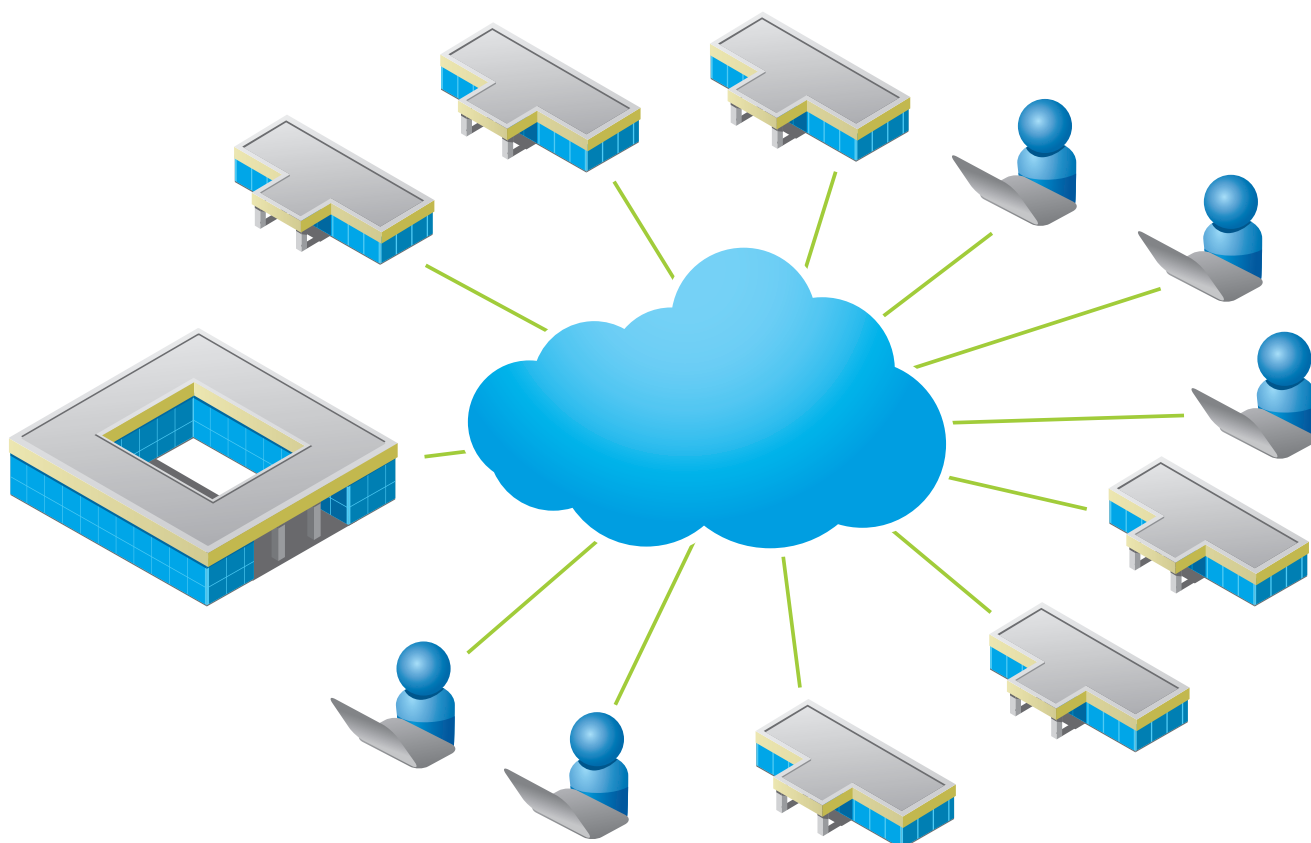




Krasnodar Region Distance Learning System



Project ProIntegration Awards – 2012



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1. General Description

The project of Distance Learning (VE) System for 124 schools of Krasnodar Territory was implemented on order of the Department of Education and Science within the frames of the program of introduction of new information technologies in the educational process of the region.

The territory of Krasnodar Territory covers 75,485 km², population amounts to 5,284,500 persons. The region ranks third by population among regions of the Russian Federation after Moscow and Moscow Region. 53.3% of the population of Krasnodar Territory lives in towns, 46.7% - in countryside. The schools are distributed evenly in the towns and villages, however, what concerns quality of education and quantity of students, rural schools differ much from town. On the average, one rural ungraded school has 120 students, which questions cost-effectiveness of their maintenance by municipal authorities.

Being challenged the Ministry of Education and Science of Krasnodar Territory came to a conclusion, that closing schools is not the answer. It is necessary to upgrade education by introducing modern information and communication and audiovisual technologies.

Thus, the objective of the project became increasing of effectiveness of the educational process in the ungraded schools, provision of equal opportunities of high-quality education to disabled children, as well as individualization of the educational process of gifted children.

The developed solution represents a multifunctional complex, which mainly differs from the traditional systems of virtual teaching by achievement of the presence effect for remote students, which is creation of the conditions that make Distance Learning maximum similar to presence in a class.

The principle of a Distance Learning complex is based on deployment an information and communication infrastructure on the basis of a resource center of Kuban State University, including server equipment for carrying out of sessions of multipoint videoconferencing, servers of recording and archiving of classes and materials. Schools, in their turn, are connected to the Resource center and are divided to base (total of 51 the region) and ungraded (73 fellow schools), which are equipped with all necessary equipment for carrying out of video conference sessions and interactive classes with various communication services. Thus, teleconferences can be carried out both centralized – on the basis of the resource center, and independently — in one area with broadcasting of classes from a base school to the ungraded schools.

Achievement of the presence effect during the sessions of virtual teaching is promoted by high-quality video image broadcasted by means of videoconferencing LifeSize systems, as well as a unique software allowing students to watch remotely all materials on the board, including all graphic explanations in real time, as well as to do exercises on the interactive board and respond at the board, as if they were in the same class room. For the arrangement of such joint work, SMART Bridgit software complex is used.

For information display from a video conference codec, high resolution 1920x1080, 46" Flame LED-display is installed in each base school.

Besides, in each base and ungraded school, interactive training aids are installed: SMART Board 885ix interactive systems and SMART Board 685ix interactive boards with an ultra short-focus projector that allows minimizing a speaker's shade on the board. "Double contact" function provided by SMART Board toolkit makes it possible that two students work simultaneously in one application, which raises interest to collective work and can be used as simultaneous work of a student with a teacher.



For demonstration of the paper documents and any other subjects, on the teacher's table SMART Document Camera 330 is installed that allows without damaging unique editions and exhibits of the school collection, to demonstrate them to all audience.

The terminal equipment LifeSize Express 220 is used as videoconferencing system in all schools. These terminals have a number of essential advantages due to which they were chosen for solution of the project tasks:

- these terminals can transfer Full HD (1080p30) video, and the equipment has less requirements to the carrying capacity of the Internet channels, in comparison with competitive solutions. For example, for high resolution video transfer 30 pps, a guaranteed channel with carrying capacity not more than 768 Kbit/s is enough, which is especially important for the schools located in remote areas where the Internet has quite low carrying capacity.
- two systems of information display can be connected to LifeSize Express 220 terminals (in this case, at base schools interactive system SMART Board and a LCD-display is connected to the terminal). Thus, simultaneous transfer of presentation and video is possible, which considerably facilitates work and increases effectiveness of perception of training material by remote students.

Within the frames of the project, in the Resource center a large-scale hardware and software infrastructure was developed, that consists of Radvision multipoint videoconferencing servers, LifeSize servers for recording and broadcasting of the educational events, SMART Brigit software for collective work, hardware and software complex for provision of services and functions of a virtual teaching portal.

The virtual teaching portal was developed for implementation of the centralized support of all services carrying out the following functions:

- unified access point to broadcasting of classes, teaching materials and video records of classes (to find online broadcasting of a class or video record of the class, student can through a standard Internet browser enter LifeSize VideoCenter 2200 server of recording, cataloguing and storage and choose a required material in the list of records and classes broadcasted at that moment)
- Informing the schedule of virtual classes
- Planning of virtual classes and notification about them
- Arrangement of forums
- Informing on the latest news in the educational sphere of the region.

The independent part of the project was devoted to training of users of the virtual teaching system. Students of the courses were divided into 3 groups:

1. Technical staff serving the Resource center
2. Experienced system users
3. Common users (majority)

Group 1 was trained by the experts of the equipment manufacturers or Polymedia. Group 2 was trained to use the system of virtual teaching with additional advanced teaching of technical features. For training of Group 3, lists of tutors trained in Polymedia to use of client parts of the complex at user level were generated.



Within 10 days, about 130 persons were trained, among who are schools teachers and system administrators of the Resource center. During a warranty period, an integrator also provided solution of all problems connected with possible equipment errors. Moreover, educational institutions could use a service of remote control and diagnostics of the equipment. On the basis of the Resource center in Kuban State University, a powerful Technical Support Center with a hot line to follow a status of the systems and equipment installed at schools was developed. Experts of the Center — highly skilled engineers and programmers who promptly react to technical questions from schools and provide uninterrupted functioning of all systems.

Of course, one cannot overestimate the importance of the project: Distance Learning System of Krasnodar territory is of high social importance, which was experienced at all levels of the region's educational system — from teachers to representatives of the education authorities. Following the results of the project, Polymedia experts achieved not only strictly educational objective, but also helped with solution of administrative questions of the region. According to the Deputy Minister of Education of Krasnodar territory, the developed solution is very helpful in carrying out of routine and operative conference calls with municipal authorities of areas, school directors and educational authorities.

The complex of means was very helpful in the emergency of natural disaster in Krymsk. Communication, acquisition of information from field services, carrying out of operative meetings with Novorossiysk, Krymsk and municipal authorities — all the above helped the regional government to find solutions to manage the emergency situation.

Project start date — November 22, 2011

Implementation date — December 25, 2011

Integrator company — Polymedia



2. Features:

- The project is territorially distributed and covers the following cities and towns of the region – Krasnodar, Sochi, Novorossiysk, Goriachiy Kluch, Gelendzhik, Armavir, Anapa, as well as the district centers. Therefore, a complex administrative scheme was applied for its implementation, according to which rules of interaction between the Moscow office, the Krasnodar representative office and subcontract organizations were set. Several steps were taken according to the project management plan to keep up with the fixed deadlines and not to decrease the quality of the solutions: creation of a base school model and testing of the equipment on its basis, communication quality checking, unification and on-site verification, creation of an accurate logistical scheme, risk assessment, forecasting of unforeseen situations, testing and selection of subcontracting organizations, installation control.
- The most effective solution of video conference organization by integration of the best qualities and characteristics of the equipment of different manufacturers. Within the frames of the project, the hardware and software infrastructure of the Resource center on the basis of the Radvision multipoint videoconferencing server, LifeSize servers of recording and broadcasting of educational events, as well as SMART Brigit joint work software, and the hardware and software complex for maintenance of services and functions of the virtual teaching portal was developed. Aggregation of the equipment of different brands allowed creation of a flexible solution as much as possible corresponding to the customer's requirements, cost-optimized, as well as optimized for introduction of equipment. Due to combination of the equipment and LifeSize and Radvision software, the maximum capacity of the Resource center was achieved, which allows carrying out up to 420 sessions of virtual classes simultaneously (both on the basis of schools and individual with use Radvision Scopia Desktop Pro software), record simultaneously up to 60 classes in HD quality with possibility of watching by up to 3000 users.
- Wide spectrum of the solved problems:
 1. Equal opportunities of high-quality education for the students of ungraded schools
 2. Participation of disabled children in regular school classes and dialogue with children of the same age
 3. Provision of possibility of the program individualization for the gifted children
 4. Variety of teaching methods
 5. Provision of possibility of intercultural exchange with the foreign educational institutions
 6. Solution of issues of administrative interaction of the education authorities, convocation of operative meetings with municipal school directors
 7. Assistance in emergency recovery operation in Krymsk.



3. Project Requirements

At a stage of the development of the Complex performance specifications the following requirements were made:

- Possibility of simultaneous classes with ungraded schools and in-home students from a classroom of the base school;
- Carrying out of classes with use of the modern multimedia and interactive equipment;
- Possibility for the students of ungraded schools or in-home students to see and hear a teacher at base school;
- Possibility for the teacher at base school to see and hear all students in remote classes;
- Possibility of image transfer from an interactive board at base school to all remote classrooms and in-home student monitor, and possibility of simultaneous work with them from any classroom;
- Possibility of recording of classes and record storage, cataloguing and provision of the possibility of online broadcasting and portal access to the recorded materials;
- Multifunctional performance of the complex and provision of the possibility to upgrade eventually its individual components.

4. Customers' opinions

[1. N.E. Bairachniy, Deputy Minister of Education and Science of Krasnodar Territory](#)

[2. S.F.Cherniavskaya, Director of School № 71 of Krasnodar](#)



5. Description of the equipped objects and integrated systems

By the equipment configuration, location and functional purpose, the whole hardware complex is divided to 4 kit groups:

- 1) Class of the base school (51 kits)
- 2) Class of a ungraded school (73 kits)
- 3) Mobile kit (1 kit)
- 4) Resource center (1 kit)

The equipment was chosen taking into account a considerable quantity of factors: functional capabilities, popularity of manufacturer, its reputation in the market, reliability, price/quality ratio, price/functionality ratio, warranty period, maintainability, operational life, etc.

The complex is optimized from the point of view of the switching equipment and cabling. Questions of equipment placing, its installation, power supply, operation, and fire safety requirements were worked through.

The scheme of the Complex construction assumes allocation of one base school and several fellow schools. The equipped classroom of the base school in which the class is conducted is connected by means of modern audiovisual communication techniques with equipped classes of other schools, and, thus, students can virtually be present at class. Thus, the remote audiences can see and hear the teacher's explanations, ask questions, and the teacher can observe the situation in the remote classrooms. Besides, all classes of the virtual teaching system are equipped with interactive boards with possibility of joint work of all participants of a remote teaching session. Also, it is possible to record classes, store, catalogue and access online the recorded materials.

The "Base school" and "Ungraded school" kits are remote parts of the unified Complex. Each kit consists of the equipment permanently installed in a classroom switched to each other. All kits are interconnected through the Internet, and their coordinated work, video recording function is implemented by the Resource center. The mobile kit is portable system supplemented by graphics input and output devices and large-zoom camera.

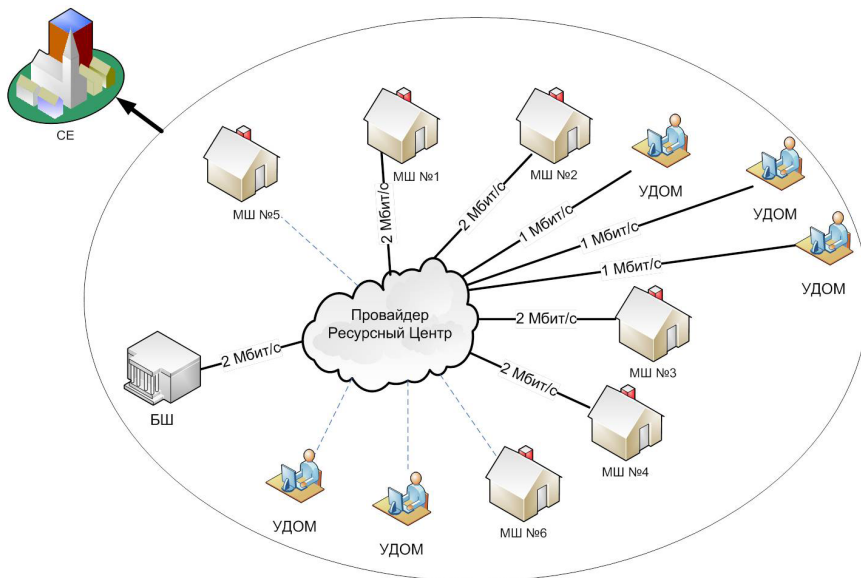


Fig. 1 – VE structural unit.

In the Figure– VE complex based on a structural unit (CE), consisting of the Base school (БШ), ungraded schools (МШ), and in-home students (УДОМ).

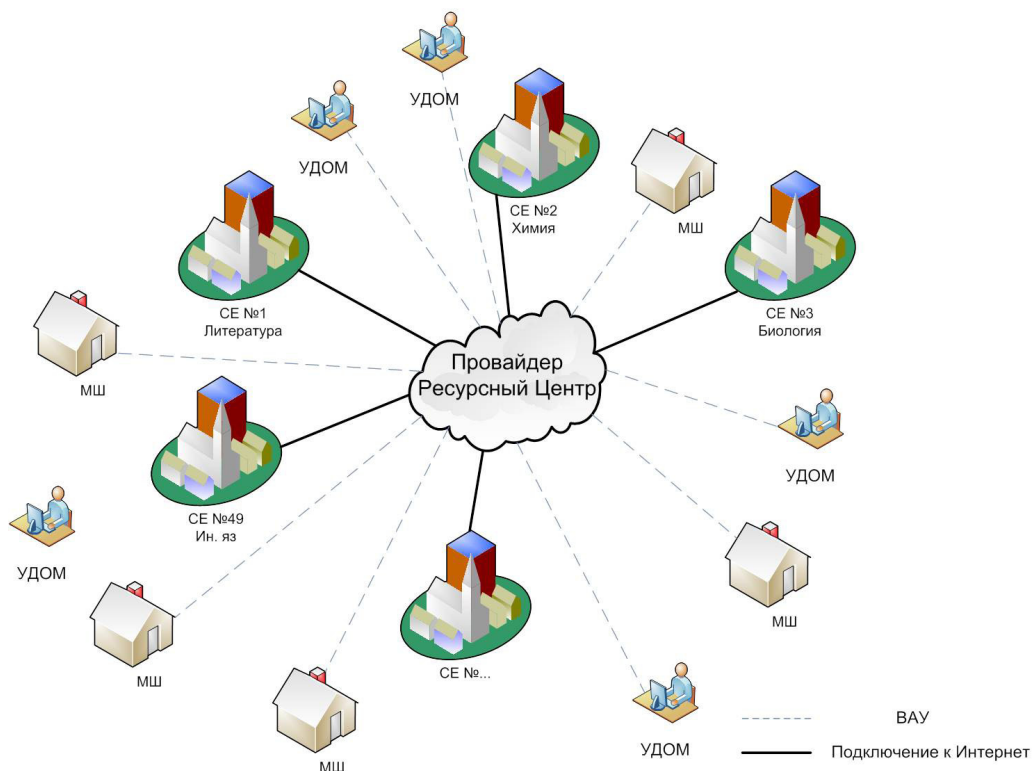


Fig. 2 –General scheme of operation of the structural units.

Structural units can change active participants among themselves. Possible active participants can be connected to them, if there vacancies in a virtual class.



“Base school” kit

Kit structure

The system of video and audio playback and interactive work

The system includes a SMART Board interactive board and a ultra short-focus projector, which does not produce shades on a surface of the board. Dual Touch function allows users to work simultaneously in all educational space of the board.

SMART Notebook 10 software is an environment for creation and carrying out of classes with use of the SMART interactive equipment, which is included in the delivery kit of the interactive board.

For the accompanying sound of video data a SMART acoustic system is included to the kit, which is installed directly on the interactive board.

46” LCD Flame LED screen is used for demonstration of video conference.

HP laptop is the main teacher’s instrument of work and creation of teaching materials. Video signal from it is switched through a document-camera to LifeSize codec. The document-camera transfers the image to the laptop or can be an independent source of video signal.

Videoconferencing system

The videoconferencing system is a multifunctional system which is a main link between the equipment in each kit and individual separate kits of the Complex.

The system corresponds to following requirements:

- Creation of a solution on the basis of the global network of data transfer;
- Construction of a system on the basis of the video conference equipment supporting H.323, SIP data transfer protocol;
- Support of the H.239standard of image transfer from a personal computer;
- Provision of simultaneous carrying out of classes from classes of the base school with ungraded schools and in-home students;
- Support of carrying out of classes with use of the modern multimedia and interactive equipment;
- Provision of students of the ungraded schools or in-home students with the possibility to see and hear a teacher of the base school;
- Provision of a teacher of the base school with the possibility to see and hear all remote participants of classes;
- Provision of all remote students with the possibility to see the image from the interactive board in the base school;
- Provision of the online broadcasting, recording, storage and cataloguing of classes, as well as access to the portal with recorded materials for all users.
- Provision of connection of the laboratory complexes and other equipment used in the educational process.



The basis of the system construction is LifeSize Express 220 codec. Besides arrangement of video conferencing, it also acts as a central switching link of the kit. The codec receives signals from the sources (video-camera, teacher's laptop, document-camera) and transfers them to video and audio playback devices. Thus, the signals can be both broadcasted in an external network, and reproduced in the classroom. The video signal from the codec is formed on the Flame display, and a signal from the laptop and/or document-camera – on the interactive board. Switching is automatic, but the user can do it manually by using remote control panel of the codec and a screen menu. The audio signal of the video conference or from the laptop is switched by the codec to the acoustic systems.

LifeSize Express 220 codec has following specifications:

Visual communication:

- Full resolution of video transmission — 1920x1080;
- Sufficient speed of a communication channel at full resolution — 1.7 Mbit/s;
- Full resolution of video transmission at a communication channel 512Kbit/s — 1024x576;
- Scanning at any resolution — progressive;
- Frame frequency at any resolution — not less than 30 f/s;
- Supported standards — H.261, H.263, H.263 +, H.264, H.239.

Communications:

- Communication protocols — H.323, SIP;
- Supported protocols and standards — H.221, H.224, H.225, H.231, H.241, H.242, H.245, H.281, BONDING (ISO13871), RFC 3261, RFC 3264, RFC 2190, RFC 3407
- Support of network addressing — IPv4, IPv6;
- Support of "firewall traversal" — H.460.

Audio communication:

- Supported standards — G.711, G.722, G.722.1, G.728, G.729, MPEG-4-AAC-LC;
- Available functions — echo suppression, automatic control of amplification, automatic noise blanking;
- Type of audio communication — full duplex.

Safety:

- Availability of access rights — administrator, user;
- Possibility of alert sending using SNMP;
- Possibility to forbid access under protocols HTTP, SSH, and Telnet;
- Possibility of encoding under protocol H.235;
- Availability of a lock for prevention of the terminal theft.

User interface:

- Availability of the Russian graphic user interface;
- Availability of the built-in address book;
- Availability of support of LDAP, H.350;
- Availability of the "not to disturb" mode;
- Availability of the web interface for remote control.
- Available interfaces and dimensions of the device:
- Availability of a network socket (type RJ-45) — 1;
- Availability of an input connector for video-camera — 2;
- Availability of a phone jack for analogous telephone lines RJ-11 — 1;
- Availability of output connectors for HD monitors (HDMI/DVI) — 2;
- Availability of input video connector (HDMI/DVI/S-Video/Composite) — 4;
- Availability of input microphone connector — 1;
- Availability of output audio connector — 1;

Service:

- 1 year of service backup LifeSize Team 220 — Services (1-year) LifeSize.



Switching system

Cisco router is included to the kit for the equipment network switching and arrangement of Wi-Fi access point, which is connected to the school's local network.

HP multifunctional device (МФУ, printer, scanner, copier) is connected to the teacher's personal computer via USB interface.

Joint work system



Fig. 3 – System of remote joint work

For the organization of the joint work of students from remote schools with electronic materials demonstrated during a session of virtual class, the SMART Bridgit software complex is used. Students can see remotely all materials from the board, including all graphic explanations, in real time, as well as, draw on the interactive board, do exercises together with other students and present reports, as if they are in the same classroom. SMART Bridgit software is installed in each teacher's laptop.

“Ungraded school” kit

The kit is a reduced “Base school” kit and consists of the same devices, except the Flame display, document-camera and multifunctional device.

Kit structure

- Video and audio playback device - SMART Board with acoustic systems
- Information source – teacher's HP laptop
- Videoconferencing devices – LifeSize codec, video-camera and microphone
- Cisco router.

The interactive board is a uniform mean of display for the teacher's laptop and video conference. If necessary, to switch between these sources and output to the user's screen, the user needs to use the codec's screen menu with a remote control.



Mobile kit

Within the frames of the project, a mobile kit of the equipment was also developed for broadcasting of mass school events to the student who cannot participate in them. The kit equipment was developed so that, if necessary, it was possible to arrange, independently from the general system, a virtual class or broadcasting of any event without connection to the existing display devices and sources of the graphic information. For this purpose, the equipment kit was supplemented with a scaler of video signals and graphic format transformer, which allowed connecting to the system of any signal sources and information display devices. LifeSize Team 220 with two video-cameras was used videoconference codec, for interactive work and display – SMART Board 885ix interactive system on a mobile support.

Kit structure

- Video and audio playback device - SMART Board with acoustic systems
- Information source – teacher’s HP laptop
- Videoconferencing devices – LifeSize codec, video-cameras 4x and 10x and microphone
- Switching devices –Extron IN1508 scaler and Extron DVS 304 DVI D video format transformer.

Codec control and switching of its signals is performed by a remote control panel and screen menu. For connection to the system external different format sources or signal receivers, the kit includes switching devices. Extron IN1508 scaler acts as a multifunctional switchboard of the incoming signals. Extron DVS 304 DVI D transformer receives an output video-signal from the videoconferencing codec and distributes it to analogous RGB and digital DVI outputs. Thus, various external devices receiving video signals can be connected to the system.

Resource center

Structure of the infrastructure equipment

- Teamserver
- 3 recording and broadcasting servers
- 2 multipoint videoconferencing servers
- Portal server
- Software server for educational institutions
- Software servers of the authority

For the dialogue of teachers and students from remote schools, a system developed on the basis of multipoint videoconferencing servers Radvision Scopia Elite 5230 is used, which allows gathering for the classes simultaneously up to 240 participants, and these resources are distributed dynamically. The key advantage of this solution is availability of program clients for personal computers operating under Windows or Apple OS-X systems.



Videoconferencing equipment of the resource center consists of two multipoint videoconferencing servers Radvision Scopia Elite of 5230 and the following servers: three recording and broadcasting server LifeSize Video Center 2200, five servers of management and connection of subscribers from personal computers ProLiant DL320G6 E5630 RPS with installed iView and Scopia Desktop Server.

For adjustment and debugging of servers, 17 "ATEN CL1008MR console monitors with switcher are installed on all eight servers. For remote connection to the system, HP LG652EA HP ProBook 6560b i5-2410M 15 04GB/320 PC laptop is provided. Switching occurs through the Cisco Catalyst 2960S switch.

For installation of the equipment of the Resource center Estap EuroLine 42U floor switching case is provided.

Multipoint videoconferencing server Radvision Scopia Elite 5230 has following characteristics:

- Supported connection protocols — H.323, SIP;
- Supported video standards — H.261, H.263, H.264;
- Supported audio standards — AAC LC, G.711, G.722, G.722.1, G.723.1, G.728, G.729 (AB);
- Full resolution — 1920x1080;
- Support of multipoint videoconferencing modes — Continuous presence (CP), Voice Activated Switching (VAS);
- Maximum quantity of conference participants – 120 at SD resolution in CP mode, 120 at TrueHD (720p) resolution in VAS mode, 30 at TrueHD (720p) resolution in CP mode;
- Support of data transfer protocols — H.239;
- Availability of a control web interface;
- case — RackMount 19", height — 3U;
- Support of video-transcoding;
- Support of frame frequency matching;
- Support of management under protocol H.243;
- 1-year guarantee.

The server of recording and broadcasting of videoconferences LifeSize Video Center provides storage of media data 1 Tb and has the following functions:

- up to 20 simultaneous record streams in HD mode;
- up to 40 simultaneous record streams in SD (480p) mode;
- up to 1000 simultaneous connections to online broadcasting in HD mode;
- up to 2000 simultaneous connections to online broadcasting in SD mode.

The server of control and access for subscribers from the personal computer, ProLiant DL320G6 E5630 RPS has following specifications (each):

- Intel® Quad-Core E5630 — 2.53GHz;
- Built-in VGA video adapter;
- Built-in double network interface 10/100/1000 Mbit/s;
- Operative memory 3x2Gb DDR3;
- 9 operative memory slots;
- Hard disks 1Tb SATA (two hard disks HP 500GB 7,200 rpm LFF SATA Midline Pluggable HDD (3,5"));
- Forms-factor 1U;
- Microsoft Windows Server 2008 32/64 Russian;
- Radvision Scopia iView;
- Radvision Scopia Desktop Server;
- 600 licenses of Scopia Desktop Pro.

Console monitor Aten ATEN CL1008MR has the following specifications:

- 17" screen;
- Control of up to 8 computers;
- Possibility of cascade connection of KVM-switch;
- Forms-factor 1U DUAL RAIL.



Virtual teaching portal

The virtual teaching portal became the main and unified interface of service provision for end users.

The portal is implemented on 1C: Bitrix platform.

Main functions:

- Broadcasting of classes
- Common access window to the teaching materials
- Schedule of virtual classes
- Planning of VE
- Forums
- News

The infrastructure also provides collective work with documents by use of SMART Bridgit software, multipoint videoconferencing with up to 240 subscribers (Radvision Scopia Elite 5230), recording and broadcasting of virtual class sessions (LifeSize Video Center 2200) up to 60 simultaneous HD streams for up to 3,000 users.

Use of Radvision server kits for multipoint videoconferencing allowed joining videoconferencing hardware and software. The delivery kit included 300 licenses of Radvision Scopia Desktop Pro, which provided the possibility to arrange virtual planned and optional classes with in-home students. This software can be installed and used free of charge both at personal computer under various operating systems and at suitable mobile devices of all manufacturers, which considerably increases the number of potential system users with no extra cost.



Fig. 3 –Scopia Desktop PRO interface



The portal provides users with access to news, teaching materials, online video conferences, and video archive. The portal has user support section, where one can find instructions and receive answers to the questions about working with the portal.

The site consists of the following main sections

- Home page
- General documents
- Teleconferences
- Support
- Personal page

STRUCTURE OF THE PORTAL

Home page	Documents	Teleconferences
<i>General information</i>	<i>General documents</i>	<i>Online broadcasting</i>
<i>Updates</i>	<i>Files of working groups</i>	<i>Video archive</i>
<i>Weather forecast</i>	<i>Document templates</i>	<i>Request sending</i>
<i>Messages</i>	<i>Personal files</i>	<i>Solution description</i>
<i>Problems</i>		<i>Schedule of conferences</i>
<i>Calendar</i>		
	Support	Personal information
	<i>Help-Desk</i>	<i>Profile options</i>
	<i>Instructions</i>	
	<i>FAQ</i>	
	<i>Downloads</i>	



Control and access server

Server software structure

The following software is installed in the control and access server:

- Radvision Scopia iView;
- Radvision Scopia Desktop Server;
- 600 licenses Scopia Desktop Pro (active).

This server is intended for administration of the videoconferencing system, reservation of MCU server resources, user management, and access of PC users to the videoconferencing system.

Videoconferencing system administration

For administration of the videoconferencing system different levels of user access were provided:

Access rights	Top level administrator	Administrator of organizations	Operator	Organizer of meetings	Common user
See and administrate several organizations	Yes				
Administrate all network devices in all organizations	Yes				
Administrate all network devices, videoconferencing codecs, users and their virtual rooms in the organization		Yes			
See and administrate all meetings in all organizations	Yes				
See and administrate all meetings in the organization		Yes	Yes		
Create meetings and administrate strange meetings		Yes	Yes	Yes	
Administrate personal address book		Yes	Yes	Yes	
Administrate personal virtual room		Yes	Yes	Yes	
Create own meeting and administrate it		Yes	Yes	Yes	Yes
See planned meetings		Yes	Yes	Yes	Yes
Participate in meeting		Yes	Yes	Yes	Yes
Administrate meeting		Yes	Yes	Yes	Yes
Change own profile		Yes	Yes	Yes	Yes



Depending on access level, users can:

- Administrate network equipment, including MCU servers, gatekeepers, gateways, servers of recording, servers of broadcasting, servers of access from PC;
- Administrate terminal videoconferencing codecs and their parameters;
- Administrate users;
- Create and administrate meetings;
- Create reports of videoconferencing system use.

Server of access from personal computers

For arrangement of user access from personal computers to videoconferencing resources (participations in meetings and calls to each other) Radvision Scopia Desktop Server is used.

Access to all accessible server resources is carried out through a common web page, and depending on user status (common or Pro) accessible system functions change.

Management of user type is carried out through iView software. It should be noted that user account is not tied to the equipment and user can freely move from one computer to another. Besides, such access system allows administrating flexibly videoconferencing system resources, disconnecting old users and adding the new in time.



7. Specifications of the integrated systems

Classroom equipment in the base school

Device	Qty, ps.
LG652EA HP ProBook 6560b i5-2410M 15 04GB/320 PC c laptop	1
HP LaserJet Pro M1132 MFP multifunctional device	1
Cisco 881W-GN-E-K9 router	1
LCD Flame 46LED 46"	1
LifeSize Express 220 videoconferencing codec	1
LifeSize 4x video-camera	1
LifeSize MicPod microphone	1
SMART Document Camera SDC-330	1
Smart SBX885ix interactive board with projector	1
ATEN UE-250 extension cord	1
Smart Projection Audio System (kit)	1

Classroom equipment of ungraded school

Device	Qty, ps.
LG652EA HP ProBook 6560b i5-2410M 15 04GB/320 PC c laptop	1
Cisco 881W-GN-E-K9 router	1
LifeSize Express 220 videoconferencing codec	1
LifeSize Camera 4x video-camera	1
Life Size MicPod microphone	1
Smart SBX685 interactive board with projector	1
ATEN UE-250 extension cord	1
Life Size MicPod microphone	1
Smart Projection Audio System (kit)	1

Mobile kit equipment

Device	Qty, ps
HP LG652EA HP ProBook 6560b i5-2410M 15 04GB/320 PC c laptop	1
Extron IN1508 scaler	1
Extron DVS 304 DVI D video format converter	1
LifeSize Team 220 videoconferencing codec	1
LifeSize Camera 10x	1
Life Size MicPod microphone	1
LifeSize Camera 200F	1
Smart SBX885ix interactive board with projector	1
ATEN UE-250 extension cord	1
Smart Projection Audio System (kit)	1

**Resource center equipment**

Device	Qty, ps
HP LG652EA HP ProBook 6560b i5-2410M 15 04GB/320 PC c laptop	1
HP ProLiant DL320G6 E5630 RPS server	5
Cisco Catalyst 2960S network switch	1
Cisco GE SFP transceiver	2
LifeSize Video Center 2200 server of recording and broadcasting of videoconferences	3
Radvision SCOPIA Elite 5230 Increased Capacity Pro Bundle videoconferencing server, 120 subscribers	2
KVM switch with ATEN CL1008MR console	1



8. Project objectives and tasks

The objective of the project is provision of all students of Krasnodar territory with equal opportunities of the high-quality education

Problems:

- Increase of effectiveness of the educational process in the ungraded schools
- Provision to children with disabilities of equal opportunities of education with healthy children of the same age
- Individualization of the educational process at teaching gifted children
- Avoidance of sense of isolation in special needs children by creation of conditions making Distance Learning as much as possible close to lessons in classrooms
- Increases of students' motivation and maximum involvement in the educational process by making it possible to arrange all teaching methods: video lectures, video seminars, practical work in the interactive mode, online testing, joint interactive work with a common document, space bridges, quiz games, etc.
- Achievement of the maximum results in the shortest terms by introduction of the technologies of synchronous virtual teaching with use videoconferencing means, interactive technologies and means of collective work



9. Complexities at project implementation

- Implementation deadlines at wide territorial extent of the project.
Total number of the equipped objects is 126, including the Resource center in Kuban State University, and mobile kit in the Department of Education and Science of Krasnodar territory, radius of object distribution is 350 km from the center (Krasnodar), implementation period is one month. In the majority of sites, works were conducted simultaneously.
- Complex logistical scheme
- Clear project management scheme. Due to technical identity of the sites objects and their wide territorial extent, any, even the smallest, discrepancy could cause great expenses of material and human resources. Being guided by the experience and competence, the company applied in developing the project a plan of co-ordinated and stage-by-stage management.

The Moscow office supervised over the project in close cooperation with the Krasnodar representative office, which also carried out control of subcontract organizations.

Before the beginning of works, the meeting of all school directors was organized for the announcement of the plan of creation of the system of virtual teaching. To set requirements to the premises for equipment installation, questioning of the sites was carried out, which revealed their current status. Objects were divided to 5 areas – central, eastern, western, southern and northern, according to which a schedule of works, which also considered readiness of the site for equipment installation, was executed. Before project implementation, model tests of client parts of the complex were carried out, their functionality, convenience and ease-of-use was checked. Special attention was paid to availability and quality of communication in sites, after which the choice was made in favor of the closed domestic network arranged by a provider, whose communication quality was also tested.

Subcontractors were also tested and selected. Employees of subcontract organizations conducted installation works under supervision of Polymedia installation experts for correcting and training.

After termination of installation in the first 7-10 sites, the executed works were checked. If problems were revealed, list of deficiencies was made, according to which defects were eliminated and objects were commissioned.

Simultaneously with installation, groups were made for training seminars on work with the equipment.

Implementation of this project was possible due harmonized activities of the company's divisions and great responsibility of each employee.

- Special level of responsibility conditioned by the mission of objects: when carrying out architectural works in premises of children establishments, it is necessary to pay special attention to the safety of constructions. In particular, Polymedia engineers took great responsibility at installation of the heavy wall-mounted equipment, no mistakes were allowed.



10. Possibilities of the project development after implementation

The developed solution is quite flexible to introduction of additional systems for its further development.

- For the purpose of better effectiveness of the educational process in the region, Polymedia considers reasonable the construction on the basis of the Resource center (or the Ministry of Education and Science of Krasnodar territory) a situational center in Education Department with introduction of the system of monitoring and supervision of the education quality.

Such situational center would allow assessment of the students' results and teaching quality throughout an academic year, but not just at its end as it happens in case of Unified State Examination in 11th grade or State Final Certification in 9th grade. Educational situational center of Krasnodar territory also would allow data management, information system integration with student transcripts and, depending on a task, attraction of participants of the educational process to solution of questions.

- One of the effective ways of virtual teaching system development is creation of methodical offices for carrying out of electronic video-courses of synchronous and asynchronous teaching of a school program, preliminary courses, refresher courses of qualification. Such project development is possible with use the audiovisual equipment and special software on the basis of Education Department and Kuban State Universities.

11. Contact information

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Re: No. – as of –

To Director General
of CLOSED JOINT-STOCK COMPANY "POLYMEDIA"
E.V. Novikova

About influence of the introduced Distance Learning System on the educational process

Dear Elena Vladimirovna,

Within the frames of a complex solution offered by the Polymedia Company, schools of Krasnodar territory received modern multimedia and interactive technologies, as well as ample opportunities for communication, which favors the quality of education even in the most country rural schools. Provision to all children of equal possibilities of quality education without dependence from their residence was the project's key objective. As shows the early experience of implementation of the new Distance Learning System, it allows bringing many schools, including remote rural ones, on a qualitatively new educational level.

Its introduction gave teachers a real possibility to practice such teaching methods as video lectures, video seminars, interactive polls and online testing. It is obvious that, at the same time, requirements to organization of the educational process also raised: now it is not easy for a majority of senior teachers to adapt to new working conditions, however, with time, many teachers can master new teaching methods and technologies. Besides, they get considerable assistance from Polymedia's experts, who carried out a series of seminars for teachers, facilitated much the process of accustomization to a new format of work.

On the basis of the Resource Center at Kuban State University, a technical support hot line was arranged, which allowed all schools to receive prompt technical assistance without distracting from the educational process. The new System is also used as a resource for carrying out of classes and intercultural communication with foreign schools within the frames of open exchange classes. Such possibility became an invaluable source of knowledge, especially at learning of a foreign language through a direct dialogue with native speakers.



The System is also of great use for the education authorities in carrying out of conference call with directors of schools. All 1200 schools directors simultaneously take part in these conferences. At the regional level, there is now a possibility to discuss any urgent questions directly with school directors, escaping a municipal link. All questions now are solved much faster they have been earlier, which considerably increases management effectiveness of the region in the educational sphere.

It is necessary to mention the System's utility in solution of the emergency situation in the Crymsk area. The video conference was useful for communication and reception of the information from field services, as well as carrying out of operative meetings with the municipal authorities.

Of course, it will take time to assess the System's effectiveness. Nevertheless, we can say now, that having accustomed with the new equipment, teachers began to carry out classes interesting for children with many participants. It captivates students, gives them a great stimulus to learning, joins children of the same age, whether healthy, gifted children or children with disabilities, in a uniform communicative environment.

Deputy Minister

N.E. Bairachniy



Opinion

“About use of Distance Learning system within the frames of fundamental school”

**Director of the municipal budgetary educational institution
of Krasnodar secondary comprehensive school No. 71
Svetlana Fedorovna Cherniavskaya**

Our school implements Distance Learning in several areas. One of the main areas is a unique possibility to train children with disabilities, which we now have after installation of VE system. Work with disabled children is our very important achievement. Last year, we had eleven such students who were connected from their workplaces through Macbooks with installed Skype software. Our teachers work with each child individually.

Situations, which are even more exceptional, happen, which are quite difficult to be solved without this project. We have a student who, for health reasons, is completely isolated from the external environment and cannot attend school and even meet teachers at home. We have completely transferred him to virtual learning – the equipment was install at his place, and he virtually “visits” all classes. This solution allowed the child to be in and take part in all discussions in the class, keep up with the program, and eventually, gives the chance to receive a certificate of secondary education in the future.

Other area of use of the VE equipment is holding conferences, meetings, seminars organized by the Ministry of Education of Krasnodar territory, with participation of the heads of nearby educational institutions. Virtual participation of the teachers in pedagogical seminars and conferences has already became a normal practice. There is also a prospect of virtual courses of teacher continuing education in our school. Krasnodar Territorial Institute of Extended Professional Pedagogical Education conducted pilot lessons of course retraining by remote means.

One of the most interesting areas to be implemented in the nearest future is lessons with ungraded rural schools, students and teachers in which for some reasons could not take part in various events aimed at exchange of teaching experience, creative development of students and discussion of other important problems. Our school has good teachers of physics, chemistry, literature, and interactive virtual classes exactly in these subjects will be carried out. VE is very effective at use of the system of collective work with a shared document in the remote rooms. Students like very much classes with a space bridge to the audience at a different school, when they take part in various intellectual competitions or just communicate with children of the same age from different distant villages and settlements of the area.

We have already developed certain outlines of the further prospects of VE system application. For example, work with the gifted children is becoming more and more relevant, for which we will get in contact with colleagues from other schools, colleges, and universities from other regions, which could and would like to conduct virtual classes of advanced study of subjects.