SA3: eduCONF Certification Service

Abstract

This document provides an overview of the research work carried out in Research ActivitySA3, Task 4, known as the eduCONF Certification Service, and describes the NREN videoconference service certification procedures proposed by the eduCONF team. The procedures were designed to check and guarantee the integration and interoperability of a given NREN videoconference network with any other certified NREN service.
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1 Introduction

This document describes the NREN videoconference service and videoconference room certification procedure proposed by the eduCONF team. The procedures were designed for managers of NREN videoconference teams (NREN VC Managers) to check the most basic fundamental points needed to guarantee the integration and interoperability of a given NREN videoconference network with any other certified NREN service.

Two sets of procedures are defined within this document:

- NREN videoconference service certification procedure: Aimed at standardising the level of central NREN videoconference services (addressing, monitoring, support, interoperability).

- Videoconference room certification procedure: Aimed at standardising the setup of videoconferencing rooms that must comply with a set of requirements (addressing, support, interoperability, visibility).

Documentation and tools are available to help NREN videoconference teams to comply with the certification requirements. This documentation will allow teams to update their videoconference services or to implement new versions of services within a considerably reduced time frame of less than a full working week. The NREN videoconference service certification procedure was designed to be completed in less than a working day. It is expected that certified services will provide users with a better user experience and fewer faults, which will result in an increased of usage and cost savings in support for NRENs.

The videoconference room certification procedure is much simpler, and should be carried out by each VC Room Manager with the support, if needed, of the NREN VC Service Manager. The room certification procedure is simple and should be able to be completed in a few minutes. VC room users will be more independent and will be able to rely on each other due to a more homogeneous set of information and call setup procedures.

eduCONF aims to increase usability of videoconference services, and provide users, VC Room Managers and NREN VC Managers with the tools they need to be more efficient and effective.
2 Certification Procedure

2.1 Design Premise

A certification procedure consists of the verification of a set of requirements. eduCONF has designed its videoconference room and service certification procedures based on the following premises:

- (S)imple
- (A)utomated
- (F)ast
- (E)ffective.

The SAFE approach is implemented by minimising the number of steps and information requested, and whenever possible, relying on automatic procedures.

2.2 eduCONF Certification Workflow

The states and steps of the workflow process supporting the certification procedures are as follows.

States:

- Registered
- Validated
- Pre-certified
- Certified

Steps:

1. Auto-validation
2. Automated validation
3. Certification request
4. Manual validation

Figure 2.1: Certification Workflow
2.3 Certification Revalidation

After successful certification, ‘automated validation’ will be carried out on a regular basis. If automated validation fails over a threshold (time duration, number of failures) or the certification has expired, then ‘manual validation’ must be repeated in order to maintain certification status. Service Managers may make ‘certification requests’ at any time for further manual validation (NREN service certification requests are authorised by eduCONF team members and room certification requests are authorised by NREN Certified Services).

Figure 2.2: Certification Revalidation Workflow

The timings for revalidation and automated operations for eduCONF’s certification procedures are described in Appendix E: Timings for Certification and Revalidation.
3 NREN VC Service Certification

This chapter describes the NREN videoconference service certification procedure. This procedure consists of a list of basic requirements with which a NREN must comply to be certified. The list holds a description of steps to apply within the certification procedure.

3.1 Requirements

In order to be certified, at the beginning of the process, an NREN must provide basic information about services. Some NRENs only provide national service and institutional/NREN member support. Some NRENs also provide service to the end users. NREN certification includes the national level of support (H.323 country domain) and general support for the institutions/NREN members.

3.1.1 Videoconference Support Service

An NREN must provide a videoconference support service for its constituency. This service should be provided by a designated team (NREN VC Support Team) and provide national support, online details about the videoconference service, and the eduCONF room certification.

3.1.1.1 National Support

The NREN VC Support Team must support institutions and, whenever possible, their users, to handle and resolve videoconference issues. This team works closely with the eduCONF team, which can provide second-line support, documentation and training.

3.1.1.2 Videoconference Service Webpage

An NREN must deploy a webpage (described further in Appendix F: NREN Videoconference Service Webpage Details), that describes the videoconference service, its components and contacts. The webpage must also reference the following eduCONF webpages:

- GÉANT eduCONF website.
- eduCONF Directory Service.
- eduCONF Monitoring Tool.

3.1.1.3 eduCONF Room Certification

Within its Support Service, an NREN must support the eduCONF room certification procedure with a member of staff dedicated to room certification and promotion of this certification. A specific webpage must be included on the NREN’s website, explaining the goals, benefits and how an institution (support contact and eduCONF website link) should proceed with the room certification process.

At least one videoconference room associated with the service must be certified before full NREN videoconference service certification can be obtained. After the first NREN room is certified, then the NREN takes on the certification process for the other videoconference rooms.
3.1.2 Gatekeeper Service

NRENs should provide a gatekeeper infrastructure (with national and global gatekeepers) to allow terminal registration and call routing for the terminals within their networks.

NRENs may decide to delegate registration to the eduCONF Terminal Registration Service. In this case, this NREN service MUST not exist and, therefore, will not form part of the certification process.

3.1.2.1 Terminal Registration

Every terminal (all endpoints, such as MCU, gateways, etc.) should be registered in a gatekeeper within the NREN hierarchy. These terminals should be registered with the full Global Dialling Scheme (GDS) number. Gatekeepers must refuse registration of terminals that do not comply with the GDS prefix of the gatekeeper (GDS is an international H.323 numbering plan for global video and voice over IP (VoIP) networks, developed by ViDeNet).

Although not mandatory, the gatekeeper may use any kind of authentication of terminals.

The NREN must also be able to provide the IP, name, IPv4/IPv6 address, network gateway IPv4/IPv6 address and DNS name for the national gatekeeper.

3.1.2.2 Call Routing

One of the fundamental services within a multi-domain network is the ability to reach terminals outside a user’s domain.

3.1.2.2.1 Global Dialling Scheme (GDS)

The gatekeeper must be able to resolve the GDS number schema.

- Every organisational gatekeeper within the country must point to its national gatekeeper, with an 00 prefix.
- Every national gatekeeper must point to the global gatekeeper, with an 00 prefix.
- Each national gatekeeper assumes the prefix for its country (see Appendix C: E.164 Country Codes).

3.1.2.2.2 GÉANT Short Dialling Scheme (GSD)

A GSD identifier consists of six digits (non-repeated digits), and is sequentially allocated to each videoconferencing room upon registration. The GSD will be fully compatible with GDS, as it will not override the E.164 standard.

The national gatekeeper must be able to resolve the GSD number schema:

- GDS-only terminals will be able to reach GSD terminals by using the prefix 000 (which must point to the eduCONF GSD call routing gatekeeper).
- All six-digit numbers should be routed to the eduCONF GSD call routing gatekeeper.

3.1.2.2.3 IP

The national gatekeeper must allow IP-destination calls. If not supported, the gatekeeper may redirect the requests to the eduCONF GSD call routing gatekeeper.
3.1.2.4 URI
The national gatekeeper must allow uniform resource identifier (URI) destination calls. If not supported, the
gatekeeper may redirect the requests to the eduCONF GSD call routing gatekeeper.

3.1.2.3 Free Registration Zone Service
An NREN may provide free registration zones to allow external terminals to register and access network
resources. This registration gatekeeper serving these zones must ensure use of the national prefix (See
Appendix D) and allow call routing as any other gatekeeper on the hierarchy.

3.1.2.4 Monitoring
Gatekeepers should provide registration metrics to their managers and to the eduCONF Monitoring:

- Service status.
- Number of registered terminals.
- Number of active calls.

The data should be retrieved by Simple Network Management Protocol (SNMP) within 5 minutes, once pooled
from the central monitoring node.

Note: Only monitored gatekeepers will be able to be used as gatekeepers for eduCONF certified rooms.

3.1.3 MCU Service
If provided by an NREN, the Multipoint Control Unit (MCU) Service must comply with the following requirements:

- Videoconference rooms accessible by GDS.
- The possibility of having rooms accessible by GSD.

NRENs should, whenever possible, provide:

- IP access, with IVR front-end.
- IP access with extension dialling (##).
- URI-accessible sessions.

The MCU service must be present on the NREN’s webpage as a service provided to their community.

Note: If an NREN does not have its own MCU infrastructure, it may use the eduCONF Cloud Service to provide
user access to multipoint videoconferencing services.

3.1.4 IPVCR Service
If provided by an NREN, the IP-based Videoconference Recording (IPVCR) Service must comply with the
following requirements:

- The recordings must be accessible by GDS.

Whenever possible, NRENs should provide:

- IP access, with IVR front-end.
• IP access with extension dialling (##).
• URI-accessible sessions.

The IPVCR Service must be present on the NREN's web page as a service provided to their community.

### 3.1.5 Gateway Service

If provided by the NREN, the Gateway Service must comply with the following requirements:

• Dialled-in connections should be able to access GDS destinations.

The Gateway Service must be present on the NREN’s web page as a service provided to their community.

### 3.2 Information

The NREN Service must provide the following information to eduCONF via the web page during the certification request:

• **Videoconference Support Service**
  - Contact Name
  - Service Telephone Number
  - Service Email Address
  - Service H323 IP
  - Service H323 GDS
  - Service H323 GSD

• **Location**
  - City

• **Troubleshoot Certified Room**
  - Reference, within the system, to the NREN certified room.¹

• **Web presence**
  - NREN URL
  - NREN VC Service URL
  - NREN Certification Room Service URL

• **Gatekeeper Mode:** yes / delegated / no

<table>
<thead>
<tr>
<th>Note:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
<td>NREN provides a national gatekeeper for national service. GDS must be enabled.</td>
</tr>
<tr>
<td><strong>Delegated</strong></td>
<td>NREN does not provide a gatekeeper. No national GDS will be available. Terminals must register with the eduCONF central gatekeeper. No further information needs to be entered.</td>
</tr>
<tr>
<td><strong>No</strong></td>
<td>REN fails the certification process. Service is not provided.</td>
</tr>
</tbody>
</table>

¹Note that eduCONF central services certify NREN rooms prior to the NREN certification procedure.
• GDS National Gatekeeper (if “delegated” above, this values should be blank or a reference to eduCONF central gatekeeper)
  ○ Name
  ○ IPv4 Address
  ○ IPv6 Address
  ○ Network Gateway IPv4 Address
  ○ Network Gateway IPv6 Address
  ○ DNS Name
  ○ Service URL

• Gatekeeper Terminal Registration (if “delegated” above, this values should be blank or a reference to eduCONF central gatekeeper)
  ○ Name
  ○ IPv4 Address
  ○ IPv6 Address
  ○ Network Gateway IPv4 Address
  ○ Network Gateway IPv6 Address
  ○ DNS Name
  ○ GDS Prefix
  ○ GDS Test Number
    — Origin: ]
    — Destination:
      • Service URL\(^2\)

• Gatekeeper Monitoring
  ○ SNMP IP Address
  ○ SNMP Read Community

---
\(^2\)Must contain information for NREN's end users on how to get help to register terminals. The page can also present some technical data: GDS prefix, IP address, etc.
• Gatekeeper Free Registration Zone (fields are mandatory if this exists)
  — Available: yes / no
  — Name
  — IPv4 Address
  — IPv6 Address
  — Network Gateway IPv4 Address
  — Network Gateway IPv6 Address
  — DNS Name
  — GDS Prefix
  — Service URL

• MCU Service
  ○ Available: yes / no
  — Name
  — IPv4 Address
  — IPv6 Address
  — Network Gateway IPv4 Address
  — Network Gateway IPv6 Address
  — DNS Name
  — GDS Prefix
  — Session Number Range
  — IP Access, With IVR Front-End: yes / no
  — IP Access, With Extension Dialling (##): yes / no
  — URI Accessible Sessions: yes / no
    • URI Structure
    • Service URL

• IPVCRe Service
  ○ Available: yes / no
  — Name
  — IPv4 Address
  — IPv6 Address
  — Network Gateway IPv4 Address
  — Network Gateway IPv6 Address
  — DNS Name
  — GDS Prefix
  — Service URL

• Gateway Service
  ○ Mode: yes / no
  — Name
— IPv4 Address
— IPv6 Address
— Network Gateway IPv4 Address
— Network Gateway IPv6 Address
— DNS Name
— Dial-in Mode: yes / no
  • ISDN Telephone Number
  • GDS forward Dialling Available: yes / no
— Service URL.

3.3 Service Certification Procedure

The NREN videoconference service certification procedure can be undertaken in series of simple steps.

1. The NREN VC Manager accesses the website http://educonf.geant.net
2. The Manager selects the option NREN Services Certification
3. The website guides the NREN VC Manager (user) through a series of steps that will end with the issue of an Online Certification Stamp.

Note that:
• The user can pause and resume the NREN videoconference certification procedure at any time. A user may only create one NREN certification workflow (as described in Section 2.2), which he can cancel/delete at any moment.
• Only one NREN certification workflow is allowed for each NREN at a given time.
• eduCONF Managers may be able to add, delete and general manage ownership of NREN Certification Workflows.

3.3.1 List of Steps

There are seven steps required to register and certify a workflow: authentication, identification, information, automated validation procedure, certification request, manual validation, and certificate publishing.

Step 1: Authentication

The user identifies him/herself on the eduCONF certification website (eduGAIN).

Step 2: Identification

The user selects the appropriate NREN. (All GÉANT partner NRENs are listed.)

If the selected NREN has an ongoing, associated certification workflow:

• The web program fails to add a new certification workflow.
• The user receives an error message.
• The NREN VC Manager that owns the original workflow is notified.

Certification Workflow State: Registered

Step 3: Information

The user accesses the NREN Videoconference Service Certification Workflow entry process. All information must be submitted.

Step 4: Automated Validation Procedure

The system starts the automated validation procedure with a series of connectivity tests and works its way through the procedure until it reaches the gateway service:

• Connectivity Tests
  ○ Network Gateway IPv4 ping
  ○ Network Gateway IPv6 ping
  ○ Gatekeeper IPv4 ping
  ○ Gatekeeper IPv6 ping

• SNMP Tests
  ○ Monitoring Values Retrieving

• Terminal Registration Tests
  ○ Within GDS prefix: must succeed
  ○ Out of GDS prefix: must fail

• Call Routing Tests
  ○ See: “Automated Call Routing Test Sequence”

• MCU Service
  ○ Ping MCU IP

• IPVCR Service
  ○ Ping MCU IP

• Gateway Service
  ○ Ping Gateway IP.

If any test fails, the system will not allow the user to proceed.

In addition, if the call routing tests fail, reports will be sent to the NREN VC Manager and GDS Administrator with the relevant information:
• NREN VC Manager: list of results and course of action to successfully pass each test.
• GDS Administrator: institution, country, GDS prefix, national GDS gatekeeper IP.

Note: The eduCONF platform does not manage world gatekeepers. GDS Administrators should make the appropriate changes to the setup of each world gatekeeper, based on the information received.

The user can run these automatic tests at any time.

Upon success, Certification Workflow State: Validated

**Step 5: Certification Request**

The system notifies the eduCONF team of the new state of the NREN workflow. The team has access to all the information and will carry out appropriate actions for final Manual Validation:

- Schedule Meeting with NREN VC Manager
- Schedule Manual Validation Tests

The NREN VC Manager should, at this moment, start a Room Certification Workflow of a room or terminal within its institution.

Certification Workflow State: Pre-certified

**Step 6: Manual Validation**

At the agreed date and time, a set of manual validation will be performed by the eduCONF team:

- Connectivity Tests
  - Verify if the monitoring system is sensitive to network outages.
- Service Tests
  - Verify if the monitoring system is sensitive to service outages.
- Verify Measures
  - Verify if the SNMP retrieved values are correct.
- Verify Web Pages
  - eduCONF Room Certification Procedure
  - eduCONF reference
- Room Certification
  - One room is certified

Upon success, Certification Workflow State: Certified
Step 7: Certificate Publishing

The certification procedure is completed with the publishing of the eduCONF NREN Videoconference Certificate. The certificate is provided as a web widget constructed in real time from the eduCONF web platform.

The web widget address (URL) and reference (identifier) will be available for use wherever the NREN VC Manager wishes.

The NREN VC Manager should post a notice on the NREN's webpage, such as “Videoconference Services Certified by GÉANT eduCONF”, and publish the web widget wherever the NREN VC Service is referenced.
4 Videoconference Room Certification Procedure

This chapter defines the several steps needed for a VC room to be certified under the eduCONF room certification procedure. It lists a set of room requirements that must be met prior to certification and the certification procedure to be applied in each room.

4.1 Requirements

Prior to room certification, information and technical conformities should be verified. The following information will be requested during the certification procedure.

4.1.1 Information

4.1.1.1 Physical

- Room Name
- Room Address
  - Street
  - City
- Coordinates (Google Map interface…)
  - Latitude
  - Longitude
- Room Webpage URL
- Accessible to people with disabilities: yes/no
- Number of seats
- Room Type: portable, meeting room, class room, small auditorium, large auditorium, multi-functional, telepresence, other
- Camera: PTZ / Fixed

4.1.1.2 Addressing

- IPv4
- IPv6
- GDS
- GSD
- H.323 URI

4.1.1.3 Technical

- Brand
- Model
- Max Resolution: CIF; SD/4CIF; HD – 720p; FullHD – 1080p
- Number of screens
• H.264 Capable: yes / no
• H.239 Support
  ○ Local Screen Sharing
  ○ Remote Screen Viewing
• SIP Support
• SIP URI

4.1.1.4 Monitoring
• IPv4 Gateway
• IPv6 Gateway
• IPv4 Gatekeeper
• IPv6 Gatekeeper

4.1.1.5 Scheduling Information
• Online Scheduling
• Scheduling Contact
  ○ Name
  ○ Phone
  ○ Email
• Time Zone
• Working Hours:
  — Start Morning Hour
  — Finish Morning Hour
  — Start Afternoon Hour
  — Finish Afternoon Hour
• After Hours information
• Weekend information
• Pricing

4.1.1.6 Administrative Contacts
• Name
• Phone
• Email

4.1.1.7 Technical Contacts
• Name
• Phone
• Email

4.1.1.8 Paper Support Sheets
• Must be present and contain:
  ○ Native Language & English (front & back)
  ○ Technical Contact: Name, Phone, Email
○ Direct Phone Number of Room
○ Equipment Brand and Model
○ IP / GDS / GSD / URI
○ Instructions on How-to…:
  — Place and frame participants prior to call setup (if PTZ capable camera)
  — Dial a new call (number and IP based)
  — Mute/unmute call
  — Close a call
  — Share laptop screen (if H.239 available)

4.1.1.9 Internet Connectivity
• Wireless: eduroam / free / other / no
• Wired

4.1.1.10 Description
• Room Description

4.1.1.11 Additional equipment
• Additional Equipment Available

4.1.1.12 Images
• Four Images Per Room (from each corner to centre)
  1. Front-right to centre
  2. Front-left to centre
  3. Back-right to centre
  4. Back-left to centre

• Audience Facing Towards Main Screen
• Main Camera towards audience
• Building Exterior
• Public Picture (Internet available).

4.1.2 Technical

The VC terminal must be H.323 compliant, be registered with a gatekeeper enabled within the national gatekeeper hierarchy provided by the NREN, is fully compliant with GDS and eduCONF NREN videoconference certification procedure.

The terminal must be able to place and receive calls using any addressing method, without any configuration change.

The terminal should have an “always-on” policy, which means, that it should be connected during working hours. It is up to the Room Management to setup the system, or not, on auto-answer mode.
4.2 Procedure

The eduCONF room certification procedure can be undertaken in series of simple steps.

1. The VC Room Manager accesses the website http://educonf.geant.net.

2. The Manager selects the Room Certification option.

3. The website guides the VC Room Manager (user) through a series of steps that will end with the printing of the eduCONF Room Certificate. Users can pause and resume the room certification procedure at any time. The user can also create as many room certification procedures as needed. A user can cancel or delete any room at any time.

4.2.1 List of steps

Step 1: Authentication

User identifies him/herself on the eduCONF certification website (eduGAIN).

If the user fails to authenticate, the certification process ends.

Step 2: Identification

The user selects the appropriate NREN. (All GÉANT partner NRENs are listed.)

If the chosen NREN has yet to be certified, then it is impossible to certify the room, and the certification process ends. The platform notifies the user and sends an alert message to the VC Room Manager and the eduCONF team.

Step 3: Information

The user enters the room information and uploads pictures, as described in the list of requirements detailed in Section 4.1.

Step 4: Monitoring and Firewall

After the user enters all the required information and photos, the system starts the automated validation procedure.

- Gatekeeper ping.
- IPv4 Gateway ping.
- IPv4 Terminal ping.
• IPv6 Gateway ping.
• IPv6 Terminal ping.
• IPv4 TCP Connect to terminal port: 1720.
• IPv6 TCP Connect to terminal port: 1720.

If any test fails, the system will not allow the user to proceed. The user can carry out these tests on an ad-hoc basis.

Step 5: Call Setup Testing

The system presents a list of calls to perform:

• From Terminal to Network
  ○ IP Destination
  ○ GDS Destination
  ○ GSD Destination
  ○ URI Destination

• From Network to Terminal
  ○ IP Destination
  ○ GDS Destination
  ○ GSD Destination
  ○ URI Destination

• NREN Specific Tests
  ○ (to be defined by each NREN)
  ○ NREN Test Room/Equipment
    — IP
    — GDS
    — GSD
    — URI

• NREN Specific Information
  ○ Contacts
  ○ Weekdays and Time of Day for Testing
  ○ Other information.

This list of specific tests will be emailed to the user.

The system informs user that the following procedure must be done with the support of the NREN VC Manager.
Step 6: NREN Notification

The NREN VC Manager receives an email requesting room certification. The email includes room information, as well as the list of destinations that should be used during the final test stage.

The NREN VC Manager should schedule the moment of verification with the VC Room Manager.

Step 7: NREN Verify Room

At the scheduled time provided by the NREN notification email, the NREN VC Manager should be near the NREN Room test equipment to place a VC to the room. The Manager will then access the eduCONF website using the link provided by the NREN notification email.

- Select Room Verification Procedure option.
- Continue to work through the screens until Authentication.
- Select room name from the Rooms to Verify list.

The verification procedure should be supported by a second medium of communication (phone), if possible.

NREN VC Manager is presented with a checklist that will require him/her to state the result of each test:

<table>
<thead>
<tr>
<th>Call Dialling</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>To &lt;eduCONF IP Number&gt;</td>
<td>Success/Fail</td>
</tr>
<tr>
<td>To &lt;eduCONF GDS Number A&gt;</td>
<td>Success/Fail</td>
</tr>
<tr>
<td>To &lt;eduCONF GDS Number B&gt;</td>
<td>Success/Fail</td>
</tr>
<tr>
<td>To &lt;eduCONF GSD Number&gt;</td>
<td>Success/Fail</td>
</tr>
<tr>
<td>To &lt;eduCONF URI Address&gt;</td>
<td>Success/Fail</td>
</tr>
</tbody>
</table>

Note: all these destinations are in the MCU room. Both the room VC Manager and NREN VC Manager should call the MCU room.

<table>
<thead>
<tr>
<th>Call Receiving</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>From &lt;NREN VC Test Room&gt;</td>
<td>Success/Fail</td>
</tr>
<tr>
<td>Using IP</td>
<td></td>
</tr>
<tr>
<td>Using GDS</td>
<td></td>
</tr>
<tr>
<td>Using GSD</td>
<td></td>
</tr>
<tr>
<td>Using URI</td>
<td></td>
</tr>
<tr>
<td>From eduCONF MCU Interface</td>
<td>Success/Fail</td>
</tr>
<tr>
<td>Using IP</td>
<td></td>
</tr>
<tr>
<td>Using GDS</td>
<td></td>
</tr>
<tr>
<td>Using GSD</td>
<td></td>
</tr>
<tr>
<td>Using URI</td>
<td></td>
</tr>
</tbody>
</table>

Verify Room Conditions

In a point-to-point call, discuss and evaluate:
• Quality Issues
  ○ Light condition: poor / medium / great
  ○ Sound: poor / medium / great
  ○ H.239: not available / not worked / worked
  ○ Latency: high / medium / low
  ○ Room Setup: poor / medium / great
  ○ General Quality: poor / medium / great

• Other issues
  ○ Paper Support Sheets near the equipment: yes / no
  ○ Images provided on the site depict the room correctly: yes / no

The NREN VC Manager will evaluate the room conditions based on the descriptions found in Appendix A: Evaluating Room Quality. Whenever possible, the Room Manager should try to improve room quality, and discuss possible improvements with the NREN VC Room Manager. For more information, see Appendix B: Increasing Room Quality.

Data Submission
The NREN VC Manager will submit all the information to the eduCONF certification website. Based on the information, a report will be provided to both the NREN VC Manager and to the VC Room Manager.

If the room is under the Certification Threshold (in the process of obtaining certification) it will be registered on eduCONF Directory Service, but will not have the certification stamp. VC Room Managers can improve their room environment and conditions and apply for a new certification whenever they wish (Step 6: NREN Notification).

Note: Room Certification will fail if:
  • Any parameter is: "fail"/"poor"/"high"/"no"
  • More than three parameters were rated: “medium”

Step 8: Room Certificate Printing and Publication

Upon evaluation, if the room achieves the minimum quality threshold, a room certificate is provided to the Room Manager.

Certification is immediate upon validation from the web platform. (Step 7: NREN Verify Room). It will also be possible to print from this file, which should be posted on the room. It should not take more than 30 minutes for a Room Manager to achieve certification. All certificates have an expiration date, upon which the room will need to be submitted for revalidation.

The certificate will also be cancelled on the eduCONF website if the monitoring system detects a failure lasting for more than eight days. After that, the room must be re-validated.
The Room Certificate will look something like this:

![Image of eduCONF Room Certificate Layout]

**eduCONF Certified**

http://educonf.geant.net

<table>
<thead>
<tr>
<th>Institution: &lt;name of institution&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room: &lt;room name&gt;</td>
</tr>
<tr>
<td>Date: &lt;date of validation&gt;</td>
</tr>
<tr>
<td>Valid until: &lt;date of expiration&gt;</td>
</tr>
<tr>
<td>Technical Contact:</td>
</tr>
<tr>
<td>&lt;name of contact&gt;</td>
</tr>
<tr>
<td>&lt;phone&gt;</td>
</tr>
<tr>
<td>&lt;e-mail&gt;</td>
</tr>
<tr>
<td>Addressing Information:</td>
</tr>
<tr>
<td>&lt;IP&gt;</td>
</tr>
<tr>
<td>&lt;GDS&gt;</td>
</tr>
<tr>
<td>&lt;GSD&gt;</td>
</tr>
</tbody>
</table>

Figure 4.1: eduCONF Room Certificate Layout

The eduCONF platform will also provide a web widget that can, and should, appear on every webpage that references the room.

The web widget is provided by the platform with an address (URL) and a unique reference (identifier).
Appendix A Evaluating Room Quality

This appendix sets out the qualitative parameters for the evaluation of a room.

A.1 Room Setup

- Poor – some participants can’t be seen within the frame, there is background activity or distortion of the image from reflections, image of participants is very small (even after proper framing).
- Medium – no problems with light, framing or background. Small adjustments are needed for every session.
- Great – every participant is seen within the frame, there is no background activity on the image or distorting reflections or lights. All participants’ faces and expressions can be clearly seen. Recommended.

A.2 Light

- Poor – shadows, very low contrast, impossible to obtain a clear image of participants.
- Medium – some shadows in faces, participants are recognisable, facial expressions can be seen.
- Great – faces are seen without shadows. Optimal contrast.

A.3 Sound

- Poor – echo from remote participant, echo inside the room, constant noise, drops and sound failures. Difficult to maintain a conversation.
- Medium – clear sound from speakers, although minor pitch changes. Almost no sound drops. Easy to maintain a conversation.
- Great – high quality sound, no noise and no feedback. Easy to sustain a conversation for a long period of time.
A.4 H.239

H.239 is an ITU-T recommendation from the H.32x Multimedia Communications’ macrofamily. H.239 defines rules and messages for establishing an additional video/graphics channel, often to transmit a PC graphics presentation or video from a document camera, while still transmitting the video of the presenter.

While validating H.239 functionality on a room, the NREN VC Managers should select the appropriate value while assessing the room quality:

- **Not Available** – the terminal does not support H.239.
- **Not Worked** – the terminal supports H.239, but it was unable to verify.
- **Worked** – the terminal supports H.239 and was fully tested.

A.5 Images Provided on the Site Correctly Depict the Room

From the videoconference, the NREN VC Manager should assess if the images present at room registration are correct and correspond to the Videoconference Room that is being validated.

- **Yes** – if the pictures are correct.
- **No** – if the pictures are not correct.

A.6 Latency

In doubt, apply the ping test.

- **High** – A conversation can’t be established. Long delays. “Lisbon Test” takes more than eight seconds to perform (ping latency > 120ms).
- **Medium** – Some delay, but conversation can be established. “Lisbon Test” takes less than eight seconds to perform (ping latency > 70ms).
- **Low** – Some or none delay. Conversation is natural between participants. “Lisbon Test” takes less than six seconds to perform (ping latency < 70ms).

Note: The Lisbon Test consists of both parties counting to ten, with one party counting the odd numbers and the other party counting the even numbers. One party is only allowed to say the next number after hearing the previous one.
A.7 General Quality

- Poor – poor quality. Unusable.
- Great – excellent in every way. Recommended.
Appendix B Increasing Room Quality

This appendix describes best practice on how to increase the overall room quality during a videoconference.

B.1 Light Condition

In order to increase light conditions, try the following:

1. Reduce natural light as much as possible, but turn on the room lights.
2. The camera should not directly face towards any windows or other light sources.
3. Illuminate the back of the camera wall as much as possible.
4. If there are windows that cannot be covered, try to arrange the system so that it is placed in front of the window.
5. Light will reflect off a white or bright-coloured table.
6. Use a solid, light-coloured (non-white) background.

B.2 Sound

In order to increase sound quality, try the following:

1. Place the microphone one meter away from the main speaker.
2. Place the speakers as near as possible from the screen.
3. Reduce the audio of the screen/sound system to the lowest that is still audible.
4. If there is much echo on the room, add some furniture or place fabric on the walls or windows.
5. Prefer wood furniture to metal furniture.
6. Apply carpets on the floor.
7. Apply acoustic treatment on the room (walls, ceiling, and floor).

B.2.1 Room Setup

Try the following to enhance the setup of the room:
4. Place the camera as near as possible to the centre of the screen (over or under it).
5. Place the camera at eye level of the participants.
6. Place the camera in such way it doesn’t display any doors or windows.
7. On a small room, arrange participants around a V- or U-shape table.
8. Place participants away from the equipment, at a distance not more than five times the height of the screen.
9. Users should not sit more than 2.5m away from a screen with a height of 50cm.
10. Place participants at a distance that is more than twice the height of the screen (users should not sit more than 2.5m away from a screen with a height of 50cm, or more than 3m away from a screen with a height of 1.5m).
## Appendix C E.164 Country Codes

The following is a list of European country-calling codes as defined by the ITU-T.

<table>
<thead>
<tr>
<th>Code</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Greece</td>
</tr>
<tr>
<td>31</td>
<td>Netherlands</td>
</tr>
<tr>
<td>32</td>
<td>Belgium</td>
</tr>
<tr>
<td>33</td>
<td>France</td>
</tr>
<tr>
<td>34</td>
<td>Spain</td>
</tr>
<tr>
<td>351</td>
<td>Portugal</td>
</tr>
<tr>
<td>352</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>353</td>
<td>Ireland</td>
</tr>
<tr>
<td>354</td>
<td>Iceland</td>
</tr>
<tr>
<td>355</td>
<td>Albania</td>
</tr>
<tr>
<td>356</td>
<td>Malta</td>
</tr>
<tr>
<td>357</td>
<td>Cyprus</td>
</tr>
<tr>
<td>358</td>
<td>Finland</td>
</tr>
<tr>
<td>359</td>
<td>Bulgaria</td>
</tr>
<tr>
<td>36</td>
<td>Hungary</td>
</tr>
<tr>
<td>370</td>
<td>Lithuania</td>
</tr>
<tr>
<td>371</td>
<td>Latvia</td>
</tr>
<tr>
<td>372</td>
<td>Estonia</td>
</tr>
<tr>
<td>373</td>
<td>Moldova</td>
</tr>
</tbody>
</table>

For a full list of country-calling codes see http://www.itu.int/dms_pub/itu-t/opb/sp/T-SP-E.164D-2011-PDF-E.pdf
Appendix D eduCONF Services

This appendix describes other eduCONF Services, Functions and Tools referenced in this document.

- Service – provides a publicly available function to end users.
- Function – provides a private function to eduCONF administrators or NREN VC Managers.
- Tool – a system that is part of a function or a service.

D.1 eduCONF Terminal Registration Service

This service is the gatekeeper that provides registration service to terminals. This gatekeeper will register GSD only terminals. This gatekeeper will be IPv4 and IPv6 compliant.

D.2 eduCONF Directory Service

This is the website that holds all the information of the registered terminals (certified, or not) with the eduCONF Certification Procedure.

D.3 eduCONF GSD Call Routing Service

A gatekeeper will have the “eduCONF Directory Service” database at its back end. It will be the holder of the GSD prefix and will route the call to the appropriated destination (IP address). It will provide call routing to GSD, GDS, IP, URI and ENUM dialling.

This service, in the future, may be attached with other services as:

- SIP Gateway Service: will allow interoperability with SIP based services.
- Personal Number & Roaming Service: will allow users to have personal GSD numbers that follow users to each room location.
D.4 eduCONF Monitoring Tool

This is the set of tools that will allow monitoring of the videoconference network’s health by monitoring gatekeeper status, performing registrations and setting up calls with each gatekeeper. It will also monitor terminals and gateways of certified rooms.

D.5 eduCONF MCU Cloud Service

Set of tools and procedures that allow NRENs to use ports from MCUs made available by other NRENs.
Appendix E  **Timings for Certification and Revalidation**

Revalidation of the certification should be executed in regular time periods. This table describes the eduCONF Certification Procedure timings for each action:

<table>
<thead>
<tr>
<th>NREN VC Service</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Expiration Date</td>
<td>One year after certification date</td>
</tr>
<tr>
<td>Automated Validation</td>
<td>Once a day</td>
</tr>
<tr>
<td>Certification Request</td>
<td>Once a day</td>
</tr>
<tr>
<td>Scheduled Automated Validation</td>
<td>Once a week</td>
</tr>
<tr>
<td>Scheduled Automated Validation Threshold</td>
<td>Five continuous failures</td>
</tr>
<tr>
<td></td>
<td>Ten, non-continuous failures</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Room</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Expiration Date</td>
<td>One year upon certification</td>
</tr>
<tr>
<td>Automated Validation</td>
<td>Once a day</td>
</tr>
<tr>
<td>Certification Request</td>
<td>Once a day</td>
</tr>
<tr>
<td>Scheduled Automated Validation</td>
<td>Once a week</td>
</tr>
<tr>
<td>Scheduled Automated Validation Threshold</td>
<td>Five continuous failures</td>
</tr>
<tr>
<td></td>
<td>Ten non-continuous failures</td>
</tr>
</tbody>
</table>
Appendix F  NREN Videoconference Service Webpage Details

The NREN Videoconference Service Webpage must appear on the NREN website with the following basic descriptions:

F.1 General Service

- Support Service:
  - Service Description
  - Documentation
  - Technical Contacts

- Gatekeeper Service (if available):
  - Terminal Registration
    - Requirements and Constrains
  - Call Routing:
    - GDS, GSD, ENUM, IP
  - Free Registration Zone Service (if available)
  - Monitoring (if available)

- MCU Service (if available):
  - Service Description
  - Basic Usage Instructions

- IPVCR Service (if available):
  - Service Description
  - Basic Usage Instructions
• Gateway Service (if available)
  ○ Service Description
  ○ Basic Usage Instructions

F.2 eduCONF Reference

• eduCONF Room Certification Service
  ○ Service Description
  ○ Documentation
  ○ Technical Contacts

• eduCONF Links
  ○ GÉANT eduCONF Website
  ○ eduCONF Directory Service
  ○ eduCONF Monitoring Tool
Appendix G Automated Call Routing Test Sequence

The following table lists all the tests that should be performed during the Automated Call Routing Test Sequence.

<table>
<thead>
<tr>
<th>Origin Terminal Registered to:</th>
<th>Destination Terminal Registered to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>NREN GK</td>
<td>NREN GK</td>
</tr>
<tr>
<td>Other NREN GK</td>
<td>Other NREN GK</td>
</tr>
<tr>
<td>eduCONF Central GK</td>
<td>eduCONF Central GK</td>
</tr>
<tr>
<td>Nothing</td>
<td>Nothing</td>
</tr>
<tr>
<td>IP</td>
<td>N/A</td>
</tr>
<tr>
<td>GDS</td>
<td>N/A</td>
</tr>
<tr>
<td>GSD</td>
<td>N/A</td>
</tr>
<tr>
<td>URI</td>
<td>N/A</td>
</tr>
<tr>
<td>ENUM</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table G1 - Automated Call Routing Test Sequence

4. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on the same gatekeeper using an IP address. *(In-Zone – IP dial test)*

5. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on the same gatekeeper using a full GDS number. *(In-Zone – GDS dial test)*

6. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on the same gatekeeper using a GSD number. *(In-Zone – GSD dial test)*

7. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on the same gatekeeper using an URI address. *(In-Zone – URI dial test)*

8. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on the same gatekeeper using an ENUM address. *(In-Zone – ENUM dial test)*

9. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on another NREN gatekeeper using an IP address. *(Off-Zone – IP dial out test)*

10. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on another NREN gatekeeper using a full GDS number. *(Off-Zone – GDS dial out test)*

11. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on another NREN gatekeeper using a GSD number. *(Off-Zone – GSD dial out test)*

12. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on another NREN gatekeeper using an URI address. *(Off-Zone – URI dial out test)*

13. Registered terminal on National Registration Gatekeeper tries to call other terminal registered on another NREN gatekeeper using an ENUM address. *(Off-Zone – ENUM dial out test)*
14. Registered terminal on National Registration Gatekeeper tries to call other terminal registered only on the eduCONF Central Gatekeeper using an IP address. (eduCONF-Zone – IP dial out test)

15. Registered terminal on National Registration Gatekeeper tries to call other terminal registered only on the eduCONF Central Gatekeeper using a GSD number. (eduCONF-Zone – GSD dial out test)

16. Registered terminal on National Registration Gatekeeper tries to call other terminal registered only on the eduCONF Central Gatekeeper using an URI address. (eduCONF-Zone – URI dial out test)

17. Registered terminal on National Registration Gatekeeper tries to call other terminal registered only on the eduCONF Central Gatekeeper using an ENUM address. (eduCONF-Zone – ENUM dial out test)

18. Registered terminal on National Registration Gatekeeper tries to call other terminal not registered on any gatekeeper using an IP address. (Internet Zone – IP dial out test)

19. Registered terminal on National Registration Gatekeeper tries to call other terminal not registered on any gatekeeper using an URI address. (Internet Zone – URI dial out test)

20. Registered terminal on National Registration Gatekeeper tries to call other terminal not registered on any gatekeeper using an ENUM address. (Internet Zone – ENUM dial out test)

21. Registered terminal on another National Registration Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using an IP address. (Off-Zone – IP dial in test)

22. Registered terminal on another National Registration Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using a GDS number. (Off-Zone – GDS dial in test)

23. Registered terminal on another National Registration Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using a GSD number. (Off-Zone – GSD dial in test)

24. Registered terminal on another National Registration Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using a URI address. (Off-Zone – URI dial in test)

25. Registered terminal on another National Registration Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using an ENUM address. (Off-Zone – ENUM dial in test)

26. Registered terminal only on eduCONF Central Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using an IP Address. (eduCONF-Zone – IP dial in test)

27. Registered terminal only on eduCONF Central Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using a GDS number. (eduCONF-Zone – GDS dial in test)

28. Registered terminal only on eduCONF Central Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using a GSD number. (eduCONF-Zone – GSD dial in test)

29. Registered terminal only on eduCONF Central Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using a URI address. (eduCONF-Zone – URI dial in test)

30. Registered terminal only on eduCONF Central Gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using an ENUM address. (eduCONF-Zone – ENUM dial in test)

31. Terminal not registered on any gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using an IP address. (Internet Zone – IP dial in test)

32. Terminal not registered on any gatekeeper tries to call in to a terminal registered on the National Registration Gatekeeper using an URI address. (Internet Zone – URI dial in test)
Appendix H State of the Art

H.1 NREN Certification

H.1.1 Background

Videoconference calls should succeed upon the first dial attempt. NREN certification will provide stable H.323 service between NRENs within the GÉANT network and on the International level. The main purpose of certification is to set professional standards, and increase professionalism in the field.

In general, certification provides “The list” of NRENs that have a ‘good’ and stable H.323 and GDS service, with clear organisational structure and knowledge of how to solve possible user videoconference problems. The certification process will also benefit the NRENs that are not yet a part of GDS, to easily establish and upgrade their videoconference service to the correct videoconference standards.

NREN certification will help to establish protocols in problem solving and put forward best-practice documentation procedures (for example, how to set-up gatekeeper and connect it to GDS). The certified NRENs would be published on GÉANT eduCONF web pages, receive a certification banner, and be widely recognised as a quality videoconference partner for videoconference collaboration.

At the eduCONF workshop in Lisbon 2010, the idea was born to make the list of NRENs that have stable connection to GDS. To keep the list of NRENs that have deployed H.323 gatekeeper and connected to GDS the concept of eduCONF NREN certification was introduced. In order to receive certification, an NREN has to have stable connectivity to GDS, implementation of GÉANT monitoring H.323 node and other necessary implementations or videoconference service infrastructure.

There are two certification processes that take place within the eduCONF service:

- NREN certification.
- Videoconference room certification.

The eduCONF certification procedure has been established to provide all GÉANT members and GÉANT stakeholders with an impartial and professional certification and verification process. It also provides a high-level of confidence that any certification, verification or service provided by eduCONF service will meet agreed standards.
Figure I.1: Certification Workflow

After an NREN submits a request for NREN certification, the request is processed by an eduCONF team member. Most of the validation is carried out as an automatic process. The videoconference room certification validation is executed by a certified NREN.

H.1.2 Current Situation

From the data provided by a recent eduCONF survey and eduCONF workshop, it appears that GDS is not working properly and users “do not like it”.

The most persistent problems include:

- GDS connection from NREN and global hierarchy of H.323 gatekeepers has interruptions/breakdowns of service.
- Many European NRENs are not a part of GDS (see the link: http://educonf.GÉANT 2.net/directory/map/).
- Large NREN institutions that lack a local gatekeeper service.

The approach taken by GÉANT eduCONF team to set-up the basic is to provide advisory service that could lead to a ‘global’ pan-European working GDS H.323 zone and further build the list of NRENs that are a part of stable and actively monitor GDS H.323 zone.

In order to create a list of NRENs with stable GDS, an eduCONF advisory service has been established with a primary role to:

- Create best practice and advice on how to (configure) documents.
- Provide expert help to NREN gatekeeper administrators.
- Create basic and advanced certification of NRENs (the list of NRENs that have stable connection to global hierarchy of H.323 gatekeepers).
H.1.3 Benefits of Certification

Certification will address most of the issues described above. It will establish problem solving protocols and establish consistent professional standards and protocols in the videoconferencing field within the GÉANT eduCONF network.

The main impact is to force the eduCONF service, its partners and International partners to act bilaterally in establishment of stable pan-European videoconference network.

The NREN certification process sets good-practice guidelines for videoconferencing, which will enable NREN to become widely recognized as a quality videoconference partner for videoconference collaboration. The main impact of NREN certification is to force the eduCONF service, its partners and International partners to act bilaterally in establishment of stable pan-European videoconference network.

Certification of NRENs aims to ensure an organisation achieves a certain level of proficiency, as well as agreeing to certain standards or criteria.

NRENs that would like to be certified must file the “Request for Certification” form on the eduCONF web site.

In order for an NREN to be certified, the following key video-infrastructure will be examined:

- H.323 zone (national gatekeeper, NREN gatekeeper, other H.323 terminals/devices, etc.).
- Installation of H.323 monitoring listening node.

A certified NREN must also regularly update the H.323 gatekeeper zone data to eduCONF directory database, and also have at least one videoconference room certified (as explained in Section 4).

An overview of the steps involved in the certification process is shown in Figure H2.
H.1.4 Certification Request

First phase of certification process begins with NREN entering valid data:

- NREN name.
- Videoconference organisation details.
- Link to NREN videoconference policy document (if one exists).
- National and NREN gatekeeper H.323 data.
- Other H.323 components that will be certified.

If the NREN does not have H.323 videoconference service or other infrastructure, the eduCONF team will be able to advise on the deployment of proper service.

H.1.5 NREN Validation Process

The NREN certified videoconference network must have:

- National H.323 gatekeepers.
• NREN or institutional gatekeeper.
• Local eduCONF monitoring node.
• One videoconference room, reachable via GDS.

The NREN certified videoconference network could have other H.323 equipment, that could be in use within GÉANT community, so that equipment (example: MCU, VCR, gateways...) should be also certificated.

After the request for certification following process will be validated:

• Validation of GDS H.323 zone – gatekeeper configuration and test call scenario.
• Validation of eduCONF monitoring node – installation and reliability.
• Validation of data entered in directory – gatekeeper, endpoint and other data.
• Validation of other equipment.

The validation process will be mostly automated via an eduCONF certificate engine. Current validation data, for every validation point, will be published as pass or failed.

Verification techniques that will be a part of eduCONF validation process will include:

• Dynamic testing – testing that involves the execution of a system or component based on a defined scenario.
• Structural testing – testing of H.323 zone hierarchy.
• Data monitoring – monitoring collecting data from the installed monitoring node, checking the reliability of NREN H.323 zone.
• Static and random testing – use of randomly determined test-call scenarios (automatic or manual).

The duration of the verification process will be set at a minimum of 20 working days.

H.1.6 NREN Evaluation

Based on the data gathered by the validation process, the decision for issuing a certificate is guided by following principles:

• All verification tests are marked as “pass”.
• NREN H.323 zone is stable for a 20 working days after the verification process has ended.
• Monitoring node is stable for a 20 working days after the verification process has ended.

After the above guidelines are accomplished, the NREN will be marked as certified. The certified NRENs would be published on the GÉANT eduCONF webpage, receive a certification banner, and be widely recognised as a quality videoconference partner for videoconference collaboration.
H.1.7 NREN Certification Checklist

Information gathered from the certification process will be published on the eduCONF website. The following categories will be needed to fulfil NREN certification.

<table>
<thead>
<tr>
<th>I. General</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact information</td>
<td></td>
</tr>
<tr>
<td>NREN website modification</td>
<td></td>
</tr>
<tr>
<td>One certified room</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. Videoconference infrastructure</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>National gatekeeper</td>
<td></td>
</tr>
<tr>
<td>NREN gatekeeper</td>
<td></td>
</tr>
<tr>
<td>Free registration gatekeeper (optional)</td>
<td></td>
</tr>
<tr>
<td>MCU service</td>
<td></td>
</tr>
<tr>
<td>IPVCR service</td>
<td></td>
</tr>
<tr>
<td>Gateway (optional)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>III. Call routing protocols</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>IPv4</td>
<td></td>
</tr>
<tr>
<td>IPv6 (optional)</td>
<td></td>
</tr>
<tr>
<td>GDS</td>
<td></td>
</tr>
<tr>
<td>URI</td>
<td></td>
</tr>
<tr>
<td>GSD</td>
<td></td>
</tr>
<tr>
<td>SIP (optional)</td>
<td></td>
</tr>
<tr>
<td>ENUM (optional)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IV. Monitoring</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NREN test IP number</td>
<td></td>
</tr>
<tr>
<td>NREN test H.323 number</td>
<td></td>
</tr>
<tr>
<td>NREN test SIP number (optional)</td>
<td></td>
</tr>
</tbody>
</table>
References

http://educonf.geant.net/wiki

Glossary

CIF
Common interchange format

E.164
E.164 (recommended by the ITU-T) defines the international public telecommunications numbering plan and format of telephone numbers (a maximum of 15 digits, prefixed with a ‘+’).

eduCONF
A set of services to provide and support videoconferencing across Europe.

DNS
Domain Name System, a naming system for network resources such as computers or services.

ENUM
Electronic Numbering Mapping is a protocol that relies on DNS to retrieve final terminal destinations in the URI format.

GÉANT
Pan-European data network dedicated to the research and education community.

GDS
Global Dialling Scheme. The Global Dialling Scheme is an international numbering scheme, often used for videoconference H.323 calls, developed by ViDeNet (Video Development initiative). GDS has been widely adopted by many European NRENs and institutions for H.323 inter-zone dialling. H.323 terminals can register with a service called an H.323 gatekeeper, which provides H.323 name and/or E.164 number resolution to a specific IP address. In order to facilitate GDS functionality, the global hierarchy of H.323 gatekeepers was established for making inter-zone calls.

GDS Test Number
GDS number to be used for testing and monitoring purposes. Each NREN must provide two different numbers for the eduCONF monitoring systems.

GSD
GÉANT Short Dialling Scheme. The GÉANT Short Dialling Scheme is a specific GÉANT numbering scheme that is used within the GÉANT VC Network. All the eduCONF-certified rooms will comply with GSD. The GSD identifier is attributed sequentially to each room upon registration. GSD numbers have six digits and do not repeat digits. GSD is fully compatible with GDS as it will not override the E-164 standard. GDS-only terminals will be able to reach GSD terminals using the 000 prefix. All the GSD-compliant terminals and gatekeepers will route the calls to the GSD-based network to all dialled 6-digit numbers.

H.239
A standard approved by the ITU-T for multimedia communications over various networks ("Role management and additional media channels for H.3xx-series terminals"), which sets a way to
have multiple video channels (e.g., one for conferencing, another for presentation) within a single session (call).

**H.264**  
Also known as MPEG4, or advanced video coding, H.264 is a standard for high-definition video compression.

**H.323**  
A standard approved by the ITU to promote multimedia communication (VoIP and VC) over packet switched networks. The standard addresses call signalling and control, multimedia transport and control, and bandwidth control for point-to-point and multipoint conferences.

**IP**  
Internet Protocol

**IPv4**  
Version 4 of the Internet Protocol (StB IETF). Employs a 32 bit IP-address.

**IPv6**  
Version 6 of the Internet Protocol (StB IETF) The successor to IPv4, employing a 128 bit IP-address.

**IPVCR**  
IP-based videoconferencing service

**ITU-T**  
International Telecommunication Union, Telecommunication Standardization Sector

**IVR**  
Interactive voice response, used to assist call automation

**MCU**  
Multipoint Control Unit

**NREN**  
National Research and Education Network

**NREN Certification**  
Set of states and actions that an application goes through the evaluation certification process.

**NREN VC Manager**  
NREN staff member that is responsible for videoconference services. S/he conducts the NREN certification process with the eduCONF team, and supports room managers with the Room Certification Procedure.

**Online Certification**  
A web widget embedded in real-time on a webpage whenever it is viewed. This “stamp” provides basic information about the status of the service certification such as: NREN Name, Date Certified, Service Status Level and Expiry Date.

**Ping**  
An administration utility that tests the reachability of a host on an IP network and measures the time needed for messages sent from the originating host to a destination computer.

**PTZ**  
Pan, Tilt, Zoom videoconferencing camera

**VC Room Manager**  
The Videoconference Room Manager is responsible for a videoconference room and applies the Room Certification Procedure.

**SIP**  
Session Initiation Protocol

**SNMP**  
Simple Network Management Protocol

**URI**  
Universal Resource Identifier is a generic address schema that can be used to identify terminals on a multi-domain network. These addresses have a similar format to email addresses: <extension number/name>@<gatekeeper address>.

**URL**  
Uniform Resource Locator

**VC**  
Videoconference

**VSCP**  
Videoconference Service Certification Procedures

**Web Widget**  
JavaScript-based web script that will render the Certification Status of a given NREN or Room. The web widget presents the current online status of a given Certification Workflow.