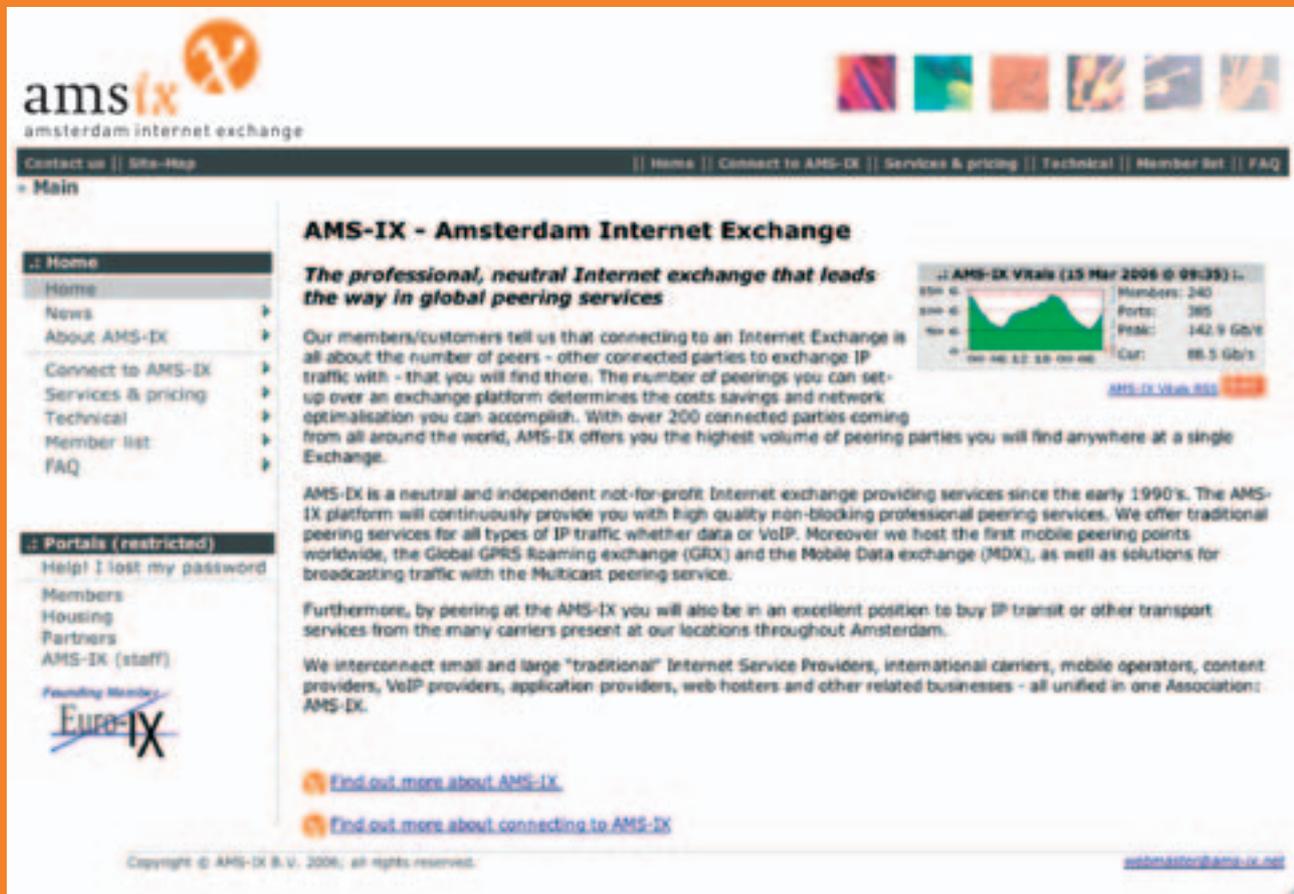


annual report 2005

www.ams-ix.net

Any questions: visit our website



The screenshot shows the homepage of the Amsterdam Internet Exchange (AMS-IX). The header features the AMS-IX logo and navigation links. The main content area includes a title, a tagline, a statistics widget, and several paragraphs of text. A sidebar on the left contains a menu of links.

amsix
amsterdam internet exchange

Contact us | Site-Map | Home | Connect to AMS-IX | Services & pricing | Technical | Member list | FAQ

Home

- Home
- News
- About AMS-IX
- Connect to AMS-IX
- Services & pricing
- Technical
- Member list
- FAQ

Portals (restricted)

- Help! I lost my password
- Members
- Housing
- Partners
- AMS-IX (staff)

Founding Member



AMS-IX - Amsterdam Internet Exchange

The professional, neutral Internet exchange that leads the way in global peering services

Our members/customers tell us that connecting to an Internet Exchange is all about the number of peers - other connected parties to exchange IP traffic with - that you will find there. The number of peerings you can set-up over an exchange platform determines the costs savings and network optimisation you can accomplish. With over 200 connected parties coming from all around the world, AMS-IX offers you the highest volume of peering parties you will find anywhere at a single Exchange.

AMS-IX is a neutral and independent not-for-profit Internet exchange providing services since the early 1990's. The AMS-IX platform will continuously provide you with high quality non-blocking professional peering services. We offer traditional peering services for all types of IP traffic whether data or VoIP. Moreover we host the first mobile peering points worldwide, the Global GPRS Roaming exchange (GRX) and the Mobile Data exchange (MDX), as well as solutions for broadcasting traffic with the Multicast peering service.

Furthermore, by peering at the AMS-IX you will also be in an excellent position to buy IP transit or other transport services from the many carriers present at our locations throughout Amsterdam.

We interconnect small and large "traditional" Internet Service Providers, international carriers, mobile operators, content providers, VoIP providers, application providers, web hosters and other related businesses - all unified in one Association: AMS-IX.

[Find out more about AMS-IX](#)

[Find out more about connecting to AMS-IX](#)

AMS-IX Vitals (15 Mar 2006 @ 09:35) :-



Members: 240
Ports: 285
Peak: 142.9 Gb/s
Cur: 86.5 Gb/s

[AMS-IX Vitals RSS](#)

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» Connect to AMS-IX

Reasons to connect

Membership

How to connect

List of partners

» Portals (restricted)

Help | I lost my password

Members

Housing

Partners

AMS-IX (staff)

Why connect to AMS-IX?

The reasons to connect to AMS-IX vary per connected member, a recent customer survey has shown the following selection criteria, in order of importance:

- A cost effective means of exchanging traffic
- A large amount of parties to peer with
- The quality of service offered
- The neutrality and independence (i.e. being an Association)
- The geographical location
- The type of connected parties
- The range of ports and services offered

Especially the two first reasons are strongly related and together score almost 70% (35% and 34%) as the most important reason to connect. The large amount of parties to peer with actually represents both a means for cost savings through reduction of upstream connectivity but in some cases even more important it means improving network performance by improving connectivity, redundancy and more direct traffic flows/shorter paths.

Many connected parties at AMS-IX have open peering policies. We find 69% of the responding members to have an open peering policy. The average number of peering given in the survey was 109.

What do we offer?

AMS-IX is dedicated to offering professional non-blocking peering services over Ethernet infrastructure. We have no restrictions on utilization of the port. Our platform is designed for continuous optimum performance using innovative technologies. AMS-IX is the first IX worldwide to use photonic switching in the core of the switching platform. Moreover it is the first exchange to offer 10GE peering services. AMS-IX has a very extensive IX service portfolio with ports from 10 Mbps to 10Gbps allowing both IPv4 and IPv6 including:

- Unicast peering VLAN – for regular IP peering all types of traffic – data & VoIP
- Multicast peering VLAN – especially useful for broadcasting streams
- Private Interconnects – between 2 members
- Closed User Groups – between 3 or more members
- GRX – the first global GPRS roaming exchange peering service (restricted)
- MDX – the first Mobile Data exchange peering service
- IP on demand – IP auction service of our member Telefonica

All these services will be available to you through AMS-IX membership.



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Preface from the Chair

AMS-IX's main aim is to continuously increase the value of the exchange to its members by increasing the number of parties connected and facilitating non-blocking traffic growth. In 2005 AMS-IX growth was again substantial, both in members and in traffic. The Executive Board was especially pleased with the firm uptake of the most recently launched 10GE service, this definitely served as a value increasing factor.

The Association's Executive Board elections resulted in another term for four of the sitting Board members. We are grateful for the trust the members place in the Board and the positive feedback we get for our manner of governing. We welcome Wilfried Dudink from Deutsche Telekom in our midst as the most recent member on the AMS-IX Board. Additionally, we thank Maurice Dean from Google for the time and effort he put into serving on the AMS-IX Board for 4 years, we will miss his unique and insightful contributions.

I trust that AMS-IX will continue to thrive in 2006 as market conditions are favorable and company management is focused on many value increasing developments for the Association's members.



The new corporate governance structure, adopted by the members in 2004 and implemented by the Executive Board beginning of 2005, served well. The responsibilities of the different organisational bodies are now clearly defined. The structure also served well in giving the AMS-IX company the operational flexibility it needed to sustain the 10GE growth. The growth resulted in sound financial figures for 2005, which ensure the continuity of the exchange for the Association's members.

On behalf of the AMS-IX Executive Board,

Boudewijn Nederkoorn
Chairman

Introduction

Though the AMS-IX organisation is quite used to the exponential growth of its traffic and linear growth of the ports and members by now, the uptake of the newly launched 10GE service somewhat surprised us. The company had expected to exceed the conservative forecast by some, however the achieved over-score on the 10GE port count (130%) was unanticipated. So setting the theme for the Annual Report 2005 was easy, it could only be 10GE.

Throughout this report you will find that this 10GE uptake permeated the whole organisation, not only technically but organisationally as well. In Chapter 1 the organisational impact and resulting events are given. Early in the year it became apparent that it would be necessary to soon take action, would this growth continue the way it was. We had scheduled for platform-upgrades later in the year when new-generation equipment would become available from the vendors. Now it seemed that would be too late in the year. The management team revised the budget and (investment) forecast and the network operating team came up with an intermediate platform plan. The laboratory was extensively used during the year. Chapter 2 Technical & Services will give the details of the platform transition in 2005.

Since 10GE represents quite an investment for the member companies, especially the router interfaces, many chose also to upgrade to multiple GE ports first. As traffic levels on their AMS-IX ports rose fast for many parties, the additional GE port take-up also increased considerable. As trunked or aggregated ports need to be adjacent, some of the switches were soon filling up for that use.

All in all we could not do otherwise than to stop selling (trunked) GE ports and 10GE's on some locations for a short time. In a commercial world this would be grand

of course, for AMS-IX, offering non-blocking services, always working on increasing the (peering) value for its members, it was less agreeable. Luckily by clever 'social engineering' of AMS-IX office and marketing, as well as real engineering by the NOC team obviously, we managed to keep the 'commercial' damage to a minimum and most members did not even notice. Chapter 3 goes into the details of the 'social engineering' relating to Marketing and Business development.

The Outlook 2006 and beyond will give insight in where we expect the market to go and how we position ourselves to make sure we will remain the non-blocking, high value exchange.

The financial picture given in the Summary of Accounts 2005 shows quite some difference with the original budget. Revenues are a lot higher than forecasted (+17%), as are the investments, thus depreciation and costs. The result is quite in line with the expectation (Euro 563 K).



General

After the 10th anniversary in 2004 of the first AMS-IX implementation, it was the first lustrum of the AMS-IX company in 2005. In this period the company matured into a professional service- providing business, servicing over 200 customers with a wide array of network implementations.

Organisation structure

In the beginning of 2005, a new corporate governance structure for the AMS-IX organisation was implemented by putting into motion new Articles of Association and company articles. The new governance was aimed at giving the company more flexibility in its operations. Moreover it was designed to protect the Association's members from pushing through generally unsupported decisions by a small group of peers.

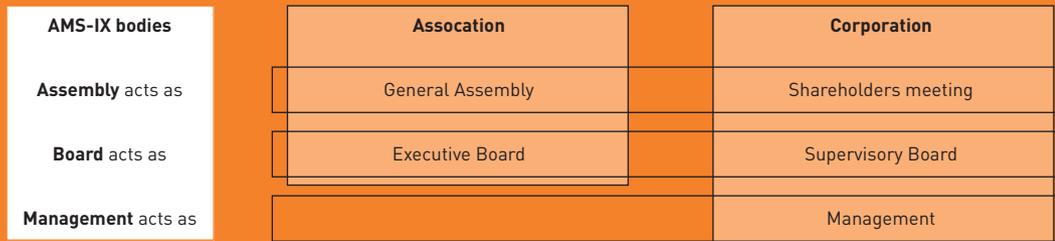
Unquestionably, with the encountered growth due to the fast 10GE uptake in 2005, the company really needed that flexibility in order to keep the platform stable and secure, so the changes were quite justified. Under the old structure additional General Meetings (GM) would have to be called for to agree on necessary extra investments outside of the original budget, needlessly slowing down platform upgrades.

The structure is quite straightforward, as the AMS-IX organisation bodies have dual functions, see the graphic below. The AMS-IX General Meetings represent both the Association's Assembly Meeting, as well as the Corporation's Shareholders Meeting. The same applies to the Board, both the Association's Executive Board and the Corporation's Supervisory Board consist of the same natural persons. Elections at the General Meetings are the most important instrument for the members to secure their interest for a relatively long period of time, while many of the short-term issues are delegated to the Board. This allows for faster action, while at the same time preserving the members' best interests. At every GM, the Board has to justify its actions to the members.

The Amsterdam Internet Exchange Association

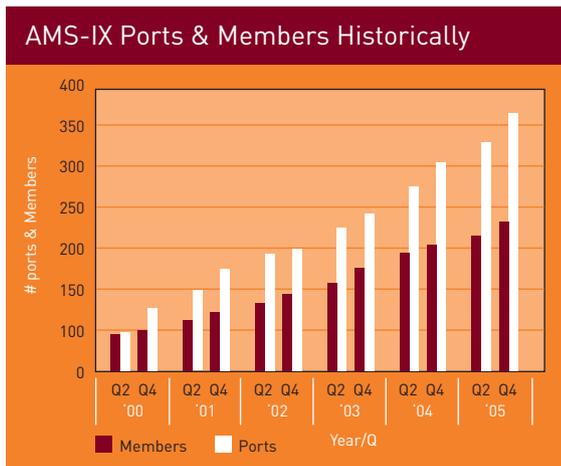
As always since the start of AMS-IX, the total number of members grew linearly in 2005, from 209 to 234 (see the member growth graph showing the number of members & ports from the start of the Association till 31 December 2005). The actual number of new members was a lot higher with 48 newcomers; however, the Association also lost a considerable number of members, 20 in total. The leaving parties were mostly smaller companies being acquired, dissolved or terminating for economical reasons.

AMS-IX Organisation Structure



The majority of new members (52%) have their home bases somewhere in Europe (excl. the Netherlands), with Germany and France on top with both 17%, followed by the UK with 13%, the rest distributed over several countries. New members from the US & Canada represented 21% of the total, quite an increase compared to previous years. The Netherlands' based new members were good for 27%.

As for the background of the members, we see more and more content providers and/or media companies joining. Another particular group of joiners are the VoIP providers. Though both groups are indiscernible from the traditional ISP's in the sense that they only connect to the ISP peering VLAN, no specific content or voice peering environments are set up at AMS-IX (at the moment).



Executive Board of the AMS-IX Association

Since January 2005 the Executive Board of the Association now also functions as the Supervisory Board of the Company. As such, the management of the Company reports to this Board. The Board represents the interest of the combined membership towards the company. Therefore, the Board composition should try to mirror all the dis-

tinct membership groups. Even though full Board elections were held during the November GM in 2005, there weren't many changes in the Board. Four of the five existing Board members were re-elected. Only Maurice Dean, who was not up for re-election as he had served two terms already, left the Board. Maurice Dean was replaced by Wilfried Dudink. The Board continues to have a well-distributed positioning across the distinct member groups: an academic network, an independent ISP, a content provider, a mobile network, and an international carrier.

Executive Board of the AMS-IX Association

Boudewijn Nederkoorn – *SURFnet (Chair)*

Michel van Osenbruggen – *BIT*

Jan Paul Dekker – *RTL Interactive*

Mark van der Laan – *Vodafone*

Maurice Dean – *Global Crossing (until 23/11/05)*

Wilfried Dudink – *Deutsche Telekom (from 23/11/05)*

Board meetings are held quarterly. These are also attended by the AMS-IX management. In the Board meeting the AMS-IX management briefs the Board on business progress and discuss new developments. In 2005, these discussions, amongst others, focused on the dependency of AMS-IX on the current co-location providers and the turbulence in this market segment. Security in its broadest sense is another of such topics. The outcome of these discussions is described in Chapter 5 Outlook 2006 and beyond. The considerable success of 10GE and associated additional revenues surprised the board and was positively received. Obviously, the earlier than planned investments in the platform to keep up with growth were agreed to without problem. Additionally, the Board guards the employment conditions at the company for which a new set of remuneration benefits was implemented in 2005.

General Meeting

The AMS-IX General Meeting convened twice in 2005, the 18th GM on May 25th and the 19th on November 23rd. The location of the 18th GM was unique, on the datacenter floor of Global Switch Amsterdam. For the 19th GM we finally decided on the Society for Old and New Media "De Waag", due to its excellent connectivity for streaming. We may use this location for future meetings for the same reason. Since 2005 it is legally allowed in the Netherlands to vote remotely using the Internet. As this application suits the AMS-IX model very well with many remote members that cannot always fly in for a days meeting, we immediately took it upon us to develop an e-voting application. This was a long standing request out of earlier GMs, but not yet a legal means of voting at the time.

In combination with webcasting the meetings and having an interactive IRC channel for questions and feedback, this offers a full remote meeting experience.

Though the e-voting has not been fully embraced yet by the remote members seeing the still low volumes of voters, the system has now been thoroughly tested and functions adequately. Webcasting has been adopted much more rapidly, on both counts the streaming server's logs show over 70 unique visitors.

The 18th GM focused amongst others on the presentation of the Annual Report 2004 for information and approval of the Annual Accounts 2004, both of the B.V. and the Association. Also formally approved was the four years Long Term Outlook 2005-2008 of the AMS-IX company, the means for securing the member influence on the 'commercial' strategy of the AMS-IX company. A barbecue was scheduled at the end of the day that was very well attended and much appreciated by the attendees. It served as a good means for some social interaction with peers. The 19th GM involved Board elections. The sitting Board nominated a new Board, with 4 of the 5 sitting members plus a new candidate, which was unanimously agreed on.

The annual operating plan for 2006, including budget and tariffs, was presented for the members' information. Due to the new governance structure, no formal approval for the budget at the GM is necessary anymore. The annual plan stems from the long term Outlook, which provides the operating guidelines for the AMS-IX company and is approved at the spring GM. The AMS-IX Board has been charged with the task of approving the annual plan and budget and approving of running changes in the budget due to new insights. Furthermore, the preliminary findings of the investigation into setting up an AMS-IX controlled switch location were presented and discussed. More on this topic in Outlook 2006 and beyond.

Last but not least, the preliminary results of the Member Survey 2005 were made available. These showed a similarly positive result as in 2004. More details are given in Chapter 4.

In conjunction with the GM and Technical Meeting (TM) in November, we held a theme track on Voice over IP/ SIP/ ENUM that was very well attended. Speakers from several member communities and the Dutch government provided a clear picture of national and international developments. Members enthusiastically embraced the fact that AMS-IX took it to heart to be a catalyst in these developments, though no clear statement was reached as to the exact role AMS-IX could play. Follow up on these topics through mailing lists and workgroups is planned.

Technical Meeting

The Technical Meetings are now held with the same frequency as the General Meetings, so one in spring (May) and one in autumn (November), unless there are pressing reasons to increase the frequency.

The technical meeting is always well attended, which was certainly the case for the 2005 meetings, on both counts up to 70 attendees. The fact that we had a barbecue

scheduled after the first one and the VoIP theme track adjacent to the second may have helped with attendance. The 22nd TM in May had quite some diverse topics next to the traditional platform overview update. The first live implementation experience of the Glimmerglass Photonic switches was debriefed as was the first experience with 10GE customer interfaces. Next, the impact of unnecessary ARP traffic on the peering LAN and the improvements we have made by implementing the so-called ARP sponge (also known under the name SpongeBob) were discussed. More details on the other topics of the meeting, e.g. the route-server and Quality Statement, in Chapter Technical & Services. The platform upgrade and topology changes due to the fast take up of 10GE ports were the main topics of the 19th TM. Furthermore, there was an in-depth topic on the developments in the AMS-IX Lab.

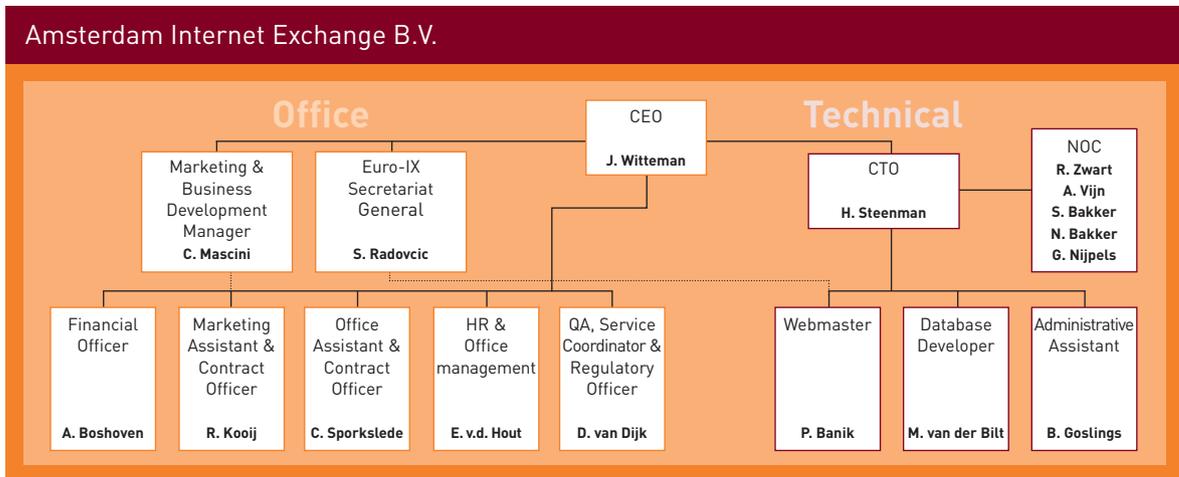
The AMS-IX B.V.

Amsterdam Internet Exchange B.V. is a limited liability company, which is 100% owned by the AMS-IX Association as a whole. The company manages all contractual relations, commercial and administrative tasks as well as the opera-

tion and support of the platform. All assets are owned by the AMS-IX B.V. .

All AMS-IX employees are in employ of the B.V. The number of employees of the company has grown during the year from 14 to 17 people, representing 15 FTE, see the company structure overview for functions and names. Two main 'departments' exist; the AMS-IX Technical team, operating and running the platform, and the AMS-IX Office responsible for all other disciplines. Strategic business planning is done by the management team, involving all disciplines.

AMS-IX B.V.'s Chief Executive Officer Job Witteman was the first employee to celebrate his 5th year of employment with the company, closely followed by Anneloes Boshoven, the Financial Officer. The team as a whole is steady and there has been no staff turnover, loyalty to the company is high. After a an external review on request of the AMS-IX Board, the remuneration package and fringe benefits for employees were renewed to bring the whole package within peer group boundaries.



The European Internet Exchange Association (Euro-IX)

Euro-IX was formed in May 2001 with the intention to further develop, strengthen and improve the Internet Exchange Point (IXP) community. AMS-IX was one of the founding members. With now more than 35 IXP's from over 20 different countries, Euro-IX offers a unique platform for IXP's to share information and discuss current topics and issues of interest.

Euro-IX provides its members a web portal to help attract further customers, several databases of information that are relevant to IXP's, mailing lists for current discussions, regulatory reports, and the opportunity for all member IXP's to come together twice a year for face to face discussions at Euro-IX Forums. Two very successful Forums were held in 2005, the first being in London, which saw a record amount of some 30 IXP's in one room, and the second being held in Prague in September. In 2005 Euro-IX began inviting IXP's from outside the European region to join the association. Within a few months IXP's from both Japan and the USA accepted this invitation and became Euro-IX's first associate members, bringing an even wider range of ideas and solutions to the table during Euro-IX Forum discussions.

While high profile IP related regulatory conferences were taking place in both Brussels and Tunis this year, there was a clear message from the IXP membership that Euro-IX should start looking into the possibilities of taking a more active role in representing the IXP community on certain public affair matters. December of 2005 saw Euro-IX's first Regulatory Policy Advisory Committee meeting which is looking to find a set of common regulatory interests from the membership.

Euro-IX continues to act as an information repository for trends and statistics in the IXP community. Overall European IXP Member peak traffic rose from 260 Gbps to almost 470 Gbps in the last 12 months while total connected parties rose from 1.720 to just over 1.900 in the same timeframe. The average European IXP now has approximately 60 connected parties and just under 17Gbps of peak traffic.

The Euro-IX Secretariat Services are still being operated by AMS-IX and will continue be until at least the end of 2007. In 2006, Euro-IX will again attempt to bring the international IXP community even closer together by accepting more IXP's into the association from even more corners of the world.



Serge Radovicic

Secretariat General





Word from the CEO

2005 has been an eventful, challenging year for us. Once again, continuing growth represented itself in various ways. Many new parties found our exchange and joined the AMS-IX Association to connect. Again, traffic amounts grew exponentially, breaking records.

The member count by the end of 2005 was 234, representing 365 ports, which was an increase of 28 members and 56 ports compared to 2004. A considerable amount of our member community consist of companies from abroad.

The Netherlands has a considerable broadband penetration: almost 60% of all households are directly connected to the Internet with broadband connections. That's over 4 million broadband subscribers in total, integrating the Internet in their daily activities.

Today's progressive developments in bandwidth demands pushed the AMS-IX platform to its limits. The most influencing growth factor was undoubtedly the 10GE service, which we had introduced to the members in October 2004. We forecasted a considerable take up of the 10GE service. However, we were pleasantly surprised by the number of 10GE ports ordered during the year. The high adoption rate has pushed the network operations center to anticipate to its extreme and a platform- upgrade had to be performed earlier than originally planned. Obviously, it's crucial for us to maintain intensive dialogs with our vendors in order to keep performing successfully. In search of next generation products, ISP too are pushing vendors' knowl-

edge and skills to the ultimate. Eventually, the development of a 100GE service at AMS-IX will be realised, it is inevitable.

The Board has allowed the AMS-IX management to revise the budget and (investment) forecast and the network operating team came up with an intermediate platform plan. With an 36% increase the revenue was considerably higher than the budget forecasted. Also, the company faced higher costs. On the other hand, the growth in numbers of 10GE ports being used caused the result to be equal to 2004.

The net result of the company was 17% higher than the original budget. The result is nearly exactly equal, as forecasted. It was forecasted to be lower, but ended up equal to 2004. The net result is 13% of the turnover, which we consider a satisfactory result. These financial results are beneficial for the continuity of the AMS-IX company. It enables us to further focus on future investments in new technologies.

One of our main objectives is to offer our members relevant, reliable and efficient services.

The conclusions we have distilled from the 2005 member survey provide an excellent chance to see how the AMS-IX Association and Company performances are appreciated by the members. Member representatives from various disciplines provided useful and mainly positive feedback. We are happy to have received such valuable input, which we will use to further streamline our daily service. We hope that next years' survey results will reflect similar responses.

We will continue to follow the industry developments and we are constantly informed by our members to enable opportunities for the community. Our skilled team will face an ongoing challenge in maintaining and improving the service level, which our members expect from us.

Job Witteman
Chief Executive Officer

AMS-IX Technical Team

Henk Steenman, the Chief Technical Officer, runs a team of professionals, as was confirmed again with the findings of the member survey. The members' opinion of the technical expertise of the AMS-IX engineers is rated between 8 and 9 on a scale of 10. The engineers had a heavy job in 2005 as you will see in the following chapter, so they were very pleased to find their efforts were appreciated. The technical team was extended with 2 people who both have part-time functions, one as webmaster, the other responsible for technical administration. By adding these supporting functions, less of the engineers' time needs to be spent on 'peripheral' activities.

AMS-IX Office

Main activities of the AMS-IX Office are Marketing, Contract administration & non-technical member support, Finance and Regulatory Affairs. This team was extended with a part-time HR assistant.

Related to the high number of 10GE and aggregated port upgrades and new members, the contract administration and non-technical member support team was kept on its toes this year. Even though the team had improved the efficiency many-fold in the year before, it was quite a challenge to keep up with the quality of service specifications regarding contract changes and feedback. The number of questions, requested changes, up/downgrades and additional ports scored new highs every month with the exception of July 2005 which traditionally, anywhere in Europe, is the slow-month of the year. So when the good-to-excellent score came back in the member survey on these topics we were glad to establish the members agreed on the teams' efficiency and quality. In the future the planned "My AMS-IX" feature on the Member Portal should help the team in even further improving its efficiency and service.

Additional revenues due to the success of 10GE paint a sunny financial picture for 2005 as you will find in the Summary of the Annual Accounts. New investments had to be done ahead of schedule though, so the Financial Officer had to continue and even tighten the strict policy regarding outstanding payments to keep the operational cash flow position healthy.

The days outstanding for invoices decreased somewhat, though not as substantially as in 2004, when the strict enforcement using the disabling & termination procedure was first implemented. As managing cash flow becomes increasingly more important to ensure the continuous expansion of the platform and to fulfill commitments made to members and suppliers, the strict enforcement of policy and payment terms might even be tightened further in 2006.

The time investment in governmental relations in the last year has ensured the opinion of AMS-IX at several administrative policy levels is a positive and informed one. We are being kept informed on, or participate in the major applicable governmental projects and surveys. We are informed that the Dutch opinion of DGET (Directorate General Energy and Telecommunications, part of the Ministry of Economic Affairs), the main government body on Internet regulation, is one supporting self-regulation as long as general market conditions are positive for all parties. On a European level, we are working through the Euro-IX regulatory service which actively researches and informs on a European level. In 2005 it was decided that Euro-IX will look into the possibility of actually lobbying for the community. Proposals will be made and voted on during the 8th Euro-IX forum, to be held in May 2006.



History of AMS-IX

- 1994 In the Science Park in Amsterdam a layer-2 shared infrastructure had been formed between (academic) organizations to exchange traffic. In February 1994 it was internationalized to exchange traffic with CERN in Switzerland and other ISP's were allowed to connect. The name AMS-IX was first used.
- 1997 The twenty connected Internet Service Providers and Carriers found the AMS-IX Association. Founding members are: SURFnet, NLnet, AT&T EMEA, Unisource, BT, KPN, XS4All, Global One, Euronet, EUnet, Wirehub, Belnet, RIPE NCC, Demon, IXE/PSI, Telecom Finland, IBM GN, A2000, UUnet/MCI, GTS Europe (Ebony)
- 1998 The Multicast VLAN is implemented for test-purposes and the first IPv6 tests are done. The volume of all connections increased from 4.5 Tbyte September 1997 to 26.3 Tbyte September 1998 or some 81 Mbps on average traffic rate over the month.
- 2000 The Association forms the AMS-IX limited company, AMS-IX B.V., and holds all its shares. All assets and contract obligations are transferred to the company. Technical management remains with SURFnet who subcontract the daily operations to SARA.
The Gigabit Ethernet service is launched.
The 100th member is connected
- 2001 AMS-IX extends the platform to two other sites in Amsterdam, Telecity-II and Global Switch.
- 2002 The operations management of the exchange is in-sourced to the AMS-IX company, a professional NOC is formed.
The total aggregate traffic at December 31st is 22 Gbps.
- 2003 AMS-IX becomes the IX with the largest number of connected networks worldwide with 178 members at the end of the year.
- 2004 The platform is migrated from a ring to a double star topology, photonic switches are deployed by an Internet exchange for the first time.
The trunked Gigabit and 10 Gigabit Ethernet Services are launched.
- 2005 AMS-IX becomes the IX with the highest level of public exchange traffic worldwide, the 5 minute average high of the aggregate traffic now reaches 120 Gbps for a total of 234 members.

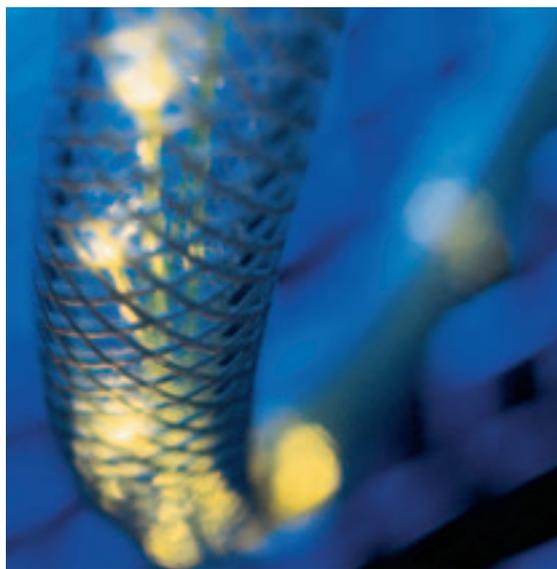
What is an Internet Exchange?

As a network of networks, the Internet builds onto the reliability of these networks' interconnection. This is where Internet exchanges come into the picture. At the Internet exchange, the networks of Internet Service Providers, telecommunications carriers, content providers, web-hosters and the like, meet to exchange IP traffic with one another. Exchange points offer a shared infrastructure for these networks to interconnect with each other through one connection, without having to directly connect on an



individual basis with all the other networks. This exchanging of national and/or international IP traffic at an Internet Exchange is generally known as 'peering'. AMS-IX is one of the world's largest Internet peering exchange points.

Every member at AMS-IX is in the position to peer with any or all other connected parties, although they are not required to. Each member might have a different peering policy and this policy may differ, depending on the party that is negotiating with them. Peering is mostly done without an exchange of money and based on a balanced situation where parties have a mutual benefit. This mutual benefit is generally established by the traffic and routes send and received, so unless parties have a fully open peering policy regardless, they will peer with parties of about the same size in traffic and reach.



Technical & Services

After 2004, in which the platform was migrated topology-wise, completely upgraded and new services were implemented, the technical team was all set for a less eventful year. It was not to happen. As can be read in the Introduction, the theme of 2005 could only be 10GE. This was especially true for the technical team. The 10GE service was launched in October 2004, however the real take-up came in 2005. Initially the platform- forecast catered for 16 10GE ports at the end of the year: we ended up with 37 operational and 8 assigned but pending 10GE ports at 31 December 2005. Just those numbers alone tell a significant part of the story the teams' challenge for 2005.

The Network Operating Centre

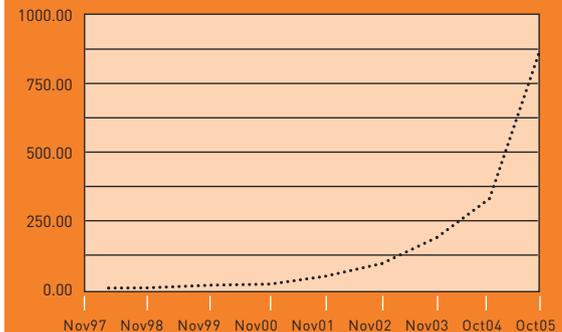
The NOC team keeps the AMS-IX platform operational 24x7x365. The team consisted of 6 skilled engineers in 2005. These engineers do not only perform the usual NOC duties of configuring switches, but are also responsible for all other platform engineering such as research, design, implementation and maintenance.

The platform was very stable and shows high availability rates of the switches for 2005 (99.9%). The platform parameters are now shown on an ongoing base through the performance matrix on the website. Also, for members' convenience, a monthly availability report is published online. The availability report shows the results of unidirectional tests performed on the AMS-IX peering LAN between the switches, both for delay and jitter. More on this under Services - Quality Statement.

Volume and Traffic Rate

The aggregated traffic volume on the AMS-IX platform has doubled in 10 months. In November 2004 it passed the 10 Petabyte per month mark for the first time. In September 2005, it first passed the 20 Petabyte. Taken over 2005 as a whole it increased from 11.1 in January to 26.4 Petabyte in December.

Average traffic Tbyte/24 hour



The regular monthly volume increase is mostly between 10 and 13% depending on the month: July and December being low and September-November being high volume growth months. For 2005, July showed only 1% growth and surprisingly August was the largest grower with 16%, supposedly due to the turn-up of several new 10GE ports early that month. As for the traffic rate, some new records were broken again. The public exchange traffic max (5 min peak aggregate) in January started off at just under 50 Gbps, in August we crossed 75 Gbps and in October 100 Gbps, to close off the year at just under 120 Gbps. Even though this in principle represents the normal exponential growth we are catering for regarding traffic, it seems phenomenal.

Word from the CTO

The year 2005 will definitely be remembered as the year of massive uptake of 10GE at AMS-IX. Growing from a couple of 10GE connections at the beginning of the year to 37 at the end was really more than we expected and very much filled up the capacity we had in the platform. The large scale deployment of the Glimmerglass Networks photonic switches as 10GE edge switches helped a lot. Using these to move customer connections between Ethernet switches when upgrading and extending the network has proven to give us a very large amount of flexibility. Also the right-on-time availability of the Foundry networks RX16 with 64 10GE ports has given us the ability to handle both the necessary port density for 10GE customer ports and the amount of ports necessary for the inter-switch links. Using the above mentioned equipment and the already announced platform upgrades, we are confident we can handle the further growth of the port and traffic densities.

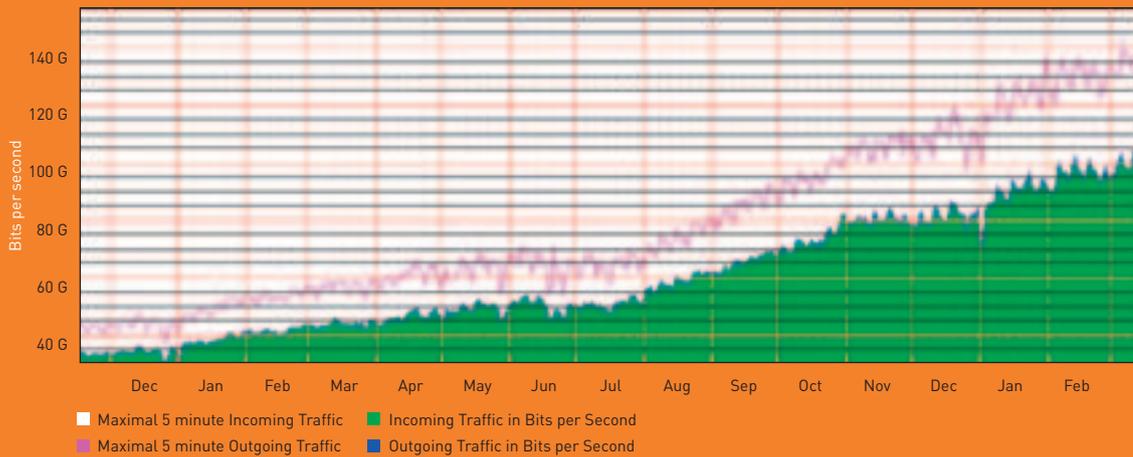
Apart from upscaling the network, we have extended the AMS-IX NOC with an extra engineer and some dedicated workspace. This allows us to better cope with the ever growing workload. This workload not necessarily being the management of the switches, but more so building the network extensions to handle the demand. For 2006 we expect to see a continuation of the trends started in 2005. More 10GE connections, take up of aggregated 10GE



connections by members and again more than doubling of the traffic. The one thing that bothers us however is the fact that the standardization processes for the successor of 10GE, which in my opinion should be 100GE, has not even been started and we are confined to link aggregation for high bandwidth links. I sincerely hope that pressure from the customer base of the different switch vendors, incidentally our members, will be applied so they will feel the priority and market demand.

Henk Steenman
CTO

24 hours average Traffic Rate

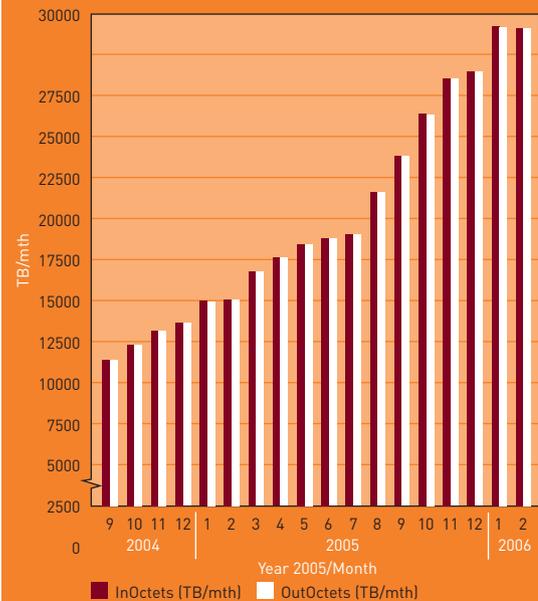


The daily minimum traffic almost doubled from a 30 Gbps average to just under 60 Gbps, showing somewhat smaller growth compared to 2004, when it tripled.

Connections

At the end of 2005, there were 365 operational member ports on the platform, an 18% increase from the year before. The actual gained number of new and additional ports was 110, but due to upgrades, especially to 10GE, and terminations we also diminished with 54 ports. The main gain was in 10GE ports with 33 new ports the highest grower to 37 in total. The number of 1GE ports grew by 14 to 188. The GE ports of type LX/LH, generally used for connecting from a remote site, increased by 55%. Most new GE ports were of that type. Additional GE ports ordered by existing members logically mainly use SX interfaces, as most members are already on-site. Even the Fast Ethernet and Ethernet ports grew marginally, with 5 and 4 ports respectively, to 90 FE and 50 Ethernet ports. The growth of the 10 Mbps ports comes solely from the mobile community who connect to the GRX or MDX VLAN.

Volume per month (TB)



The average number of ports per member increased somewhat further from 1.48 to 1.56. In fact, there was a relatively sharp increase in the first quarter when quite some trunked GE ports were ordered by members, then dropping back later in the year when the same companies moved to 10GE.

Locations

Due to the success of 10GE, which was first offered at NIKHEF, there has been no growth in number of ports there for the first time in years. The port count actually went down from 121 to 120. This is by no means a negative trend as it is due to the migration from members from trunked GE ports to 10GE. Looking at the traffic that is exchanged within the NIKHEF switches and to and from NIKHEF to the other sites, growth has been tremendous. The next site where 10GE was offered -Telecity2- is now also the second largest site with 113 ports, just surpassing SARA's port count of 107, at the end of the year. SARA

'suffered' from the same trend as NIKHEF where trunked connections were traded in for one 10 GE. Teleticity picked up more of the new single GE ports.

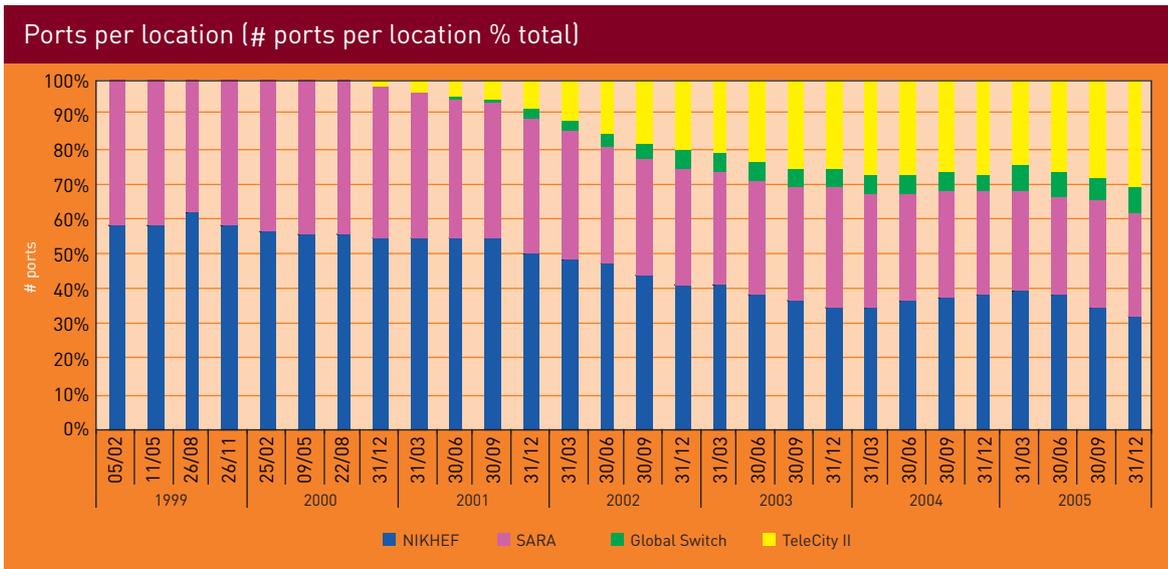
Global Switch grew from 15 to 25 ports, as 10GE was not offered here in 2005 it is a substantial growth in GE ports for this location.*

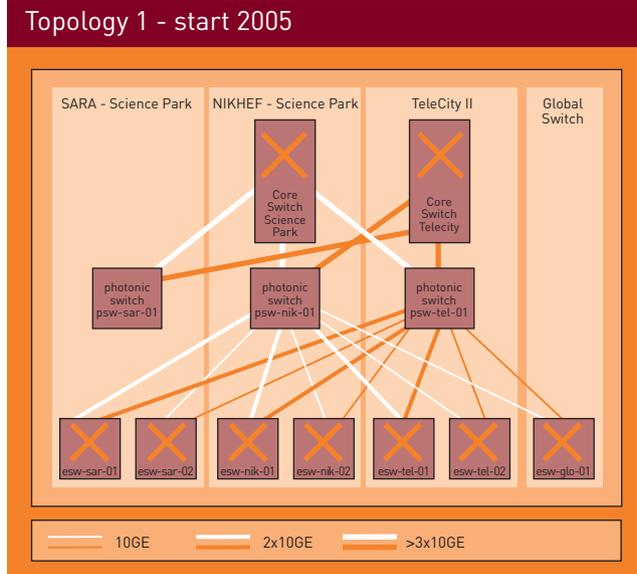
The distribution of the 10GE's over the 3 sites where it was offered is even, NIKHEF and TC2 both have 13 ports and SARA has 11.

Topology and Architecture

The hub/spoke topology we implemented in 2004 functions very well, especially with the extensions implemented in 2005. We started the year with two Foundry Networks Mucho Grande 8 core switches (MG8), one in the Amsterdam Science Park and one at Teleticity2, 3 Glimmerglass Networks System 300 photonic switches and 7 Foundry Networks

*Global Switch will be 10GE ready in Q2 2006.





BigIron 15000 edge switches (BI15K). Each of these edge switches is connected to either core switch. Members with a 10GE port are connected to the photonic switches. These L1 switches connect the member 10GE ports to the relevant MG8 switch. See Topology 1.

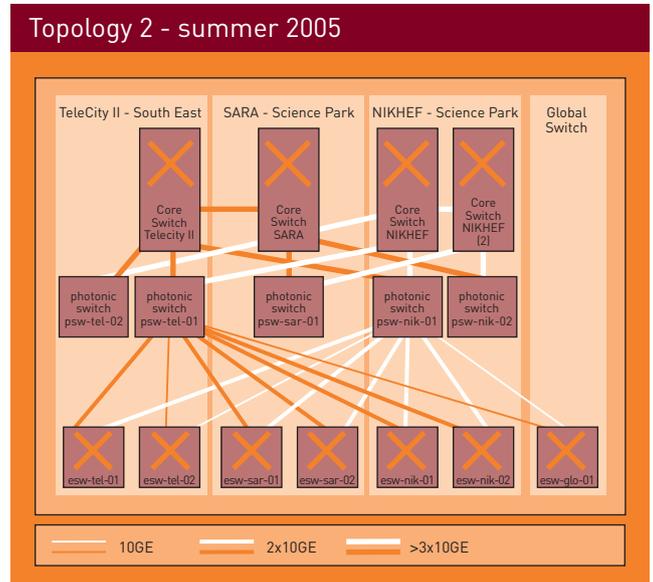
The two core switches run VSRP (Virtual Switch Redundancy Protocol) to define the active hub/spoke and to automatically fail over to the other, based on pre-defined triggers (e.g. link failure). The BI15K edge switches follow VSRP automatically, the Glimmerglass switches follow the VSRP failover based on software developed at AMS-IX. Members can connect to the AMS-IX infrastructure at any of the four AMS-IX co-locations, at 10 Mbit/s, 100 Mbit/s, 1 Gbit/s or 10 Gbit/s*.

Topology 1 – start 2005

The topology at the end of 2004 could cater for 16 10 GE connections. In the first quarter of 2005 it was already

*Global Switch will be 10GE ready in Q2 2006.

quite clear that 16 10GE ports would not be enough for 2005. As larger switches were not yet available at the time, the technical team decided to double the 10GE capacity by adding additional MG8 10GE access- switches directly connected to the core. See Topology 2.



Topology 2 – summer 2005

Now the main bottleneck of this new topology was the inter-switch link capacity as every inter-switch trunk part of 10GE takes up a 10GE port. Members turned up 10GE and trunked GE ports every day and almost instantly filled them to considerable load, so it was a challenge to keep up with the upgrades. The new set-up would allow growth up to 34 member ports of 10GE. The stub switches at SARA and NIKHEF allowing for 24 10GE connections at these locations, while the core switches at NIKHEF and Telecity2 allowed for another 10 10GE connections at Telecity2. The inter-switch capacity reserved between the stub switches and the core was 8 10GE interfaces, allowing

for a factor of 3 overbooking between stub and core switch. Practice has shown that this is a safe factor. In the event we see this overbooking ratio change we can always move the member 10GE port to another switch with no service

interruption. This is the strength of the Glimmerglass photonic switches in the platform.

However, the growth continued and when 19 10GE ports had been ordered and another 10 or so were expected by

The AMS-IX Laboratory

Although it is their duty to keep AMS-IX up and running, NOC engineers do spend quite some time and efforts in harming proper flows of traffic. Well... not the traffic between AMS-IX members of course. Those bits are sacred. This is about torture testing with generated bits. Bits generated in the AMS-IX lab.

Maintaining a network lab distinguishes AMS-IX from many other exchanges. Currently, the lab has 15kW of power and cooling capacity, two 19" cabinets and a big and very strong table to put heavy switchgear on. Patch panels above that table provide a flexible way to connect to a Glimmerglass photonic switch and two Anritsu MD1230A data quality analysers. These powerful analysers can generate, count, measure and capture traffic up to 10 Gigabit per second. The photonic switch and the Anritsu testers may be considered the heart of the lab.

Figuring out when and why things don't work ensures stability. Via experimenting and testing, an in-depth understanding in the capacities of equipment is gained. Often, the results are surprising, even for the vendors. The time-to-market of latest 10GE equipment is short. Due to the growth in traffic, AMS IX can't afford to wait until these products are majored. In-house testing proofed to be crucial to accomplish the relative short and smooth introduction of the RX16 switches in 2005.

Every piece of equipment and software image is put to the test in our lab before it is taken into production. Nevertheless, these efforts do not mean that AMS-IX will be free of trouble. The production environment seems a never-ending source of new challenges. Not to mention the risk of hardware faults.

Most of the newer lab kit is also spare equipment. Once a circuit board breaks down, it is replaced quickly with a card out of the lab. This prevails over any experiment, no matter how exciting that experiment may be. When spare parts are needed, we stop the work and continue at a later time. Good experiments are reproducible anyway.

Besides testing for trouble, we also try out new ideas to improve our stability and increase capacity. Last year we took a look at optical amplifiers and 10GE capturing. The latter will be a big focus point for 2006.



Ariën Vijn

Senior NOC engineer

The lab is open for all AMS-IX members. Last year a few members found their way to the lab. We hope to welcome some of you this year. However, our capacity is limited.

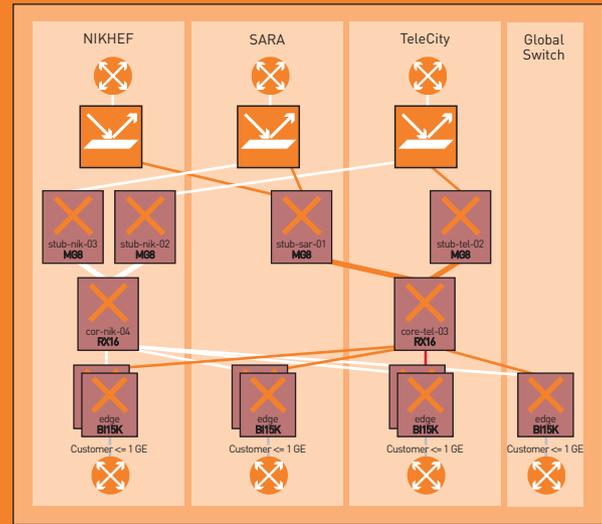
Please contact us at noc@ams-ix.net if you are interested.

July, it was apparent that some more extensions would be necessary to cater for the 10GE growth. Luckily, in the meantime our supplier, Foundry Networks, was almost ready to start shipping out the new RX16 switches with double the port capacity of 64 10GE interfaces. The NOC team had been testing the RX16 in the Foundry laboratories in San Jose extensively in August. It performed well and the team was eagerly waiting to further test them in our own labs before putting them in operation. The RX16's arrived in Amsterdam in the second half of October, initial local testing ran into some bugs delaying the implementation schedule for November by several weeks. The first RX16 was operational at NIKHEF on the 6th of December 2005, the second one at TC2 was operational on the 21st of December. Initially, no member connections were linked to the RX16 switches, they are used as new core-switches, interconnecting the BI15k edge and MG8 10GE access switches. The 10GE member ports are all connected to the MG8's now called stub-switches. Taking account of the inter-switch links between the MG8s and the core RX16s, the MG8s will allow for up to 24 10GE member connections. See Topology 3. Since the RX16 switches are rather new, the photonic switches were used to migrate to this new topology step by step. We were able to fall back to a known-good situation in case of problems. Together with the double core infrastructure, which is already the basis of our network design, this approach allowed for a smooth migration. Even though, there were more maintenance windows and VSRP swaps than usual. At the end of the year there were also a number of instances where some of the older BI15000 switches had problems that resulted in a high CPU-load and had to be reloaded. Although suspect, we have not been able to link these issues to the platform upgrade.

Topology 3 – End of 2005

We were able to bring a number of still waiting 10GE member ports operational in December due to the freed up

Topology 3 - end of 2005



capacity on the MG8 switches. The year-end topology allows a growth up to 48 member 10GE ports. The forecast for 2006 shows a figure much higher than that, so additional upgrades and extensions will be necessary again.

Research & Development

Our lab showed its weight in gold again this year. All the platform changes, both software and hardware, can be tested before being implemented, thus increasing the stability of the operational platform. Some members used the lab to test their planned (10GE) exchange connections with their Layer3 equipment. Other exchanges were able to test their planned Layer2 upgrades and extensions.

Services

Quality Statement

To show our aimed-for service levels more clearly to existing and new members, AMS-IX developed a Quality

Statement. The statement defines the service and service levels we adhere to, including demarcation points, service delivery lead times, platform availability and quality, the trouble ticket support and maintenance procedures. The availability and quality parameters such as packet loss, jitter and delay, are measured on a continuous basis using the trusted third party TTM service of the RIPE NCC, for which measurement units have been placed at all sites.

Route-server

During the 16th Technical Meeting, it was decided that a

route-server was generally a wise item to place at AMS-IX. It saves members a lot of configuring work whereas the investments necessary are minimum. Especially the smaller members can benefit. Large members generally have not much advantage for peering with smaller entities, but they may do if it is no hassle. Also, it may relieve load on BGP peering tables and thus router CPU's, especially for those that have an open peering policy.

The route-server was released in Beta this year but has not moved beyond that stage yet.

Supplier Eurofiber says...

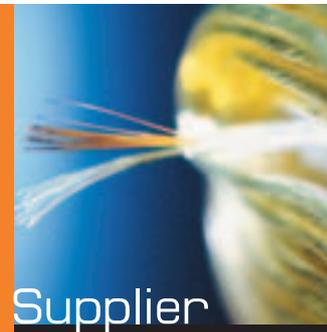
Capacity to grow

For high-speed, cost-effective connections between their sites in Amsterdam, AMS-IX turned to Eurofiber, the only specialised provider of managed dark fiber in the Benelux and the owner of the largest fiber-optic network in the region.

Eurofiber's multiple dark fiber pair connections provide 10Gbps of capacity each, ensuring plenty of bandwidth and no delays for the high volumes of data generated by members. And flexibility is built in. As demand grows, AMS-IX can expand capacity quickly and at no extra cost by simply changing the network switch settings. New pairs can also be added rapidly, creating virtually unlimited bandwidth. And monthly contract renewal allows AMS-IX to adjust its requirements swiftly to meet changing market conditions.

As AMS-IX and its members rely on the connection for their core business they need the highest possible availability and security. Eurofiber ensures both. Our superior-quality, fully subterranean infrastructure is monitored 24 hours a day using the latest technology. We also guarantee a unique repair time turnaround of no more than 8 hours.

Eurofiber is pleased to provide capacity that AMS-IX can rely on – now and for many years to come.



Joost Goderie

Chief Executive Officer

eurofiber

Marketing and Business Development

The 'commercial' strategy that was initiated in 2004 was carried out further in 2005. The positioning "AMS-IX leads the way in global peering services" clearly paid off and the AMS-IX footprint broadened, as more new parties from abroad joined the member base. The marketing activities stem from the AMS-IX mission which is aimed at preserving and increasing the value of the exchange for its members.

Important values in the AMS-IX charter are being reliable and capable, open & accessible, proactive and to inspire trust. These values are all incorporated in any business action the AMS-IX company undertakes, including marketing.

Member Relations

As AMS-IX has no sales department, most of the member relation management, other than contract administration, is part of the marketing job. It definitely does not involve account management- type activities that you would find in a commercial organisation. Most of the member contact persons would not even appreciate that kind of attention. Rather, it involves being available and accessible for questions and feedback by phone, at conferences, online by e-mail, instant messaging and even through IRC channels. Additionally, it is about social engineering, not in the hacking sense, but in being part of the social peering and IXP-community.

The fact that the member relations are managed more actively now than previously, has resulted in more inter-activity with members and more awareness of AMS-IX in the community during 2005.

Products & Services

Having just extended the basic IX service portfolio with aggregated GE and 10GE services in 2004, we actively reviewed the portfolio in 2005. Could we offer more 'peripheral' services to make it easier for the members, launch added value services, further extend the basic portfolio? The SWOT analyses done for the Outlook 2005-2008 pointed us in a number of directions.

To further professionalise the basic services, and as an answer to commercial competition at the time, we issued a Quality Statement (QS), describing the high service levels AMS-IX aims for. The QS is based on the TTM measurement service offered by RIPE NCC that we implemented.

Amongst others, to decrease the router processing load of the members with a large amount of peering sessions, we implemented a route-server. Though at the end of the year the route-server was still in Beta and not many parties were peering with it yet. Seemingly, the member requirement was less pressing than assumed.

We took steps towards having value added services for Voice over IP peering at the exchange and will continue this project in 2006.

Pricing

AMS-IX price strategy is purposely very simple and straightforward. We continued this in 2005. Members appreciate the simple structure of just a fixed monthly port price. Moreover pricing is costs-based, fitting the not-for-profit environment we operate in. First and foremost principle in price- setting for us is operational cost recovery (switchpark, personnel, housing & facilities),

second is continuity (cash flow, reserves, innovation), third is customer expectations and last is competitive positioning. None of the price levels changed in 2005.

Communication & PR

Our website is our most important communication channel, both to our community and to the public at large. In 2004 we did a complete restyle of the site when implementing the new house-style and as a result it was quite stable in 2005. We added some features and additional content, but other than that there weren't many changes. Media attention for AMS-IX increased in 2005, partly due to our increased public relations efforts and partly to general raised

awareness related to the news around the World Summit on the Information Society (WSIS) in Tunis in November 2005. The latter resulted in quite some free publicity in national newspapers and online publications.

AMS-IX issued several press releases on relevant topics. Amongst others: a release describing the diversity of the member base and new types of members joining, the AMS-IX barometer, reaching 100Gbps, several joint marketing initiatives (S&D/PAIX, Neustar, Telehouse) and some conclusions from the member survey. Remarkably, the least serious release "The AMS-IX barometer", related to the analysis of traffic showing events in society, like the Pope's passing and the first warm summer period,

VoIP Peering

Voice over IP increasingly emerges as a product for Internet Service Providers as part of a triple play strategy. Peering of voice-calls, voip- peering, is a way to offload calls before they hit the PSTN network.

AMS-IX acts as a catalyst in the Dutch and European VoIP environment, actively stimulating initiatives and bringing parties together. For this reason we organised a theme track about Voice over IP, ENUM, SIP services and VoIP-peering in conjunction with the 19th General and 23rd Technical Meeting. Currently, we are investigating the kind of role we could or should play in the VoIP arena.

Due to the unblocking, low-latency nature, the quality of service of the AMS-IX Ethernet platform and the redundancy of the infrastructure it is typically suited for VoIP peering. Furthermore, the large amount of connected service providers that can be reached makes it a cost-efficient environment.

Several parties are planning to offer specific Value Added Services for VoIP- peering over the AMS-IX infrastructure. We welcome such initiatives and will generally support them if they benefit the members. In the end it is our goal to enable as much VoIP traffic, as any other IP traffic, between parties.



Geert Nijpels

NOC Engineer

was picked up almost the best, at least nationally. This might have been due to the timing, deliberately around the start of slack time in summer, though the accessibility for the public at large has certainly not hurt the publishability factor. We may periodically issue a similar type of release for the media to use as background for several purposes. The release that got the most exposure, both nationally and internationally, was the one we sent out upon reaching 100Gbps peak in October 2005.

Events

Apart from the official meetings, AMS-IX organised a number of other events. Together with LINX and NetNod we organised a Birds-of-a-Feather, or BoF session, during the RIPE50 meeting in Stockholm. It was the first time such a session was held at RIPE and was mainly peering personals and discussion on some topics brought to table. The session was concluded with a peering drink, where people could socialise and discuss the peering personals. As a result, RIPE scheduled an official peering track for the RIPE51 meeting in Amsterdam.

During that same RIPE51 meeting AMS-IX threw its annual party for the conference attendees and AMS-IX members at the popular Club Odeon. As in previous years the party was very well attended and received many positive references. As the number of North American members have increased considerably the last two years and they are not always able to attend the Netherlands/Europe based socials and events, we decided to also organise a social event at the NANOG35 meeting in Los Angeles. Together with LINX, we held a dinner that was well attended and valued by those present.

Sponsoring

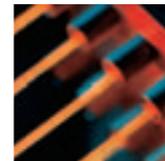
The not-for-profit attitude of the AMS-IX company makes that we have a limited sponsor budget. Sponsor projects are carefully chosen. We prefer costs-based community or industry related events and projects. Examples are the

Dutch ISP Kart-competition, the Grid Forum Summit, Peering Forums and RIPE meetings. The projects should give us some value in return, for instance member benefits or communication attention (press releases, community exposure). Additionally, we sometimes sponsor (events of) our members or relations in kind by (temporarily) providing an exchange port for their use. The latter can also apply to 'Good of the Internet' projects. AMS-IX stimulates and supports these types of projects that in the end will benefit the Internet (community) as a whole.

Since we represent a unique industry association, requests for sponsorship of AMS-IX in various ways, are often offered. We are very reluctant in having our events sponsored to avoid commercialisation. In the rare occasion that we do allow sponsorship, our members and partners in the AMS-IX partner program and joint marketing programs get preference. In 2005 we had several of them sponsor cocktails during the AMS-IX party, which was a huge success. It certainly further juiced up the party without additional costs.

Partner Program

In the second year of its operation, the AMS-IX Partner Program, or APP, matured into a well organised channel for members to join AMS-IX. The partners that have signed up differ from each other, from ISP's with capacity to spare to carriers to co-locations, each providing their own unique type of one-stop-shop including the AMS-IX port. In 2005, 20% of the new members came to us via the partner program, this amount is lower than we had initially anticipated. Upon starting the partner program it was the intention



to have all parties that wanted to connect remotely (via MPLS, draft martini) come in via the APP. As not all carriers could join the APP due to the billing requirements we set, we decided to allow remote connection outside of the APP as well. As a result, this decreased the number of connections via the APP.

The APP allows AMS-IX relations to re-sell AMS-IX ports as part of their own service portfolio. The model is aimed to provide easier (remote) access to AMS-IX without jeopardizing the mutual benefit or neutrality. The partner takes care of customer relation including billing and first line support.

All parties interested fitting the requirements may join the program. However, the requirements are strict enough to be able to protect the good name and technical stability of the platform.

A balance in the composition of the group of partners is starting to form, for more remote geographic coverage we will aim to add some US and Asia/Pacific based partners in the future.

Referral Program

Frequently, our new members are referred to us by existing members or relations. AMS-IX highly appreciates these referrals since more parties at the exchange mean more peering opportunities, making the AMS-IX platform even more attractive to peer at.

To show our appreciation, we have developed a referral program where parties can join to receive a (modest) bonus upon bringing in new members. The party has to qualify upfront to meet certain requirements and agree to a Statement of Conduct to be entitled to the referral bonus.

Joint Marketing Programs

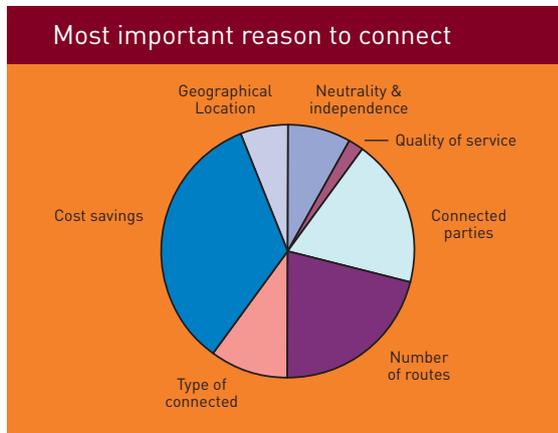
AMS-IX has established several joint marketing programs with parties in or related to the IX industry in 2005. We

enter these joint marketing programs on the basis that the parties involved bring added value to the AMS-IX members. AMS-IX never has financial gain through the programs and only acts as an intermediary for its members. Moreover, these understandings or agreements are never entered on an exclusive base.

Two of the programs involve extending the AMS-IX footprint to other IX participants' bases, namely Switch and Data/PAIX and Telehouse. The other that we started off is with Neustar that allows VoIP value added services to be offered to the AMS-IX member base.

Member Survey

The member survey of 2005 showed responses from almost 40% of the members. On general topics like the joining process, the feedback on questions, living up to expectations all scores were "As expected" or somewhat higher.



The reasons to connect to AMS-IX did not change much in relation to last year, the main reasons are given in the graph. The real high scores were given for the NOC team engineering competence (8.5 out of 10) and service levels, on most parameters scores good to outstanding. As this is

AMS-IX' core competence, we are really glad members appreciate our efforts.

The majority of the respondents answered to have an open or semi-open peering policy (86%). The people taking the survey have a good experience with finding peers and negotiating peering, though some valuable feedback tips were given to improve finding peering information. AMS-IX members generally peer with a lot of unique ASN's, 65% peers with over a 100 networks.

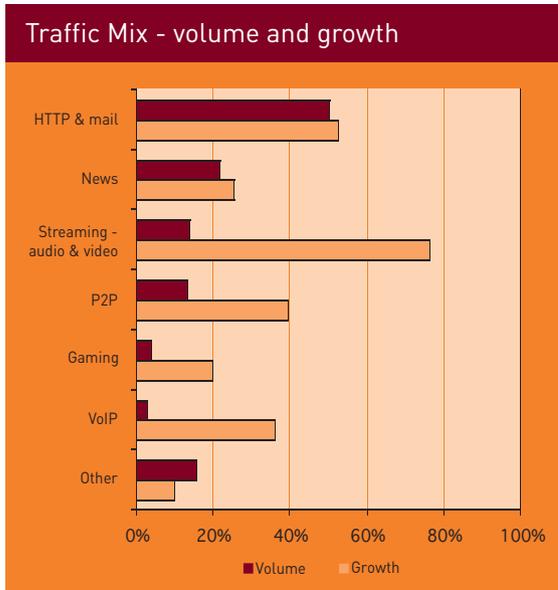
We asked the respondents to give us feedback on their current traffic mix and the expectations for growth. The respondents claim HTTP & mail is still the largest chunk of traffic out there and also still growing, mainly due to new take up of xDSL subscribers. Streaming video & audio is by far the fastest growing traffic. News is sizable but not growing as much. P2P we had expected to be a larger chunk though growth is forecasted to be considerable for the coming period. Due to the large uptake of subscribers,

VoIP is suspected to grow fast but traffic will not be that voluminous due to its nature. The picture shows current volume and largest growth areas.

Regarding future services, Private Interconnects by AMS-IX, that are not run over the switching platform like the current offering, is desired by almost 60% of the respondents. AMS-IX will integrate this in the requirements for future platform planning. Lots of interest also in developing VoIP/SIP/ENUM value added services around the exchange (63%). Seeing the developments during the most recent General Meeting on November 23rd 2005, we will surely stimulate all initiatives around this topic.

On co- location the opinions are less unanimous. Most respondents are more or less satisfied with the current co- location choice, though there are sizable groups at both ends of the spectrum. The respondents are divided exactly 50/50 about extension to other sites in Amsterdam. A majority of 60% would support colo- independent alternatives offered by AMS-IX. Of the people that are less satisfied with the current alternatives, obviously 90% wants us to extend to other sites and 70% would welcome an independent alternative by AMS-IX.

Again, AMS-IX scores high in value for money. 96% Of the respondents agree that the connection is worth (more than) its costs. The other 4% are connected for other reasons like autonomy of network, strategic choice or the marketing value. Another high score is for "I am proud to be an AMS-IX member", which we highly appreciate and will do our very best to keep as high as it is. The marketing initiatives and AMS-IX social events are appreciated by the respondents; we will continue these in a similar fashion in the future.



Outlook 2006 and beyond

The growth in number of members and their traffic make that the AMS-IX team is always planning for the future, both short to medium term as well as long term, for as far as possible. The business planning cycle includes a long term Outlook that covers 4 years. Four years "Internet time" is more than a decade, perhaps even a century in conventional time. In Internet time the world could look very different in a period of four years. We include several scenarios in our Outlook and even those could all be proven inaccurate. Then why do we do it? The alternative thinking gives us the flexibility to go anywhere and everywhere, and project it back to where we are now, providing a broader view of our 'limited' world. To plan for flexibility, scalability and change. To increase the value of the exchange for the members by being the catalyst for new innovations and developments regarding technology and peering.

AMS-IX takes the input for the Outlook scenarios from, amongst others, the General & Technical Meetings, conferences like RIPE and NANOG, Peering Forums and the Member Survey. We have increased our attendance of these events in the last years and do an annual web-survey to get more members' feedback.

Growth expectations for 2006

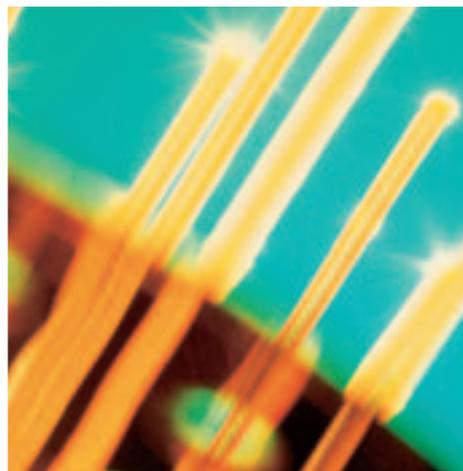
The growth expectations for the number of members and ports are not forecasted to be any different than the regular linear growth. Though the delta angle has increased a bit

in the last year, we expect it to remain similar. For traffic, an average growth-rate of 7% a month or a doubling every 10 months, thus exponential growth is expected.

That growth would bring us to between 70 and 90 10GE ports at the end of 2006 with a traffic rate max, ranging between 250 and 300 Gbps.

AMS-IX controlled PoP's

One of the strengths of the AMS-IX model is that we work with several neutral datacenters/housing providers to provide us and the members with co- location services. The model, however, does present some drawbacks as well, namely having no control over the service levels of co- location services and added features such as site security. Additionally, with the growth of the AMS-IX platform, thus the needs for rackspace, power-supply and the likes, the co- location costs are increasing disproportional. Another drawback is the compulsory business relationship we (have to) force members with remote access, carriers and some of our partners in. For which there is no particular need other than the fact they need a patch (or several patches) from the meet-me-room to the AMS-IX patch panel.



To keep the strength of the model, but circumvent the drawbacks, AMS-IX intends to move the two core switches to co-location independent, AMS-IX controlled sites, in 2006 and 2007.

These locations, core-switch PoP's, are separate from (but close to) the current co- location sites. AMS-IX will only use these PoP's for its own use as core- locations and to connect remote members, partners and carriers that have no need for a relationship with the housing locations where the AMS-IX access and edge switches are located. Those parties will be able to bring their fiber to the locations' meet-me facility to connect to the platform. We will not offer co- location services through these sites.

Security audit

On request of the members in the 22nd Technical Meeting, a Security Audit of AMS-IX will be conducted. The audit will look into the security processes and procedures, ICT security, physical security, not only of the platform, but including the co- locations and AMS-IX offices as well. As stated in the above paragraph, we can expect security advice for certain areas of the audit.

Peering Forum

Several IXP's have been organizing Peering Forums for a number of years now, though mainly in the US. AMS-IX was invited, and attended these forums the last two years. We see that these forums provide a real value- add for the attendees as they are very focused at the peering community and its specifics. We conducted a survey to get feedback of our members on this subject. The main findings of the subject were: yes, peering forums are useful and many peering coordinators would attend but try and keep (additional) travel to a minimum.

Obviously, the peering community has national, regional and international needs, as in any other industry. Since AMS-IX has an internationally oriented member profile, we decided to co-host the first Global Peering Forum

together with DE-CIX, Terremark, Equinix and Switch and Data. Moreover, we are looking into organizing similar forums with a European focus together with LINX and DE-CIX. Alignment with existing events, such as RIPE meetings, are important in these discussions to keep travel requirements to a minimum for people. National events will be organised in conjunction with our General Meeting.

100GE standardisation

Last years success with 10GE member connections has further pushed the need for a higher rate IX- platform backbone than 10GE. It is highly undesirable to have a backbone working at the same interface rates (though multiples) as the end-user connections that it services. We have and will continue to actively participate in 2006 in IETF standardisation bodies for the new Ethernet interface standardisation, focusing on 100GE rather than 40GE.

VoIP peering – SIP exchange - ENUM

The discussion around VoIP- peering and related topics such as SIP based value added services, Quality of Service parameters and ENUM, got heightened attention in 2005, in fact leading to several actual implementations in 2006. The implementations for now focus on centralized voice peering platforms and SIP value added services to be delivered via the exchange. Some of them are closed initiatives to start with, others are open to all members. AMS-IX is trying to find its role in the ENUM landscape, perhaps working in conjunction with SIDN (domain-name registration) and COIN (designated number portability provider) as a result of the 19th GM. Additionally, we will support initiatives that serve the member base in the continuous development of VoIP- peering.

Video/Audio streaming- Content distribution

As with VoIP, the member community of AMS-IX, for obvious reasons, is keen on peering solutions and value added services initiatives for video/audio streaming in Amsterdam.

Especially the national market to start with is challenged by the high bandwidth that consumers have at home nowadays. The ISP's subscribers just keep streams running. Why not, they leave the TV on all day too normally so why not the stream on the PC.

The content suppliers at their end have trouble to keep up with the infrastructure requirements of such demand. Solutions to efficiently distribute these enormous traffic loads between parties at low costs will be invaluable. 2006 will be the year to survey the AMS-IX community's role in these initiatives, if there is any at all.

Economic Affairs

The Netherlands have an outstanding ICT infrastructure. With 20 broadband access lines per 100 inhabitants, the Netherlands is leading in the EU and worldwide second only to South-Korea. With the Amsterdam Internet Exchange, the largest trading platform for internet connectivity in the world, the Netherlands have a top facility and one of the major junctions in the world wide web.

In AMS-IX, the industry cooperates for the benefit of all members, regardless of size and business model. It's not only the members of AMS-IX that benefit from this cooperation. The interconnections and efficiency ISP's can realize through the Internet Exchange result in a competitive local broadband market that provides consumers and businesses with more direct connections, higher bandwidths and improved reliability at lower prices.

In this market, new media and innovations of all sorts flourish. The Netherlands has become the premier location to test and implement new ideas and services that push the possibilities of the network to its maximum. The growth in traffic over the last year shows that consumers adopt those new services at a high rate.

Here lies the real value of these connections: what people can and will do with them. Therefore, my Ministry strives for a Connected Holland in which people have maximum opportunities to arrange their everyday environment making optimal use of ICT's. The AMS-IX is one of the cornerstones on which this Connected Holland can be built.



mr. L.J. Brinkhorst

Minister of
Economic Affairs



Summary of Accounts

Financial

The financial result for 2005 of the Amsterdam Internet Exchange shows a financially healthy organisation. The net revenues of AMS-IX B.V. for 2005 amount to Euro 3,9 Million, indicating an ongoing increase compared to 2004 of 23%. The main source of income comes from the port fees of members. The new 10 GE ports attribute considerably to this increase. Over the year the income before depreciation and taxation shows a comparable increase of some 25%, which means that revenues and operational expenses are in line and income before taxes and depreciation constantly grows. The introduction of the 10GE ports as well the number of those ports made available to customers required substantial investments in tangi-

ble fixed assets, amounting to Euro 1,6 million in 2005 (2004: Euro 1,1 million). As a consequence the amount of investments exceeded cash generated by operating activities and lead to a lower cash balance at the end of the year (2005: Euro 233 K – 2004: Euro 527 K)

The investments done over the past years lead to an increase of depreciation; during the year 2005 an amount of approximately Euro 1,1 million was taken into account. Compared to the level for the year 2004 this means an increase by some Euro 350 K (49%). The increase of operational income offered sufficient resistance and on balance income before taxes increased slightly compared to the year 2004. It is expected that the costs of new techniques will drop and thus offering possibilities for an increase of the results for the near future. An increase in future results will serve in building up capital & reserves to safe-guard AMS-IX' continuity.

The income before taxes for the year 2005 amounts to Euro 820 K and the net result amounts to Euro 563 K (2004: Euro 801 K resp. Euro 526 K).

Key figures AMS-IX (in e)

	2005	2004	2003	2002	2001
Net revenues	3.876.172	3.144.793	2.547.191	1.959.298	1.614.020
Income before depreciation and taxes	1.906.359	1.529.119	1.255.553	845.918	559.612
Income before taxes	820.573	801.604	856.971	551.136	373.481
Net result	562.995	525.717	562.306	363.556	247.523
Cash generated by operating activities	1.297.840	1.282.287	1.130.521	373.782	300.770
Investments in tangible fixed assets	1.591.755	1.113.764	1.121.795	482.186	156.728
Capital and reserves	2.729.133	2.166.138	1.640.421	1.078.115	714.559
Cash and cash equivalents (31/12)	232.677	526.592	358.069	349.343	457.747
Full time equivalents (31/12)	15	14	12	9	7
Members (31/12)	234	209	178	145	119
Connections (31/12)	365	309	245	201	172

Building up of capital & reserves serves the continuity of the business. The annual budget and rates are determined based on cost recovery first but second to ensure continuity. In the 17th GM the agreed policy determining the capital & reserves target consists of three parts that together determine the desired level:

1. Investment needs totaling to 50% of the replacement-value of the switch park
2. Working capital equaling to 1 quarter of revenues
3. Reserves for unforeseen.

For 2005 the desired level of reserves amounts to Euro 3.2 million and subsequently grows with new investments and revenue growth. Capital & Reserves build up has not reached the necessary level in 2005 (capital as per 31/12/2005 amounts to Euro 2.729 K). For this reason it is proposed to add the result of 2005 entirely to the general reserve.

Principles of valuation and determination of result

The accounts have been prepared in accordance with general accepted accounting principles in The Netherlands on the basis of historic costs. Tangible fixed assets have been valued at purchase price less accumulated depreciation calculated on a straight-line basis over the estimated useful life (3 years in general). Other assets and liabilities have been valued at face value, with deduction of a provision for bad debts.

Income and expenses are accounted for in the year to which they relate (accrual basis). The turnover consists of invoiced amounts, excluding turnover tax, for the connections provided. The turnover on these connections is attributed to the period in which the connection was used. The costs incurred are based on historic prices and charged to the relevant period.

Corporation tax payable is provided on taxable results at the current rate.

Result appropriation for the financial year 2005

As in previous years the result for the year 2005 of Euro 563 K is proposed to be added to the general reserve. This has been included in the financial statements.

Balance sheet as of December 31, 2005

in e	2005	2004
Fixed assets		
<i>Material fixed assets</i>		
Switch park	2.109.649	1.594.949
Fittings, computer hard- and software, furniture	<u>75.290</u>	<u>84.021</u>
	2.184.939	1.678.970
Current assets		
<i>Receivables</i>		
Accounts receivable	113.626	49.574
Taxes and social premiums	33.068	10.845
Other receivables and prepaid expenses	<u>385.033</u>	<u>201.547</u>
	531.727	261.966
Cash at bank and in hand	<u>232.677</u>	<u>526.592</u>
	<u>2.949.343</u>	<u>2.467.528</u>
Capital and reserves		
	2.729.133	2.166.138
Current liabilities		
Accounts payable	94.786	91.615
Taxation and social premiums	64.461	114.854
Other liabilities	<u>60.963</u>	<u>94.921</u>
	<u>220.210</u>	<u>301.390</u>
	<u>2.949.343</u>	<u>2.467.528</u>

Profit and loss account for 2005

in e	2005	2004
Net revenues	3.876.172	3.144.793
<i>Expenditure</i>		
Personnel costs	1.290.458	1.170.085
Depreciation material fixed assets	1.085.786	727.515
Other operating expenditure	<u>680.612</u>	<u>446.738</u>
	3.056.856	2.344.338
<i>Operating result</i>	<i>819.316</i>	<i>800.455</i>
Interest received	<u>1.257</u>	<u>1.149</u>
<i>Result from ordinary operating activities before taxation</i>	<i>820.573</i>	<i>801.604</i>
Taxation	<u>257.578</u>	<u>275.887</u>
Net result	<u>562.995</u>	<u>525.717</u>

Cash flow summary

in e	2005	2004
Cash flow from operating activities		
Net profit	562.995	525.717
Depreciation of fixed assets	<u>1.085.786</u>	<u>727.515</u>
<i>Cashflow</i>	<i>1.648.781</i>	<i>1.253.232</i>
Changes in working capital:		
Short term receivables	-269.761	56.238
Other short term liabilities	<u>-81.180</u>	<u>-27.183</u>
Total	-350.941	29.055
<i>Cash generated by operating activities</i>	<i>1.297.840</i>	<i>1.282.287</i>
Cash flow from investment activities (Investment in tangible fixed assets)	<u>-1.591.755</u>	<u>-1.113.764</u>
Increase in cash and cash equivalents	-293.915	168.523
Cash and cash equivalents at January 1	<u>526.592</u>	<u>358.069</u>
<i>Cash and cash equivalents at December 31</i>	<i>232.677</i>	<i>526.592</i>

Auditor's statement

The accompanying financial information as presented on page 32 through page 36 is taken from the financial statements for the year ended 31 December 2005 of Amsterdam Internet Exchange B.V. , Amsterdam. We have issued an unqualified auditor's opinion on these financial statements.

Oostzaan, May 2006,
CPAccountants B.V.

New Members 2005

Telekom Austria
Comfone AG
SOCO Network Solutions
Ncore GmbH
Sontheimer Datentechnik
TAL.DE Klaus Internet Service GmbH
InterNetWire Communications
ScanPlus GmbH
Freenet Cityline GmbH
Frontier Online
OVANET Eurowan
Nerim
BSO Communication
Ikoula
Euroacces
Neuf Telecom
OVH
lunxi B.V.
CITIC Telecom 1616
IN2IP
NedZone Internet B.V.
IP2 Internet B.V.
The Network Factory
Intermax B.V.
Instant XS
MuntInternet
Internet Unie Services
Telegraaf Media ICT
EasyCarrier Communications
Cistron Carrier Services
FastHost AS
AzurTel
PoundHost Internet LLP
Linkup Internet
Cherrytree International
Bulldog Communication Ltd.
Entanet International
RETN Ltd.
Neustar
Your.Org, Inc.
Critical Path / Supernews
WV Fiber
XO International, Inc.
Yahoo! UK Ltd
Server Central
SBC Network Technologies
Limelight Networks
MTS Allstream Inc.

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