PROTEI

Call Center

Presently, there are a lot of companies, firms and organizations, whose activity requires receiving and processing numerous telephone calls.

The main purpose of Call Centers is to handle the maximum number of the incoming calls, and/or to organize the maximum number of the outgoing calls, at the same time maintaining high standards of client's service quality and reaching maximum efficiency of the agents' work.

PROTEI Call Center is a new generation cost-effective solution that can be used by any companies for providing information services, booking services etc. and by any companies whose business requires inbound and outbound calls flow processing.
New generation technologies, such as VoIP and WEB are widely used in PROTEI Call Center.

Subscriber can access the PROTEI Call Center services by standard way from PSTN, from Internet via WEB/e-mail Callback order, by e-mail or by making VoIP call.

PROTEI Call Center uses IP network as unified universal transport making unnecessary traditional two separate networks for voice and data. Switching of voice channels in this case is composing/decomposing media-streams between particular nodes of the computer network. IP based Call Center provides a wide range of possibilities for the integration of call processing subsystem with information subsystem. In addition, it enables processing requests from the Internet via e-mail and the use of the VoIP technology.

In comparison with traditional PBX based systems IP based Call Center gives much more efficient tools for providing outsourcing services and for organizing network distributed systems. Workplaces of such Contact Center can be allocated anywhere in the telecommunication network.

All features of PROTEI Call Center are implemented through the Application Servers that process call control information and media-streams (if it is necessary) and interact during call processing with call center databases. Call Center can contain several such servers (ACD, IVR, etc.). Such approach provides perfect solution to resolve the task of providing necessary level of reliability, scalability and implementation of new features.

Call Processing Algorithms

The system supports unlimited number of agents groups and service access numbers that allow organization of any number of services in one system. Several types of call processing algorithms are implemented.
One access number can be used to route calls to several agent groups. In this case usually all calls come to the dedicated access number and are routed to a single virtual preliminary group, after which they can be readdressed to other groups (functional sectors) within the same service depend on predefined routing criteria and call conditions.

1) PSTN Incoming Call Processing Algorithm

After the incoming call is accepted by the system, the Automatic Call Distribution Subsystem processes this call according to the following scenarios:

- If there are agents available in the group, the call is routed directly to the workplace of the agent, using call distribution algorithm specified for this service;

- If there are no agents available in the group, the call is queued;

- If IVR is configured for this service, the call is transferred to the IVR subsystem. After the dialog with IVR, the call can be switched immediately to the workplace of the agent (if it is necessary); if there are no free agents available in the group, call is transferred to the queue of the agent's group.

The caller can receive some information while waiting (the advertisement information about the company services as well as the number in the queue and the approximate waiting time).

Call routing to the desired group is based on the service access number dialed by the caller, on the information received from the dialog of the caller with the IVR system (by tone dialing), and/or on the Caller ID.

2) Call processing Algorithm for Telephone Switchboard Mode

PROTEI Call Center can operate as a telephone switchboard according to ex-USSR countries rules for long distance semiautomatic service providing:

- Order reception for long distance calls for immediate or for delayed execution;

- Long distance call order execution by the call center agents: manual number dialing, A- and B-party switching, speech quality control;

- Supporting wide range of the order parameters: order execution time, call to one of the ordered numbers, serial calls to all ordered numbers, call with preliminary notification, calls with limited duration etc.;

- Providing information about the number of called party and about tariffs to the selected destination;

Main difference between standard agent terminal software and switchboard's agent terminal software is that switchboard agent has an opportunity simultaneously to serve up to 10 calls, to supervise any particular call state and to speech path quality control after the subscribers A and B are switched on.
If the called party is unavailable at the time of order execution, order can be postponed and processed later. When receiving and processing orders, the system automatically logs information such as caller ID, request reception time, and the ID of the agent who received/serviced the request.

3) VoIP Call processing Algorithm

PROTEI IP Call Center allows access to its services during the Internet session using VoIP technology.

4) Callback Features

Callback mode provides a powerful feature for accepting the incoming calls or any other call orders (e.g. e-mail) without necessity to queue them immediately, with subsequent callback to order originator by a free agent. This feature dramatically increases call processing service level and gives the unique possibility not to lose incoming calls even when all the agents are busy and the group queue is overflowed.

There are three algorithms for accessing this feature: requesting a callback from a dialog with IVR, requesting a callback from the Web site or automatic callback order placement when the group queue overflowed.

For requesting the callback service from the Web site, the client fills out a form specifying the approximate time for callback, type of communication, and the contact phone number. This information can also be entered via IVR menu.

The callback order is queued and processed similar to outgoing call.

5) E-mail Requests Processing Algorithm

A quick response to large number of e-mails increases the overall efficiency of the company business and the quality of servicing its clients. Access to resources of the contact center via e-mail can be obtained in two methods:

- Sending a letter to the company's e-mail address;

- Filling out a special form on the Web site.

### 6) Outgoing Call Processing Algorithm

One of the PROTEI Call Center features is a built-in predictive dialing subsystem. This subsystem is very useful when it is necessary to process large volumes of outbound traffic. List of numbers to be dialed can be generated automatically, by call center personnel, or by external information systems depending on the particular applications or business cases.

The system automatically initiates calls from the generated active lists, determines the state of the line (Busy, No Answer, Fax, or "Live" Answer). When the subscriber answers, the line is switched to a currently available agent (optionally to the IVR).

Queuing

To ensure the best quality of incoming calls servicing, PROTEI Call Center supports flexible call queuing. When there are no available agents in an agent group that should process the call according to call center configuration, the call is queued.
Each group of agents works with its own queue.

The system continuously monitors the length of each queue. If the length of the queue exceeds a threshold established for this group by maintenance personnel, the caller receives an IVR notification and then is disconnected.
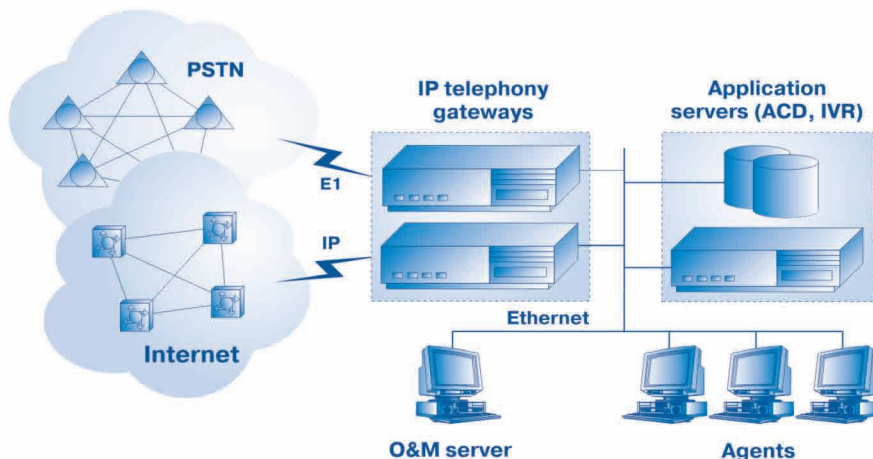
Voice Promts

A flexible system of voice prompts provides possibility to use its own prompt set for each queue. In PROTEI Call Center the following prompts can be defined for agent group:

- Service Welcome message;
- Prompt before call queuing;
- Prompt during call is in the queue;
- Prompt before call will be distributed to anagent
- Agent welcome message;
- Prompt that will play when the group queue is overflowed;
- Prompt that will play when the service access is restricted for this subscriber (in case of black list is used for particular service).

Prompts can depend on the time of the day and on the day of the week.

Average queue waiting time is calculated in PROTEI Call Center to inform calling subscribers. This parameter is calculated on the base of the following parameters:

- Number of calls in the queue;
- Average answer handling rate;
- Waiting time of the earliest call;
- Number of current agents;
- Number of available agents;

Call Routing

To optimize call processing PROTEI Call Center supports flexible routing algorithms. Specific algorithm being defined for the particular agent group depends on the analysis of the purposes of a particular contact center.

Depending on the parameters set by the system administrator, calls can be routed to different agent groups and different agents in the group; subscribers can listen to music, information, etc during waiting in the queue. The following criteria affect call routing:

- Number dialed (service access number);
- Time of the day and the day of the week;
- Caller ID;
- Digits dialed by the caller during the dialog with IVR;
- Number of agents in the agent group;
- Number of available agents in the agent group;
- Number of calls in the queue of the agent group;
- Number of high priority calls in the queue of the call center (if used);
- Calculated waiting time in the queue of the agent group;

Different combinations of these parameters allow creating very flexible call routing algorithms. For example, dedicated agents may process calls from VIP subscribers immediately.

Subscriber	5119			Duration: 00:00:05	Status: Conversation
Service	022	ID 123		Group: Information	

Exit | Console blocking | Complete a call | Accept a call | Put on hold | Consult | Transfer a call | Confirm a service | Menu

Calls Distribution Algorithms

Three main call distribution algorithms are used:

- Round-robin call distribution (i.e. any available agent handles the call);
- The "longest available" agent will be chosen for the next call (i.e. the agent that will handle the call from the queue is chosen depending on the time, during which this agent was free from servicing calls, based on the following two parameters: time free from servicing clients and the agent's qualification);
- Choice of the least busy agent (i.e. the call from the queue is handled by the agent, characterized by the least load level. Either the total conversation time or the total number of calls handled by the agent can function as the criterion for the choice. This algorithm can be modified to include the agent's qualification as another parameter.)

In addition, calls from several subscribers can be addressed directly to a particular agent. Usually such scheme is used for high priority calls from VIP subscribers.

Agents Features

The system supports several agents groups. The group can include one or several agents workplaces. Each agent in the system is identified by a unique number (ID) and password. Special software is installed at the agent workplace and allows the Call Center agent:

- Registering in a desired group at any workplace under their unique ID;
- Accepting incoming calls from PSTN and the Internet (VoIP);
- Making outgoing calls;
- Putting calls on hold;
- Consulting (second call);

- Transfering calls to another group/senior operator (supervisor)/external line;
- Making call recording;
- Exiting the call servicing mode temporarily (console blocking);
- Forcing disconnect calls;
- Getting access to the Call Center and CRM data bases while processing calls.

During the incoming call, information about the caller is displayed on the agent's workplace. Flexible API is supported in Call Center agent terminal software for integration with external application (i.e. CRM systems).

G.711 and G.729 audio-codecs are supported in agent terminal software.

To provide high level of call processing quality a special feature is implemented in PROTEI Call Center: call forwarding when the agent does not answer. This feature will forward the call from the console of the agent who does not answer it during the specified time interval to the same group of agents (for example, this situation can happen if the agent leaves his workplace without terminal blocking bu the system still considers the agent available for receiving calls).
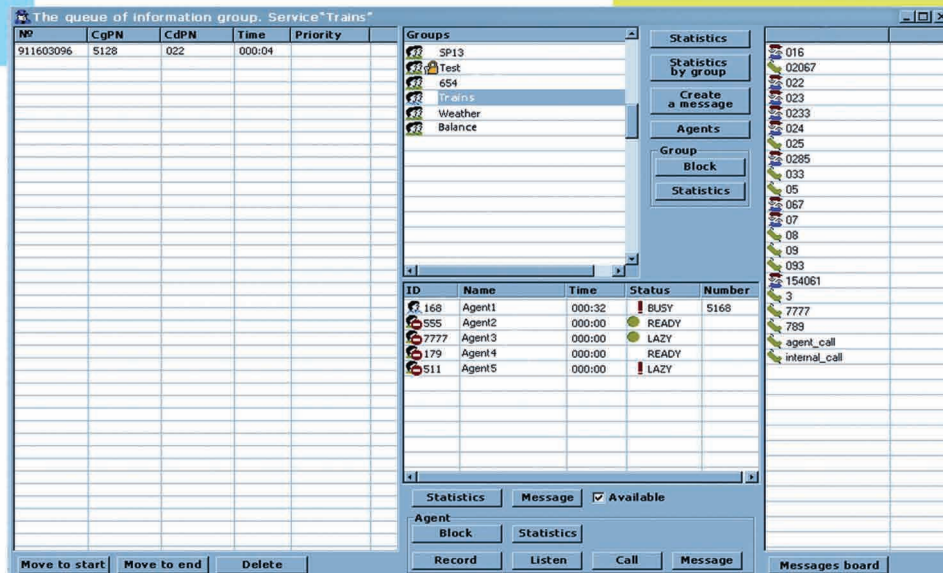
In order to avoid another "no answer" situation, the agent's workplace is blocked until the agent returns and unblocks his workplace. Call Center supervisor also will be notified about this event.

Call Forwarding

Call forwarding is an additional feature that could be used to change routing rules for particular agent group temporarily.

The following types of call forwarding are supported in PROTEI Call Center:

- Unconditional forwarding to the group/IVR;
- Forwarding when the group queue overflow;
- Forwarding if the group is administratively blocked;
- Forwarding if no agents are available in the group.

The queue of information group. Service "Trains"

№	CgPN	CdPN	Time	Priority
911603096	5128	022	000:04	

Groups:
- SP13
- Test
- 654
- Trains
- Weather
- Balance

Statistics | Statistics by group | Create a message | Agents | Group: Block | Statistics

ID	Name	Time	Status	Number
168	Agent1	000:32	BUSY	5168
555	Agent2	000:00	READY	
7777	Agent3	000:00	LAZY	
179	Agent4	000:00	READY	
511	Agent5	000:00	LAZY	

- 016
- 02067
- 022
- 023
- 0233
- 024
- 025
- 0285
- 033
- 05
- 067
- 07
- 08
- 09
- 093
- 154061
- 3
- 7777
- 789
- agent_call
- internal_call

Statistics | Message | ☑ Available
Agent: Block | Statistics
Record | Listen | Call | Message
Messages board

Move to start | Move to end | Delete

Call Monitoring and Recording

To provide an effective tools to control the call service quality and to save necessary voice information for further using the powerful call monitoring and the call recording subsystem is implemented in PROTEI Call Center.

Special features of this subsystem allow the supervisor performing effective control of the call accepting and servicing process. Two control modes are available:

- Participation in the conversation of the agent with the caller (only listening or listening with subsequent call interception);

- Recording the conversations of the selected operators with subsequent playback from the supervisor console. Conversations of up to 100% of the Call Center agents can be recorded simultaneously.

Statistics and Call Logging

The efficiency of the Call Center depends on the character of the load, number of the operators, the tasks of the Call Center, and many other factors. Only permanent monitoring of the Call Center operation can provide detailed information about traffic parameters and Call Centers functioning efficiency. A powerful statistics and call logging subsystem implemented in PROTEI Call Center can ensure optimal distribution of the Call Center resources, and allows providing the best service quality level for Call Center clients.

The system can form and store a large amount of statistical data and operation logs. It can also generate real-time reports and chronological long-time reports.
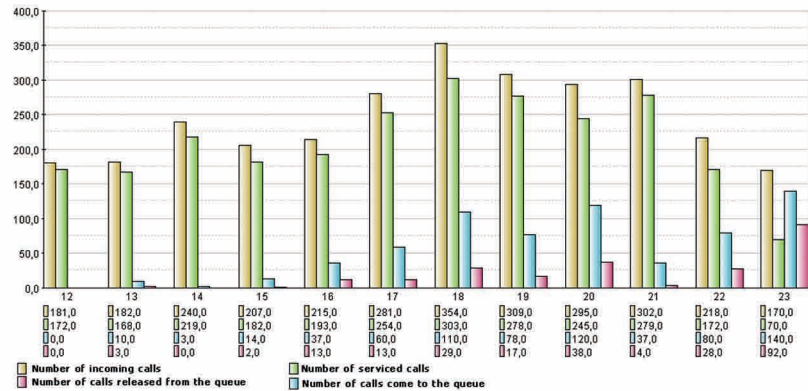
The system allows very flexible manipulations with accumulated statistical data, built-in report constructor is implemented, table and graphical report generation is available.

The following main statistical values are available:

(1) Number of calls:

- Incoming;

- Outgoing;

- Released from the queue before the agent answers;

- Released from the queue before the agent answers with the queue waiting time that is more than specified threshold;

- Correctly serviced calls with queue waiting time that is more than the specified threshold;

Statistical report

	12	13	14	15	16	17	18	19	20	21	22	23
	181,0	182,0	240,0	207,0	215,0	281,0	354,0	309,0	295,0	302,0	218,0	170,0
	172,0	168,0	219,0	182,0	193,0	254,0	303,0	278,0	245,0	279,0	172,0	70,0
	0,0	10,0	3,0	14,0	37,0	60,0	110,0	78,0	120,0	37,0	80,0	140,0
	0,0	3,0	0,0	2,0	13,0	13,0	29,0	17,0	38,0	4,0	28,0	92,0

- Number of incoming calls   - Number of serviced calls
- Number of calls released from the queue   - Number of calls come to the queue

- Average queue waiting time for successfully services calls;

- Average queue waiting time for lost calls;

- Average call duration;

- Average IVR session duration etc.

(2) Agents' work parameters:

- Number of the call processes during the selected time interval;

- Number of the calls transferred to the supervisor or to an agent with higher qualification;

- Average call duration;

- Average "after-call-time" duration;

- Average load of the agent (time in percent when this agent processed calls);

- Short breaks duration etc.

Administration and Maintenance

PROTEI Call Center software includes WEB based administration tools that allow efficient and comfortable configuration management. By using this software tools System Administrator can configure:

- Access numbers' settings;

- Agent groups settings;

- System voice prompt list;

- Voice prompts for each agent groups;

- Agents' terminal parameters;

- Agent's settings (personal agent settings, list of terminals allowed for this agent, etc.);

- Call routing algorithms for each agent group;

- Call distribution algorithms for each agent group;

- Call queuing settings for each agent group;

- Call forwarding settings;

- IVR scenarios;

- Caller "black lists";

- PSTN interface settings.

Architecture, Scalability and Reliability

The solutions used in both hardware and software design of PROTEI Call Center comply with the requirements for the carrier class real-time systems.

System has horizontally scalable architecture that allow system capacity growing according to the operator needs. Each type of system modules could be reserved. Several modules of the same type could work in the traffic sharing mode.

Market experience

PROTEI Call Center is a field-proven system. For one years at the telecom market our installations in Russia and CIS countries include:

- Mobile carriers;

- Fixed carriers;

- Emergency services call centers;

- Commercial outsourcing call center