

The Baltic Health Network –  
an important step towards  
cross-border inter-operability

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# Expected results

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- Tools that facilitate the use of eHealth:
  - § Cross border eHealth infrastructure
  - § Guidelines on how to overcome barriers for eHealth
  - § Best practice examples



# Technical issues

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- Security
- Common standards
- IP-address structure
- DNS (Domain Name System)
- National differences in character sets



# The tasks were to:



- 
- Connect the three national networks and the two regional networks into one secure IP-based network.
  - Use the network for exchange of patient data in two clinical test cases.
  - Be able to connect at least 5 other external partners on request during the project period



# The Challenges

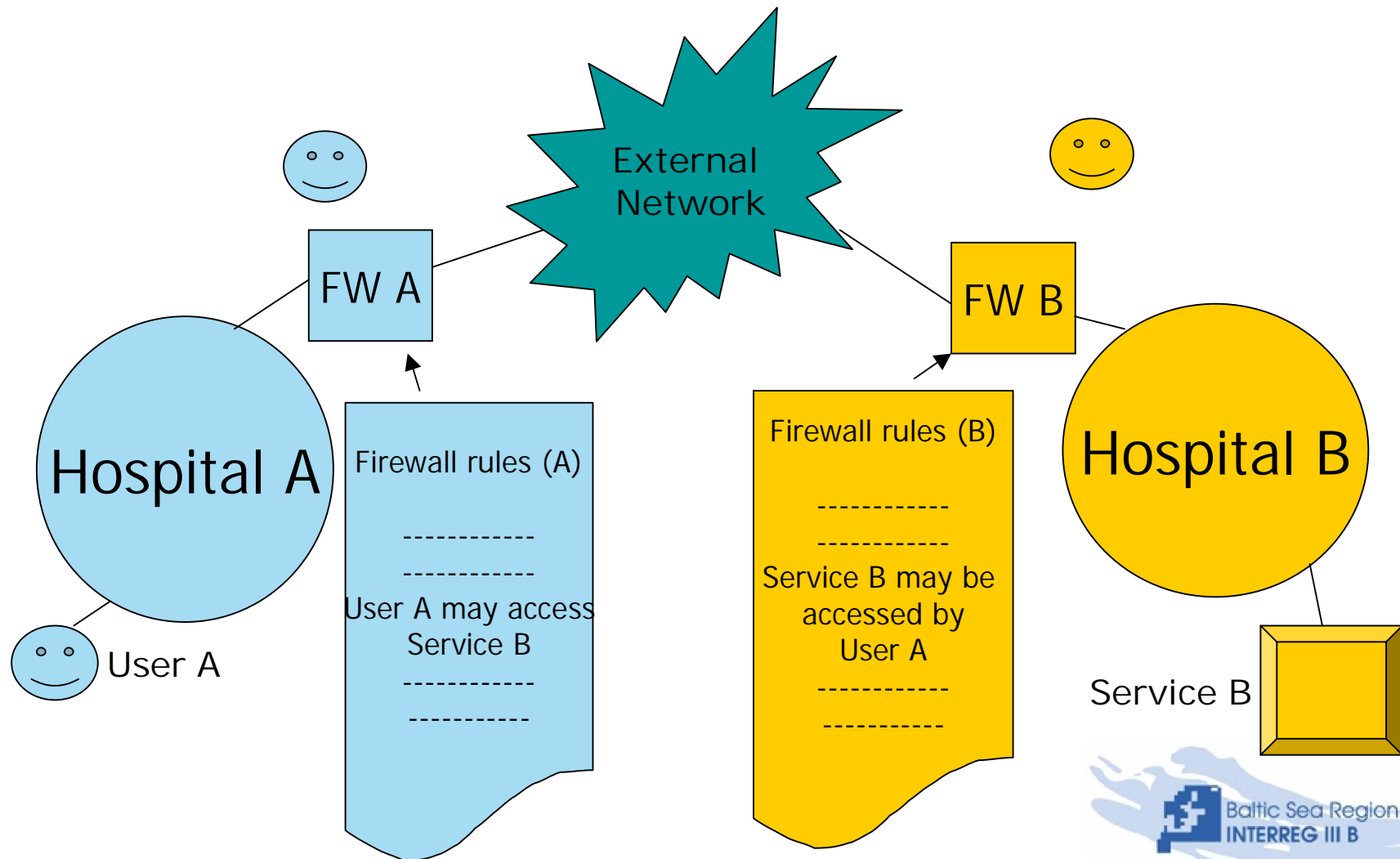
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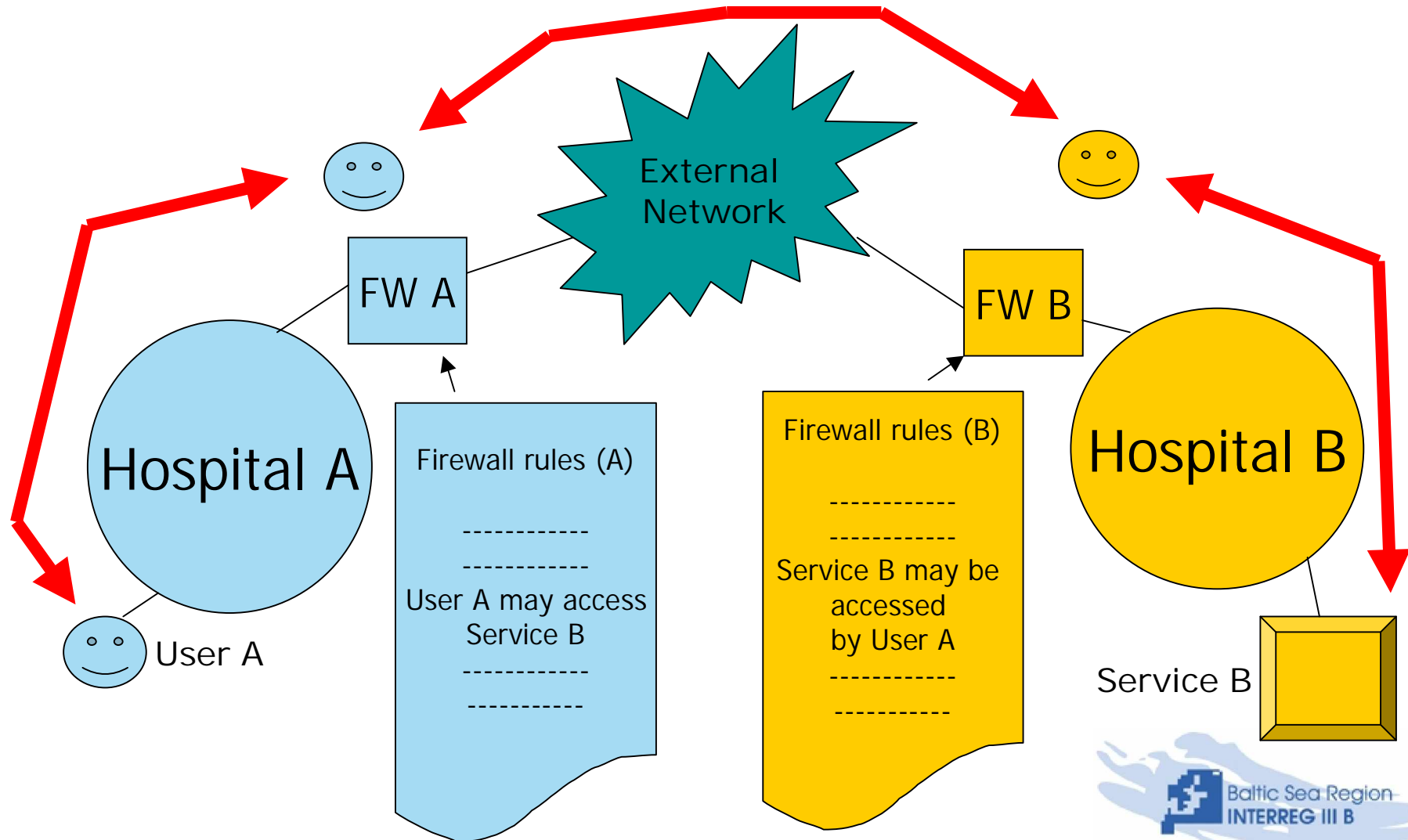
- Connecting three national health network with at about 200 hospitals (and at least 500 security responsible people)
- 2 + n other hospitals if needed
- Without jeopardizing the security of the individual network and hospital
- And at the same time minimize the administrative burden for the network and the people responsible for the security.



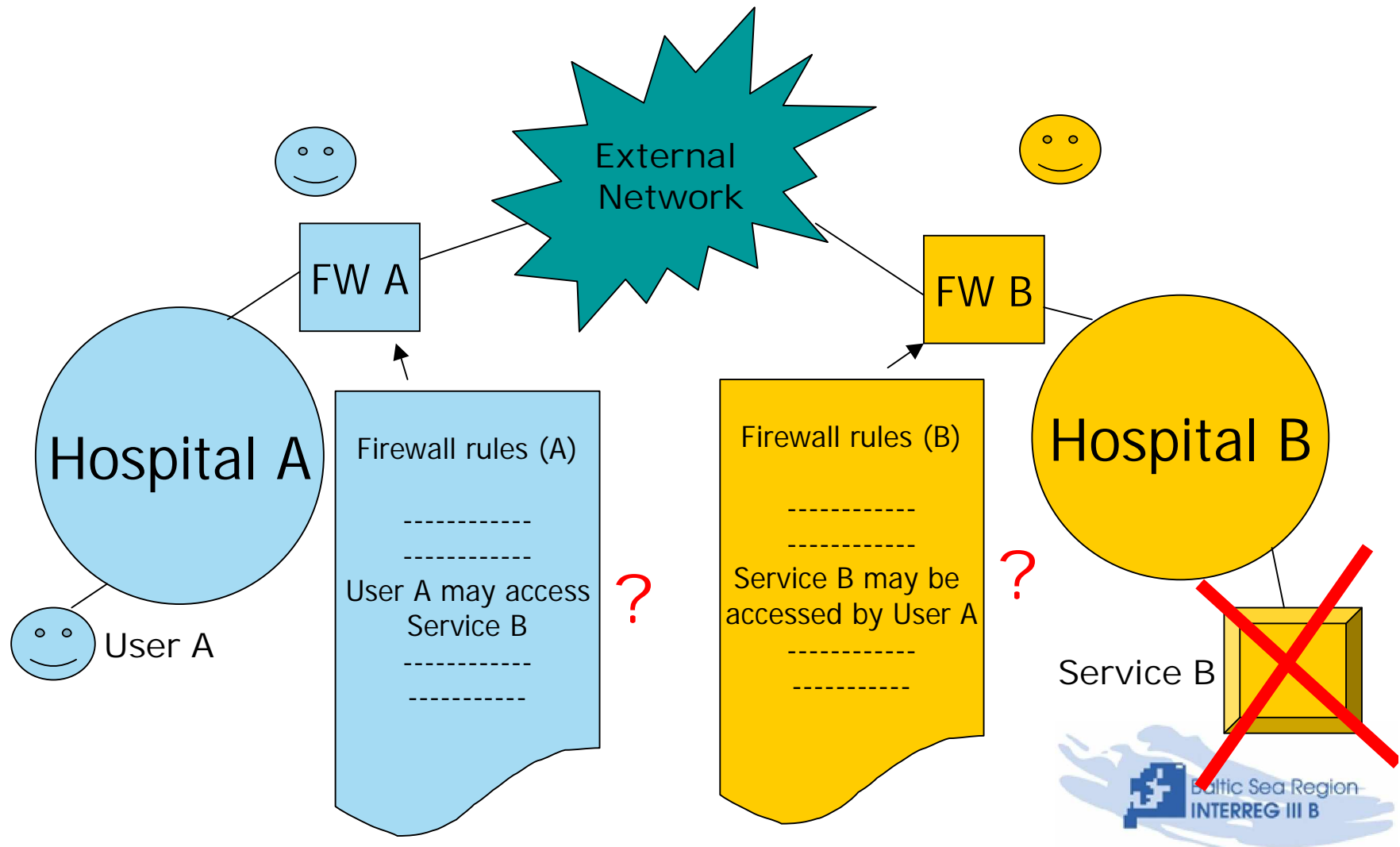
# The problem for anyone that wants to communicate



# Set-up of a new connection



# Expiration of a connection



# Manual administration



- No problem for a single example such as this
- But, if a national network contains 50 firewalls and just 10 common services are to be used across every unit, the total number of rules is 12,250
- Most firewall administrators can't say who is responsible for every rule

**Therefore: We need a system to keep track of all these connections**



# The Connection agreement system

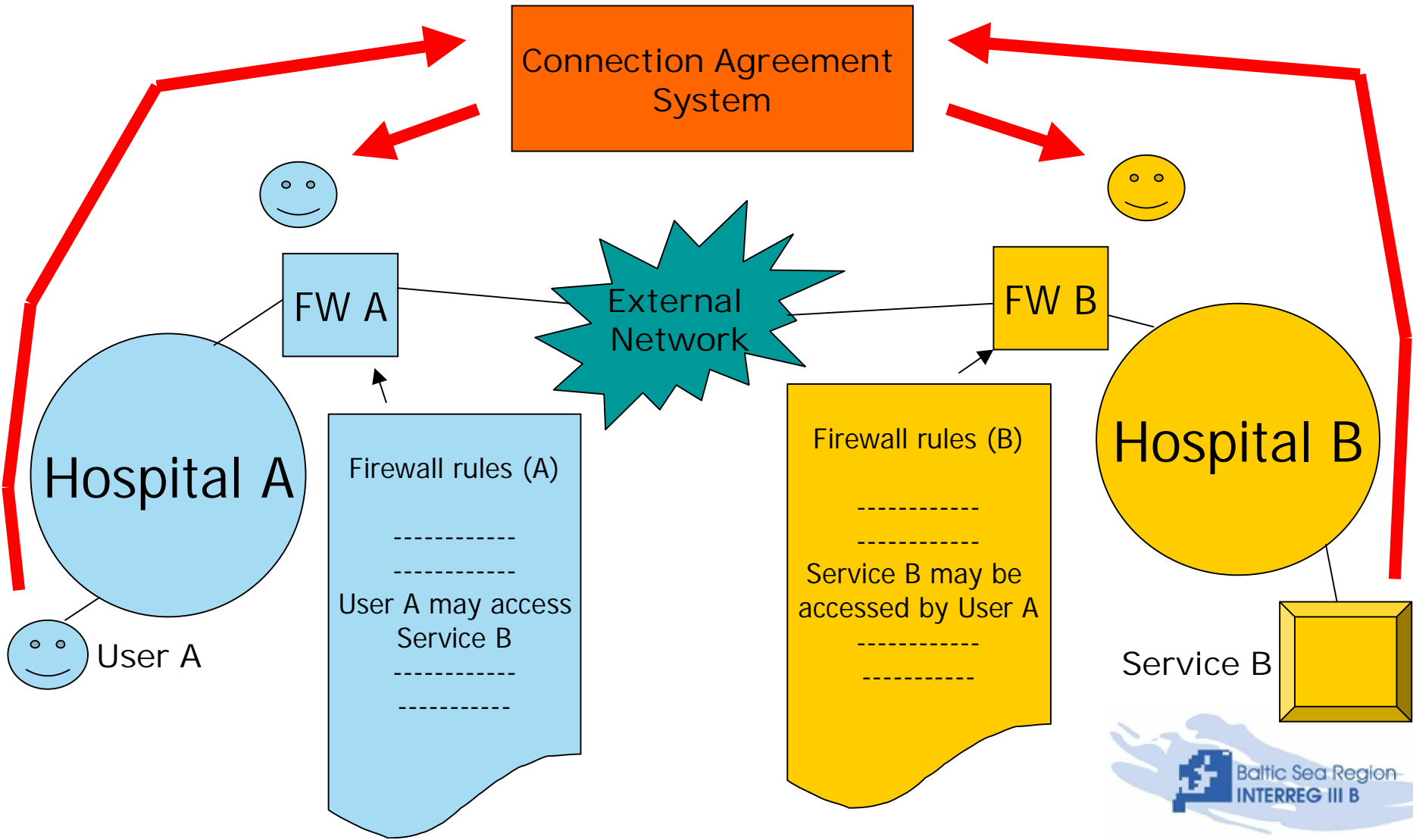
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- All groups of users and all services are put into the system by the users
- User A finds Service B in a large directory
- User A enters a request for a connection to system B
- Both User A and the administrator of Service B accepts the connection in the system
- The system generates rules which the firewall administrators put into their firewalls



# Using the Connection Agreement System



# The connection agreement system

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- Everybody can find the services they need – and each other
- Eliminates the need for administering a huge number of VPN tunnels
- Establishes documentation of who ordered what connection and how long it is supposed to exist
- Simplifies security administration
- Takes care of conflicts with private IP addresses
- A simple and inexpensive solution to a problem that is common to all nation-wide health care systems





Main menu - Mozilla Firefox

Filer Rediger Vis Gå til Bogmærker Funktioner Hjælp

← → ↻ ⓧ 🏠 <https://aftale.medcom.dk/valg.php>

## The Danish Health Data Network (HDN)

Logout

Welcome Martin Bech

You have 2 new agreements awaiting approval

### UNI-C administration

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- ▶ Add a site
- ▶ New external site
- ▶ Edit external site
- ▶ Edit a site



## The Danish Health Data Network (HDN)

Logout | Menu

### TESTLOKATION-aarhus new agreements

**agreement no: 20050906085541-590**

TESTLOKATION-Lyngby-video

Server:  
videostander.uni-c.medcom, 195.80.243.114, Alle-høje-porte

Contact:  
[TESTLOKATION-3 administrator](#)

Comment: UNI-C test regel - til videokonference test (H.323 mv)

TESTLOKATION-aarhus

Client:  
videotest, 195.80.243.70

Contact:  
[Lennart Sorth](#), tlf.: 35878889

TESTLOKATION-Lyngby-video has deleted the agreement

Delete agreement

Kommentar:

GO

15-03-2006 12:58:28: Lennart Sorth	Godkendt okidokey
2-11-2005 14:18:35: Anders Mundt Due	Godkendt Nogen i Århus må godt lige sige ok ;-)
21-11-2005 14:08:06: Martin Bech	Godkendt
22-03-2006 10:13:29: Lennart Sorth	Fortruidt
22-03-2006 15:26:47: Lennart Sorth	Fortruidt
31-10-2005 14:11:31: Anders Mundt Due	Godkendt
6-09-2005 08:55:53: Lennart Sorth	Aftale oprettet
6-09-2005 08:56:42: Lennart Sorth	Godkendt Lad os nu teste H.323 ml Lgb og Aarhus
6-09-2005 08:59:43: Lennart Sorth	Godkendt helt fint, den er jeg også med på :)

**agreement no: 20051007135219-639**

TESTLOKATION-Lyngby-video

Server:  
videostander.uni-c.medcom, 195.80.243.114, Polycom-VDO-KONF

Contact:  
[TESTLOKATION-3 administrator](#)

TESTLOKATION-Lyngby-video has deleted the agreement

Delete agreement

Kommentar:

TESTLOKATION-aarhus

Client:  
videotest, 195.80.243.70

Contact:  
[Lennart Sorth](#), tlf.: 35878889

15-03-2006 12:58:20: Lennart Sorth	Godkendt okidokey
22-03-2006 10:13:44: Lennart Sorth	Fortruidt
7-10-2005 13:52:29: Dan Mønster	Aftale oprettet

## The Danish Health Data Network (HDN)

Logout | Menu

### All agreements for H:S

Show agreements for a single site:   New timestamp:

		<input type="button" value="Not approved"/>	<input type="button" value="Approved"/>	<input type="button" value="Expired"/>		
Agreement No.	20030611154041-29	Expiration date: 0000-00-00	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	HTTP <input type="button" value="Update"/>
Server:	Århus Amt	NIP - Nationale Indikator Projekt	Lone Kærsvang	195.80.243.98	<input type="checkbox"/>	Delete
Client:	H:S	HSKlient	Johan Kjærgaard	195.80.242.33		
Agreement No.	20030925153731-69	Expiration date: 2008-09-25	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	SSH <input type="button" value="Update"/>
Server:	Sundheds Portalen, sundhed.dk	Sundhedsportalen TeamSite1	Ole Widriksen	195.80.245.1	<input type="checkbox"/>	Delete
Client:	H:S	H:S redaktion til (teamsite) sundhedsportalen Gorm Mandsberg		195.80.242.34		
Agreement No.	20030925160840-70	Expiration date: 2008-09-25	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	HTTP <input type="button" value="Update"/>
Server:	Sundheds Portalen, sundhed.dk	Sundhedsportalen TeamSite1	Ole Widriksen	195.80.245.1	<input type="checkbox"/>	Delete
Client:	H:S	H:S redaktion til (teamsite) sundhedsportalen Gorm Mandsberg		195.80.242.34		
Agreement No.	20030925160913-71	Expiration date: 2008-09-25	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	HTTP <input type="button" value="Update"/>
Server:	Sundheds Portalen, sundhed.dk	Sundhedsportalen TeamSite2	Ole Widriksen	195.80.245.2	<input type="checkbox"/>	Delete
Client:	H:S	H:S redaktion til (teamsite) sundhedsportalen Gorm Mandsberg		195.80.242.34		
Agreement No.	20030925161031-72	Expiration date: 2008-09-25	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	SSH <input type="button" value="Update"/>
Server:	Sundheds Portalen, sundhed.dk	Sundhedsportalen TeamSite2	Ole Widriksen	195.80.245.2	<input type="checkbox"/>	Delete
Client:	H:S	H:S redaktion til (teamsite) sundhedsportalen Gorm Mandsberg		195.80.242.34		
Agreement No.	20030925161315-73	Expiration date: 2008-09-25	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	HTTPS <input type="button" value="Update"/>
Server:	Københavns Praktiserende Lægers Laboratorium KPLL		Niels Hornum	195.80.243.75	<input type="checkbox"/>	Delete
Client:	H:S	HSKlient	Johan Kjærgaard	195.80.242.33		
Agreement No.	20031118092724-144	Expiration date: 2008-11-18	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	HTTP <input type="button" value="Update"/>
Server:	Sundheds Portalen, sundhed.dk	Sundhedsportalen WXC	Ole Widriksen	195.80.245.6	<input type="checkbox"/>	Delete

# Why is this a smart solution

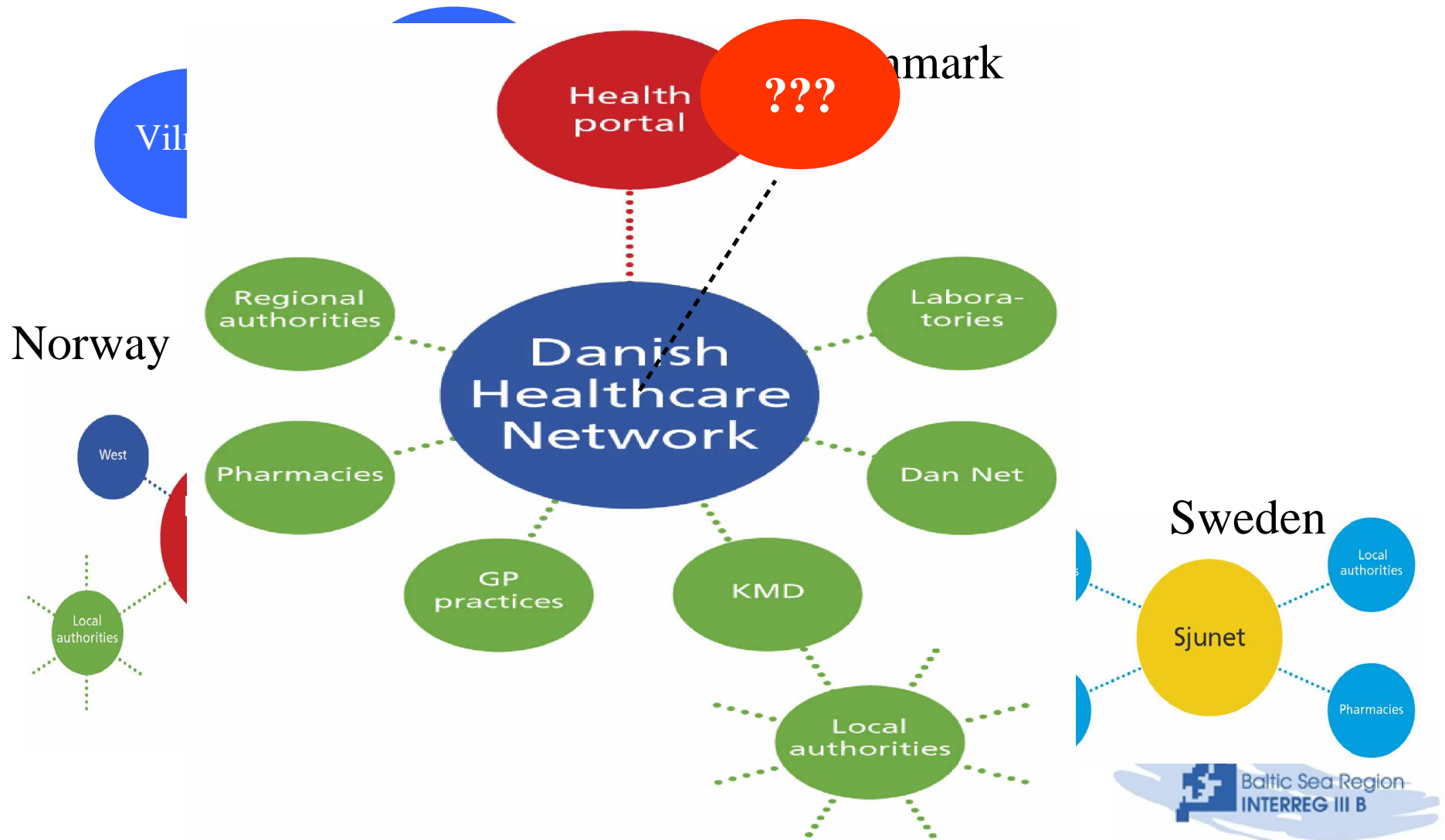
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- Creates a common security level and increases the total security
- The solution is very flexible, it is possible to connect all kinds of secure networks from a single GP surgery to whole regions. From 2 mb. ADSL to 1 Gb. fixed connections
- The network can be expanded when the need are there – you don't have to “boil the ocean”
- Cost efficient - the construction cost for Denmark was about € 350,000 and the annual running cost for DK is about € 400,000.



# eHealth Infrastructure



# And not forgetting.....

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- 在的下一個步驟乃是將整個的歐洲與的醫療記錄系統聯繫。
- 然後我們也將將所有美國與他的健康記錄系統聯繫。

(Claus - please translate accurately)

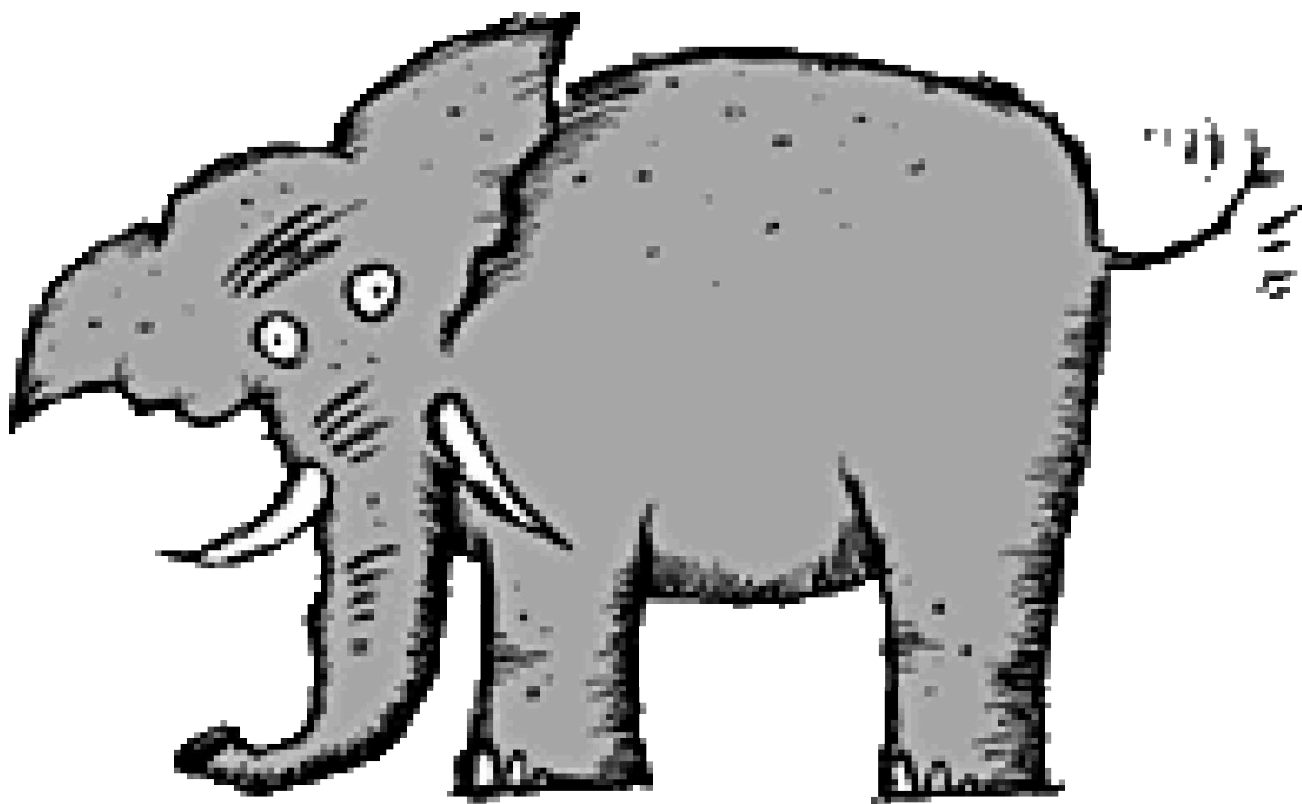


Creating the network is the same as  
when elephants are mating



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There is a lot of disturbance and noise –  
and you do not see the result until 22 months after..



# Surveillance and tools for errors solving

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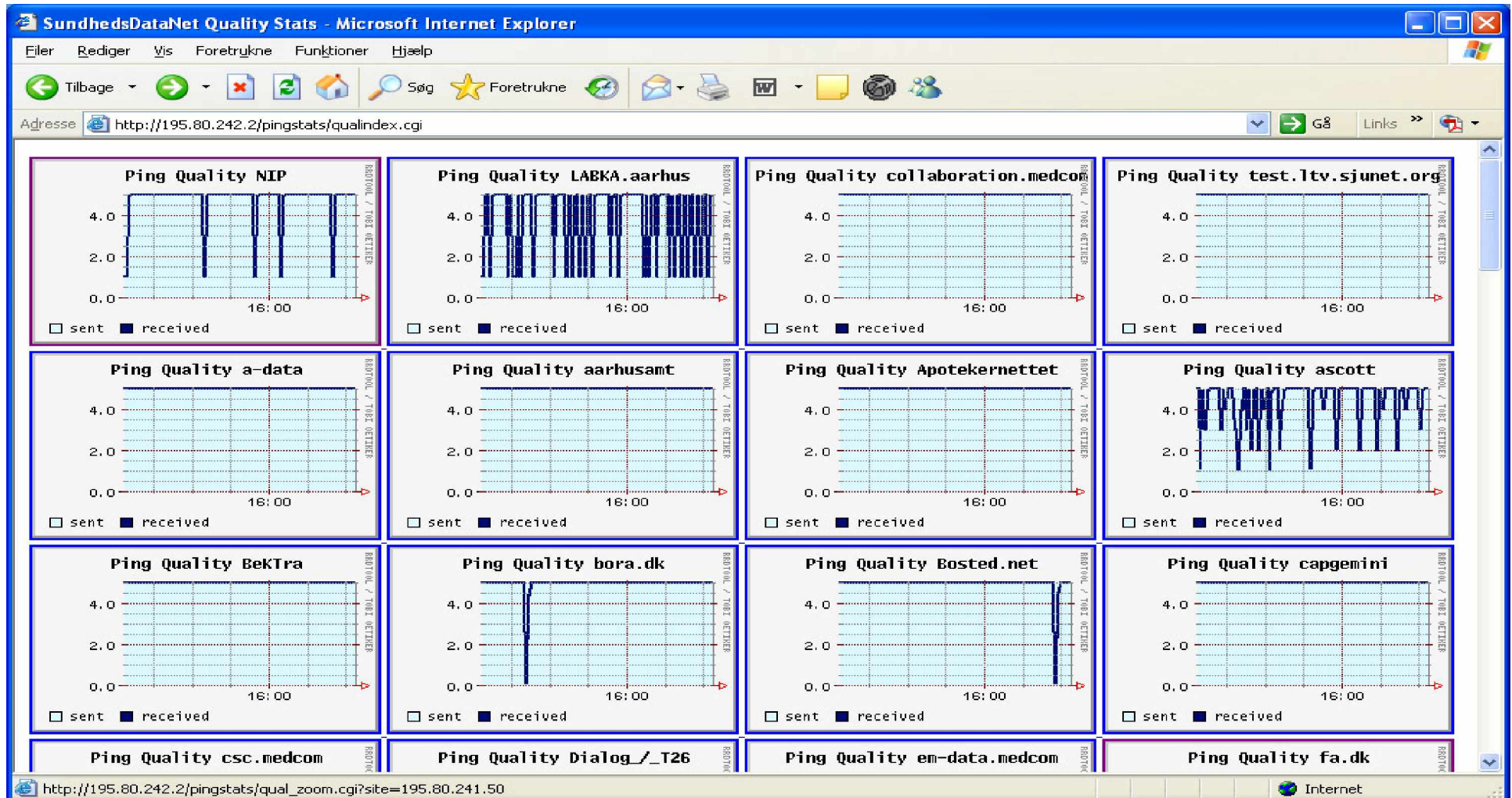


For each VPN tunnel it is possible to:

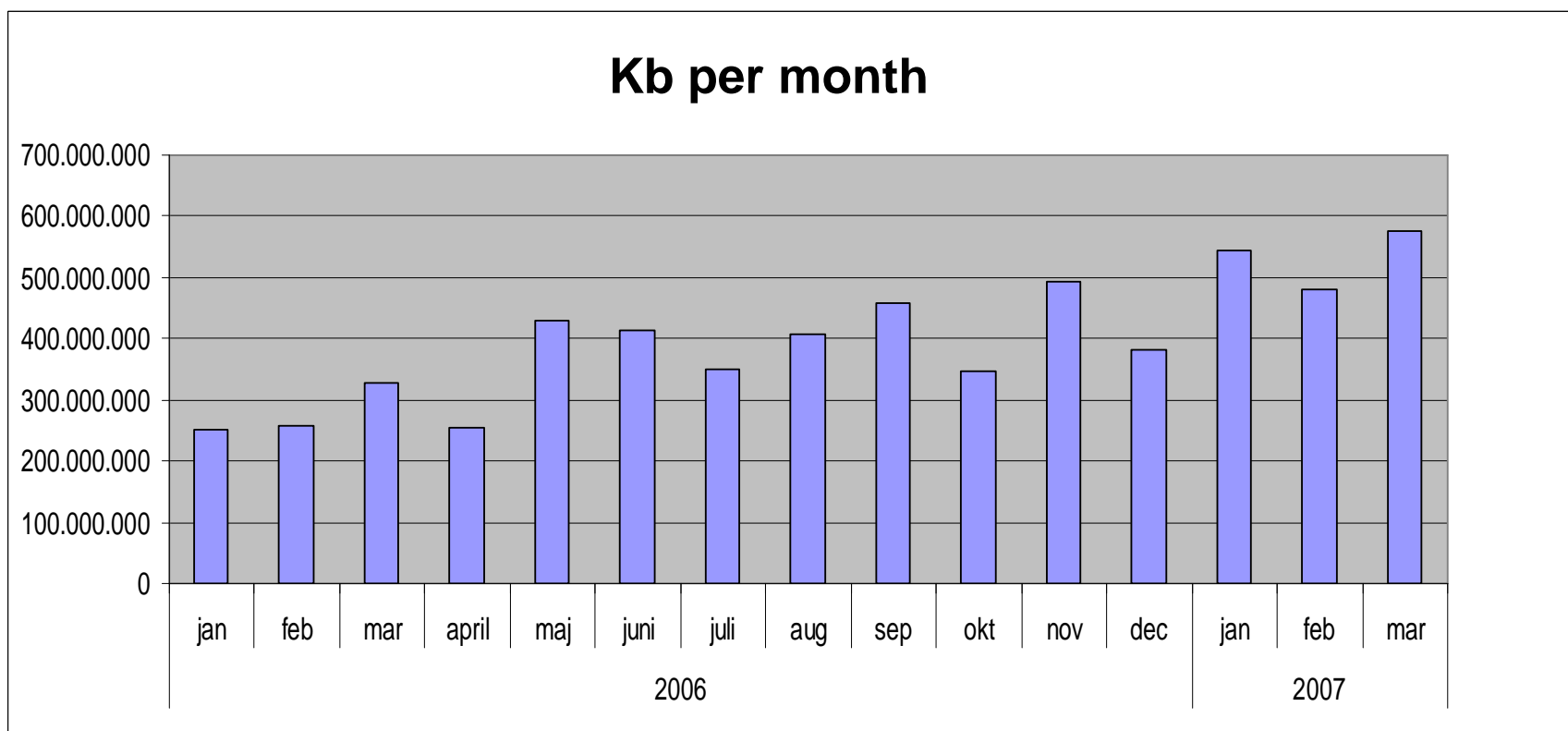
- Register (graphic) the ping-time
- Register (graphic) the ping-quality
- Traffic amount (graphic) per tunnel
- Traffic amount per service (flow data)
- Show your own IP-address
- Ping and trace route return
- Possibilities for iperf measurement of bandwidth
- Test of video conference quality to the central MCU



# Example of the tool for ping quality



# Traffic on the Baltic Health Network



# Documentation

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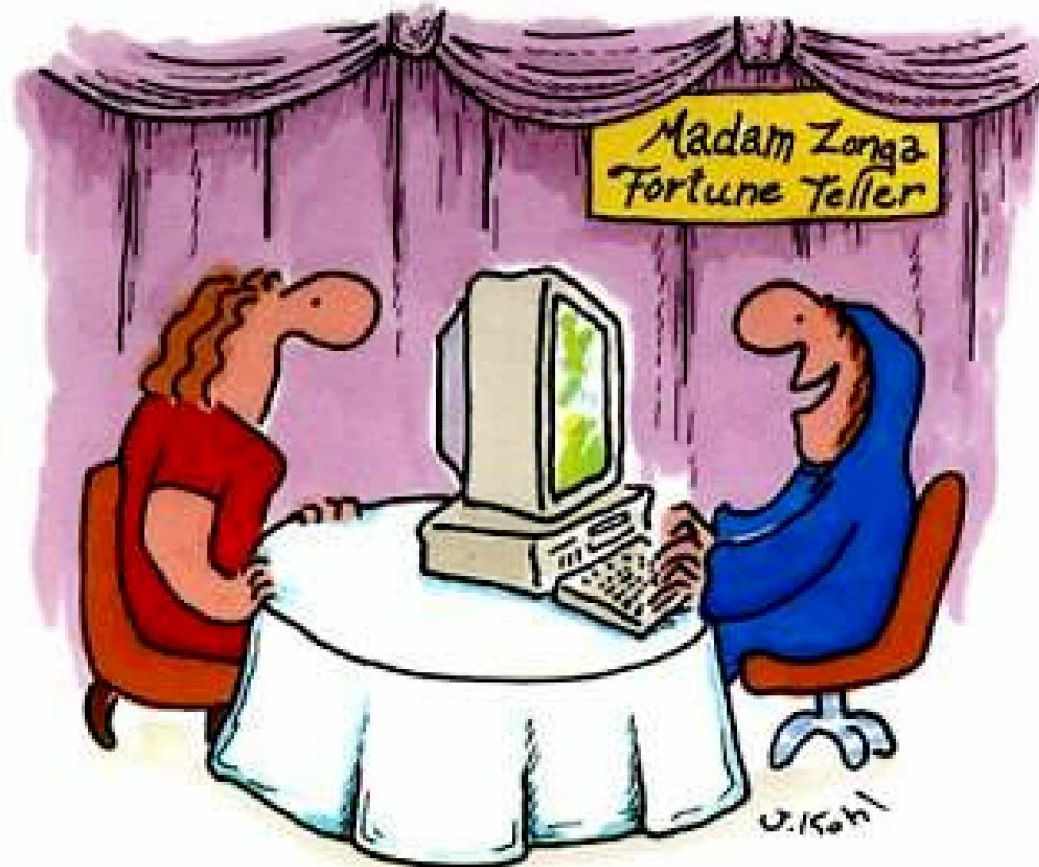


- **Technical information about the Baltic Health Network**
  - The Internet-based Health Data Network
  - Security and Responsibility Health Data Network
  - Agreement System for Health Data Network
  - Agreement Terms for connection to the node of the Health Data Network
  - Service Order Form for Health Data Network
- **At: [http://www.baltic-ehealth.org/Baltic\\_Health\\_Network.htm](http://www.baltic-ehealth.org/Baltic_Health_Network.htm)**



# Next step

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**"Nobody uses crystal balls anymore!"**

# HDN.eu



- The HDN.eu project proposes to introduce an effective way of establishing and administering secure network connections for medical research and healthcare nationally and internationally using the existing research eInfrastructures in Europe.
- The long term vision is that the whole of the European health care sector can benefit in a significant way by using this technology to communicate between the different actors in the health care sector without compromising the security and confidentiality of the sensitive personal data involved.
- 14 partners from 10 European countries
- More information on [www.hdn.eu](http://www.hdn.eu) or contact MedCom



Thank you for your attention

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