



# **ANNUAL REPORT 2004**

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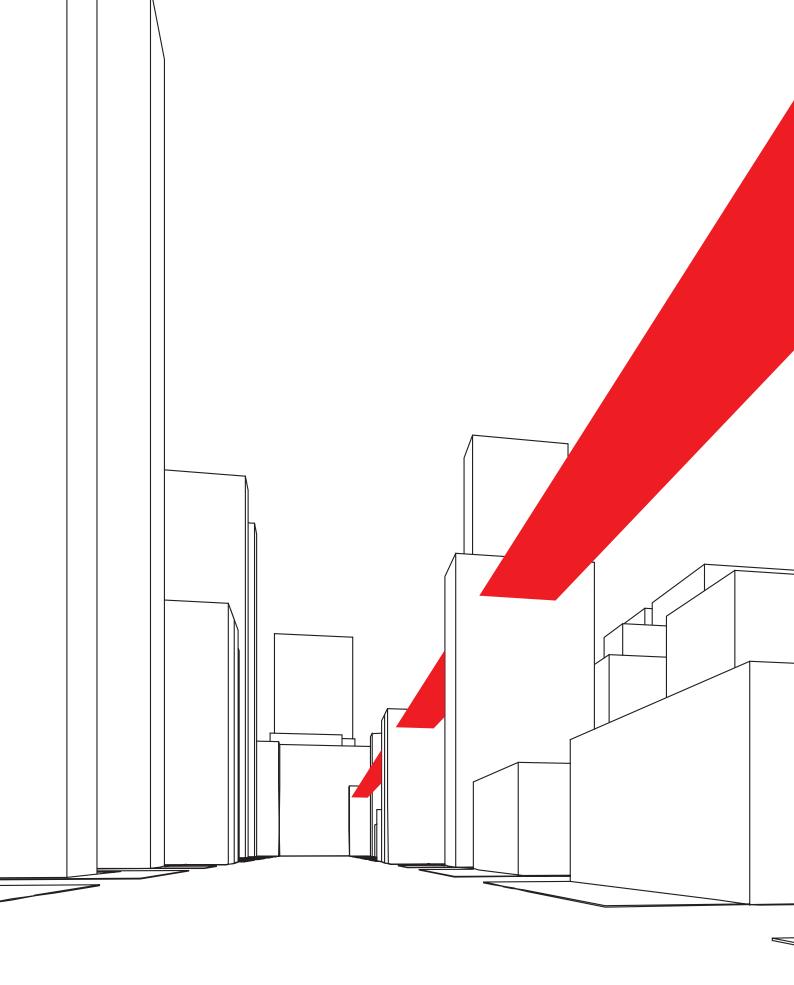
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# INTRODUCTION



Dear Reader.

2004 was a year of preparation for the future for BELNET. A future that we must explore in a targeted manner, according to our customers' needs. In our sector, speedy and flexible reaction to change is a must. That is why we have risen to the challenge to remain as close as possible to our core task: the management and development of the Belgian research network. In this context, bandwidth is less and less a competitive advantage to us. However we continue to stand out with our technical expertise and our vision of the future.

In running our company, which is backed up by a competent team, we keep a close watch on new developments. Hence it is also important to adjust our internal organisation accordingly. In 2004 we took an initial step in changing our internal structure. We opted for a matrix organisation because it allows one to adapt flexibly to a rapidly-changing environment. This also enabled us to ponder our policy as a team and, very importantly, to serve our customers even better.

BELNET wants to be lead by possibilities, not limitations. Indeed we have all the necessary ideas and means. And we have a team of people that are thoroughly convinced of the quality of our services. An incredible asset that is reinforced by sealing the right partnerships. We want to continue this approach. In so doing we shall not allow ourselves to be lead by fear of change or the possible limitation of existing organisational structures. We can add value to our network in pragmatic and creative terms, and work towards the future.

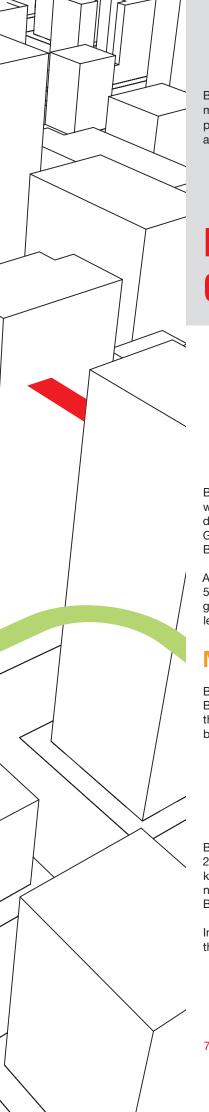
Technically, we expanded our services even further in 2004 and became involved in the computer networks of the future. This includes Géant, the European research network that is working on a second generation, and GigaNet2, our future network, as well as FedMAN2, a new network for the Federal Government.

The future is becoming the present faster and faster. This suits BELNET just fine.

Happy reading.

Pierre Bruyère Director





BELNET was created and works in a market that has evolved from the inertia of a monopoly to a dynamic, liberalised situation with tough competition. Adaptation is paramount in being able to keep offering a lasting added value in the world of networks and communication.

# MISSION AND ORGANISATION

By means of its GigaNet computer network, BELNET offers state-of-the-art internet access with security control via its CERT (Computer Emergency Response Team, see further) and a direct connection to global research networks, among which the European Géant and, through Géant, also to North American and Asian research networks. This ties in perfectly well with BELNET's strategic objective: the support of research, education and scientific cooperation.

At the end of 2004, BELNET was delivering a total network capacity of 90 Gbit/s to more than 575,000 end users. In order to continue meeting market expectations, BELNET will have to give proof of even more flexibility and also create an organisation, management structure and legal base making this possible.

#### Mission

BELNET is a government service with separated management, founded as part of the Belgian Federal Science Policy Office (Act of 07 May 1999). BELNET is responsible for the development and the management of the Belgian telematics research network for the benefit of:

- Institutions of higher education, research institutes and agencies providing scientific services, which are associated with or are subsidised by the Federal Government, the Communities or the Regions;
- private organisations carrying out scientific research;
- the federal and regional public services.

BELNET maintains GigaNet, the advanced, high-quality computer network, which is available 24/7. The network's characteristics must meet the current and future needs of users, while keeping costs as low as possible. This means that BELNET has to be capable of running its network at the highest required speed and that security must be optimal in doing so. For this BELNET has competent, experienced staff and a suitable organisation.

In addition to this, BELNET is also in charge of administering FedMAN, the network linking up the Federal Administrations, and BNIX, the Belgian National Internet Exchange.

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	<b>Legal Expert</b> V. Castille		
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	<b>Customer Relations dept.</b> K. Schelkens	Customer Relations FR: L. Lagneau	
	Administrative & Financial dept.	Accountancy: M. Jacques	
	C. de Walque	Executive secretary: C. Lagasse	
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		Servers & Services P. Panneels	Y. Christophe A. Delvaux B. Grymonpon W. Vanwalleghem P. Wallemacq
		CERT L. Ferette	K. Van Impe
		<b>GRID</b> R. Vandenbroucke	

# **Organisation**

#### Organisational chart

In order to keep adjusting to its mission and to modern times, the BELNET management restructured its organisational chart in 2004. This reconfiguration is geared at better project management and optimising the service to the customer.

A middle-management level was created within the organisation to better support project-based activity. In addition to this, there is an administrative/financial, a legal and a communication department for general support and coordination. The result is a matrix structure, allowing for greater staff involvement.

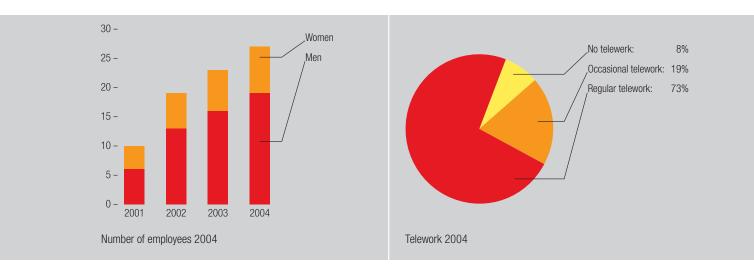
A new legal position was also created in 2004, on the one hand to put the increasing number of contracts with customers and suppliers on the right track and on the other hand to facilitate the transition to BELNET's new status.

Furthermore, in the new organisational structure the choice was made to split the technical team in two groups: one for networks and one for servers and services, with a different manager for each. The objective is to guarantee a more personal follow-up for customers and to further improve BELNET's technical results.

## **Staff**

27 people were employed at BELNET on 31 December 2004. Five members of staff have been seconded by the Belgian Federal Science Policy Department. The remaining staff are contractually employed by BELNET.

After the pilot project in 2003, telework has now been completely anchored in the organisation for those members of staff whose position allows for it. Both staff and management received telework well. The possibility to telework seems to have a positive impact on staff motivation and availability. No decrease in the productivity or the quality of the delivered work was noticed. Quite the contrary: it would appear that there being fewer people around in the office increased people's working comfort. The BELNET staff has the



choice between "fixed telework", whereby an employee works from home on one set day a week or "occasional telework". BELNET provides a PC and an ADSL connection to every teleworker for this.

#### Management Committee

The Management Committee was created in 2001. The seven members on it have a renewable four-year mandate. They follow up the framework programme, the general and the financial management of BELNET.

Composition at the end of 2004:

Marc Acheroy (Professor at the Royal Military Academy);

Pierre Bruyère (Director of BELNET);

Fabrice Carton (Deputy-Advisor at the Belgian Federal Science Policy Office);

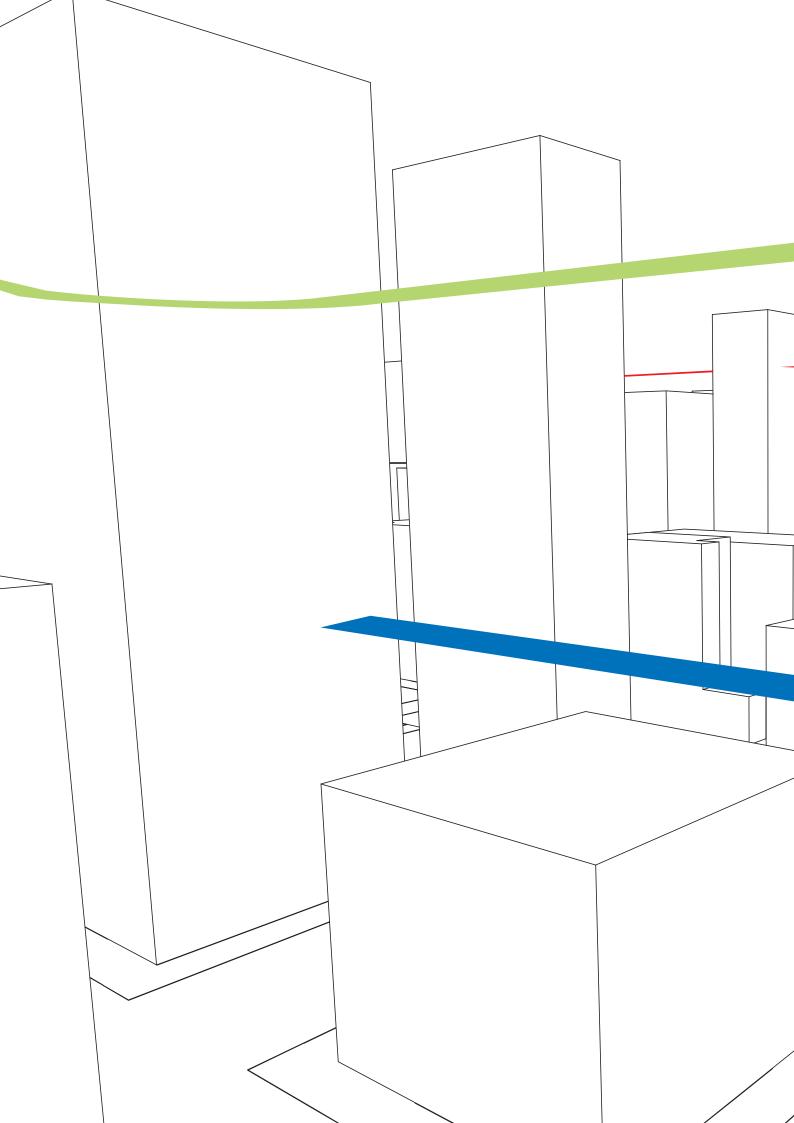
Monnik Desmeth (General Advisor for Scientific Matters at the Belgian Federal Science Policy Office);

Marianne Jacques (Accountant for BELNET);

Paul Lagasse (Professor at the University of Ghent);

Henri Malcorps (Director of the Royal Meteorological Institute);

Guy Snykers (Inspector at the Federal Finance Department).



High bandwidth is less and less the differentiating factor of BELNET's 142 customer organisations and the 575,000 end users that these represent. It is all about quality and innovation now – a challenge that BELNET is happy to rise to.

# **CUSTOMERS**

# 142 Organisations

BELNET categorises its customers into 4 main groups:

- Higher education: universities, colleges for higher education and institutes for adult education:
- Research institutes and laboratories;
- Government and administrations: public services at federal, regional, provincial and local level:
- Regional networks: organisations that develop their own regional network and offer network services to public bodies and educational institutions.

In 2004, all Belgian universities and some 70% of recognised colleges for higher education were connected to BELNET, in addition to a large part of Flemish and Walloon research centres.

At the end of 2004, 142 institutions or regional networks were connected to the BELNET-network via one of the fifteen access points (PoPs) spread across Belgium. BELNET was able to welcome 10 new customers in 2004:

- BRF Belgischer Rundfunk (Public Broadcasting Corporation of the German-speaking Community)
- HEPCUT Haute Ecole Provinciale de Charleroi Université du Travail
- NMBS, the Belgian Railway Service
- Agriculture Administration of the Ministry of the Flemish Community
- The Limburg Province
- The West-Flanders Province
- The Flemish-Brabant Province
- CIPAL Network for local councils in the Antwerp and Limburg Provinces
- VERA Flemish-Brabant Network
- The city of Bruges.

Only one organisation unsuscribed in 2004 and became an indirect customer via the FedMAN network.

BNIX, the third network administered by BELNET, has its own clientele (see further).

# 575,000 End users

Around 575,000 end users use the internet via the BELNET network on a daily basis. The educational sector has the largest groups of BELNET end users: universities, colleges of higher education and other educational institutions. Some 311,000 students, pupils and members of research and teaching staff can use our internet services.

Seven out of the ten largest consumers of bandwidth are universities, among which the Universities of Leuven and Liege in first position. A second major group of end users are the approximately 140,000 civil servants from the federal to local public services.

# Rate policy

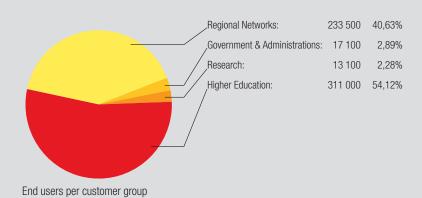
The yearly BELNET subscription is composed of two separate amounts. On the one hand there is the subscription fee for the bandwidth (min. 2 Mbit/s) of all incoming data traffic (internet and the research networks). On the other hand we charge a lump-sum per connection to our network.

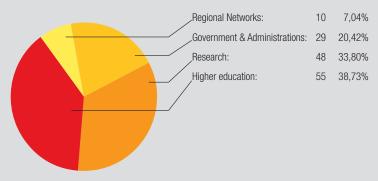
BELNET has two rate categories, based on its mission as a research network.

Under the 'Research and Education' category, there are the Belgian scientific and educational institutions, among which universities, colleges of higher education, schools and research centres. This category is BELNET's priority target group and consequently gets a cheaper rate.

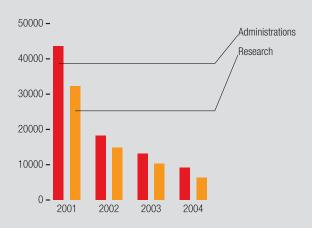
The public services are under the 'Administrations' categories. Here the rate is calculated on the basis of the real cost and one also has to pay for access to international research networks.

Year after year BELNET has striven to keep costs as low as possible for its customers thanks to a firm negotiation policy with its suppliers. The evolution of our rates over the 2001-2004 period shows a strong downward trend in the case of 10 Mbit/s connections, for instance. These rates have decreased by about 80% in the past 3 years.



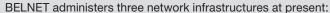


Institutions per customer group



Evolution of rates for a 10 Mb/s connection (EUR/year)





- 1. GigaNet, the national research network
- 2. FedMAN, the Federal Metropolitan Area Network
- 3. BNIX, the Belgian National Internet eXchange.

Aside from these three networks, BELNET has an extensive server infrastructure. We are permanently updating our infrastructure according to technical developments and user needs.

# INFRASTRUCTURE

# **GigaNet**

GigaNet, the BELNET research network is composed of a national and an international infrastructure.

The national network is composed of 2 star-shaped structures, which are centralised in Brussels, from where data transmission lines of 2.5 Gbit/s depart to each of the 15 national PoPs (Points of Presence). The network is fully redundant (by means of a double infrastructure) in order to guarantee maximum availability.

This national network is linked up to Géant, the European research network, and to North American and Asian research networks via Géant. Together these networks form the "global research network". This research network, which runs parallel to the commercial internet network, links up educational and research institutions throughout the world at gigabit speeds.

The national network is also linked up to the commercial internet via direct connections with the global internet and with internet connection points in Belgium (BNIX), Netherlands (AMS-IX), France (SFINX) and the UK (LINX).

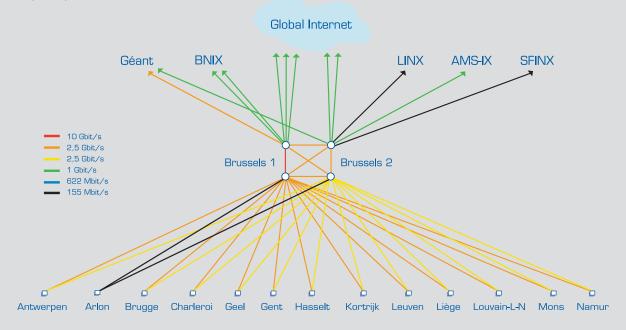
#### Achievements:

In 2004 we renewed the direct connections with the internet exchanges of France (SFINX) and the UK (LINX). These direct connections accelerate the flow of information and unburden our transit connections to the internet. Indeed the bulk of the users' communication is with our neighbouring countries.

In choosing MPLS technology, we obtained higher stability and capacity, cost savings and operational simplification.

Furthermore, a test connection between Kortrijk and Ghent was set up in 2004 via a fibreglass connection of the Flemish Community. The aim of the project was to save costs at infrastructure level. After running the test, reliability and workability were given high marks.

#### Diagram GigaNet



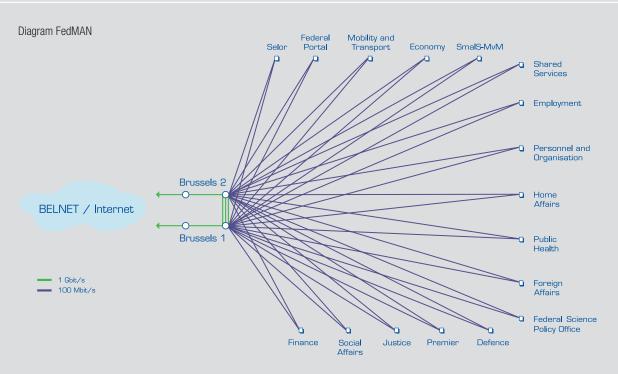
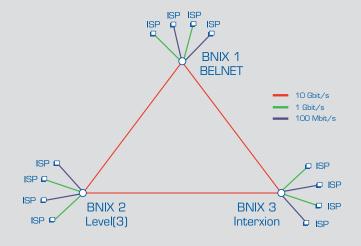


Diagram BNIX



## **FedMAN**

Since 2002, BELNET has been in charge of developing and administering FedMAN. This network, which was commissioned by FedICT, (the Federal Public Service for Information and Communication Technology), links up the buildings of the federal administrations with each other and with the internet.

The FedMAN network hast two primary objectives:

- To enable the connected public services to communicate with each other via their FedNAPs (FedMAN Network Access Points) thanks to a reliable and efficient network;
- To provide the connected FedNAPs with a unique internet access via the GigaNet.

Every FedNAP has redundant Fast Ethernet connections (100Mbit/s) to the central routers of both star structures of the FedMAN network.

These routers are linked to each other by 3 separate fibreglass circuits once again on account of reliability requirements. The central routers enable access to the internet via the GigaNet

#### Achievements:

In 2004 a FedMAN network's main node was migrated to a professional data centre. Moreover, 5 public services and their access nodes migrated to the FedMAN network.

BELNET was in charge of coordinating these migration projects. These projects were completed successfully within the time frame and budget.

Lastly, three new public services (OFO-IFA, FedASIL and the federal ombuds services) linked up to the FedMAN-network in 2004.

#### BNIX

The BNIX (Belgian National Internet eXchange) was set up by BELNET in 1995 and is the place where internet service providers (ISPs) in Belgium exchange internet traffic. BNIX greatly improves the quality of local connections by offering faster, shorter, unburdened and cheaper connections between the ISPs. The GigaNet user also benefits from a high-quality internet connection at a low price.

In terms of technology, the BNIX is built around 3 powerful switches, situated in three locations in the Brussels region. The switches are linked to each other via three fibreglass pairs. Internet providers can connect to the BNIX directly via a Fast Ethernet or a Gigabit Ethernet connection.

BNIX not only accepts IPv4 interconnections, but also IPv6 and multicast connections.

#### Achievements:

After the major upgrade of the BNIX network in 2003, some optimisations were carried out in 2004 as well, such as the implementation of high-density 10-Gigabit and Gigabit Ethernet modules. Thanks to this the backbone capacity, if required, can gradually be extended to 40 Gbit/s and customers will be able to connect via higher (up to 10 Gbit/s) bandwidth connections.

A number of additional services were launched in April 2004. With the introduction of long-distance Gigabit Ethernet technology, it was possible for ISPs to link up directly to BNIX up to a distance of 10 km

## Server infrastructure

In order to administer the aforementioned networks and the services offered (see further) BELNET has a comprehensive server infrastructure.

In the GigaNet nodes there are 44 servers altogether. Two different operating systems run on these servers: Linux runs on 35 servers and Solaris on 9 of them. They support BELNET services such as DNS, news, web, mail, monitoring, etc. BELNET's most famous server is the FTP server with downloads of free software.

In addition to this, BELNET also houses a number of servers from external organisations, as for instance a SourceForge mirror, I-root DNS mirror, a server for global internet caching, Signpost mirror (software distribution).

BELNET has two technical rooms in Rue de la Science (Brussels). Room 1 contains 41 standard racks on a surface of 55 m<sup>2</sup>. Room 2 contains 20 racks on a surface of 30 m<sup>2</sup>.

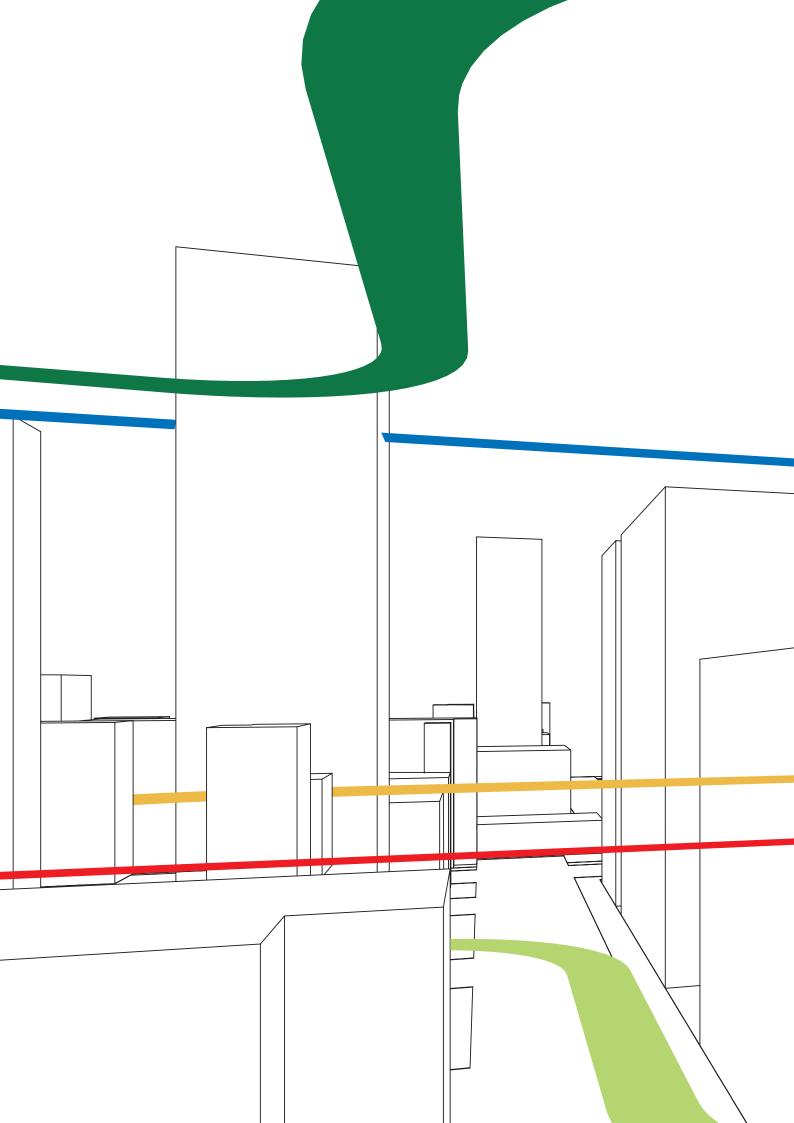
Both rooms are air-conditioned for the appropriate temperature.

A separate line supplies electricity to the two rooms and the offices of the BELNET technical service. The electric circuit is secured by a stand-alone generator with a power of 150 kVA for 15 hours.

#### Achievements:

A new FTP server was put to use in May 2004. This new server (an UltraSPARCIIIi quadriprocessor) has a memory of 16 GB RAM and storage capacity of 4 TB, some five times more than the previous server.

Furthermore, a mirror DNS root server was added to the server park. This increases the speed of the search work for computer addresses, among which for the Belgian ISPs that work via BNIX.



BELNET is permanently investing in its existing networks, turning current pilot projects into concrete follow-up projects, is committed to being a future- oriented organisation and thereby tries to remain a step ahead of user needs. BELNET services are expanding, particularly the services with a high future potential for the research community. In this context, particular attention must be paid to network security.

# **SERVICES**

## **Basic services**

#### Connectivity

Connectivity or network access is BELNET's core activity and involves unlimited access to the global research networks and high-speed access to the commercial internet network. Access always takes place via the GigaNet.

BELNET abides by extremely stringent standards in terms of the quality of the network and also lays these down in customer contracts and the SLAs (service level agreements) that are linked to these.

In 2004 the following conclusions were drawn in terms of the connectivity of the three networks that BELNET is managing.

#### GigaNet

GigaNet has an internal network connectivity of 100% almost across the entire line. There is only a minimal deviation of 99.975% with the POPs in Brussels and Namur. BELNET thereby met all SLAs in terms of connectivity for the GigaNet.

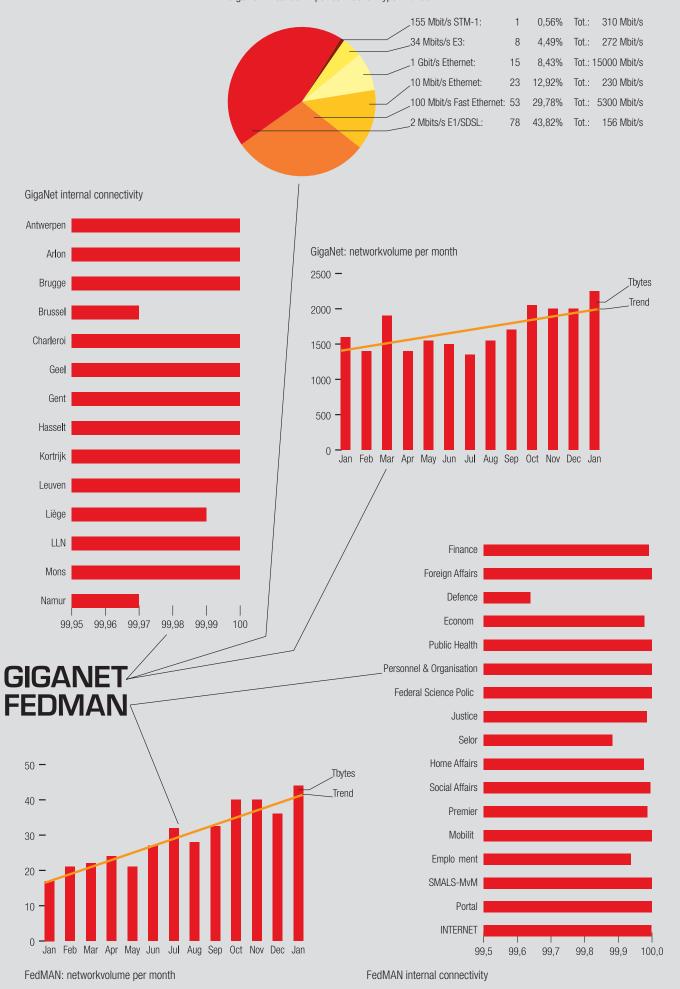
The network volume on the GigaNet ranges between 1400 Tbytes and 2000 Tbytes per month. There is a clear decrease during the summer months when students are home and academic staff is on holidays.

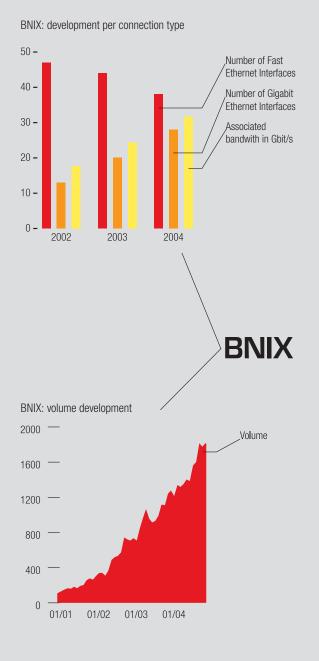
In terms of connectivity and the uptake of bandwidth by customers, we also see some remarkable developments. The total connectivity of all GigaNet access ports amounted to 21 Gbit/s or 150 Mbit/s per customer at the end of 2004. This is an almost two-fold increase in a year. We have also registered a growth of over 55% - from 1.18 Gbit/s to 1.84 Gbit/s or 13 Mbit/s per customer on average - over the span of a year in the use of bandwidth for the purpose of downloading from the commercial internet.

Even with the rate reduction, a large number of customers remain loyal to the minimum connection of 2 MB/s despite the high cost of personal infrastructure and local connection. These customers cannot fully benefit from all the GigaNet has to offer in terms of efficiency and functionality.

At the end of 2004, BELNET customers were connected to the internet through 178 physical connections. This is about 10% more than in 2003.

GigaNet: Breakdown per connection type 12/2004





#### **FedMAN**

In 2004, the internal availability of the FedMAN network amounted to 99.96% on average, with slight differences from customer to customer. The cause for the disturbances was the migrations of various access nodes.

These figures vastly exceed minimum requirements and fall completely within our objectives.

Traffic over the FedMAN network is increasing steadily. We expect that the availability of new applications, for instance e-government applications, will lead to a further increase.

#### **BNIX**

In 2004, the availability of the BNIX network amounted to 99.94% and network traffic grew an average of 48 Tbytes a month.

BNIX was able to welcome six new customers in 2004. Moreover 9 existing customers upgraded their connection and/or decided to take an additional connection on BNIX. As far as connection types are concerned, we registered a decrease in Fast Ethernet connections (100 Mbit/s) and a rise in Gigabit Ethernet connections (1000 Mbit/s).

All in all there were 47 different ISPs connected to BNIX in 2004, i.e. 66 physical connections or a total bandwidth of 31.71 Gbit/s.

#### **Network Operations Center**

In the contracts with customers and the accompanying SLAs there are provisions for fines in the event we do not meet our objectives. That

is why we do not only need a high-quality, advanced network, but also that we need to be able to administer this network outstandingly, which is precisely the Network Operations Centre's (NOC) task.

The NOC is composed of a helpdesk for technical support to customers and a "watch service" that continuously monitors the network.

The NOC is primarily dedicated to the helpdesk for users and their problems. This ranges from the transmission of information to supporting the installation of networks at customers' premises or the setting up of tests.

Thanks to the watch service, potential network disturbances are noticed immediately and solved by the NOC. Moreover there are the necessary upgrades, both of hardware and software. The NOC also regularly updates the network's functionalities.

The NOC offers customers a comprehensive, on-line overview of control information, such as total network traffic, the traffic over the internet versus the traffic over the GigaNet or over the research networks. That way, customers can immediately detect and analyse a high saturation rate or network attacks.

#### **GigaNet**

An average of 14.33 incidents per month are recorded on the GigaNet. The overwhelming majority of the incidents involve the network. Network incidents are always high priority. A lot of network problems are interruptions in the fibreglass or defects in the routing and transmission machines.

#### **FedMAN**

As for incidents on FedMAN, on the whole there are fewer than five calls a month; therefore the incident rate is extremely low. The main problems are the network lines and the routers.

There is a large peak to be seen in November. During that period the migration of several public service access nodes took place.

#### **BNIX**

Three incidents took place on BNIX in 2004. Two of these involved the BNIX network itself, and the third was a problem on the customer's side.

#### Registration of domain names

BELNET delivers domain registration services for the '.be' domain names. Registration takes place by means of an on-line tool (BEBOT).

In 2004, 1396 new and renewed domain names were registered.

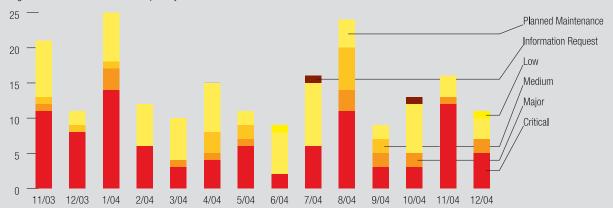
#### DNS

A DNS server makes the link between domain names and the corresponding IP addresses. BELNET offers this service to its customers. What is more, the BELNET server park houses a DNS.BE root server and a global DNS root server (I-root). This is a sign of the national and international recognition of the GigaNet's quality and reliability.

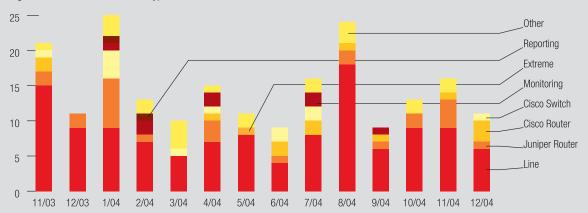
#### Distribution of free software

This is one of BELNET's best-known services. BELNET has a very powerful FTP server on which an enormous amount of up-to-date software is available for free. The fact that BELNET makes this software available via an FTP server means that download is much faster for users.

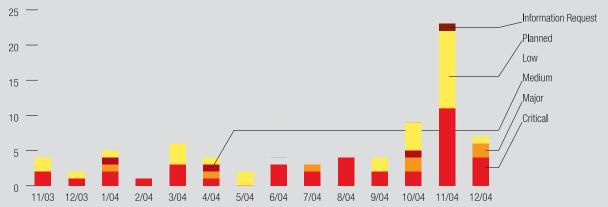
#### GigaNet: amount of incidents and priority



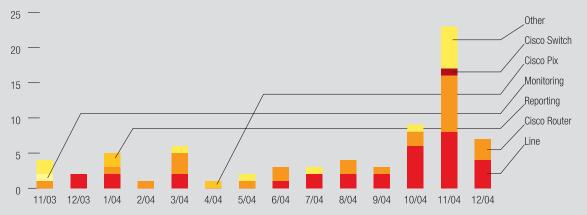
#### GigaNet: amount of incidents and type



#### FedMAN: amount of incidents and priority



#### FedMAN: amount of incidents and type



#### Advanced services

As an addition to its basic services BELNET offers a whole series of possibilities. Some are vital for the smooth running of the network and make it possible to use the network's full capacity. The others are optional facilities or support scientific research and experiments. That is how in recent years additional functions and applications were put to use on the GigaNet network. Further work was done on a lot of them in 2004.

#### **BEarid**

BEgrid, the BELNET grid initiative was started in February 2003 in order to offer a platform to encourage the use of grid in Belgium, particularly in the research community. A grid bundles separate computers into a virtual super computer. This will become the computer layout of the future for heavy arithmetical calculations. There are possible uses in the field of energy physics, astrophysics, hydrology, medical imagery and mathematical calculations.

BELNET is making different contributions to this project. Firstly, BELNET allocates two part-time positions for the operation and the building of BEgrid. Aside from that, BELNET is the 'Certification Authority' for BEgrid. This means that BELNET signs certificates giving users access to BEgrid. Moreover, a cluster at BELNET oversees most important central grid services that are necessary for connection to BEgrid.

At the end of 2004, BEgrid was composed of some 200 computing elements and about 3 Tbytes of storage capacity. The calculation and storage capacities are divided among the different partners on the project. These are:

- The Faculté Polytechnique of Mons;
- The Centre d'Excellence en Technologies de l'Information et de la Communication;
- The KULeuven;
- The Université Libre de Bruxelles;
- The Vrije Universiteit Brussel;
- The Universiteit Antwerpen;
- The Rijksuniversiteit Gent;
- The Flanders Marine Institute.

#### **BELNET CERT**

The initiative to create a CERT (Computer Emergency Response Team) at BELNET was taken after a satisfaction survey in 2003, where it transpired that security was one of our customers' most important concerns.

CERT-BELNET has been operational since 01 July 2004. Its task is to inform customers and to help them with problems concerning computer and network security. CERT coordinates research and the flow of information about security issues where BELNET customers are the cause or the victim.

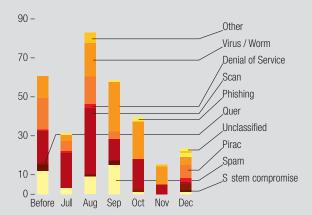
The information that CERT disseminates via the website, the daily mailings with alerts or announcements and the weekly newsletter are accessible to all, also non-BELNET customers.

In September 2004, CERT-BELNET obtained the "Trusted Introducer" accreditation at European level. CERT-BELNET thereby became a recognised member of the European CERT community, making cooperation and the sharing of information with other CERTs easier. International cooperation on security is a must.

CERT: Amount of alerts sent per month



CERT: Amount and type of incidents per month



In six months' time, CERT received 315 incident calls, peaking significantly in August. The majority of these incidents involved viruses, worms or scans.

CERT has been sending more and more alerts since July 2004. A total of 424 alerts were sent in 2004.

#### **VPN**

A VPN (Virtual Private Network) makes separate rental lines superfluous because in this form of technology the internet can be used for protected communication between 2 points. This is relevant in the framework of associations between universities and colleges for higher education that can link up their computer networks directly via their existing connection with BELNET. Similarly, research groups on different locations can link up with each other via VPN and share computer infrastructure.

BELNET examined different forms of VPN technologies in 2004, among which MPLS. Severally tests were conducted successfully, among which a project with the KULeuven whereby a VPN was set up between the KULeuven and KULAK, its branch in Kortrijk.

#### **TESTA**

In 2004, BELNET, commissioned by FedICT, renewed the access to TESTA. TESTA (Trans-European Service for Telematics between Administrations) is the highly-secured private network of the European Union that sees to the cooperation between administrations for all types of European e-government applications. Thanks to this network government administrations of the member countries can share sensitive information about social security, fraud or asylum seekers, for instance.

In 2004 BELNET implemented a secured access to TESTA via the IPsec protocol. This protocol provides extra security, in that data traffic can be sent via the FedMAN network instead of additional (dedicated) rental lines. Belgium is one of the first countries in the European Union that is already working with IPsec for access to TESTA.

#### IPv6

In September 2003 the GigaNet was adjusted to work both the IPv4 and the the IPv6 protocol. In 2004 the lines to the internet exchanges of London, Paris and Amsterdam were also changed to IPv6.

Five new customers started making use of the IPv6 in 2004. Eleven customers in total are using this service now, mostly to experiment with or test the new protocol. Each customer received a /48 IPv6 address block. BELNET is a trailblazer in this field. On Géant, the European network, BELNET customers are among the ones to make the most use of IPv6.

#### Multicast

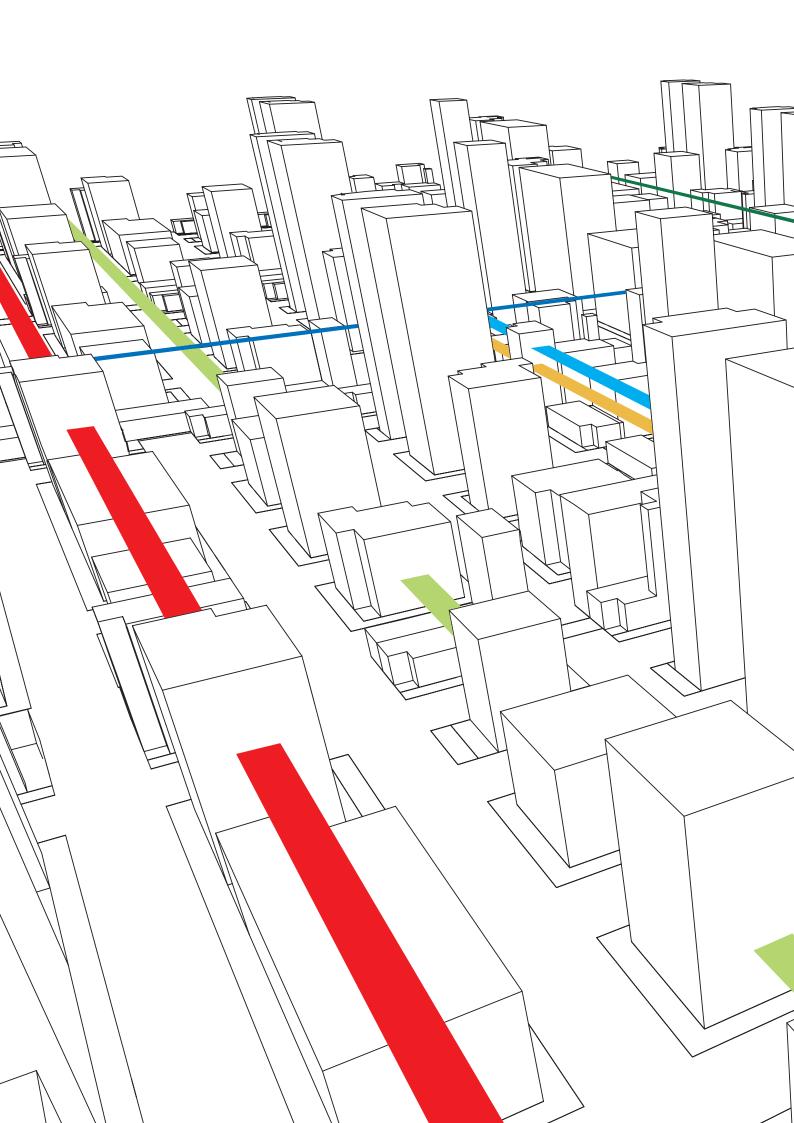
With Multicast technology, one can efficiently send large amounts of data to different recipients at the same time. The GigaNet was equipped with this technology in 2003, which is used for videostreaming, among other things. In order to use this technology the network must be equipped for multicast right up to the end user. Oftentimes this is not the case. A research group at the Vrije Universiteit Brussel has devised an application (CastGate) to remedy this. CastGate makes applications such as videostreaming accessible to networks that do not support multicast. Under the terms of a cooperation agreement between BELNET and this research group, CastGate was successfully integrated into the GigaNet. Thus in 2004 the winning films of the short film festival, 'Het Grote Ongeduld', and the RTBF SAT programmes were broadcast in high quality via the GigaNet.

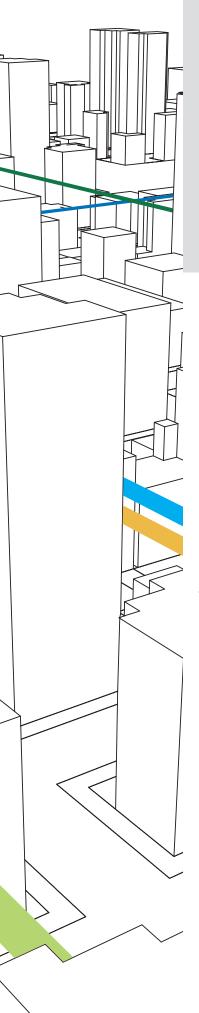
#### Cheap software licences

In 2004, BELNET signed an agreement with Signpost, a company offering good-value licences for commercial software to students and academic staff over the internet. In accordance with the agreement, Signpost reduces rates for all those who download the applications via the GigaNet. This means a decrease of 10 to 60 percent on the price of software licences.

#### Other

BELNET's participation to ISPAtrust, the security project, was brought to a halt in 2004. The use of digital certificates for security and authentification at national level was viewed as positive from a technical point of view, but the cost-effectiveness was deemed too low. That is why BELNET took the decision to stop its contribution to the project for the time being.





2004 was a year of reflection. 2005 will be a year of transition. It is important to think of the future in a changing market. Certainly for an organisation such as BELNET, that is evolving in a rapidly-developing sector and that furthermore has long implementation deadlines. We must also take account of specific rules in government assignments that we are bound to. At any rate BELNET wants to expand its capacities, via various means, in order to continue being a player both at European and at global level. BELNET has set clear objectives in different areas.

# **OBJECTIVES 2005**

# **Organisation**

In 2005, BELNET wants to devise a new management plan which is to be the successor of the three-year 2002-2004 framework programme. This plan will be devised by the new management in close collaboration with employees who are an indispensable source of information. BELNET is looking at the future in an open and creative manner with this new management plan.

BELNET's status as a state service with a separate management has shown some shortcomings and is hampering its mission and the optimal development of the network.

In addition to this, due to Copernicus, the internal reform of the federal government, there will be fresh limitations only making the need to reform BELNET's status even stronger.

That is why a legal analysis shall be carried out in 2005, to look into options for possible statuses for BELNET.

## Customers

In order to guarantee that the development of the network and its range of services remain in line with customer needs BELNET intends to further develop a coherent and integrated customer approach in 2005.

In order to do so a large-scale analysis of end users' needs shall be carried out and communication channels with the different user groups shall be improved. These initiatives should allow and encourage users to voice their needs and feedback. On the basis of this data, BELNET will be able to devise a service package that tallies with the current and future needs of users in the education and research sectors.

An increase in the minimum requirements in terms of connection and connectivity for our customers is necessary. The current minimum of 2 Mbit/s is not synonymous with what we understand to be advanced internet access at present.

Besides this, we will also be further deepening our partnerships, for instance those with the regional authorities, in order to carry out new, future-oriented projects for the Belgian research and teaching community. The focus here will be to effect a cost reduction of the access circuits to the GigaNet as well as developing new services that serve communal interests.

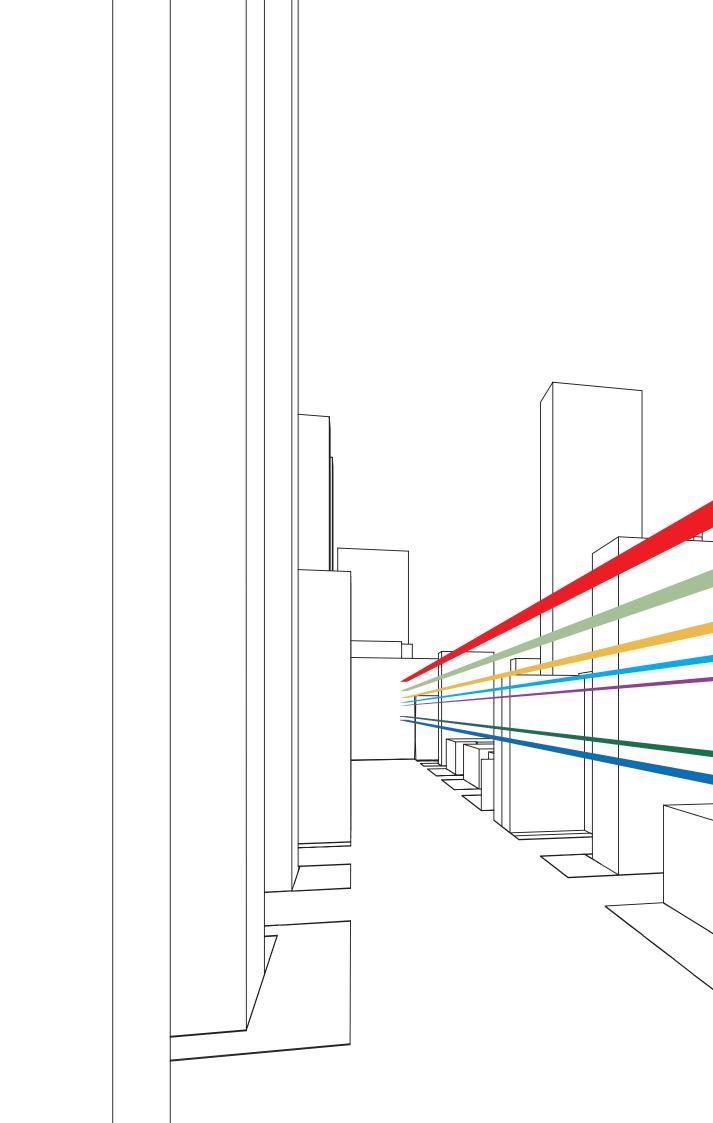
## Infrastructure

BELNET continues to work on its network's development and design. In 2005, there will be a study to prepare the next generation of networks GigaNet2 and FedMAN2. Special attention will be paid to the way these networks can be integrated optimally in Géant2, the next pan-European research network,

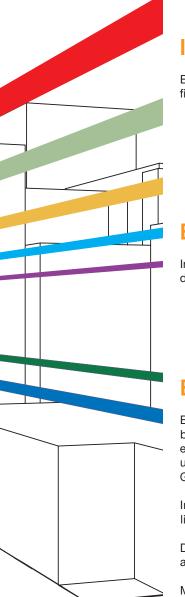
Furthermore in 2005 there will be a test lab where new services and the network can be simulated and tested. That way interferences with the production network are avoided.

## **Services**

Generally speaking, we shall be taking action to expand our range of services. Good network administration, internal IT systems, logistics, housing and the infrastructure should all contribute to this. What is important here is to see what branches we would be better off outsourcing. That way the team is freed of non-priority tasks so that it can fully focus on its core activities.



# **FINANCES**



## Income

BELNET's income amounted to EUR 11,145,468.28 in 2004. This amount was composed of five types of income:

- Financial resources (2%):
- The use of the provision, implemented in the framework of the FedMAN project(10%);
- Proceeds from services provided to the private sector, education and research and the public service sector (15%);
- The deposit from Fedict for the development of the FedMAN network (3%);
- The maintenance grant from the Federal Science Policy Department (70%).

# Expenditure

In 2004 BELNET was faced with three types of expenditure totalling EUR 9,062,252.58 and distributed as follows:

- Investments (11%);
- Costs relating to the FedMAN network (17%);
- Recurrent costs (72%): national and European lines, world-wide internet connections, overheads, salaries, services.

# Explanation of the figures

BELNET ended 2004 with a positive balance of EUR 2,083,215.7. In addition to the balance of fiscal year 2003, BELNET had a credit balance of EUR 8,570,601.89 at the end of 2004 to be carried over to 2005. This has been earmarked for investment in the upgrading of the network's routing and transmission material and in the expansion of GigaNet2.

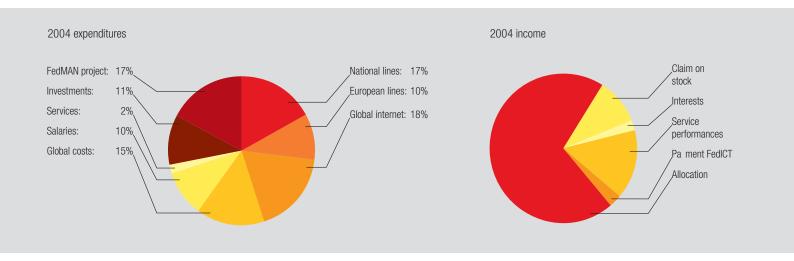
In 2004, 26% of the planned budget was not spent, primarily because BELNET had too little time to implement all projects alone.

Despite stable yet indexed funds, BELNET's 2004 receipts decreased. This is on account of the fact that the largest part of the 2004 FedMAN contributions were paid.

Moreover receipts from internet access decreased because of lower rates.

On the other hand there was more expenditure on FedMAN by reason of the increase in the amount of connections on the network, the rental of the data centre to which the network infrastructure was migrated and the migration itself.

In terms of expenditures, the wage bill increased because of a headcount increase from 22 to 27 in 2004. In 2004, investments in the GigaNet were almost doubled in relation to 2003, in accordance with the current framework programme.



Balance sheet	Financial year 2003	Financial year 2004
Active		
Tangible assets  Long-term debts by third parties not subject to PCG  Long-term debts by third parties subject to PCG  Certificates and cash bonds  Bank accounts on demand and giro cheques - stamps and cash funds  Securitues due to be cashed and internal financial transfers  Asset adjustment and suspense accounts  Total assets	3 568 751 59 623 11 049 8 193 000 2 419 566 0 730 138 14 982 127	2 746 537 20 387 133 815 6 943 000 3 729 214 0 1 765 409 15 338 362
Passive		
Net assets or company assets or net liabilities Provisions for liabilities and charges Long-term debts by third parties not subject to PCG Long-term debts by third parties subject to PCG Liabilities adjustment and suspense accounts Total Liabilities	10 452 753 3 543 004 314 006 595 128 77 236 14 982 127	11 713 755 2 468 263 842 057 138 799 175 488 15 338 362

Results Account  Costs	Financial year 2003	Financial year 2004
Other use of consumable goods and services from third partiesn Property tax and miscellaneous taxes Direct and indirect staff renumeration Amortisation on tangible assets and establishment costs on tangible assets Transfers of income (expenses) other than company benefits Losses in capital on existing assets and liabilities Provisions for future liabilities and charges Result in general accounting Overall total costs	7 792 141 0 926 805 1 850 950 21 563 843 0 1 229 214 11 821 516	6 789 566 0 1 116 528 1 918 122 57 865 2 385 0 1 261 002 11 145 468
Profits		
Invoiced services provided Interest and other financial income Capital gains on existing assets and liabilities Transfers of income other than taxes and NI contributions Releases on provisions for future liabilities and charges Overall total profits	3 834 249 155 116 11 7 787 847 44 293 11 821 516	1 988 776 179 518 27 068 7 875 365 1 074 741 11 145 468

#### **GLOSSARY**

backbone: central network infrastructure of internet networks.

**bandwidth**: the capacity of a data connection, measured in hertz (analogue networks) or bits per second (digital). Bandwidth designates the amount of data that can be transferred in a certain time.

BEgrid: the BELNET grid initiative.

bit: abbreviation of 'binary digit' (or the binary numbers 0 and 1). Basic unit with which a computer system works, usually combined in a sequence of bits. 8 bits make up a byte.

**BNIX**: Belgian National Internet Exchange. A central exchange where internet service providers who are active on the Belgian market exchange data traffic with each other. The term IX (Internet eXchange) is used internationally in most abbreviations for internet exchanges.

byte: a sequence of eight bits.

**CERT**: Abbreviation of 'Computer Emergency Response Team'. A centre for the prevention and solution of problems relating to computer security through permanent monitoring and sharing of information and cooperation at international level.

**FedMAN**: acronym for 'Federal Metropolitan Area Network' or federal urban network. Belgian computer network built by BELNET for FEDICT, connecting the Brussels federal administrations with each other and with the internet.

**fibre optics**: network technology whereby data traffic runs over a bundle of fibreglass or plastic wires (old networks are run on copper wires). These optical networks have a high bandwidth and allow for the simultaneous transport of different data signals.

**FTP**: File Transfer Protocol, an agreed way of sharing files over the internet.

**Géant**: the European research network, created from a joint venture of 26 national research networks and the European Commission. More info is available at www.geant.net.

**grid computing**: advanced, embryonic technology based on the global linking of computers for shared processing of large quantities of data. BEgrid is the BELNET grid initiative for promoting grid computing in Belgium.

**IP**: Internet Protocol, the standard for transporting data over the internet according to a series of established communication rules.

**IP-adress**: a unique identification number of a computer in a network. In an isolated, internal network the use of IP addresses is virtually free. However registered IP addresses are needed to connect computer systems to the internet in order to prevent duplicates with other computer systems, thanks to which the data arrives at the right computer (see also IPv6, NAT).

**IPsec**: Internet Protocol Security, an agreed manner of sending data packets over the internet securely. Both the sender and the recipient need a public key in order to decipher the encoded packets.

**IPv6**: Internet Protocol version 6, the newest Internet Protocol generation and the successor of IPv4. Among other things, IPv6 provides for an incredibly significant increase in the amount of IP addresses that computer systems require in order to connect to the internet directly.

ISP: Internet Service Provider.

**lambda switching**: advanced technology for sending information quickly and precisely over optical networks (see fibre optics.

**MPLS**: Multiprotocol Label Switching, standaardtechnologie om allerlei soorten netwerkverkeer te versnellen en het beheer ervan te vereenvoudigen.

multicast: a technique whereby a data stream is sent to several recipients at the same time, appropriate for sending images and sound.

**PoP**: Point-of-Presence, access circuit on a network, the geographic location where one can connect to a main network. Access in a PoP is mostly divided by tens to hundreds of users.

SLA: Service Level Agreement.

**streaming**: technique to send on data steadily and uninterruptedly. Streaming makes it possible to open an incoming multimedia file before it has been completely transmitted.

**VPN**: Virtual Private Network, a part of a public network – oftentimes called tunnel – for protected communication between two or more points.

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