



A unique collaboration system, designed for the LHC

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CHEP09, Prague 03/23/09



EVO Objectives

- Provide a global-scale robust real-time collaboration service **to the LHC experiments and other major research and education programs**
- Support and foster much more effective collaboration, across the full range of working environments ***from laptop to conference room to control room and auditorium***
- Build and operate a system that can support the entire research and education community, ***on a global scale***
- **Design, build and evolve a system that can do all this, Operated by a Small team, with the required high level of functionality, and Low Cost**



STATISTICS

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LHC Usage

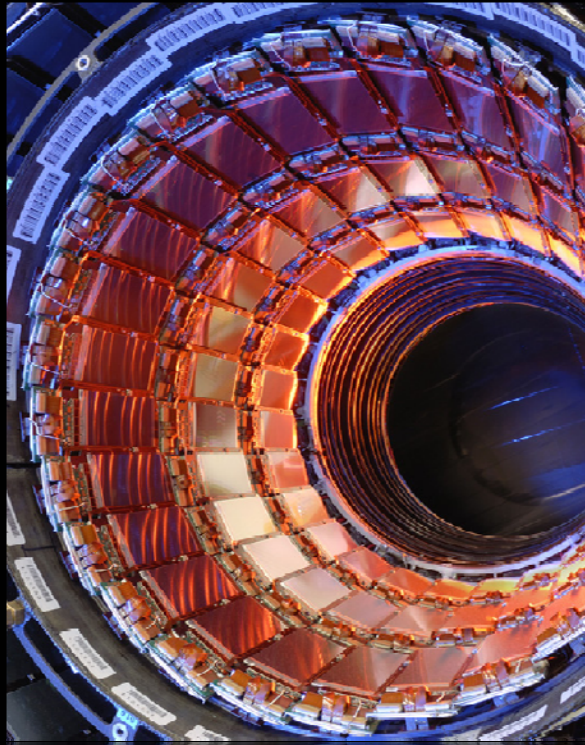
LHC Usage

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CMS Usage in 2008

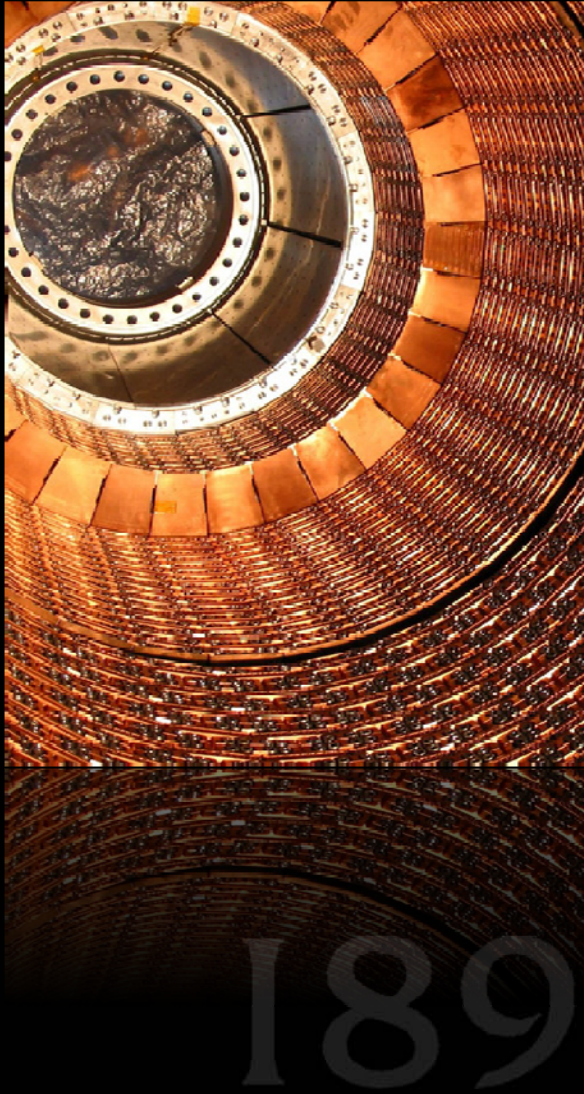


- 6092 active meetings (6371 bookings)
- 1597 phone connections with a total duration of 1,244h
- 2119 users participated in those meetings with a total duration of 63,143h



ATLAS Usage in 2008

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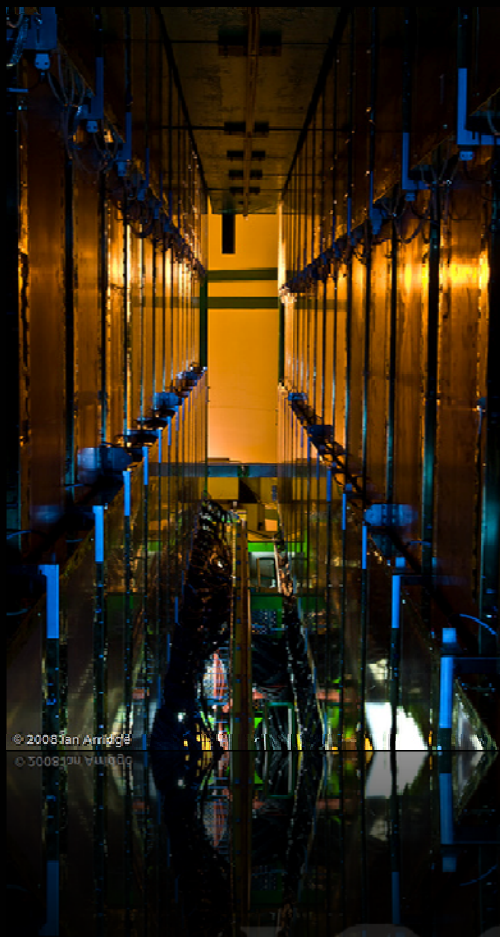
- 1977 active meetings (2078 bookings)
- 2997 phone connections with a total duration of 3,081h
- 1394 users participated in those meetings with a total duration of 13,685h

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LHCb Usage in 2008



- 654 active meetings (677 bookings)
- 475 phone connections with a total duration of 540h
- 294 users participated in those meetings with total duration of 4,516h

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ALICE Usage in 2008

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- 413 active meetings (431 bookings)
- 223 phone connections with a total duration of 145h
- 436 users participated in those meetings with a total duration of 5,004h

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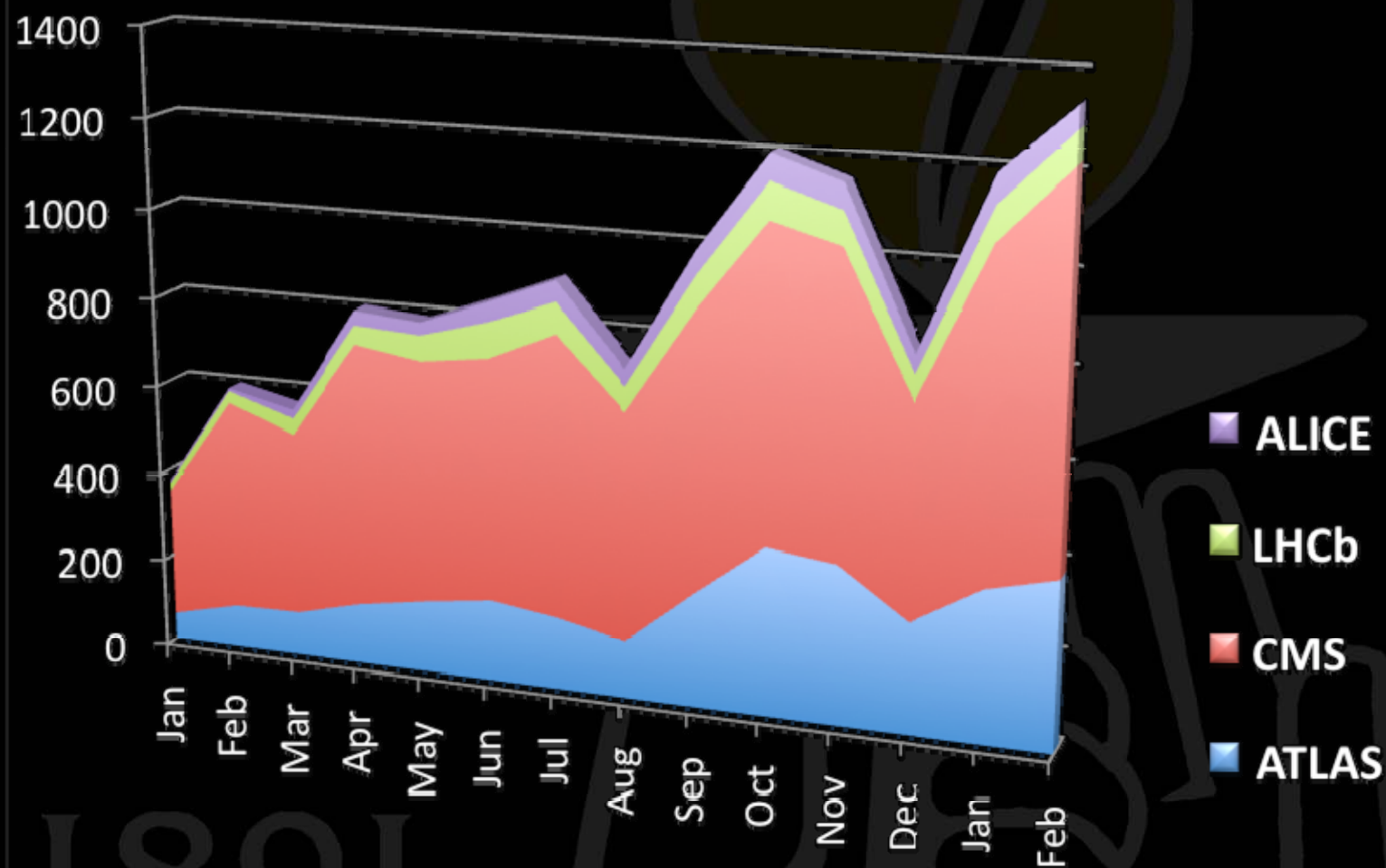
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Meetings per Month



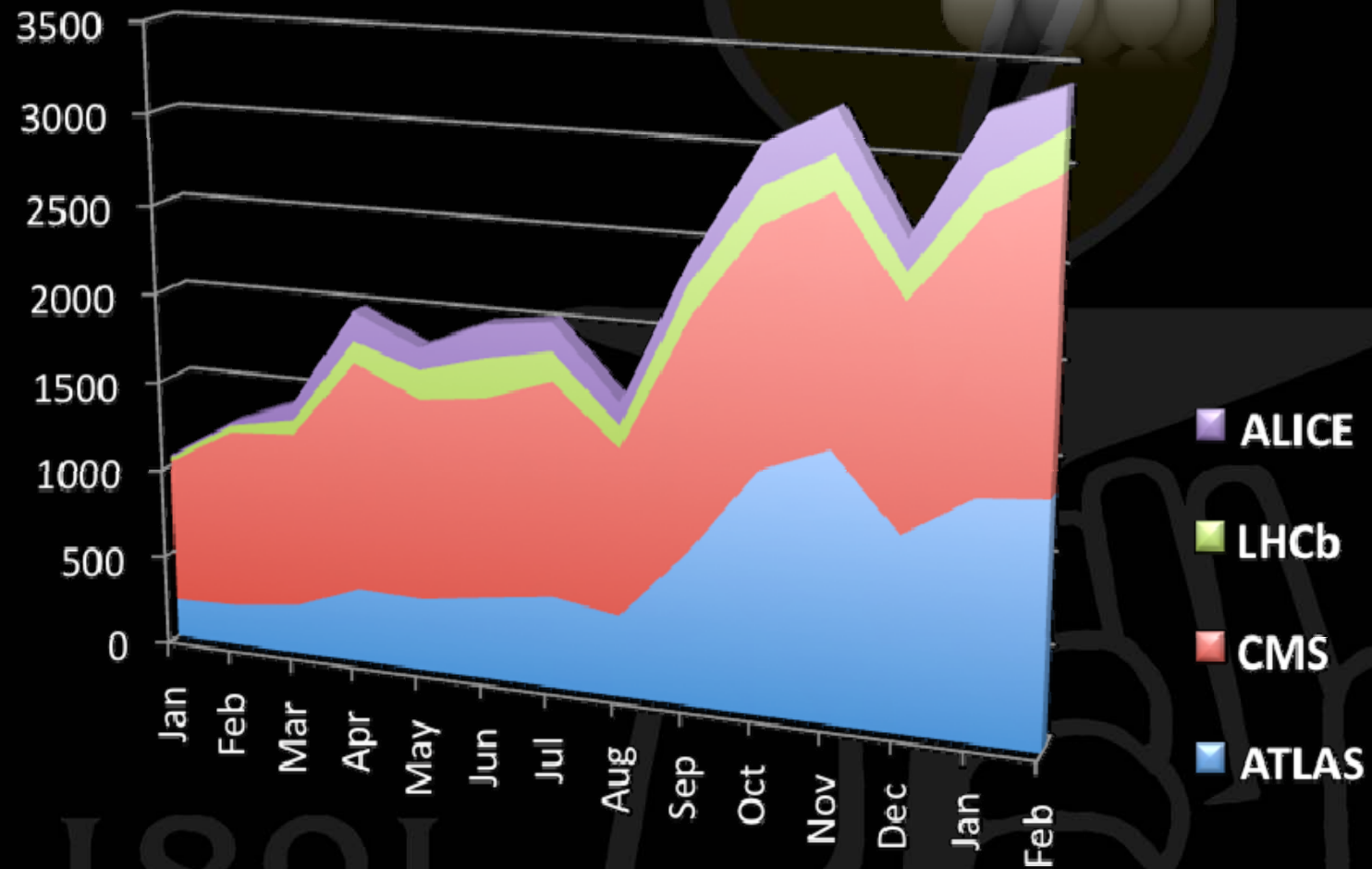
LHC meetings in 08-09





Different Sites per month

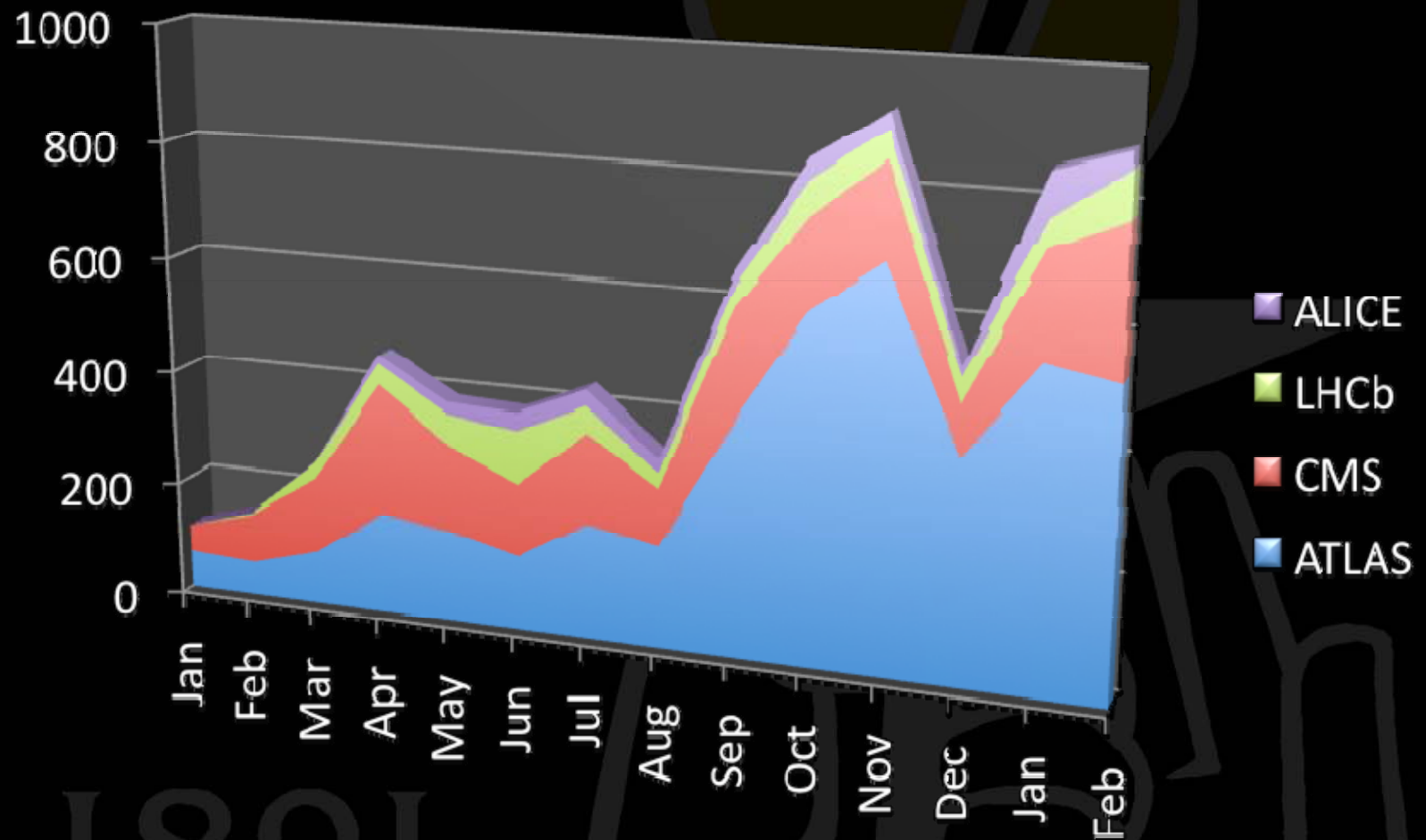
LHC sites in 08-09





EVO Telephone Bridge

Telephone Calls per month





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Architecture, Features, Functionalities

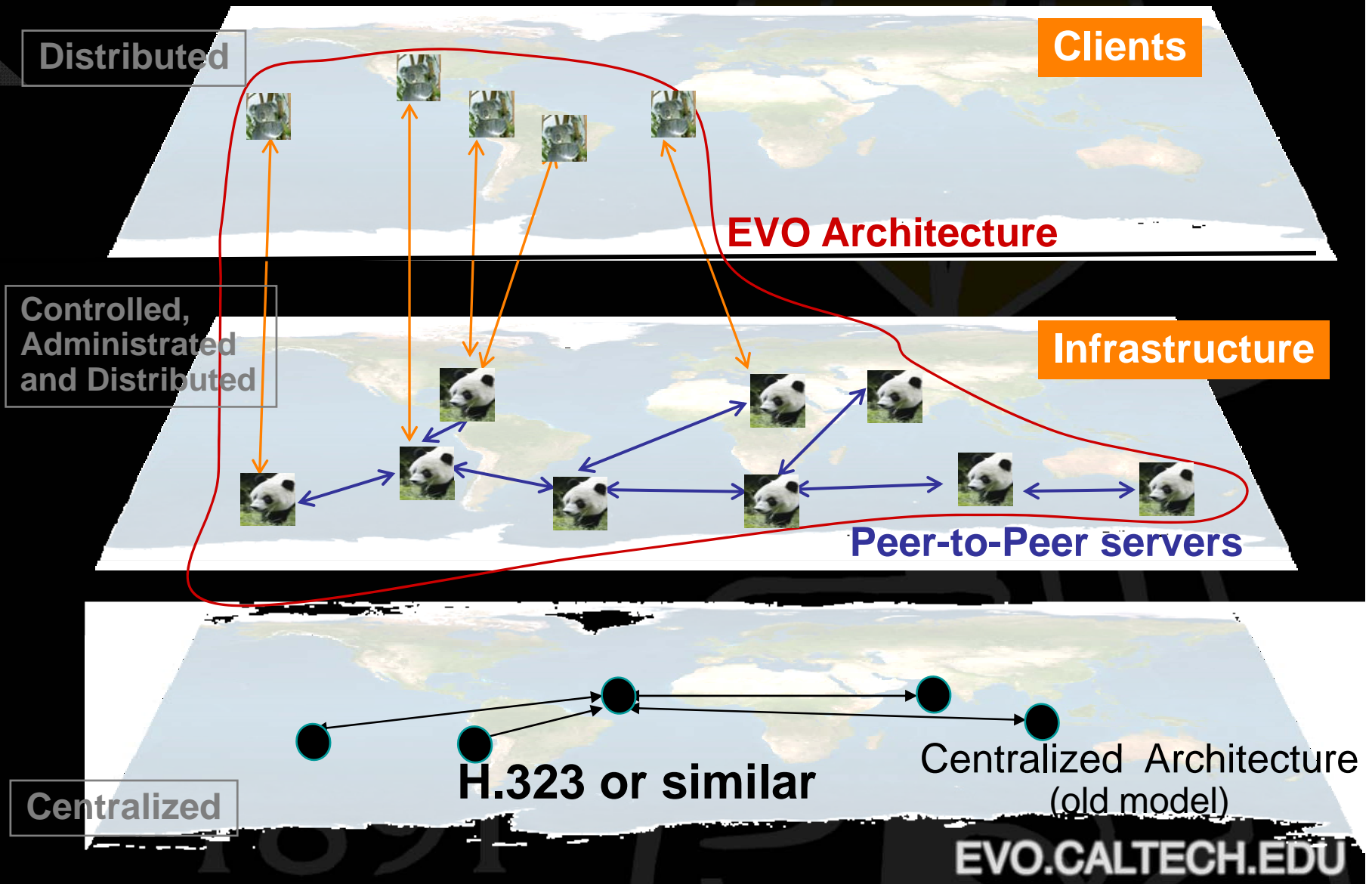
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EVO Architecture

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Self Managed Infrastructure

EVO uses MonALISA :

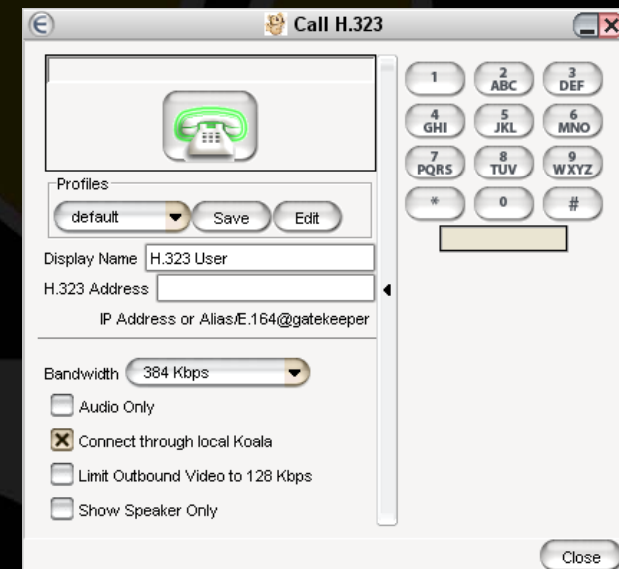
- **52 servers** spread in 22 countries
- **Detects any network cut or peer down : Automatically reconnect** the topology of servers to face the problem.
- **Telephone Bridge** in 6 countries

<http://monalisa.caltech.edu>



H.323 Integration

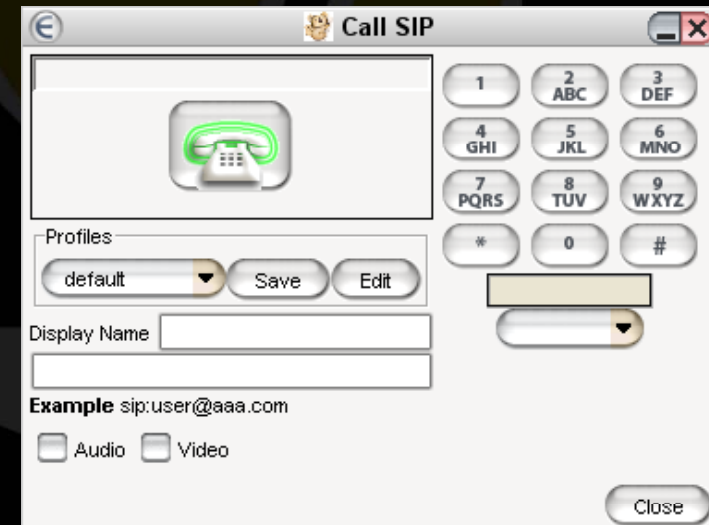
- Allows to connect:
 - Local H.323 software
 - External H.323 client
 - H.323 MCU
 - H.323 Telephone
- Mixing of the Audio
- Transcoding of videos:
 - Can reduce bandwidth
 - 4 videos into 1 CIF or a 4CIF
- Compatible Gatekeepers
- Avoids Firewall restrictions





SIP Integration

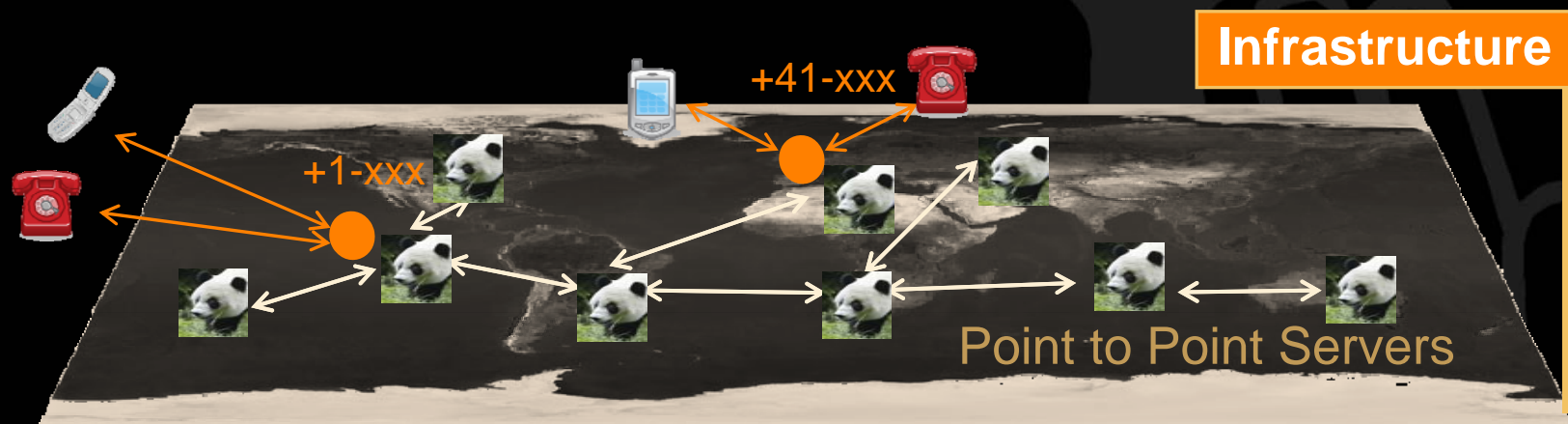
- Allows to connect:
 - Local software SIP client
 - External SIP client
 - SIP Codian MCU
 - SIP Gateway
 - SIP Telephone
- Mixing of Audio
- Transcoding of videos:
 - Can reduce bandwidth
 - 4 videos into 1 CIF or a 4CIF
- Avoids Firewall restriction





Telephone Integration

- Installation of a EVO Telephone Gateway on the main sites. Currently 10 countries covered.
- Low cost few \$10 per ports
- Works with all standard telephones





General Features Capabilities

- Instant Messaging (IM), Chat and Presence information
- Booking functionality from ad-hoc to permanent meeting rooms
- Java robust audio tool with possibility to have private audio chat between 2 participants
- Recording and Playback. Recorded meetings can play back locally or re-broadcast to a larger audience
- File Exchange capability between individual participants and/or for the meeting room.
- Whiteboard application to share texts and pictures between participants in real time
- Administration of meetings: Become a meeting moderator; Mute/Unmute video/audio of a participant; kick out a participant; add a new participant as a moderator.
- Sharing of computer screens (any part) among participants of the same meeting.



3D multi-video client



ViEVO

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ViEVO features

- All videos are shown in a single window
- Use GPU (Graphical Processor Unit) instead of CPU
- Real time:
 - Transparency
 - Text over video
 - 2D and 3D special effects (shadows, etc...)
 - Title of the meeting
- All resolutions from QCIF to HD 1080p
- Codec: H.261, H.263 and H.264





EVO: Large view of the Universe

From Standard Definition video (CIF) to Full High Definition video

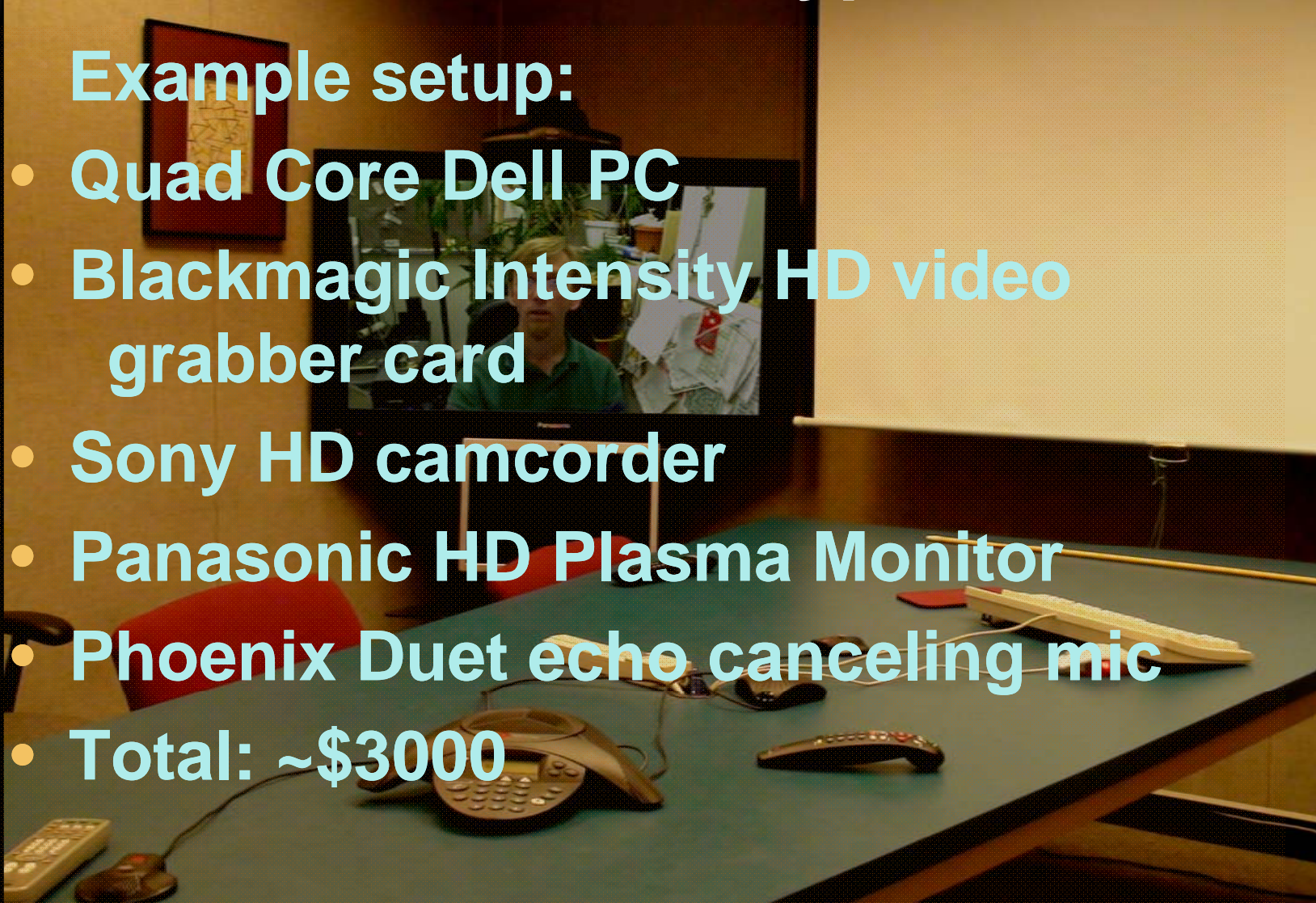




EVO Full HD (1920 X 1080p) Prototype

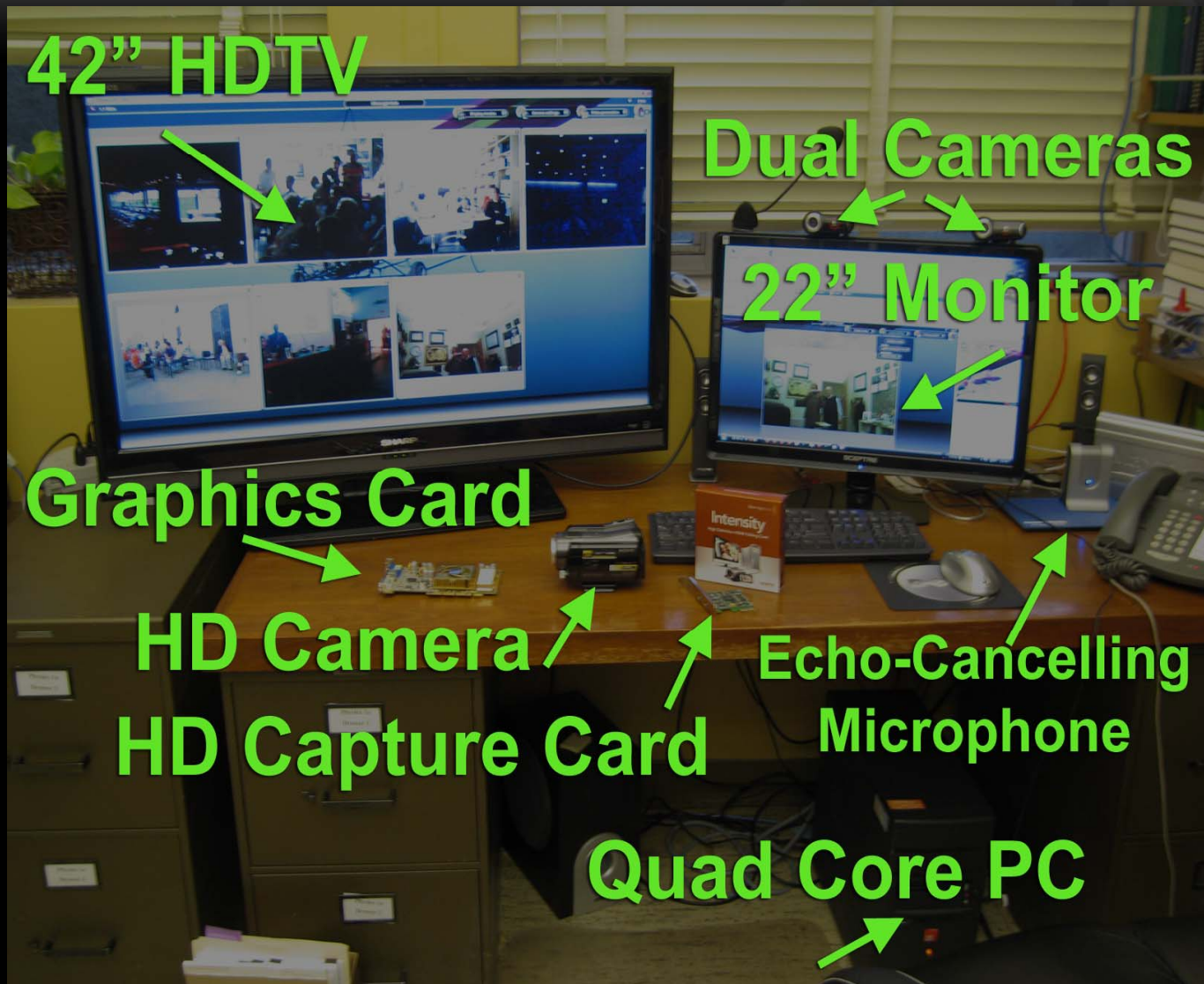
Example setup:

- Quad Core Dell PC
- Blackmagic Intensity HD video grabber card
- Sony HD camcorder
- Panasonic HD Plasma Monitor
- Phoenix Duet echo canceling mic
- Total: ~\$3000





EVO Desktop HD Setup





EVO Desktop HD Setup

Example setup:

- Quad Core PC - \$700
- One (or more) Logitech QC 9000 Cameras - \$85 each
- 42" HDTV - \$800
- Graphics Card - \$120
- Phoenix Solo echo canceling mic - \$120
- Total: ~\$2000



Some Key unique EVO features



NO LIMIT!!

No limitation in the number of participant in a meeting!
No limitation in the number of meetings at the same time!

Examples:

1250 sites took part in the « LHC Startup Meeting » the September 10.

193 sites at the same time on the « All CMS Meeting », February 2009.





EVO Video WALL

Viewo 16.0 Mb/s Team meeting 0 b/s



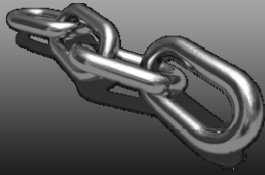
EVO speaks to everyone!

- Works on MS Windows, Mac OS X, Linux!
- Connects to H.323 client, H.323 MCU, SIP client, SIP MCU, IP telephone, standard telephone!!
- Works on Unicast and Multicast!
- Accepts 4CIF, CIF, VGA, 4CIF, 720p, 1080i, 1080p resolutions!!
- Support H.261, H.263 and H.264 video codecs
- EVO GUI is available in 11 languages!
- Deals with all time zones!
- Deals with IPv4 and soon with IPv6!




Security

- All data are encapsulated into Java Objects.
- All or part of the connections could be encrypted on the fly.
- EVO is transparently passing through NAT and Firewall.
- EVO is tunneling all communications in one Port (UDP or TCP)
- Meetings can be password protected
- Need login/authentication to log into the system



Strong Integration

- Built-in powerful booking: meeting via invitation, had-hoc meeting, booked meeting, recurrent meetings, permanent meeting
-  integration (*very soon*) : auto booking, auto-modification, auto-join meeting
- Conference room integration: special room account, special room setup, administration privileges





EVO: A Unique End-to-End Self Managed & Secure Infrastructure for Collaboration; Integrating all protocol and conferencing system

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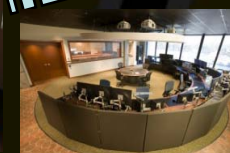
H.323



Phones



Multicast/AG



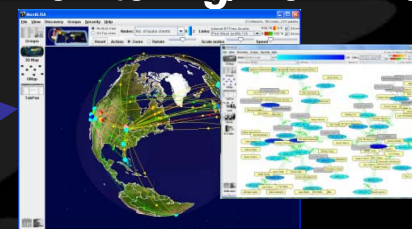
Physics Control Centers

Handheld



SIP

Monitoring/MonALISA



Desktops



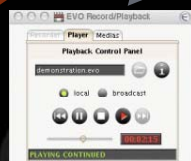
Full HD



IPv6

APIs

Record/Playback



OpenGL Video



IM / Chat



Whiteboard/
Shared
Files
EVOte



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MasterClasses 08

Particle Physics

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4500 high-school students de 70 institutes across Europe and the USA spent two weeks working at the frontier of physics in the third International MasterClasses for High-School Students.

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MasterClasses 09

Particle Physics

The screenshot shows a multi-screen video conference interface. The top bar indicates a 'Meeting name' and a bandwidth of '1.3 Mb/s'. The main window displays a spreadsheet titled 'CERN cern-513-r [desk]' with the following data:

	A	B	C	D	E	F	G	H	I	J
0: DELPHI										
1: OPAL										
Town (COUNTRY)			Electrons	Myons	Taus	Quarks		enable	OPAL	
SAO PAULO (BRA)	0	103	43	169	630		institutes	institute	OPAL	
PISA (ITA)	0						1	0		
BIENEN (GER)	1	34	51	44	873		1	0		
PALAISEAU (FRA)	0	65	51	55	683		1	0		
PADOVA (ITA)	0	41	51	64	802		1	0		
	0						1	0		
	0						0	0		
	0						6	1		
Sum (corr)		263.4	196	332	2988	3779.4				Sum
Stat. Uncertainty		30	22	33	83					mean
Fract. of Visible		e / all	μ / all	τ / all	q / all	$q / ((e-\mu-\tau)/3)$				DELPHI
SAO PAULO (BRA)	0	0.108	0.046	0.179	0.667	6.0				
PISA (ITA)	0	0.000	0.000	0.000	0.000	0.0				
BIENEN (GER)	1	0.053	0.050	0.043	0.854	17.5				
PALAISEAU (FRA)	0	0.076	0.060	0.064	0.800	12.0				
PADOVA (ITA)	0	0.043	0.053	0.067	0.837	15.4				
	0	0.000	0.000	0.000	0.000	0.0				
	0	0.000	0.000	0.000	0.000	0.0				
DELPHI		0.076	0.053	0.104	0.767	9.9				Sum
Statistical Uncertainty \pm		0.011	0.010	0.013	0.018	1.1				mean

Smaller video windows show participants from various locations, including 'Pisa Italy', 'Padova Italy', 'SPRACE Brazil', and 'Pisa scale human'.

5000 high-school students de 80 institutes across Europe and the USA spent two weeks working at the frontier of physics in the third International MasterClasses for High-School Students.

On going now !! March 16 until April 03, 2009

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Documentation

F.A.Q. : <http://evo.caltech.edu/evoGate/FAQ/>



Video tutorials :

<http://evo.caltech.edu/evoGate/videosTutorials.jsp>

Documentation :

http://evo.caltech.edu/evoGate/Documentation/EVO_Manual_EN.pdf

Support : EVOsupport@VRVS.org

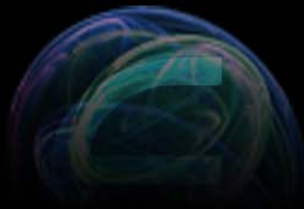


See you in EVO

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<http://evo.caltech.edu/evoGate/FAQ/hardware.html>

<http://evo.caltech.edu/evoGate/FAQ/hardware.html>



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Extra Slides

Extra Slides

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EVO Components

- Koala - Local Client
- Panda – Router Server
- Kangaroo – Database Agent
- Database Server
- Web Server
- Lemur – Files Server
- Mongoose – Telephone Gateway
- Monkey – Administrator Client
- Kiwi – Local Services Manager



EVO : Server

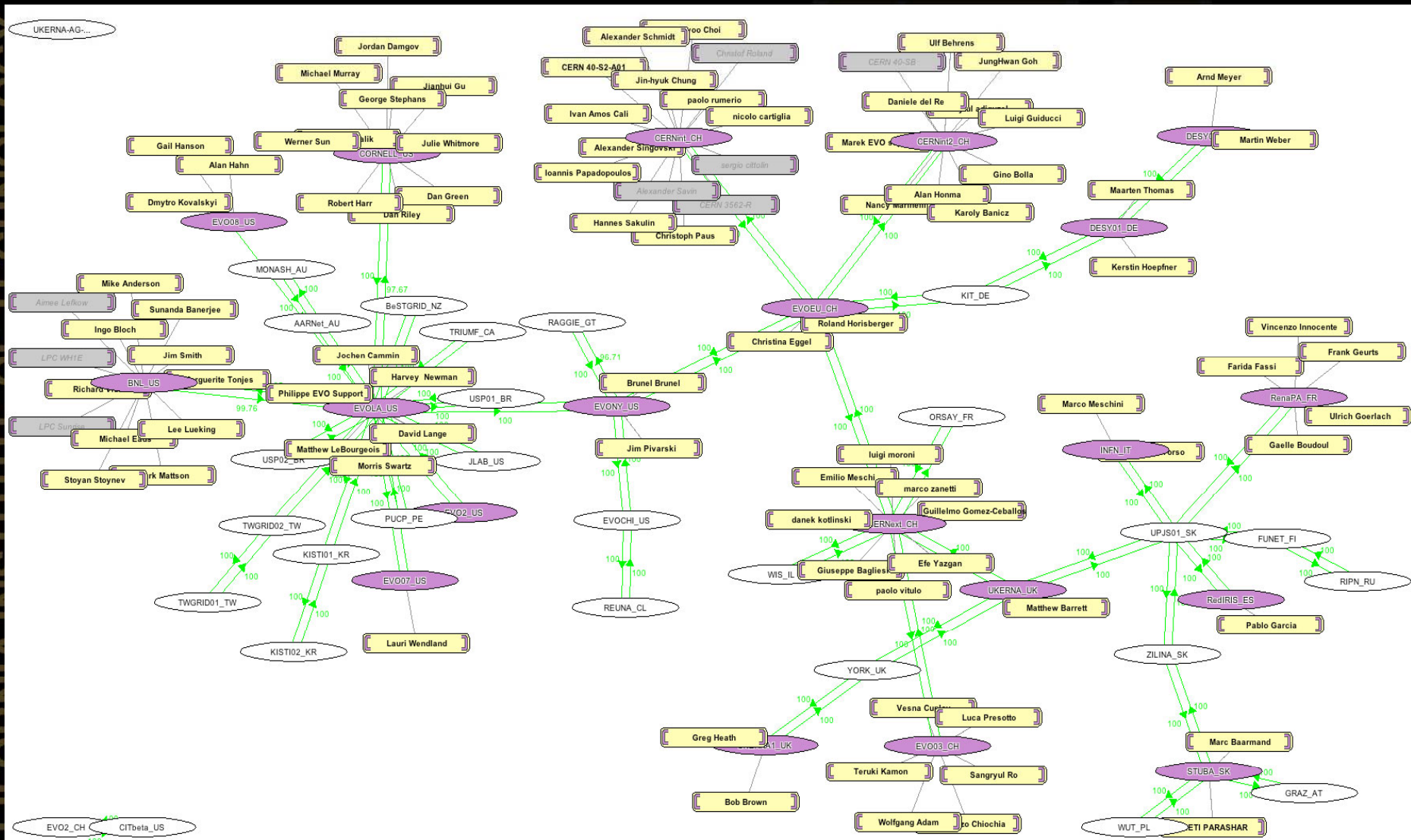
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PANDA

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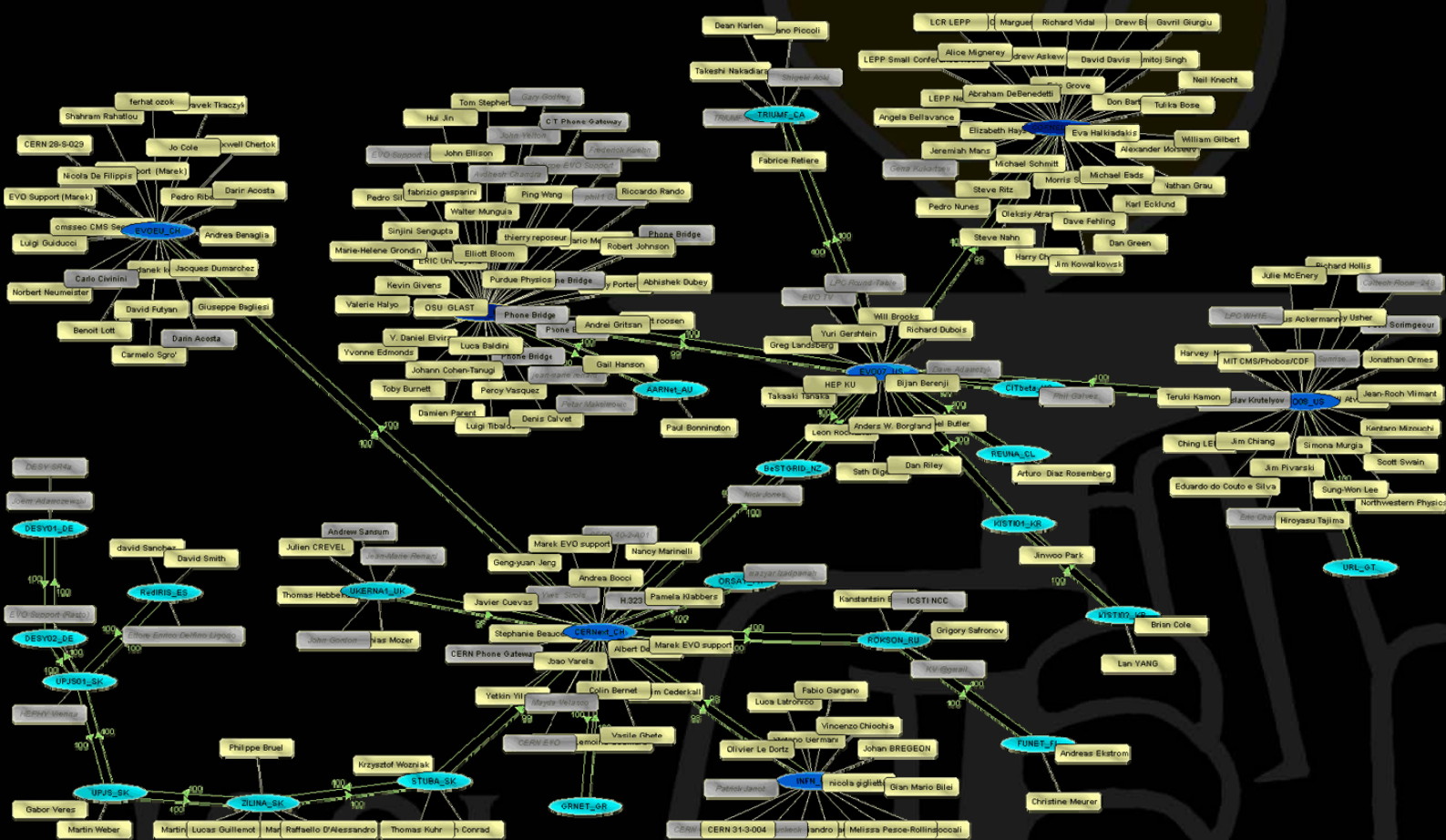
Users Distribution





EVO : World Wild Topology

50 servers spread on 25 countries



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Autonomous Infrastructure

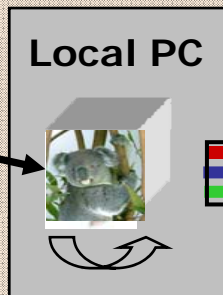
All communication pass through **a tunnel** via a **unique port** (UDP or TCP). **Firewall traversal and DHCP servers!!**

Dictionary Services



MonALISA

IM
H.323
EVO medias
SIP



Local PC

IM, Chat, Presence, packets management

Video

Audio

Ability to encrypt:
IM, Chat, presence packet
AND/OR Video packets
AND/OR Audio packets

Ability to encrypt the
communication between
Pandas

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HOW TO

Improve your Experience

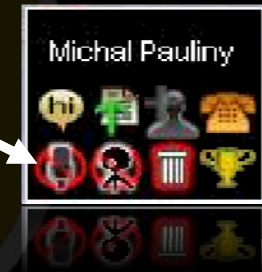
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AVOID ECHO

- Use the moderator privileges to mute participant that send echo or noise. meeting creator = moderator



- Use USB Headset when you are using a laptop
- Use an USB Echo Canceller device with your computer desktop



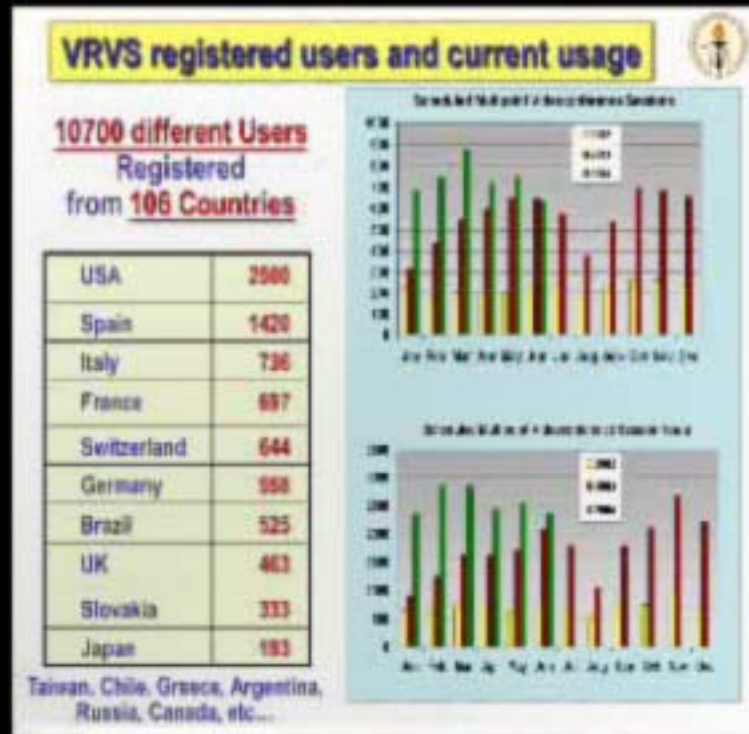


NETWORK

- Behind a very strict firewall open the port: 46015
- Always prefer wire Ethernet connection when it is available.
- On DSL select the “Limited Bandwidth” video mode to save bandwidth.



Broadcast Slides



Here is what the remote participants see if you use a scan-converter or via H.323 client connected to EVO

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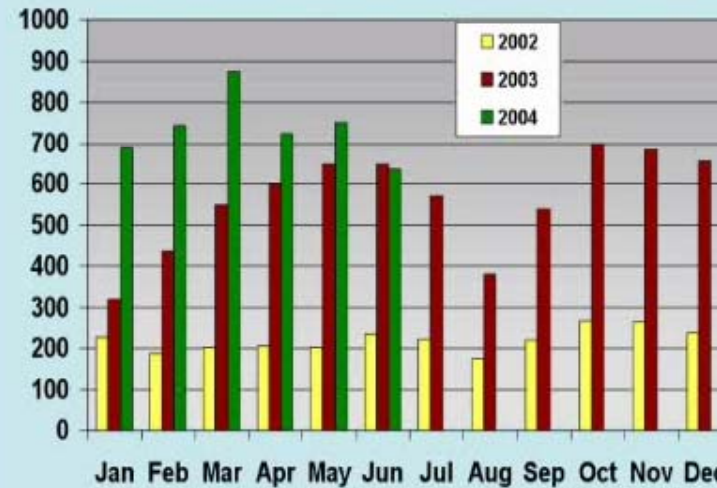
VRVS registered users and current usage

10700 different Users
Registered
from **106 Countries**

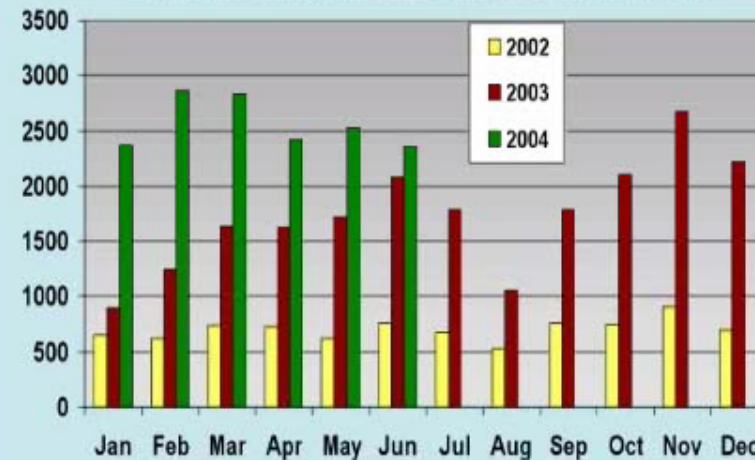
USA	2500
Spain	1420
Italy	736
France	697
Switzerland	644
Germany	558
Brazil	525
UK	463
Slovakia	333
Japan	193

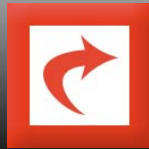
Taiwan, Chile, Greece, Argentina,
Russia, Canada, etc...

Scheduled Multipoint Videoconference Sessions



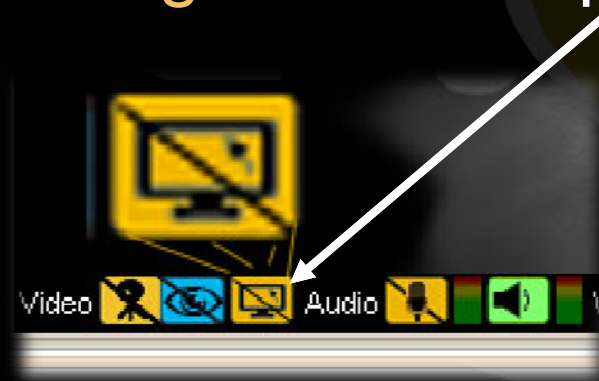
Scheduled Multipoint Videoconference Session Hours





Broadcast Slides

The previous slide shows what the participants see if you are using the Desktop Sharing program instead.



You can broadcast a part or your entire desktop up to XGA resolution (1080 x 768 pixels).
The participants can see your cursor location too.
You can send your video and your desktop at the same time



HELP!

Push this button in Koala as soon as you encounter a problem.
Then type the description of the problem.

Thus the EVO team will receive your description of the problem with all the necessary information and logs.

It is always important to inform us at the time you face a problem than afterwards.



Firewall Settings

Minimum:

EVO works perfectly with dynamic translation of IP address (Network Address Translation or NAT), (local) firewall or site firewall that allow all outgoing connections on the port

IN/OUT - UDP/TCP: 46015

Optional:

Authorizing the following outgoing TCP let the EVO client (Koala) estimate in real time the best servers (Pandas) to connect to, according to the server location, the network information (bandwidth, number of routers to pass through, number of packets lost, etc..) in addition to the load of the servers.

OUT - TCP with the following IP addresses:

evo01.cern.ch / 192.91.244.138	evo01.caltech.edu / 131.215.116.151
--------------------------------	-------------------------------------

Directory Service	Proxy Service	Topology Service
4042, 4043, 4044	60001, 60002, 60003	10090

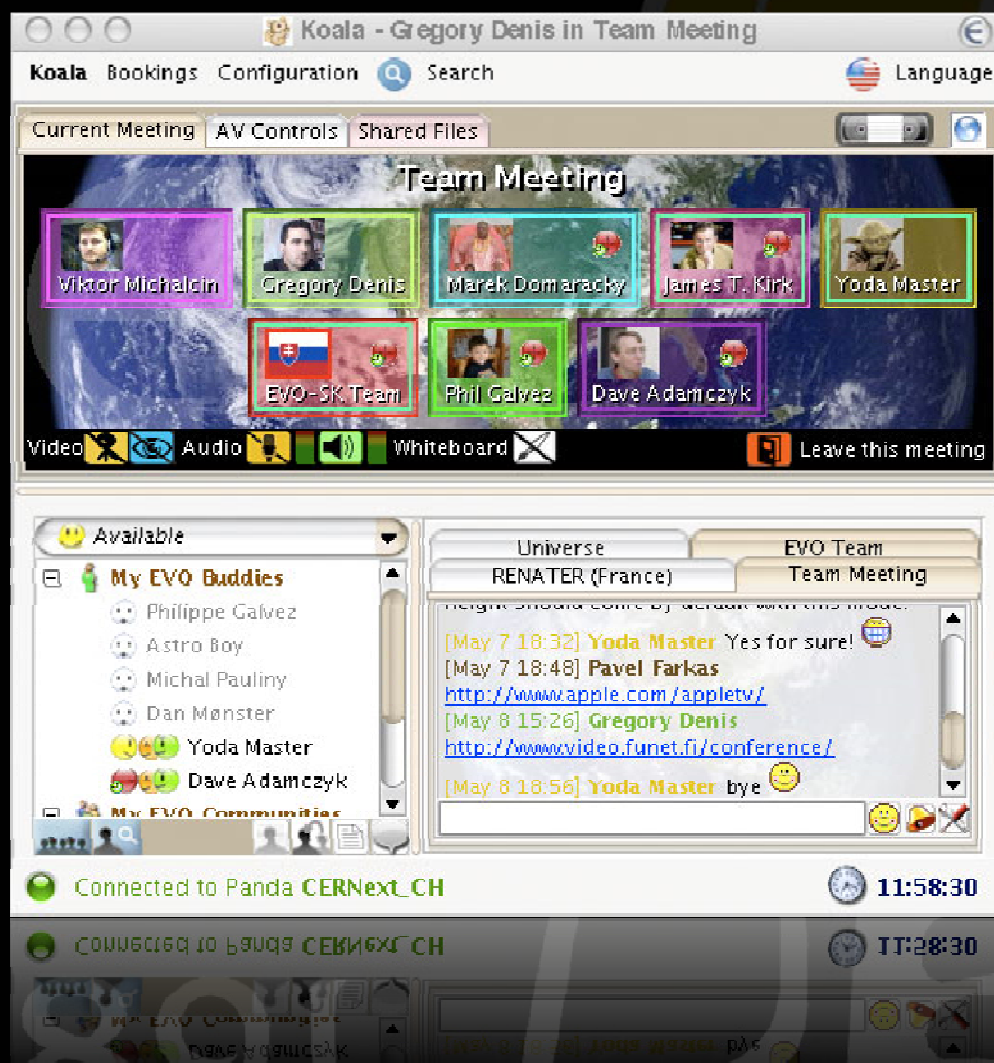


EVO Features



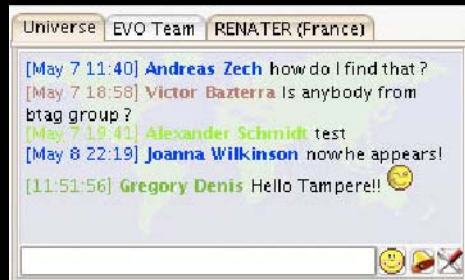


Koala : a pure Java Client





Instance Messaging / Chat



- IM Presence information of each user currently available
- Ability to force your presence status
- You can manage your own buddy list.
- Possibility to initiate a private Chat session with any user (even if you are not in a meeting with him).
- A public Chat session exist for each Community and each Meeting



Moderator Privileges

- The creator of a meeting is automatically the moderator.
- Privileges:
 - Banned a selected participant from a meeting
 - Mute the audio of any selected participant
 - Mute the video of any selected participant
 - Extend the meeting duration
 - Give his privileges to any participant
- After 3 minutes without moderator in the meeting: any participant can mute the audio/video of the others.

Booking

Community: Universe

Title: test

Description: This is a test meeting

Password: *****

From: 12/Mar/2007 7:30 Central European Time

Until: 12/Mar/2007 8:30

☒ Recurrence

Occure

☐ By Day

☒ Weekly

☐ Monday ☐ Saturday

☒ Tuesday ☐ Sunday

☐ Wednesday

☒ Thursday

☐ Friday

Repeat for: 5 occurrence(s) (max 25)

Create Clear Done

- Book a schedule meeting
- Start an Ad-hoc meeting
- Invite a buddy to a private meeting
- Have permanent meeting room
- Restrict access by a password

Meeting Title

Meeting Description

Meeting Password (Optional)

Community: Universe

OK Cancel



EVO Built-in Audio

- Platform independent (Java Code)
- Better audio quality : 16Khz
- 3 possible choice in quality/bandwidth
- Ability to choose different devices for playing audio and recording audio.



- Automatic Silence Suppression
- Automatic Gain Control of the input level
- Higher range of volume
- Mix all audio streams
- A derived version is used in EVO has audio mixer only



Aparté : private audio discussion

Allows during an ongoing meeting to initiate a private audio discussion with a selected participant of the current meeting.



The private discussion start as soon as the selected participant accept your request.

You can mute or not the audio from the ongoing meeting.





Recorder / Player

Record a Full meeting:

Audio, all videos, screen capture,
presence, chat, whiteboard

Marks and pauses are allowed.

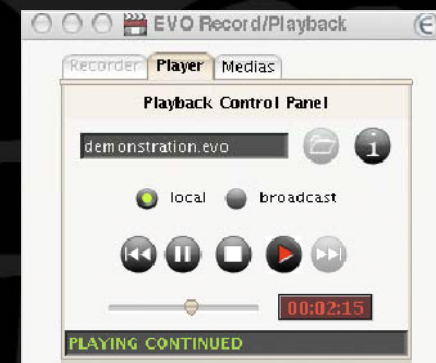


Playback any time an EVO recording

for your eyes only

or

broadcast into a live meeting





File Exchange

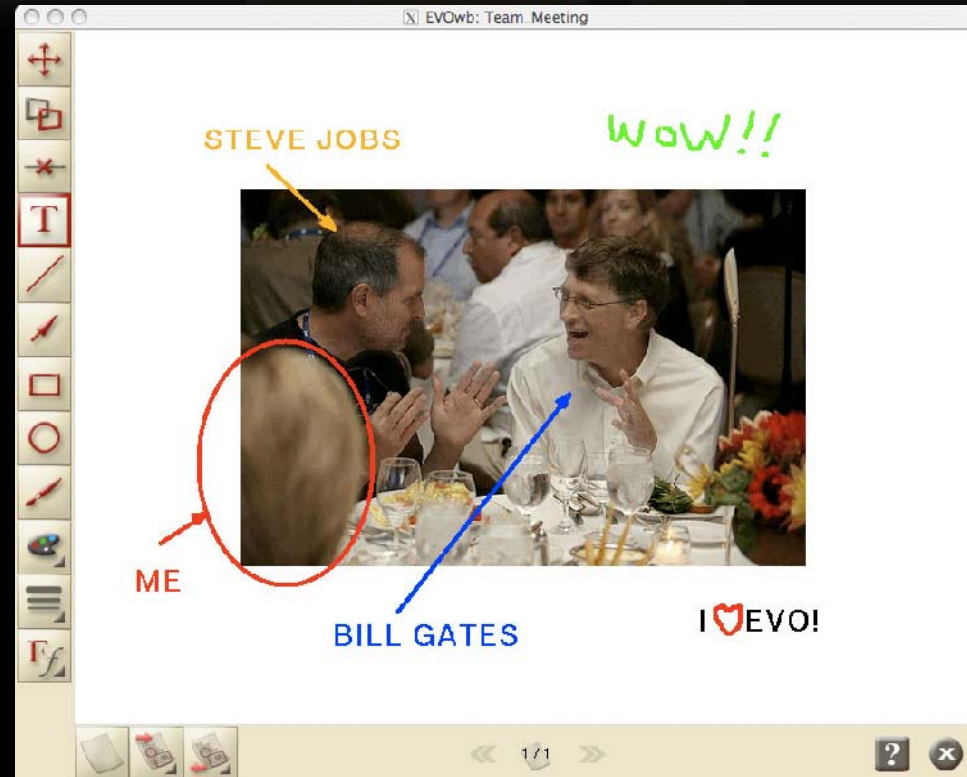
- Exchange any files between EVO users even if they are not in a meeting (or not in the same meeting).
- In a meeting a shared space allows to upload and download files (during the meeting duration).

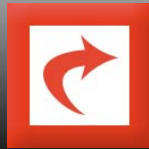


- No limit in file size and in number of files.

Whiteboard

- Works on 3 platforms
- Multiple pages capably
- You can import Image and text files
- Each component in the page can be:
 - Moved
 - Duplicated
 - deleted



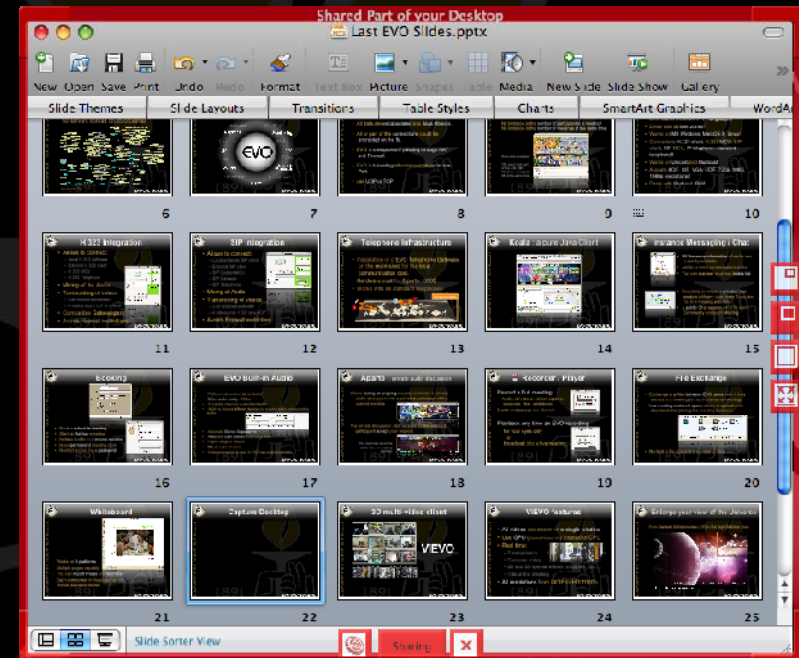


Capture Desktop

Sharing of computer screens
between participants of the
same meeting.

Part of the screen or the entire
screen can be broadcast.

CIF to XGA (1020x768)
resolutions are available.





EVO

Provides a worldwide videoconference and collaboration service:

- Audio, Video
- Instance Messaging, Chat
- Captured Desktop, Whiteboard
- Shared files, Recording/Playback

