

15 YEARS OF BELNET
for higher education
and research

1993

2008

2008 Annual Report





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Pierre Bruyère
Director

FOREWORD

15 years of BELNET

Pierre Bruyère talks about the present, past and future of the organisation

In 2008, BELNET celebrated its 15th anniversary. A good moment both to take a look back and to gaze into the future, all the more so because BELNET finds itself at a pivotal point in its existence. Last year BELNET's own network became operational, from now on the organisation can concentrate more on the development of its service aspect.

With its new network, BELNET took its place amongst the world leaders. The network is extremely innovative, yet at the same time it has proved to be very reliable. The Belgian universities, colleges and research centres use it for research, communication and for grid computing, in which numerous computers pool their computing and storage capacity. Now that all its customers have migrated to the network, it is the beginning of a new period in which BELNET will strive to strengthen the position of Belgian higher education and research by offering leading-edge services over its network.

BANDWIDTH

For a long time, bandwidth was the bottleneck. That problem has now been resolved. The new BELNET network offers a basic bandwidth of 10 Gbps but, by using so-called lightpaths (point-to-point Ethernet), this capacity can be multiplied.

Customers can get up to 42 times the basic bandwidth. As well as large bandwidth, the new network offers many opportunities for better, faster research and promotes more international scientific cooperation. Institutions can thus be linked to one another directly, or set up their own separate network environments within the BELNET network. The network meets the ever-higher demands of customers for corporate security and safety. It seems that the BELNET network fully satisfies requirements in terms of technology as well as architecture. Every network infrastructure experiences regular challenges, for example when works in the road cut a cable. Last year it appeared that the new system overcame such incidents flawlessly and that our customers didn't experience a single problem.

HOMOGENISATION

BELNET is becoming more and more important to the education and research world for which it works. In 2008, for example, we worked on a joint initiative with the universities of Antwerp, Brussels, Gent and Leuven, and in collaboration with the Flemish Community and the Flemish Supercomputer Centre. Every university has made part of their computing power available to the physical entity of the supercomputer, we looked after the connections between the

It seems that the BELNET network fully satisfies requirements in terms of technology as well as architecture.

_____ entities. We also made an important contribution to the technological unification of higher education.

Prior to this, there was a clear technological gap between universities and most colleges. BELNET now gives everyone access to the same network with the same speed and capabilities. In 2008, we connected the last colleges in Wallonia and Brussels. By doing so, we reached 100% of our target. All higher education institutions now form a homogeneous community on the BELNET network.

BASED ON NEEDS

In order to satisfy the requirements of the Belgian educational and research community better, BELNET

runs regular satisfaction surveys. In 2008, a major user survey was set up to establish how customers envisaged the quality of our services evolving and to establish which services they viewed as the most important. The results will be published in 2009 and will form the basis of an action plan with items for improvement and for establishing priorities. By the end of 2009, we shall see whether this action plan has been implemented. This approach fits in with our strategic vision in which the customer is central to everything we do.

SERVICE

This vision has caused BELNET's attention to shift even more towards the service aspect. We have always focused on service, but this can now be accelerated because, for the next few years, the new BELNET network will be using fewer resources. In 2008, we already took new steps to improve our service level. We installed a new helpdesk which is available 24 hours a day. The new BELNET helpdesk was the result of customer demands. Before this, there was a helpdesk, but it was only accessible during office hours.

In the future
we will
concentrate
more on
safety and
security.

BELNET also wants to create added values in many other areas. We planned to launch a more comprehensive videoconferencing service. Researchers often work on the same project at different locations and therefore make great use of this service. BELNET already has a professional central solution through which more than two partners can take part in a videoconference, but we will now also be launching an online solution for working cooperatively via webcam between two locations. In the future, we will also concentrate more on safety and security. These are subjects which are not only close to the hearts of BELNET customers and end-users, but are also of real importance to BELNET itself, because it only takes one vulnerable computer at a customer to contaminate the entire network. A network like BELNET's, with its high capacity, is very attractive to malfeasants who want to launch large-scale

Our mission

- BELNET stimulates scientific development through innovative high-quality network infrastructures and associated services, to the benefit of Belgian higher education and research.
- BELNET accelerates the growth of the knowledge and information society thanks to the expertise it has built up, its unique position in the market and its economies of scale.

Our strategic objectives

- BELNET intends to meet the needs of educational and research institutions and their end-users as far as network infrastructures and services are concerned in an optimum manner.
 - BELNET intends to deliver innovative networks and applications which will adapt to future needs.
 - BELNET intends to be a strong, visible organisation accessible to all educational and research institutions.
 - BELNET intends to deploy its resources and staff in an effective way within an optimised organisation.
-

attacks. So we not only look after our own security, we make our customers aware of it and keep them alert.

Our expertise in security is nationally recognised. So in 2009, at the request of Fedict, the Federal Public Service for Information and Communication Technology, we will set up a Belgian CERT (Computer Emergency Response Team). This will enhance the safety of Belgian Internet users. We earned this trust because we had gained the necessary experience with our own BELNET CERT and because, in other areas such as extending the FedMAN network, we had already proved that we could set up and manage similar projects.

CHALLENGES

One of the great and enduring challenges facing BELNET lies in finding the right balance between technological innovation and meeting the customers' requirements. Commercial companies also want to satisfy the needs of their customers, but we take a different position because we emphatically want to stimulate innovation. The introduction of lightpath technology on the BELNET network is a good example. BELNET wants to promote the spread of this technology because it will make new, unimagined developments in education and research possible. As an organisation, we allow ourselves to be pushed by staff who come up with new solutions and by customers who have specific needs. The first remains extremely important, because this is how we justify our role as a pioneer. And what can look like an astounding novelty today may be the norm in a few years. BELNET started with this pioneering attitude fifteen years ago and it wants to continue in that role so that it can make its unique contribution to the development of the Belgian knowledge community. To achieve this, we will need more staff members in the future. In 2008, we already added a few new staff and in 2009 we will add another fifteen or so. They are necessary to satisfy the growing demands for service and support.

We started out fifteen years ago as a pioneer, and we want to continue to play that role.

2008

at a glance

- Migration of all customers to the new BELNET network
 - Pilot phase of the Flemish Supercomputer Centre
 - International TERENA Networking Conference in Bruges
 - Annual BELNET Networking Conference
 - All Belgian colleges and universities on the BELNET network
 - 24/7 BELNET helpdesk for customers
 - Increased Internet connection speed and research bandwidth
 - Large scale customer satisfaction survey
 - Vulnerability scanner for increased security on the network
-

THE DIFFERENCE COMPARED WITH 15 YEARS AGO

On a technological level the situation today is totally different. The technology, the sector, our own organisation have all changed radically. In fact one can hardly speak about evolution, rather a kind of revolution. Fifteen years ago in Belgium, there was still no Internet network, just a few isolated initiatives. The technologies were still in their infancy. We didn't yet have the kind of stable infrastructure which today forms the basis for further growth, and the speed was a mere 64 kbps. The liberalisation of the telecommunications market had yet to take place and the world of science and education looked very different.

Nevertheless there are still some constants. What was important 15 years ago is still as important today. We are always being driven by the needs of our target market, by a quest for quality and professionalism. We also always try to provide leading-edge services for education and research which cannot be found in the private sector. In 1993, shortly after we had started, this pioneering role was extremely important. One should not forget that, at the time, there was not one single company which offered an Internet service. That was one of the real reasons that BELNET was set up. With our new network, we have once more carried out pioneering work. It could be a sneak preview of what public broadband Internet will become in the future.

PIERRE BRUYÈRE

Director

TESTIMONIAL

AMBITION REALISED

“We always believed that BELNET would grow into what it is today. Even if in 1993 we had to build everything from the ground up. At that stage, BELNET was nothing more than an office with a couple of chairs in the computer section of the Science Policy department. Belgium was really lagging behind at the time, but this gave us the advantage of being able to base the BELNET network’s foundations on best cases from abroad. And the ambition that BELNET has today was already apparent then. In the initial period, we took responsibility for all technical aspects: designing the network, writing the specifications, scouting locations, implementation on site, etc. We also represented BELNET at international conferences. This was at a time when the Internet was primarily used for transferring large amounts of data. That was just the way it was, everyone took it for granted. The first commercial organisations had just started to offer services on the Internet and we were still trying to establish who would or would not use BELNET’s services.”

STEPHAN BIESBROECK (left in the photo) and **ERIC LUYTEN** who, along with current director, Pierre Bruyère, were present at the birth of BELNET in 1993.





Customers and users

CHAPTER I

Fifteen years ago, BELNET started out with 24 customers: universities, research centres or federal scientific institutions. The number grew and, by the end of 2008, had reached 188. All Belgian colleges and universities are now connected to the BELNET network. In addition, BELNET also works for federal, regional and local administrations and for the research divisions of private companies and international organisations.

INTERVIEW

A unique position in research, education and government administration

The Belgian institutions for higher education and research form BELNET's most prominent target group. "We have acquired a unique position in that segment," says **KOEN SCHELKENS**, head of Customer Service. "Our customers see us more as a trusted partner than as a supplier."

How does BELNET differ from a commercial Internet Services Provider?

"Our customers usually need a huge amount of bandwidth. Therefore they can't go to commercial companies where the tariffs are not affordable for non-profit organisations. Because we have no commercial obligations, we can fulfil their requirements at a relatively low price and, at the same time, give priority to corporate security and quality. We want to be more than just a supplier to our customers, we want to be seen by them as a trusted partner. In a commercial environment for example, certain details and knowledge are sometimes hidden from customers. BELNET does not do that. On the contrary, we are happy to share our knowledge and expertise in terms of network technology and security to bring our customers up to a higher professional level.

Our aim is ultimately a social one: BELNET wants to be one of the engines of innovation and knowledge development in Belgium. We increasingly represent

a large community of users in research and higher education."

What is the focus of the Customer Service department's policy?

"Naturally, our prime goal is customer satisfaction. More specifically, we strive to improve communications with our customers. We are trying to strengthen relations through maintaining greater personal contact. We also strive to provide our customers and end-users with tailor-made communications and documentation which are clear and appropriate. Faultless and efficient customer management is also part of good communication. Another aim is that communication is two-way. Our customers and important end-users must know that we will always listen to them, that we are happy to share our knowledge and expertise and that we will look for solutions with them. In 2008, two technical advisors joined our department to make that even more possible.

We are also looking for a product manager who can



KOEN SCHELKENS
Coordinator of the Customer Service department

streamline all the non-technical aspects of our service. The product manager will start in 2009 and, amongst other things, will ensure that the new services really are developed from a strong needs analysis.”

What was the most important development for Customer Service in the past year?

“Over the past year, we have become a fully-fledged customer department with a staff of 10. In order to improve the administration and follow-up of customer contacts, we introduced a CRM system at the beginning of 2008. We strengthened ties with our customers, set up a customer survey and got the whole of BELNET involved in the introduction of a model to increase customer satisfaction further.”

From a Customer Service perspective, how do you see BELNET evolving in the higher education and research sectors?

“We act more and more like a central service provider. This is increasingly expected of us. Our customers see us ever more as a one stop shop and so want us to provide their access line, for instance. In 2008, we carried out affordability research about that and, in 2009, BELNET will actually offer fixed lines. Many customers also want to entrust us with their basic ICT services, such as anti-virus and anti-spam services, mail management and storage,

so that their own ICT staff can concentrate more on applications and data management. And the rising demand for service level agreements and network and data security show the increasing professionalisation of our customers. Furthermore, through public private partnerships between universities or colleges and companies, we see an increase in the requirement for companies or temporary alliances to connect to the BELNET network. In 2009, we will try to respond to this demand. There is also increasing interest from the medical world for the corporate security and high bandwidth our network offers.”

What do you think has determined the success of BELNET?

“From the customer research we carried out last year, it appears that our customers found the combination of ‘low price – high bandwidth – high corporate security’ very attractive. Customers also see us as not just another commodity supplier. Our customers are very positive about us and this leads to a lot of word of mouth advertising.”

What are Customer Service’ plans for the future?

“We will make our service even more professional in several areas: customer communication, segmentation, price setting, user benefits, needs analysis, etc. We also want to manage our customers’ expectations better. In 2009, we will therefore publish a service levels description in which all our services will be described. In addition, we will continue to share our expertise and knowledge with our customers, and we want to improve and strengthen our contacts with them.”

“In 2008 a large scale customer satisfaction survey was carried out. An action plan was drawn up on the basis of the results. At the end of 2009 we will evaluate how well we have implemented the plan.”

“We are happy to share our knowledge and expertise in terms of network technology and security with our customers.”

1.1

EDUCATION AND RESEARCH

Since last year, BELNET has reached 100% of Belgian colleges and universities. In 2008, the last 8 colleges in Wallonia and Brussels were connected. Two research institutions also joined: the Inter-University Institute for High Energies (ULB-VUB) and the Flemish Supercomputer Centre. BELNET also connected private research centres and international organisations to its network. The federal scientific institutions are also BELNET customers.

1.2

ADMINISTRATIONS AND PUBLIC SERVICES

Federal, regional and local administrations are also amongst BELNET's customers. In 2008, three regional institutions joined the BELNET network: the Flemish Land Association, the Flemish Agency for Geographical Information, and Waterways and Sea Canals. The city of Kortrijk also became a BELNET customer, as did the Erasmus Hospital, the Imelda Hospital and the Antwerp Hospital Network.

1.3

BNIX CUSTOMERS

BELNET controls the Belgian Internet exchange, BNIX. This exchange facilitates rapid communications between the different networks of private Internet providers on the Belgian market. At the end of 2008, 44 organisations were connected to BNIX.

1.4

INCREASING BANDWIDTH, DECREASING TARIFFS

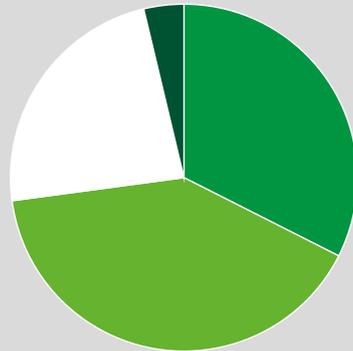
Over the past few years, BELNET customers have had ever more bandwidth at their disposal while tariffs have fallen. Almost half of BELNET's customers currently have a fibre optic connection with a bandwidth of 1 Gbps.

1.5

FINGER ON THE PULSE

BELNET maintains contact with its customer base in different ways. Customers are visited regularly by someone from our Customer Service department. In 2008, a new edition of the BELNET Networking Conference was organised for customers and end-users. BELNET also kept in contact with its customers through BELNET workshops and courses. In addition, BELNET regularly conducts surveys about its customers' satisfaction, needs and suggestions.

Number of institutions per customer group, end 2008



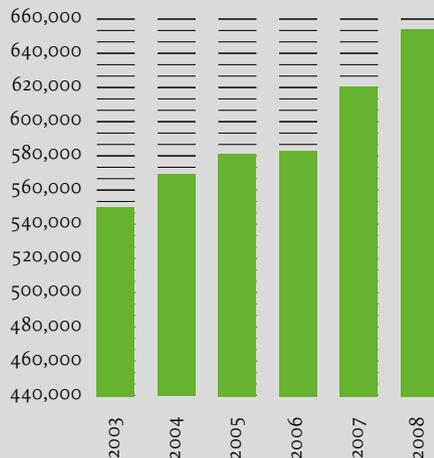
Research	61	32.45%
Higher education [including universities]	76	40.43%
Government and administrations	44	23.40%
Regional networks	7	3.72%
Total	188	100.00%

Growth in the number of customers and percentage growth over the previous year



2003	135	
2004	142	5.19%
2005	155	9.15%
2006	161	3.87%
2007	176	9.32%
2008	188	6.82%

Growth in the number of end-users and percentage growth over the previous year



2003	550,000	
2004	575,000	4.55%
2005	584,000	1.57%
2006	585,600	0.27%
2007	620,100	5.89%
2008	655,600	5.72%

188

customers

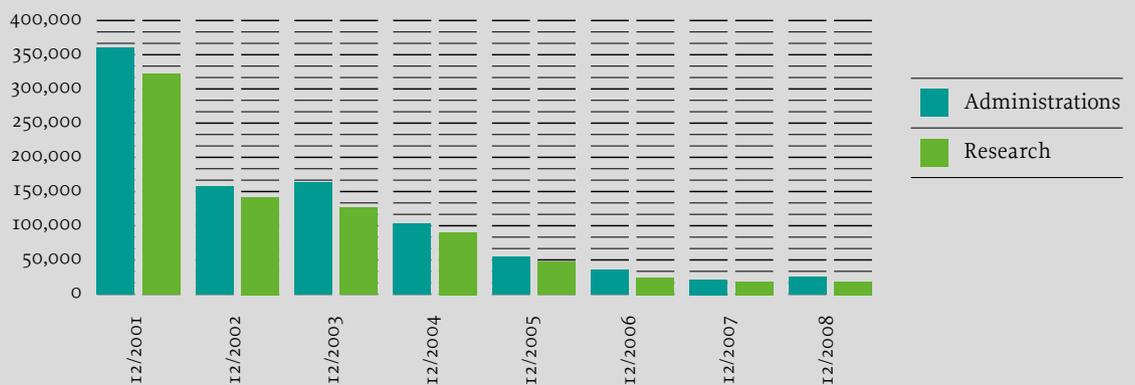
250

connections

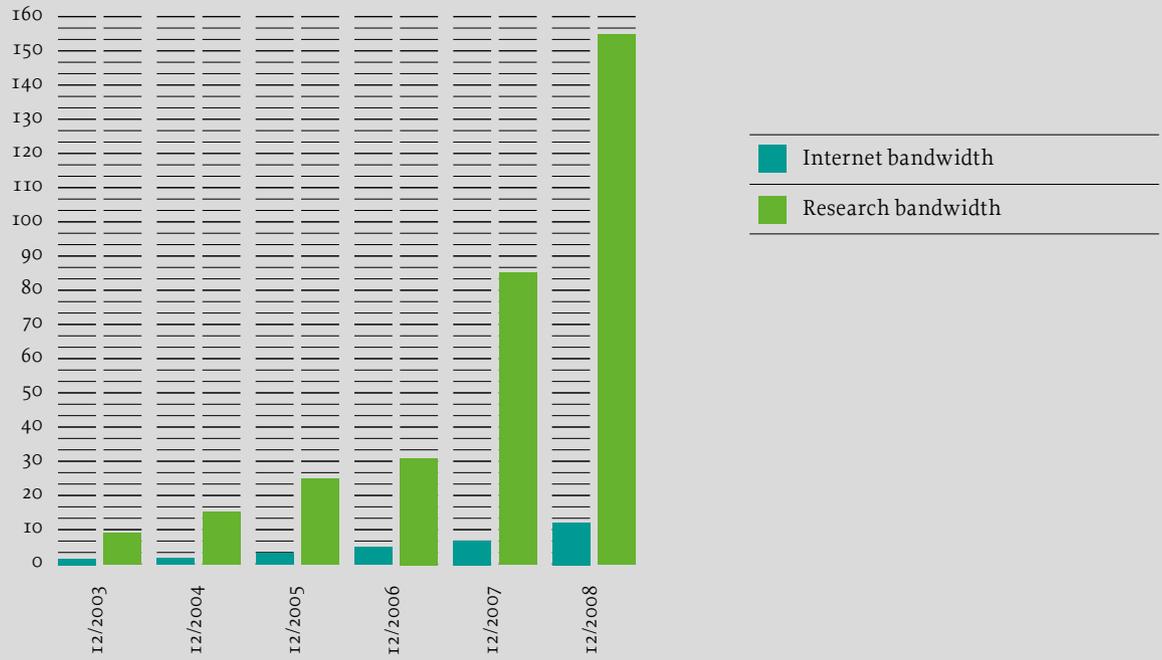
655,600

end-users

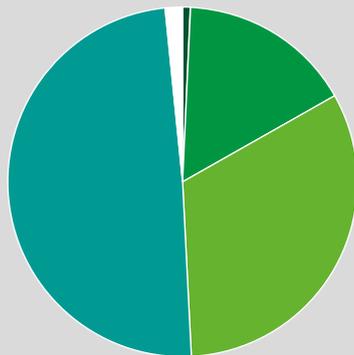
**Base price of a 100 Mbps connection in the period 2001-2008,
in euro per year (incl. VAT from 2007)**



Growth of BELNET customers' total access capacity, in Gbps



Split of connections by type and access capacity



	Number of active connections	Number of backup-connections	Mbps	% of the total
2 Mbps E1/SDSL	1	0	2	0.40 %
10 Mbps Ethernet	35	6	350	16.40 %
100 Mbps Fast Ethernet	71	10	7,100	32.40 %
1 Gbps Ethernet	108	15	108,000	49.20 %
10 Gbps Ethernet	4	0	40,000	1.60 %
Total	219	31	155,452	100 %

A GREAT ADVENTURE

“Even before the BELNET network was set up, we prepared the way with a number of people. At the time, computer networks in Belgium were extremely fragmented. In addition, there was a kind of ‘computer Holy War’ going on in the Belgian academic world between the supporters of two different networks, EARN and EUnet. They were not compatible and the supporters of each ‘clan’ stubbornly ignored one another. We were one of the few countries in Western Europe where the network naming structure didn’t end in the two letters referring to the country. In our case this became today’s well-known ‘.be’. Something had to happen.

The first, informal, meeting of the group of experts was an immediate bull’s-eye. We quickly came to an agreement about setting up a single new network, to which both existing networks would migrate. The working group, made up of academics and officials from the FPS Science Policy Office under the leadership of Pierre Bruyère, also decided to set up an ‘official’ experts working group which would determine the architecture and transmission capacity of the future network. I have wonderful memories of the meetings in which people from all the universities and from all the regions worked together in an extremely fruitful manner. It was a great adventure!”

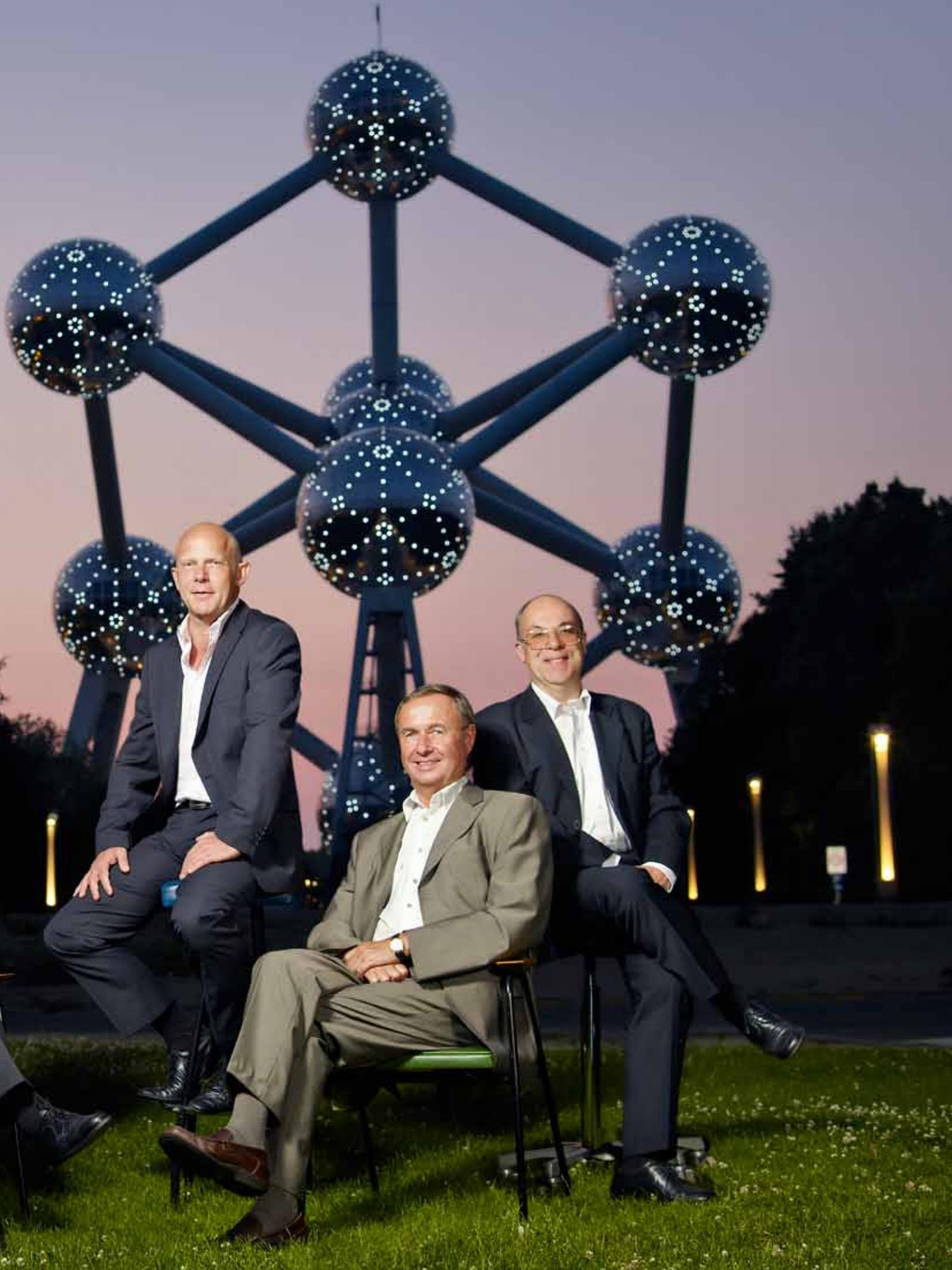
PHILIPPE VAN BASTELAER

Emeritus professor of F.U.N.D.P. (Facultés Universitaires Notre-Dame de la Paix) in Namur, responsible for the telecommunications and computer networks courses.

Members of the first ‘official’ experts working group. They laid the foundations of BELNET

PHILIPPE VAN BASTELAER ¹
 PAUL LAGASSE ²
 PAUL VAN BINST ³
 PIERRE BRUYÈRE ⁴
 RENÉ FLORIZOONE ⁵
 PIERRE-ARNOUL DE MARNEFFE ⁶
 PIET RYPENS (not in the photo)





Networks

CHAPTER 2

The first BELNET network dates from 1993. The first customers were connected with one another at a speed of 64 Kbps. Ever since then, the bandwidth has steadily increased. The basic bandwidth has now reached 10 Gbps. Over the years, BELNET has added two other networks to the BELNET network: BNIX, for Internet traffic between Belgian Internet providers and FedMAN for internal traffic between federal administrations as well as their Internet traffic.

INTERVIEW

A network which compares with the world's best

According to **DIRK HAEX**, head of the Networks department at BELNET, the BELNET network is one of the world's best. It is equipped with the latest technology and in the future it will get even better with the implementation of new services.

How has the BELNET network evolved over the past few years?

"The first network dated from 1993, when I was still at school. There were very few customers and PoPs (Points of Presence, local network access points) and only a handful of end-users. The Internet was still just something for geeks, more a kind of plaything. There were no great expectations at that point. The speed had reached a mere 64 kbps. In 1995, BELNET began to develop the BNIX network, to bring commercial providers' Internet traffic together. As a neutral party, BELNET was well-placed to do this.

From 2000, you could say that there was a real shift in expectations. The Internet was being actively used by a lot more people and the business models adapted accordingly. While earlier there had been no monitoring of the network, from 2000 the backbone of the BELNET network was monitored 24 hours a day. A redundant structure raised uptime. The network of the federal administrations had also evolved fundamentally.

Up until 2002, communications at the administrations ran via a tangle of separate networks. Internet access was slow and unstable. Whether we could improve it everywhere over a short period of time raised quite a lot of scepticism. But confidence grew and eventually we were appointed to set up FedMAN, a fast, redundant network that centralised access to the Internet. This was necessary in order to make the first e-government applications such as Tax-on-web possible.

In the interim, we have had FedMAN₂ since 2006, and have started on the business case for FedMAN₃."

How do you see technology evolving further?

"The new BELNET network which came into operation in 2008 took the evolution of more complex networks a step further. The end-user now expects the network to be 'always on' and expects us to think up ways of using it better. We now have three physically separate networks: BNIX, FedMAN and BELNET. It is possible that in the future we will build different networks on a uniform infrastructure through virtualisation."

What do educational and research institutions expect from a network? Isn't the current basic 10 Gbps bandwidth overkill?

“At home, the average end-user with a broadband connection already has a speed of 10 Mbps. So you have to offer at least the same performance at work. For institutions with many end-users, by definition you need a high flow rate. We work for specific target groups who use applications which sometimes require a lot of bandwidth. We also see that, through associations in higher education, there is a trend towards centralising services. For this you need an extremely powerful network on which you can create point-to-point connections. By doing so you can entirely separate the traffic between two points from the rest of the network traffic. One of our network's strengths is that we can create connections in two ways: on the IP layer (via MPLS) depending on requirements, or directly over the fibre optic network (via lightpaths). MPLS is a good solution, especially if there is a lack of resources for creating a fibre optic connection with a PoP.”

How do you see the needs and expectations of higher education and research evolving further?

“After the centralisation of ICT services, demand will continue to increase. In addition, customers will also expect a high quality, secure corporate infrastructure, but with yet more added value. In the context of research projects, there is also the need for cross-border cooperative working. For instance, the KMI (Koninklijk Meteorologisch Instituut - Royal Meteorological Institute) exchanges terabytes of information with Harvard University via BELNET, the European Géant2 research network and the American Internet2. We would also like to adapt more flexibly to new needs and be able to listen more. We would like to work in a more customer-oriented manner.”

To what do you attribute BELNET's success?

“The personnel are certainly responsible for a great deal of our success. BELNET works with competent, flexible and progressive staff. On top of that we get the resources we need from our stakeholders to realise our vision and mission.”



DIRK HAEX
Networks department coordinator.

“We want to devote even more attention to security and make our customers aware of security issues.”

What are the Network department's future plans?

“For the 2009/10 period, we have many plans. We are going to build a new BNIX network and are starting the preparatory work for FedMAN3. Currently, we have two data centres for the BELNET network, but there will be more. We also want to connect those customers who have no fibre optic connection to our network via a managed leased line. In the longer term, I see the BELNET network connecting even more customers and we will strengthen and improve our services further. Virtualisation also has a role to play. And the guarantees we give will become more important. Customers must know precisely what they can expect from us.”

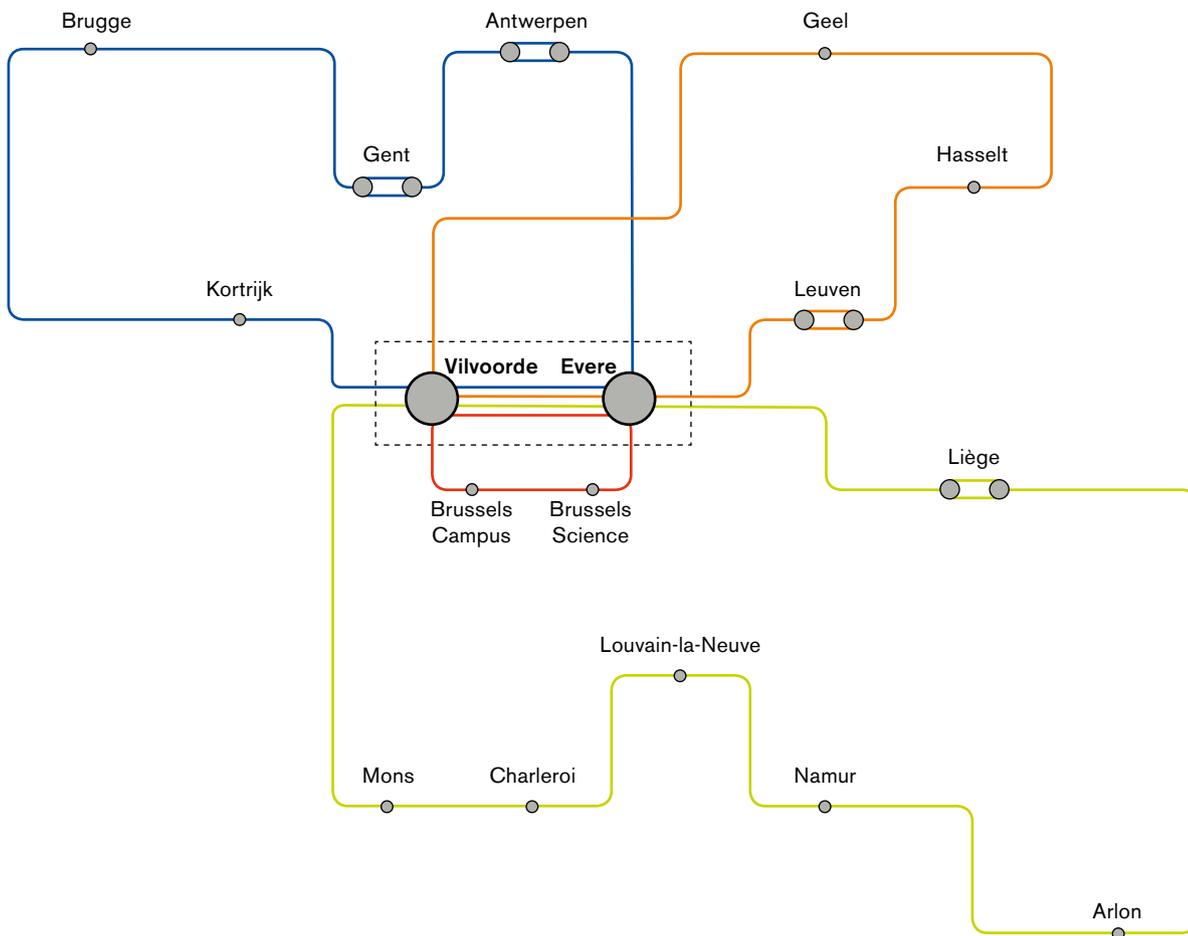
2.1

SUCCESSFUL MIGRATION

In 2008, all BELNET customers migrated to the hybrid BELNET network. This new network combines a traditional IP network with an optical layer. The traditional IP element is used for Internet traffic, the optical layer is used for 'lightpaths'. These are direct, secure optical connections, with a specific frequency or light colour, between two points on the network. With the help of its own optical equipment, BELNET can, in one single glass fibre, activate 42 lightpaths simultaneously, each with a capacity

of 10 Gbps. The network is further equipped with access routers with a capacity of 60 Gbps and central routers with an 800 Gbps capacity. The large BELNET data centres in Vilvoorde and Evere guarantee the security and corporate security of the network which consists of 1,651 kilometres of fibre optic cable, the majority of which was acquired through a cooperative agreement with the Flemish Community and the Walloon Region.

The new BELNET network



Data communication can be carried out via lightpaths over the new BELNET network. Lightpaths are direct optical connections between two points without the intervention of routers. High capacity, quality and reliability are the most important advantages.

2.2

INTERNATIONAL NETWORKS

All Belgian universities and colleges are directly connected via fibre optic cable to the BELNET network. The BELNET network thus forms an important technological foundation for national and regional collaboration in higher education and research. Furthermore, linking the BELNET network with international research institutions makes optimum international collaboration possible.

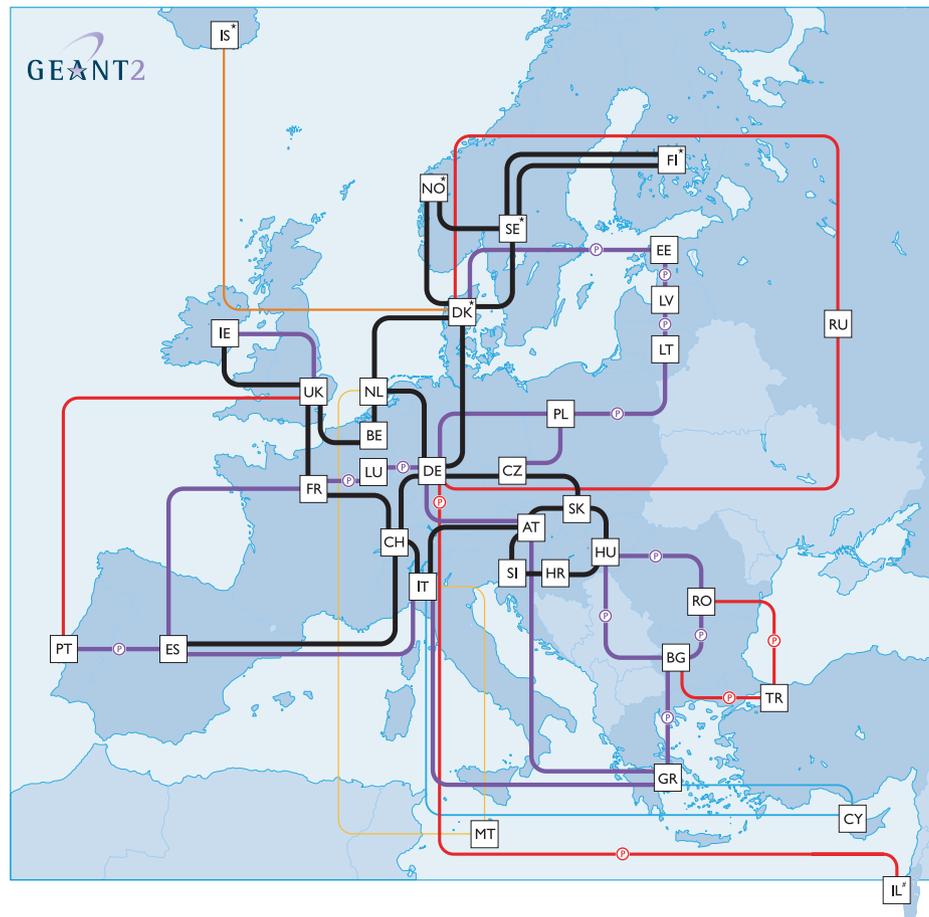
The BELNET network forms part of the Géant2 research network which connects academics and researchers from 34 European countries. In addition, users of the BELNET network have access to other research networks in other parts of the world, such as the American Internet2 network.

2.3

OTHER NETWORKS

On behalf of the federal government service Fedict, BELNET created the FedMAN network that connects federal administrations in Brussels with one another and with the Internet. It also manages BNIX, the Belgian Internet exchange to which 44 Internet providers are connected.

The Géant2 network



The new BELNET network is connected to large international research networks. Together they form the Géant2 network.

The core of the network comprises multiple 10 Gbps connections. These consist mainly of fibre optic connections.

21

network nodes

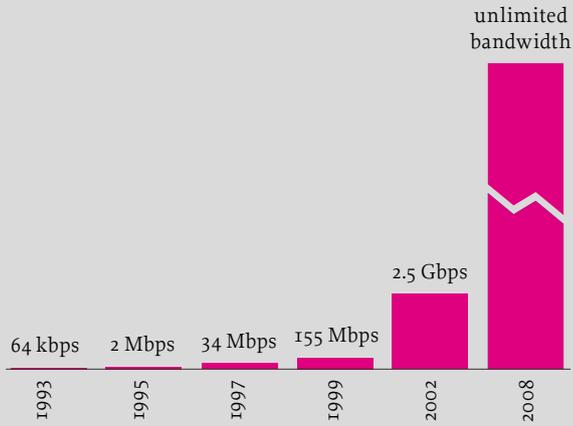
1,651 km

fibre optic cabling

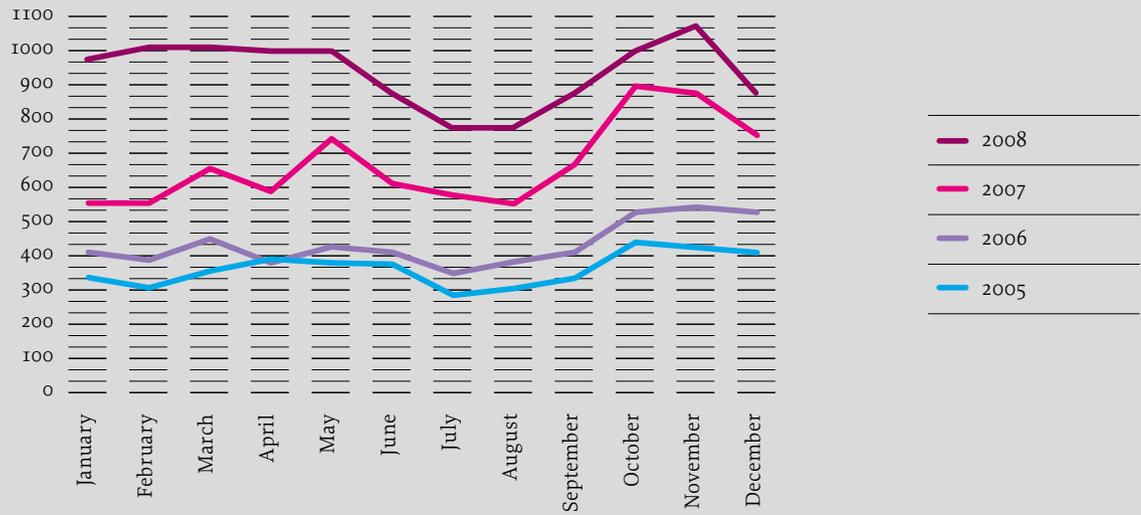
10 Gbps

basic bandwidth

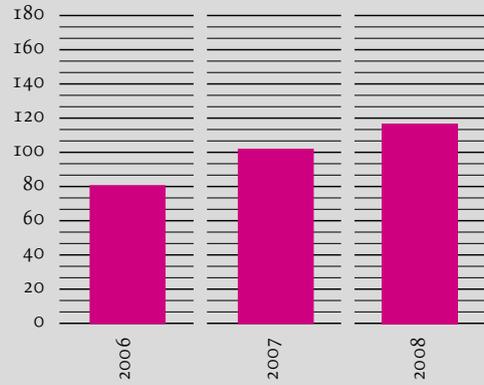
Growth of backbone bandwidth since 1993



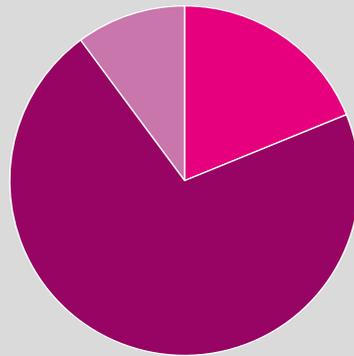
Growth of external traffic in terabytes (TB) per month



The FedMAN network - number of incidents

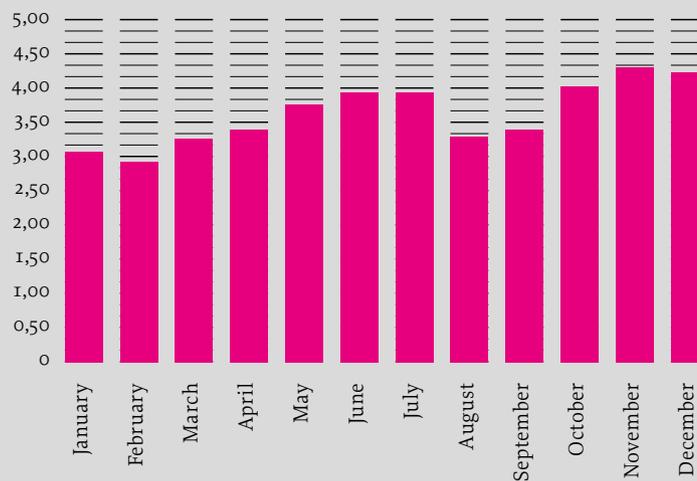


The BNIX network - number and types of connection



	2002	2003	2004	2005	2006	2007	2008
100 Mbps Fast Ethernet	47	44	38	32	21	20	13
1 Gbps Ethernet	13	20	28	33	41	44	49
10 Gbps Ethernet					1	5	7
Total number of connections	60	64	66	65	63	69	69
Customers			47	46	47	47	44

BNIX network volume in 2008, in petabytes (PB) per month



New BELNET network – trouble tickets in 2008

Type	May	June	July	August	September	October	November	December
S1	4	1	0	0	0	1	0	0
S2	55	33	33	10	33	35	14	5
S3	6	9	9	13	27	39	27	13
S4	3	3	3	0	7	19	3	0
Total	68	46	45	23	67	94	44	18

S1 Complete backbone failures. PoP out of service

S2 Reduced working (with an effect on service delivery)

S3 Problem with the redundancy, without effect on service delivery

S4 Information request



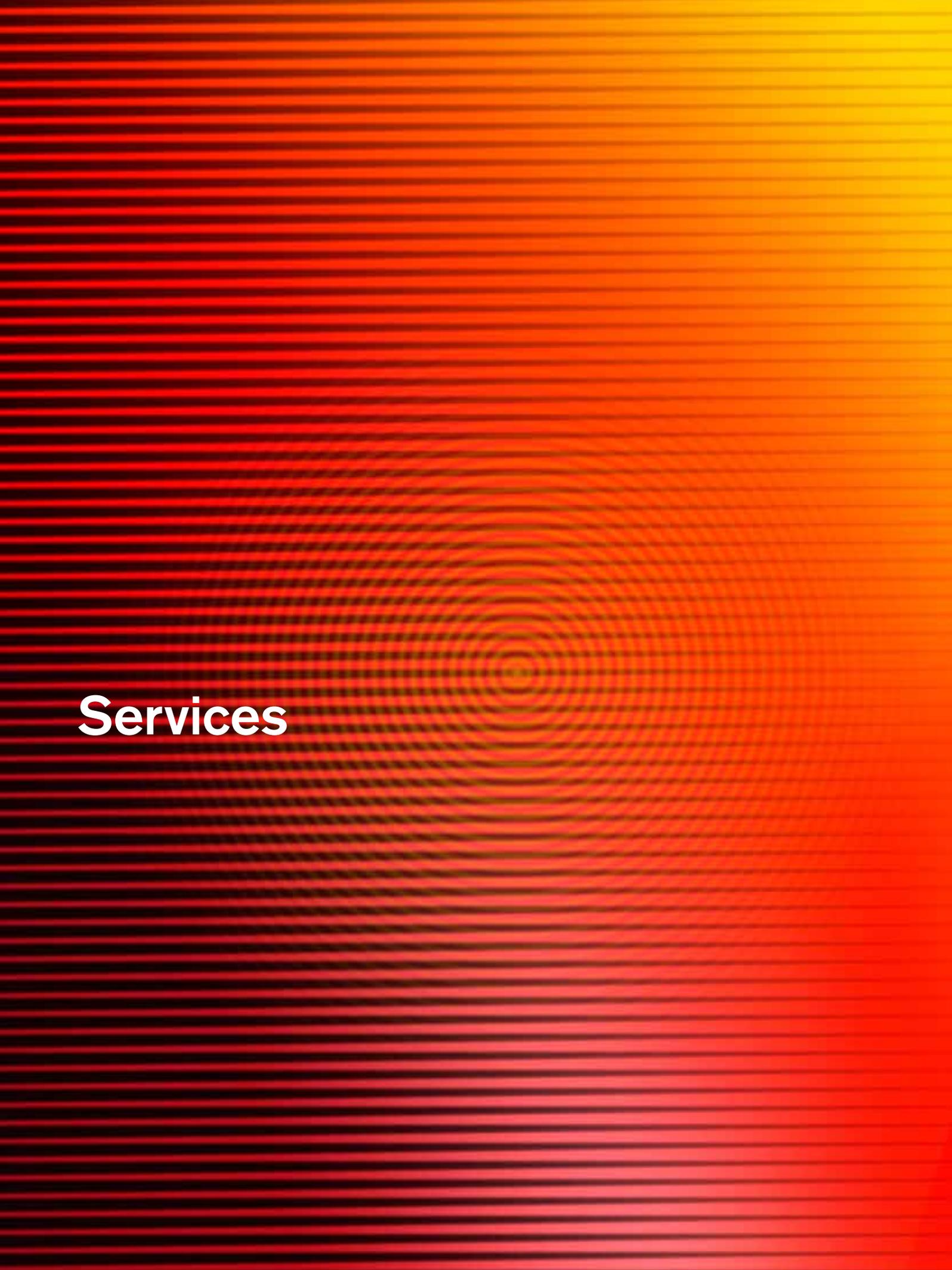


TESTIMONIAL

MAKING A MARK ON THE KNOWLEDGE SOCIETY

“Over the past fifteen years BELNET has become highly professional. In the beginning no-one really knew anything about the Internet. There was no operational control such as the proactive monitoring we know today. This approach means that we constantly review our performance and can thus avoid problems before they even arise. If a customer brings us a problem today, we immediately go about solving it. A great deal is possible thanks to great staff with the right commitment and experience. We should certainly be proud of our staff. Naturally, they get something back too, a unique environment which offers a great deal of satisfaction and responsibility. Our employees can work with real state-of-the-art equipment that you will not find anywhere else in Belgium. Or they can be involved with BNIX, the network which is vital to the Internet in Belgium. BELNET has also made its mark on the Belgian knowledge society in other ways. We built FedMAN for the federal government, the network which has speeded up and simplified e-government. On a European level we play a key role via our participation in organisations like Géant2 and Euro-IX. In 2008, we finally won the broadband battle, that was certainly a major milestone. Bandwidth on the new BELNET network is almost unlimited and offers a wide range of new possibilities. Another important factor is that we took complete control of our own BELNET network last year. We can now develop our own infrastructure further with complete autonomy, without having to depend on a commercial partner. In 2008, we started planning a Belgian CERT (Computer Emergency Response Team) that we will implement in 2009. This will increase security for individuals, companies and government alike and fill an important gap.”

JAN TORREELE has worked for BELNET since 1995 and is Technical Director.

The background features a vertical color gradient from red at the bottom to yellow at the top. In the center, there is a pattern of concentric circles that create a 3D effect, resembling a ripple in water or a lens flare. The circles are more densely packed in the center and become more widely spaced towards the edges.

Services

CHAPTER 3

Since 2003, BELNET has offered services such as native IPv6 and multicast over its network. In 2008, Quality of Service (QoS) was introduced, whereby customers could reserve bandwidth on the network for critical applications. BELNET also realised one of the main original objectives of the Impulse Information Technology programme. Since 2004, BELNET has offered effective supercomputer facilities via BEgrid. In 2008, BELNET contributed to the establishment of the Flemish Supercomputer Centre in collaboration with five Flemish academic associations.

INTERVIEW

More collaboration, more possibilities

BELNET has changed its focus from infrastructure to specific services for higher education and research. Such institutions often cannot rely on commercial companies for these services. “For example, there is great demand for huge computing and storage capacity,” says **LIONEL FERETTE** head of the Services department at BELNET.

Looking back over last year, what do you see as the most important trend for your department?

“The most important trend was strengthening our existing services. We began this by preparing for the migration of the services which had been split amongst our own sites to hired spaces in datacentres. As a result of this migration, we had to call on virtual infrastructures even more often in order to reduce our carbon footprint. In the long term, this means we will also be able to improve the availability of our services.”

Which services do the educational and research worlds need today?

“Because of mergers and associations, educational and research institutions use an increasing amount of shared resources. Services like Eduroam are thus essential for the mobility of students and researchers, but also for making applications that they use, such as library services, more widely available. As far as research is concerned, there is an ever-increasing necessity for huge computing power which can process gigantic amounts of data, for example for climatological research or for the start-up of the LHC (the CERN particle accelerator).

BEgrid offers researchers on similar projects the necessary bandwidth and computing capacity.”

Are you particularly pleased with a new service that you have set up or offered?

“It’s not really about one or another new service, but more about the growing use of a number of our services, SCS for example, the service whereby our customers can protect the connection between their system and end-users. Another successful project we set up was a virtual infrastructure for our own requirements, via which we could rationalise our hardware use and offer services which were far more powerful than before. I am also very proud of what CERT has achieved: showing the BELNET community as well as our colleagues abroad that it is a valuable partner.”

“We can concentrate on the quality of our services and supply our customers with what they want.”

How do you see needs evolving further?

“Universities and colleges must set up an even greater number of shared services, first nationally, then internationally. They need a supplier who can deliver basic services, such as e-mail and calendar applications, so that they don’t need to worry about these things themselves. They will also need services which enable them to work cooperatively within associations and academies. Similar services already exist: there is Eduroam for example, which gives students or researchers in other institutions wireless access to their own network. Video-conferencing is another example; we will be extending this service and developing it further into a fully-fledged cooperative environment in which users can not only speak to one another, but can also share documents or prepare presentations together. To accommodate all these requirements, we must naturally install the appropriate infrastructure, which we call ‘federations’.

“BELNET concentrates first and foremost on tasks to do with its core business or those which the private sector cannot take on.”

Can the current situation be compared with that of five, ten or fifteen years ago?

“In comparison with the past, our emphasis is now far more strongly on becoming more professional. Since the very beginning, BELNET has always offered its customers stable and high quality services, but today’s users rely far more heavily on our services than they did in the past to do their jobs. In the security field, the situation has totally changed in comparison with five or ten years ago. Every day, our CERT is challenged: the number of security incidents is on the rise and they occur even more often due to specialists who want to control as many machines as possible for their own benefit.”

BELNET looks after certain services and out-sources others. What are the criteria for this split?

“BELNET concentrates first and foremost on tasks to do with its core business or those which the private sector cannot take on. Such areas as Eduroam or BEgrid, for example, services specifically aimed at research. We outsource tasks which are less crucial for our customers, or which involve a large volume of work, supporting 650,000 end-users for example.”

To what do you attribute BELNET’s success?

“BELNET doesn’t have to seek short term profits, so we can concentrate on the quality of our services and supply our customers with what they want. However none of this would be possible without the dedication and commitment of our engineers, who make these services possible.”

What future plans does your department have?

“We must make our services stronger and more professional. That is why we are pursuing the migration to datacentres. We want to expand our team, but we are being hindered by the fact that good staff are hard to find: they must have profound technical knowledge and the broad vision to tackle problems, as well as being able to work meticulously. We remain committed to fulfilling our customers’ needs to the best of our ability. So in future you will doubtless hear more about videoconferencing, federations and security.”



LIONEL FERETTE
Coordinator of the Services department

3.1

EDUROAM

Eduroam (educational roaming) gives students, researchers and academics secure wireless connection to the Internet from institutions other than their own. Through BELNET's participation in TERENA (Trans-European Research and Education Networking Association), this service is not only available domestically, but also abroad. The service went live in 13 institutions in the 2008/9 academic year and 73,091 connections were made via this infrastructure.

www.eduroam.be

3.2

VIDEOCONFERENCING

Videoconferencing has taken on new importance due to the increasing levels of collaboration in education and research. BELNET has made equipment available for professional videoconferencing with more than two parties. In 2008, the videoconferencing service was used 332 times.

3.3

SERVER CERTIFICATE SERVICE (SCS)

Educational and research institutions want to offer their users secure services. This is why they make use of the BELNET Server Certificate Service (SCS). In 2008, this service delivered 776 official SSL (Secure Sockets Layer) certificates which ensure a secure connection to a website.

3.4

COMPUTER EMERGENCY RESPONSE TEAM (BELNET CERT)

Over the past few years, BELNET has gained extensive expertise as a centre for computer security. We safeguard the security of our network, send out security information and take part in international security initiatives. CERT fights spam, piracy, viruses, worms, phishing and other practices. In 2008, CERT sent 506 mail alerts and distributed 981 security advisories.

3.5

BEGRID

BEgrid makes grid computing possible. It is a technology whereby different computer processors are linked together to create huge computing capacity. In 2008, BEgrid consisted of 1,002 CPUs spread across 7 institutions, with a total storage capacity of 40 terabytes. BELNET delivered the requisite certificates to customers who wanted access to the grid. In 2008, we delivered 781 of these certificates. They also give access to the European DataGrid testbed for even higher capacity.

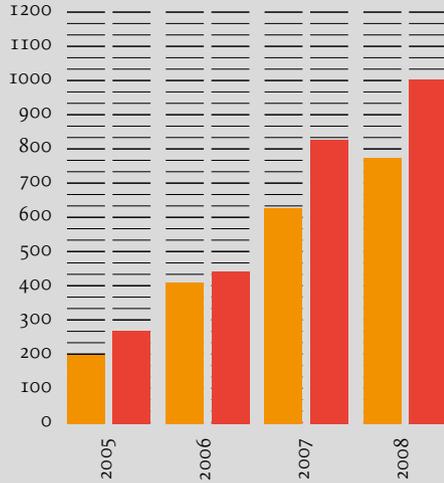
www.begrid.be

3.6

OTHER SERVICES

- IPv6
- Domain registration
- IP addressing
- Multicast (high quality audio and video streaming)
- ftp.belnet.be (software and documentation)

BEgrid – grid computing



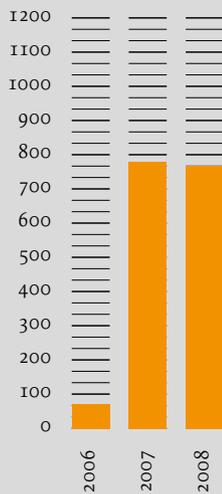
Number of certificates
Number of CPUs

BELNET CERT – mail alerts and security advisories

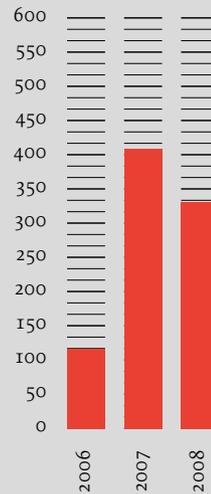


Number of mail alerts
Number of security advisories

Server Certificate Service - number of certificates delivered since starting in 2006



Videoconferencing – number of sessions



TESTIMONIAL

AN ABSOLUTE NECESSITY

“BELNET was set up thanks to the enthusiasm of a dozen or so IT specialists who were fascinated by their subject. At the end of the 1980s, people began to think about a worldwide web and were struck by the idea of an ‘information superhighway’. The Internet would soon become a reality. So it was the ideal time to set up major projects, especially as all the large telecommunications contracts were up for renewal. But the RTT (the Belgian national telegraph and telephone company) was in no hurry to do so, despite the fact that the research world was jumping up and down impatiently. Under pressure from the scientific sector, my administration was one of the first to declare, ‘We must be connected to the worldwide web.’ So one could say that BELNET was established as a result of the confluence of three factors. The first was that the Science Policy Office had long been involved in our country’s telecommunications problems, mainly in the area of transmission capacity. We were thus fully occupied with this question. Secondly, we were in permanent contact with the research community; we wanted to provide them with an efficient way to transmit computer data. And finally, we had strong links with the European institutions who had set up two large scale programmes, Esprit and Race. Amongst other things, I was a member of the scientific research community working group, created by the European Commission, and Pierre Bruyère was our representative in the Race working group, which was busy with large, high-speed networks. So in Belgium, the Science Policy Office was the obvious partner for the European Commission, but at the same time also a fully-fledged partner of the research community. Through this, we could accomplish our mission which consisted of encouraging scientific research, while helping to solve problems relating to data transmission.”

JACQUES WAUTREQUIN, Secretary General of the Federal Science Policy Office in 1993, when BELNET was founded





**Administration,
Finance & HR**

CHAPTER 4

BELNET started as an operational unit within the Federal Science Policy Office. In 2000, it became a state service with independent management. The new status offered more flexibility and made BELNET a professional organisation with responsibility for managing its own budget and personnel. Today, BELNET is again asking for its status to be adapted.

INTERVIEW

An atmosphere focused on professionalism, achievement and people

BELNET's activities and services have multiplied rapidly over the past few years. This has had an enormous impact on the management and administration, on the organisation and on its staff. **NATHALIE PINSART**, who leads the Administration, Finance and HR department, outlines the changes and challenges.

What are your department's strengths?

"My department has wide-ranging responsibilities: reception, bookkeeping, financial management, personnel recruitment, monitoring the regulation of public tenders, etc. One of the strong points of our team is its multi-faceted ability. Our commitment is constant and I think that the quality of our work has a lot to do with that. We offer services that are seen as essential and which are highly appreciated by the relevant parties.

We also try to strengthen our own resources. We invoice certain services and are aiming to increase our income through them in the short to medium term so that we can develop our mission further. We are also going to take on more staff for our Customer Service department so that we can extend our customer base. Finally, I have to mention that our department is staffed entirely by women, whereas the rest of BELNET

is very much a man's world. I see our feminine contribution, organisationally focused and with our feet on the ground, as an additional advantage."

BELNET has changed enormously over the past 15 years. Which factors have had an influence on your department?

"We have greatly increased the size of our department and the number of things we handle has grown substantially. Staff numbers have also grown. This has led to the development of a specific HR approach, adapted to an environment which is growing vigorously.

The structure and management of our organisation continues to evolve which means that we regularly have to re-examine working hours and responsibilities. At the moment we are at the first 'dematerialisation' stage of some large projects. We have to reduce paperwork to a minimum and boost efficiency. Another project, one close to my heart, involves

developing performance indicators for our staff. This performance indicator has become important because in the near future we want to recruit no fewer than 19 new staff, in other words, half the number again of our current staff.”

What do you think has made BELNET successful?

“We have a very dynamic management who can rely on a young, highly motivated team. Our staff are passionate and invest a lot in their work. They’re not afraid of putting extra hours into a project or taking work home with them. They all feel deeply involved and their motivation is rewarded because management has no hesitation in delegating.

Here, people learn quickly and are given a lot of responsibility. You can also see that absenteeism is very low at BELNET. In the outside world, BELNET enjoys an outstanding reputation. I think that this is explained by two factors: first and foremost there are some not inconsiderable resources with which people are entrusted. And then there are the results we achieve with those resources.”

In a certain sense, you are at the very heart of the organisation. How would you define BELNET’s company culture?

“If I had to sum it up in a few words, I would say that our company culture lies in the quest to find a balance between professionalism, performance-oriented work and giving priority to each individual person.”

Does this combination attract new staff?

“Absolutely, yes. We place great importance on the human aspect. Furthermore, it’s obvious that we are working in an environment which is technologically far advanced and which engages young people. We offer them the opportunity of regular training to keep pace. From a salary survey we conducted, it seems that we offer our young staff highly competitive salaries compared with the private sector, and that we also combine this with job security.

In a time of uncertainty, that last element is a strong point in BELNET’s favour. This is fortunate, because as a state service with independent management, recruitment is not always easy. In terms of management jobs and other specific profiles, state salaries are not always suitable. In an ideal world, we would change our status. In terms of staff salaries, we have had good news recently. A new law allows BELNET to offer different salaries to people in technical jobs. This is a major step forward, because without appro-

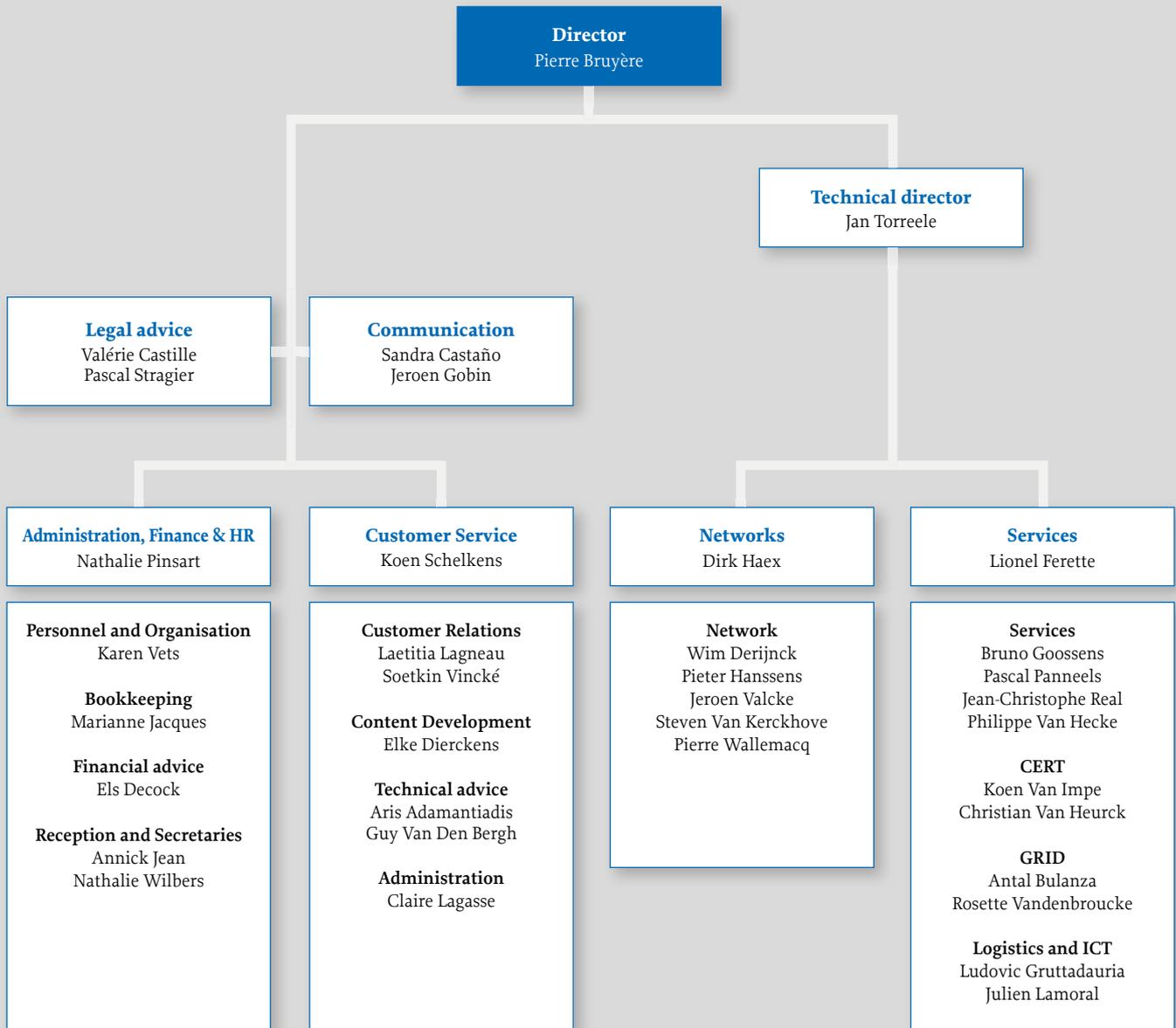
“We are very interested in the welfare of our individual staff, yet at the same time we need to focus on result-oriented and efficient working. At BELNET, we have found a good balance.”



NATHALIE PINSART
Administration, Finance and HR Coordinator

prate reward, we risk losing the competences that we have built up internally. We have had several occurrences when we have trained a young member of staff and seen them leave for the private sector three or four years later; this is also partly because BELNET has an outstanding reputation.”

THE ORGANIGRAM



THE MANAGEMENT COMMITTEE

CHAIRPERSON

DOMINIQUE FONTEYN, director general Research & Applications
FPS Science Policy ¹

VICE-CHAIRPERSON

PIERRE BRUYÈRE, director, BELNET ²

VOTING MEMBERS

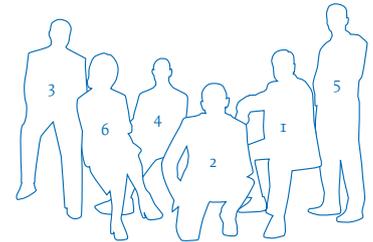
ROBERT VAN DE WALLE, general advisor, FPS Science Policy³
PAUL LAGASSE, professor at the University of Gent ⁴
YVES DELVAUX, director of operations & technology, A.S.T.R.I.D. ⁵
JOHAN VAN HELLEPUTTE, vice-president, IMEC
HENRI MALCORPS, director of the Royal Meteorological Institute
MARC ACHEROY, professor at the Royal Military School

MEMBERS WITH AN ADVISORY ROLE

MARIANNE JACQUES, accountant, BELNET
PAUL ANNICAERT, general inspector, FPS Finance

SECRETARIES

NATHALIE PINSART, Administration, Finance & HR, BELNET ⁶



4.1

DIRECTORS, MANAGEMENT COMMITTEE AND STAFF

BELNET is managed by its director Pierre Bruyère and by a management committee. Amongst other things, they monitor the management plan, the expansion, the investment plan, accounts, rates, public tenders and appointments. At the end of 2008, BELNET's operational workforce amounted to 33.04 full-time equivalents, an increase of 2.61 full-time equivalents compared with 2007. Staff are employed directly by BELNET (75%), by the Federal Science Policy Office (15%) or through outsourcing (10%). Most staff are employed at level A (26.33 full-time equivalents). Of all staff members, 35% are women and 65% men. Approximately 53% perform technical duties, the remaining 47% fulfil administrative, commercial or management roles. 60% of all staff are younger than 35 years old. The majority travel to work using public transport (82%). About half of the staff are regular teleworkers, another 29% are occasional teleworkers.

4.2

DOMESTIC AND FOREIGN PARTNERSHIPS

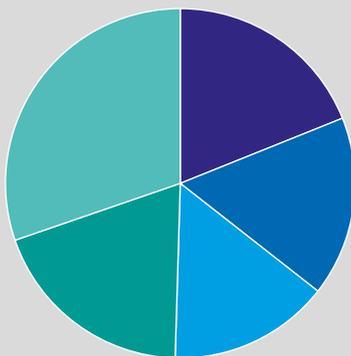
Together with many partners, BELNET is building a Belgian and worldwide knowledge community. Its national partners are: the Belgian universities, colleges and research centres; the Flemish government; the Walloon Region; Fedict, (the Federal Public Service for Information and Communication Technology); the Internet Service Providers Association (ISPA) of Belgium; and DNS Belgium, the central organisation for the registration of '.be' domain names. International partners are: the Géant2 international research network; the Trans-European Research and Education Networking Association TERENA and the European Internet Exchange Association Euro-IX.

36
staff

65 %
men

35 %
women

The average number of employees by department 2008, in full-time equivalents



	2006	2007	2008
Customer service	2.83	4.44	6.25
Administration, Finance & HR	3.90	4.51	5.50
Management & Staff	4.77	5.57	4.92
Networks	6.0	6.83	6.36
Services	7.2	9.08	10.00
Total	25.42	30.43	33.04

4.3

RESULTS

The budgetary result shows a credit balance of 262,369 euros, a difference of 916,756 euros compared with the bookkeeping result which shows a loss of 654,387 euros. This loss is explained by significant depreciation associated with a cumulative number of investments.

The operating and equipment grant (8,406,000 euros) increased in this financial year. The increase in the indexed annual grant in 2008 is due to the addition of an amount equal to the estimated costs of financing ScienceMAN. The Board of Directors of the Federal Science Policy Office decided to entrust the implementation of this project to BELNET, financed by a portion the Federal Scientific Institutions' annual grant which was transferred to the BELNET grant.

The reduction in services invoiced is mainly due to a decrease of 9% in the revenue from recurring activities (1,616,000 euros in 2008 compared with 1,811,000 euros in 2007). This decrease is due to the fact that BELNET absorbed its customers' VAT charges. When BELNET became liable for VAT at the end of 2007, the organisation decided not to increase its rates by 21%, but to keep them identical, including VAT. The second reason for the reduction is the large discount given to the Flemish and Walloon regions in return for the availability of their fibre optic networks. These decreases are partially offset by the increase in the number of customers and their desire for increased bandwidth.

The costs of services and diverse goods have risen, mainly as a result of one-off costs associated with organising the TERENA conference in 2008, but also because of the increased maintenance costs of the new network associated with the new Network Operations Center and helpdesks that BELNET started operating in 2008. These were partly compensated for by the decrease in the costs for fixed lines.

Personnel costs rose in comparison with the previous financial year due to salary indexing and the recruitment of a number of personnel in 2008.

The decrease in revenues in comparison with the previous financial year is mainly due to the lower average investment level during the 2008 financial year, as a result of devoting notable resources to the large investments made in 2007 and early 2008.

4.4

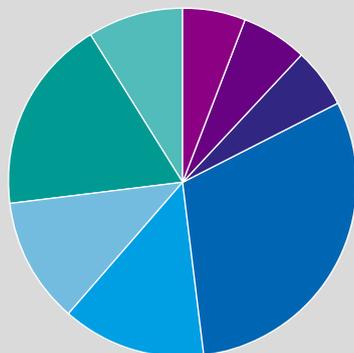
BALANCE

The investments made during the 2008 financial year (euro 2,249,000), mainly involved the equipment (euro 1,977,000) required for the further implementation of the new BELNET network and the purchase of Opentrust PKI software for managing security certificates (euro 131,000). Depreciation in the accounts for the 2008 financial year amounted to euro 3,981,000 at an annual depreciation rate of 25% for the computer infrastructure, 20% for mobile material and 10% for the remaining capital goods.

The greatest amount receivable over the year was a payment of euro 283,000 from the VAT authorities. This amount mainly consisted of VAT recovered from incoming invoices received during the last trimester.

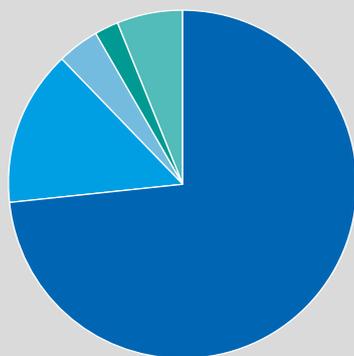
The external debts due in no more than one year subject and not subject to the accounting system show a strong decline, due to the large invoices received at the end of the 2007 financial year for investment in the new BELNET research network and its maintenance.

Excerpts from the budgetary account: expenditure in thousands of euros



	2007	2008
National lines	1,135	684
European lines	1,283	684
Commercial Internet	457	614
Maintenance of network equipment and services	1,866	3,432
Overheads	1,070	1,492
Salaries	978	1,285
Other investments	9,603	2,035
FedMAN2 project [including investment]	1,117	977
Total	17,509	11,203

Excerpts from the budgetary account: income in thousands of euros



	2007	2008
Grants	7,973	8,406
Services invoiced	1,782	1,654
FedMAN2 project	0	457
Interest	508	244
Deductions towards provisions and transfer of receipts	1,117	695
Total	11,380	11,456

Balance sheet, in euros

ASSETS	2007 FINANCIAL YEAR	2008 FINANCIAL YEAR
Tangible fixed assets	8,074,900	6,874,306
External receivables due in no more than one year, not subject to accounting system	2,491,152	336,527
External receivables due in no more than one year, subject to accounting system	114,388	46,424
Share certificates and treasury certificates	10,443,000	6,193,000
Bank and giro accounts – cash in hand and stamps	314,807	3,575,198
Transitory assets and unallocated amounts	6,095,530	1,021,626
Total assets	27,533,777	18,047,081
LIABILITIES	2007 FINANCIAL YEAR	2008 FINANCIAL YEAR
Net assets or Own assets or Net liabilities	16,751,358	16,618,999
External debts due in no more than one year, not subject to accounting system	9,227,164	638,481
External debts due in no more than one year, subject to accounting system	172,754	124,226
Transitory liabilities and unallocated amounts	1,382,501	665,375
Total liabilities	27,533,777	18,047,081

Profit and loss account, in euros

EXPENDITURE	2007 FINANCIAL YEAR	2008 FINANCIAL YEAR
Other use of consumer goods and external services	5,963,924	6,983,534
Increased property and diverse taxes	10,301	13,188
Direct and indirect personnel salaries	1,151,214	1,444,738
Economic depreciation on accommodation expenses, intangible and tangible fixed assets	3,485,653	3,235,387
Transfer of income (expenditure) other than social security payments	68,915	64,315
Capital losses on existing assets and liabilities	0	9,375
General accounting result	1,026,740	-132,359
Total expenditure	11,706,747	11,618,178
	2007 FINANCIAL YEAR	2008 FINANCIAL YEAR
INCOME		
Services invoiced	3,230,433	2,938,198
Interest and other financial income	507,534	243,980
Extraordinary income	-4,220	30,000
Transfer of income other than taxes and social security allowances	7,973,000	8,406,000
Deductions from provisions for future risks and charges	0	0
Total income	11,706,747	11,618,178

Epilogue

In 2008, we looked back over 15 years of BELNET. We ‘celebrated’ this birthday in Bruges by hosting the TERENA (Trans-European Research and Education Networking Association) international conference. The highlight of the year was the new BELNET network going live and all our customers migrating to it.

If the past can forecast the future, we can expect another 15 exciting years. Our sector, the technology and our organisation will continue to evolve. This evolution will bring BELNET into even closer consultation with its customers. On the one hand, we will listen even more closely to their wishes and accommodate their needs better; on the other hand, we want to continue to challenge, using new, advanced technologies. By doing so BELNET and its customers will shape the Belgian knowledge society of tomorrow.

In addition to our customers and staff, many other stakeholders have played their part in BELNET’s development over the past 15 years. Amongst these stakeholders are other governmental services, federal, local and regional administrations and our international partners. BELNET would like to thank everyone for their cooperation and hopes that it can advance into the future in an equally positive manner.

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BELNET wishes to thank the following organisations and people for their willing help and enthusiasm in the creation of this annual report:

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(www.atomium.be – SABAM 2009-06-11)
- The management and staff of the Royal Museum for Central Africa

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