of its use is that all the nodes sending any command on Scoring machines server back it up on the standby server.

The standby server processes the received command similarly to the main server. In case if the processing demands to send any command to any node, the redundant nodes does it.

For example, Scoring machines server, having received INFO command from Master, resends it to Server of the Results. Reserved server does the same. Thus, Master Таким образом, Master sends one INFO Command and Server of the Results receives two INFO commands from the main and reserved servers.

It is allowed to use 'silent' mode of the reserved server. In this mode the Reserved server, having received the command, processes it similarly to the main one, but it does not send any commands to anyone.

IP addresses

172.20.0.2

The other parameters are similar to the main server.

Server of the Results

Server of the results provides distribution of the information about the condition of the competitions and pistes in real time mode.

Server of the results gets the commands from server of the machines (INFO) and Manager(s) (UPDATE, STNADBY, MSG) and resends them to the connected to it clients.

Communicates with nodes

- Scoring machines Server
- Backup Scoring machines Server
- Manager(s)
- Client(s)

Communicating with the Scoring machines Server and Backup Scoring machines Server

Server of the results immediately after the start awaits the command of reserved INFO server from Server of the machines and as soon as it gets them resends to the appropriate clients.

The connection between the servers is not controlled. Scoring machines Server и Backup Scoring machines Server always send INFO commands, having received them from Master.

In case, if the same command comes from the main and reserved server, the Server of the results can resend only one command.

Communicating with the Manager

Server of the results immediately after the start awaits UPDATED, STANDBY, MSG from Command Manager and as soon as it gets them immediately resends to the appropriate clients.

Server of the Results does not establish the connection with managers and does not control it.

Manager automatically sends the commands to the Server of the results without analyzing if it is in the network or not.

Communicating with the Client

Server of the Results using must store a list of all Clients. For each should be stored:

- Clients IP:port,
- Piste code (or ALL),
- time of the last HELLO message.

Client sends HELLO command every 4 seconds to the Server of the results. As the parameter it mentions the piste from which it wants to get the results or ALL if from all the pistes.

If the client does not want to receive information from the Server, it sends STOP command.

If there is no message from the client for more than 63 seconds – it is deleted.

As soon as Server of the results receives INFO, STANDBY, MSG, BROKEN commands it automatically resends it to all the Clients from the list which are awaiting information from the present piste (including those which mentioned ALL as the piste).

As soon as Server of the results gets UPDATED command, it automatically resends it to all the Clients from the list.

IP addresses

172.20.0.8

UDP ports

50100 – a port for receiving messages from the Scoring machines Server,

50103 – a port for receiving messages from the Managers.

50104 – a port for receiving messages from the Clients.

On port 50100 only accept messages from the sender:

- 172.20.0.1 or 172.20.0.2. Any UDP Port.

Messages from other IP:Ports are ignored.

On port 50103 only accept messages from the sender:

- 172.20.0.y where $y \in \{1, \dots, 255\}$. Any UDP Port.

Messages from other IP:Ports are ignored.

On port 50104 only accept messages from the sender:

- 172.20.x.y where $x, y \in \{0, \dots, 255\}$. Any UDP Port.

Messages from other IP:Ports are ignored.

Received commands

HELLO, INFO, UPDATED, **GETTEAM**, STANDBY, BROKEN, MSG, PING, STOP

Send commands

INFO, UPDATED, STANDBY, BROKEN, MSG

Events and processing

Event	Behavior of the Scoring machines Server	Received	Sent
Receive command HELLO from Client unknown ⁸	Saves a new Client in the Clients list	HELLO	
Receive command HELLO from Master known	Update field "Time of the last HELLO message" for this Client in the Clients list. If the Piste code is not equal in the command HELLO and in the Clients list, then save new piste Code to Clients list	HELLO	
No message from the some Client more than 127 seconds.	Delete this Client from Clients list		
Receive command STOP from Client known	Delete this Client from Clients list	STOP	
Receive command INFO , BROKEN from Scoring Machines Server or Backup Scoring Machines Server	Forward message to all Send a message to all clients from the Clients list, where the value of the field "Piste code" is equal command or ALL	INFO, BROKEN	INFO, BROKEN
Receive command UPDATED from any Manager	Forward message to all Send a message to all clients from the Clients list	UPDATED	UPDATED
Receive command , STANDBY, MSG from Manager for some Master	Forward message to all Send a message to all clients from the Clients list, where the value of the field "Piste code" is equal command or ALL	STANDBY, MSG	STANDBY, MSG
PING is received from any Node	HELLO sends a response.	PING	HELLO

⁸ Known Master - a Master who is in the Masters list in the Scoring machines Server. Otherwise - the unknown Master.

Manager

Manager(s) is node in the Management of fencing competition software. In the Management of fencing competition may be several operators that control fights.

Each operator is working at the computer on which you installed special software - Manager

A manager sends to piste data bouts, receives the results and saves them.

All communication between the Manager and the piste goes through the Scoring machines Server.

Communicates with nodes

- Scoring machines Server
- Backup Scoring machines Server
- Server of the Results

Communicating with the Scoring machines Server and Backup Scoring machines Server

Immediately after the start Manager must connect to the main and reserved servers. To do it Manager must send the HELLO command to the Scoring machines Server every 4 seconds.

In order to disconnect it must send STOP.

Server of the machines immediately after the connection of the new Manager starts to resends it to all the commands from all the pistes (from Master) – INFO, NEXT, PREV и REPLACE e.t.c. Manager must process them using own algorithms according to the FIE Regulations for holding of the competitions.

In order to set new participants on the piste Manager must send DISP command on it with new parameters. If the procedure ended successfully, in a little while Manager starts to get INFO commands with new parameters from the present piste. If it did not happen during 8 seconds after sending of the command, it means the procedure of setting new participants is finished unseccessfully.

In team events Manager must before the beginning of the bout send TEAM command to the piste (for right and left sides) with the list of the teams. At that it performs generation of the unique identifier (random number) and adds it to TEAM command. I.e. if the manager sends two similar TEAM commands in a row, their identifiers must be different.

Than, receiving INFO commands from the mentioned piste manager analyzes the field «Last message TEAM code» if it corresponds the sent command, it means the command had been received.

Sometimes devices on the pistes (Master or any Additional device) have a screen (table) for information output. In this case Manager can send MSG command on the piste with the code of the piste and text message which device will display on its screen.

Some devices has a special 'sleeping' mode. For example, in foil, white lamp is not lightened and there is a sound signal when the weapon is disconnected. In order to switch the apparatus in this mode Manager can send STANDBY command indicating the piste.

Communicating with the Server of the Results

Manager does not establish and does not control the connection with Server of the Results. It sends the messages to the Server of the results but does not analyze if it is in the network or not.

Every time when the Manager has updated XML files with the competition data it sends UPDATED command to the Server of the results 4 times.

Manager can double STANDBY and MSG commands to the Server of the Results. In this case they will be resent to the appropriate clients.

It is important that the Manager can send, for example, STANDBY to the server of the results but do not send it to the server of the machines. In this case, the Client can process the present command and the apparatus will stay in the normal mode.

IP addresses

172.20.0.y, where x-is a number of the piste Master and $y \in \{9, \dots, 32\}$

UDP ports

Manager may use any UDP port.

On UDP port only accept messages from the sender:

- 172.20.0.1 or 172.20.0.2

Messages from other combinations IP:Ports are ignored.

Received commands

INFO, NEXT, PREV, REPLACE, DENY, PING

Send commands

HELLO, DISP, TEAM, BOUTSTOP, UPDATED, STANDBY, MSG, STOP

Client(s)

Clients connect to the Server of the results and gets the commands from it about the condition of the pistes.

Clients cannot influence on the interaction of the other nodes.

Communicates with nodes

- Server of the Results

Communicating with the Server of the Results

Clients connect to the Server of the results and receives the commands.

IP addresses

IP addresses must be obtained from DCHP server within the range - 172.20.129.x-172.20.254.x , where and $x \in \{0, \dots, 255\}$

UDP ports

Client may use any UDP port.

Received commands

INFO, TEAM, BROKEN, STANDBY, MSG, UPDATED, PING

Send commands

HELLO

Format command protocol Cyrano 2.0

Any protocol command presents ANSI line consisting of the name of the protocol, command and the parameters, divided by '|' symbol. The fields can be empty.

HELLO

To organize connection between the nodes.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	HELLO	HELLO	8
3	PisteCode	Piste code (optional parameter)	See "Pistes code and Pistes name" or empty	1,2, RED, FINAL, etc	6

Examples:

```
|EFP2|HELLO|RED|  
|EFP2|HELLO|
```

DISP

To set the new athletes on the piste

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	DISP	DISP	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6
4	Event ID	ID of the event	Number	24	5
5	Competition Code	Weapon type	See "Competition codes"	STW, EIM	3
6	Phase	Phase of the competition	Poules, PreTablo or Tablo	PL1, P32, T32, etc	5
7	Order	Bout order in Phase	Number	1, 3, Etc	3
8	Bout ID	ID of the Bout	Number	32	5
9	Time begin	Time of the beginning of the bout.	hh:mm	14:45	5
10	Stopwatch	Time of the bout – sets the duration of the bout	m:ss	3:00 2:00	5
11	Right fencer/team ID	ID of the right athlete or team	Number	33	5
12	Right fencer/team name	Name of the right athlete or team	String	IVANOV Sidor RUSSIA	48
13	Right fencer/team nation/club code	Country/club code of the right athlete or team.	String	RUS	8
14	Right team member ID	ID of the current member of the team to the right	Number Empty in individual	33	5

15	Right team member name	Name of the current member of the team on the right	String Empty in individual	IVANOV Sidor	48
16	Left fencer/team ID	ID of the left athlete or team	Number	531	5
17	Left fencer/team name	Name of the left athlete or team	String	LIMON Jua FRANCE	48
18	Left fencer/team nation/club code	Country/club code of the left athlete or team.	String	FRA	8
19	Left team member ID	ID of the current member of the team on the left	Number Empty in individual	531	5
20	Left team member name	Name of the current member of the team on the left	String Empty in individual	LIMON Jua	48

Examples:

```
|EFP2|DISP|RED|24|EIM|T32|1|32|14:45|3:00|33| IVANOV Sidor|RUS|||531|LIMON Jua|FRA|||
|EFP2|DISP|RED|24|STM|T4|2|32|14:45|3:00|24| RUSSIA|RUS|33|IVANOV
Sidor|1|FRANCE|FRA|531|LIMON Jua|
```

INFO

For state transition on the piste

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	INFO	INFO	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6
	Event ID	ID of the event	Number	24	5
	Competition Code	Weapon type	See "Competition codes"	STW, EIM	3
	Phase	Phase of the competition	Poules, PreTablo or Tablo	PL1, P32, T32, etc	5
	Order	Bout order in Phase	Number	1, 3, Etc	3
	Round no	Number of the round	1-3 in the individual 1-9 in the team	1, 9	1
	Bout ID	ID of the Bout	Number	32	5
	Time begin	Time of the beginning of the bout	hh:mm	14:45	5
	Stopwatch	Current value of the stopwatch	mm:ss	3:00 2:00	5
	State	State of the bout.	N- participants of the next bout the last names are not set; W- participants of the next bout are set but the bout is not activated; H- bout is activated but the stopwatch is not started or is		1

			stopped; F -stopwatch of the bout is started; P -stopwatch of the pause (break between the bouts) is started M - time of the medical break is started; E -confirmation of the end of the bout is requested (the referee has sent the request to end the bout but the answer from the server is not received). A -the bout is finished and deactivated. (one can send the next participants)		
	Referee remote control	Means that the time is started or stopped from the referee's button	0 – no 1 - yes	0, 1	1
	Priority	Priority	N: none R: right L: left		1
	Call of the technician	Means that the technician has been called.	0 – no 1 - yes	0, 1	1
	Call of the video engineer	Means that the video engineer has been called.	0 – no 1 - yes	0, 1	1
	Call of the doctor	Means that the doctor has been called	0 – no 1 - yes	0, 1	1
	Call of the DT representative	Means that the DT representative has been called	0 – no 1 - yes	0, 1	1
	Reverse	Means that the referee has reversed the athletes	0 – no 1 - yes	0, 1	1
	Standby	Means that the Master is in StandBy	0 – no 1 - yes	0, 1	1
	Right fencer/team ID	ID of the right athlete or a team	Number	33	5
	Right fencer/team name	Name of the right athlete or a team	String	IVANOV Sidor RUSSIA	48
	Right fencer/team nation/club code	Country/club code of the right athlete or a team	String	RUS	8
	Right team member ID	ID of the current member of the team on the right	Number Empty in individual	33	5
	Right team member name	Name of the current team member on the right	String Empty in individual	IVANOV Sidor	48
	Right Score	Score	0..45	15	2
	Right yellow card	Yellow card	0 – no 1 - yes	0, 1	1
	Count on right red cards	Number of the red cards	0..15	0	2
	Right Black card	Black card	0 – no 1 - yes	0, 1	1
	Count of the used video on the right	Number of the used videos	0..9	2	1
	Right lamp	Right lamp	0 – no 1 - yes	0, 1	1
	Right white	Right white lamp	0 – no	0,	1

	lamp		1 - yes	1	
	Left fencer/team ID	ID of the left athlete or a team	Number	531	5
	Left fencer/team name	Name of the left athlete or a team	String	LIMON Jua FRANCE	48
	Left fencer/team nation/club code	Country/club code of the left athlete or a team	String	FRA	8
	Left team member ID	ID of the current member of the team on the left	Number Empty in individual	531	5
	Left team member name	Name of the current member of the team on the left	String Empty in individual	LIMON Jua	48
	Left Score	Score	0..45	15	2
	Left yellow card	Yellow card	0 – no 1 - yes	0, 1	1
	Count on Left red cards	Number of the red cards	0..15	0	2
	Right Black card	Black card	0 – no 1 - yes	0, 1	1
	Count of the used video in Left	Number of the used video	0..9	2	1
	Left amp	Left lamp	0 – no 1 - yes	0, 1	1
	Left t white lamp	Left white lamp	0 – no 1 - yes	0, 1	1

Examples:

```
|EFP2|HELLO|RED|
|EFP2|HELLO|
```

BOUTSTOP

For cancellation of the earlier sent DISP command

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	BOUTSTOP	BOUTSTOP	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6

Examples:

```
|EFP2|BOUTSTOP|RED|
|EFP2|BOUTSTOP|1|
```

TEAM

For transfer of the list of the team which is now fencing on its piste.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	TEAM	TEAM	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6
4	Side	Side of the team which is set	LEFT or RIGHT	LEFT RIGHT	5
5	Team member 1 ID	ID of the first team member (of protocol)	Number	234	6
6	Team member 1 full name	Full name of the first team member (of protocol)	String	IVANOV Fedor	48
7	Team member 2 ID	ID of the second team member (of protocol)	Number	542	6
8	Team member 2 full name	Full name of the second team member (of protocol)	String	PETROV Ivan	
9	Team member 3 ID	ID of the third team member (of protocol)	Number	43	48
10	Team member 3 full name	Full name of the third team member (of protocol)	String	SIDOROV Evgeny	6
11	Team member reserve ID	ID of the replaced team member (of protocol)	Number	2	48
12	Team member reserve full name	Full name of the replaced team member (of protocol)	String	OH Semen	6
13	Fencer in the round 1	Number fencer in the round 1	1,2,3	1	1
14	Fencer in the round 2	Number fencer in the round 2	1,2,3	2	1
15	Fencer in the round 3	Number fencer in the round 3	1,2,3	3	1
16	Fencer in the round 4	Number fencer in the round 4	1,2,3	2	1
17	Fencer in the round 5	Number fencer in the round 5	1,2,3	1	1
18	Fencer in the round 6	Number fencer in the round 6	1,2,3	3	1
19	Fencer in the round 7	Number fencer in the round 7	1,2,3	3	1
20	Fencer in the round 8	Number fencer in the round 8	1,2,3	1	1
21	Fencer in the round 9	Number fencer in the round 9	1,2,3	2	1
22	Unique ID	Unique team ID	Number	435533	8

Examples:

|EFP2|TEAM|RED|LEFT|234|IVANOV Fedor|542|PETROV Ivan|43|SIDOROV Evgeny|2| OH Semen|435533|

GETTEAM

To request the list of the team on one of the piste from Server of the Results.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	GETTEAM	GETTEAM	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6
4	Side	Side of the team where there is the replacement	LEFT or RIGHT	LEFT RIGHT	5

Examples:

```
|EFP2|GETTEAM|RED|LEFT|  
|EFP2|GETTEAM|1|RIGHT|
```

REPLACE

To report Manager that there is a replacement in one of the team in team events

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	REPLACE	REPLACE	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6
4	Side	Side of the piste where there is the replacement	LEFT or RIGHT	LEFT RIGHT	5
5	Number of fencer	Number of the replaced fencer	1,2 or 3	1 2 3	1

Examples:

```
|EFP2|REPLACE|RED|LEFT|1|  
|EFP2|REPLACE|FINAL|RIGHT|3|
```

NAK

To report Master that the received result of the bout is incorrect.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	NAK	NAK	8

Examples:

```
|EFP2|NAK|
```


ACK

To report Master that the received result is correct.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	ACK	ACK	8

Examples:

|EFP2|ACK|

NEXT

To report Manager that the referee on the piste is asking to send the next match

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	NEXT	NEXT	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6

Examples:

|EFP2|NEXT|RED|
|EFP2|NEXT|1|

PREV

To report Manager that the referee on the piste is asking to send the previous match

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	PREV	PREV	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6

Examples:

|EFP2|PREV|RED|
|EFP2|PREV|1|

UPDATED

To report all the clients that XML file with the current state of the competitions is updated.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max
---	-----------	----------------------	-------------------------------	----------	-----

					length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	UPDATED	UPDATED	8
3	EventID	ID of the event	Number	24	8
4	Competition Code	Code of the weapon	See "Competition codes"	EIM, STW etc	3

Examples:

```
|EFP2|UPDATED|23|EIM|
|EFP2|UPDATED|23|STW|
```

STANDBY

Gives a command to switch to the 'sleeping mode'

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	STANDBY	STANDBY	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6

Examples:

```
|EFP2|STANDBY|RED|
|EFP2|STANDBY|1|
```

BROKEN

Informs that the connection with the piste is lost.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	BROKEN	BROKEN	8
3	PisteCode	Piste code	See "Pistes code and Pistes name"	1,2, RED, FINAL, etc	6

Examples:

```
|EFP2|BROKEN|RED|
|EFP2|BROKEN|1|
```

MSG

Distributes information message.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	MSG	MSG	8

3	PisteCode	Piste code	Piste code (see, "Pistes code and Pistes name") - for a particular piste ALL - for all pistes	1,2, RED, FINAL, etc ALL	6
4	MessageText	Text of the message	Text of the message can be of any character except ' '. "	"Next bout : IVANOV I (RUS) – MULLER F (GER)"	128

Examples:

|EFP2|MSG|RED|Next bout : IVANOV I (RUS) – MULLER F (GER)|
|EFP2|MSG|ALL|Mr. Bach, please come to the Directorate|

STOP

To report that the node is disconnecting and does not wait information any more.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	STOP	STOP	8

Examples:

|EFP2|STOP|

PING

To request node – if it is in the network. Must be implemented in any node.

#	Fieldname	Description, remarks	Values, explanations, remarks	Examples	Max length
1	Protocol	Name of the protocol	EFP2 for protocol Cyrano 2.0	EFP2	4
2	Command	Name of the command	PING	PING	8

Examples:

|EFP2|PING|