What is happening in the remote north?

NCDP Project manager
Mårten Fröjdö
TAMPERE Uni, Studio Manager
Matias Palo
Riksteatern, Producer
Ann-Cathrine Fröjdö-Brandt

Nordic Center for Digital Presence NCDP
Riksteatern is the national touring theatre of Sweden. RIKSTEATERN – an idea based cultural organisation with over 40 000 dedicated members that work together to make dance and performing arts available to all people, all over Sweden. Riksteatern arranges, promotes and delivers ca 70 productions/year to over 1 000 000 audience members.

**Present at NPAPW19**
Ann-Cathrine Fröjdö-Brandt, Producer, Stockholm
AnnaKarin Westberg, Sundsvall
Tampere University, the institution in charge of the research conducted within NCDP, is presently co-operating with Coventry University in the project ‘Telepresence in Performance Training and Performing Arts’ and planning collaboration with the games department of HINN – Høgskolen I Innlandet, Hamar/Lillehammer, Norway.

NÄTY, Faculty of Information Technology and Communication Sciences (ITC)
Tampere University.

Matias Palo
Studio Manager
NCDP is a continuation of Theater & New Technology. The main purpose of the platform is to provide know how, support and tech for members with interest in remote presence.

100+ members has so far signed up including National broadcasting companies in Finland and Sweden.

NCDP is administered by Nordunet, the University broadband provider. The Nordic core team meets bi-weekly.

For more info see www.ncdp.eu

Project manager
Mårten Fröjdö
A nordic platform responsible for developing a Nordic network for remote presence. Deploying new technology and methods and providing member institutions with know how and support.

Managing partner
Nordnet
Curriculum development
Stockholms Musikpedagogiska institut (SMI)

Initiators
Extended TNT network

Beneficiaries
Music education
Nordic municipal, regional and national educations

Performing arts
Private and public theaters in the north

Music industry
Private and public orchestras in the north

Research
Universities and educational institutions with focus on remote presence, technology, theatre and music education, broadcast

Media
Private production companies and public service

NGO
Community services

Tech suppliers
Netinsight
Audinate
Yamaha
Marshall

Operators
IP-Only
DNA
Elisa
Sunet
Funet
DelIC
RHnet
Uninett
Nordunet

Sharegarden Ab
R&D, production, assembly and support for deploying remote stations
Mediaunited, Artplant Analystica. SFH,
Nordic Center for Digital Presence NCDP
Testing and optimization
We have identified 3 formats
Format A. Music education, monitors 1 x 50-60” + 2 x 24”.
Format B. Conference or small ensembles, halfstage 3-5 m projection
Format C. Theater or concert halls, full stage 12-15 m projection

www.ncdp.eu
Student Emilia in Mariehamn
NET INSIGHT NIMBRA 680 MEDIA SWITCH ROUTER

**Number of slots:**
- 8 for traffic boards
- 2 for control modules
- 2 for switch planes
- 1 for alarm-aux interfaces
- 2 for redundant power modules

**Switch Capacity:**
- 80 + 80 Gbps (unicast), 45 + 45 Gbps (multicast) in redundant configuration

**Interface Modules:**
- OC-192/STM-64 Trunk
- 4 x OC-48/STM-16 Trunk
- 4 x OC-12/STM-4 Trunk
- 4 x OC-3/STM-1 Trunk
- 10 GE Trunk
- 6 x IP/Ethernet Trunk
- 8 x Gigabit Ethernet Access
- 8 x Video Access
- 8 x 3 Gbps Video Access
- JPEG2000 Video Access
- 8 x ASI/AES Access

**Synchronization:**
- Input: 2.048 or 1.544 MHz, G.703.13
- Output: 2.048 MHz, G.703.13
The Nimbra platform

Multiservice Offering and Infrastructure agnostic solution

Video
Data
Voice

Nimbra

IP/Ethernet
CWDM/DWDM
Dark Fiber
SDH/SONET Network
PDH/E3 Network
Radio Links

Any traffic over any network in one multiservice platform
# Routing

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<td><strong>How do you specify how to reach a destination?</strong></td>
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<td><strong>Address type</strong></td>
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![Routing Diagram](image-url)
## DTM addressing

**DTM**
- 64 bits (8 bytes)
- 2^{64} addresses
- Example: `01.AA.34.1A.23.1B.01.07`

**IPv4**
- 32 bits (4 bytes)
- 2^{32} addresses
- Examples:
  - `192.0.2.235`
  - `0xCo.0x00.0x02.0xEB`

**MAC-48**
- 48 bits (6 bytes)
- 2^{48} addresses
- Example: `00:0C:F1:56:98:AD`
- Organizationally Unique Identifier (OUI):
  - 00:0C:F1
  - Intel Corporation
Opera with Remote Live Orchestra

Setup Principles

- Conductor monitoring
- Orchestra sound (multichannel)
- Fibre connection ≥10 GBps
- Singers’ sound (headmics)
- Full stage monitoring

**Orchestra in home venue**

- Nimbra fibre interface
- Monitor mix
- Conductor’s camera
- Conductor’s view of remote stage

**Singers**

- Nimbra fibre interface
- FoH/Monitor mix
- Stage view camera
- Conductor monitors
Opera Extravaganza 2018
LAT 62 "THREE ROOMS" 2020
Join The remote north by signing up for NCDP info.

www.ncdp.eu

Nordic Center for Digital Presence NCDP