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Berlin-Bonn Information Network (IVBB)

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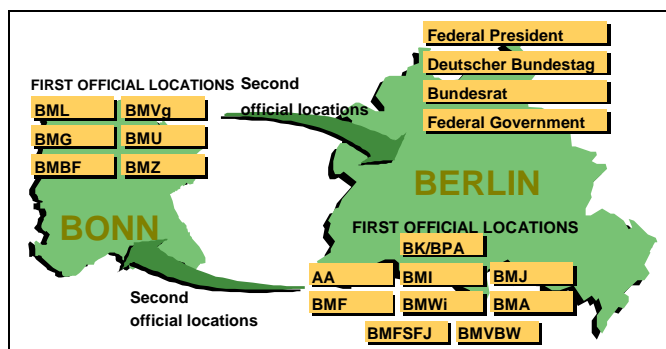
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I. INTRODUCTION

On 20 June 1991, the Deutscher Bundestag adopted the Decision on the Completion of German Unity. In consequence, the Deutscher Bundestag and the Federal Government moved to Berlin. The functions of Government are divided between Berlin and Bonn.

In light of this fact, it is strategically vital to ensure functionality and cooperation, a fact which led to the creation of the Berlin-Bonn Information Network (IVBB). Using modern, future-safe information and communication technology, the Federal Government remains able to function in spite of its dislocation. Considerable technical and organisational improvements have been achieved in many areas. Because of this, the IVBB also offers the key to extensive modernisation of the administration. Full operation began in January 1999 on the basis of the broadband IVBB network.



*Sub-division of the constitutional organs**

The users of the IVBB are the Bundestag, the Bundesrat, the Federal Chancellery and Federal Ministries, the Federal Court of Audit and subordinate Federal authorities in Berlin and Bonn.

* Key:
BML = Federal Ministry of Food, Agriculture and Forestry
BMG = Federal Ministry of Health
BMBF = Federal Ministry of Education and Research
BMVg = Federal Ministry of Defence
BMU = Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
BMZ = Federal Ministry for Economic Cooperation and Development
AA = Federal Foreign Office
BMF = Federal Ministry of Finance
BK = Federal Chancellery
BPA = Federal Press and Information Office
BMI = Federal Ministry of the Interior
BMW = Federal Ministry of Economics and Technology
BMFSFJ = Federal Ministry for Family Affairs, Senior Citizens, Women and Youth
BMJ = Federal Ministry of Justice
BMA = Federal Ministry of Labour and Social Affairs
BMVBW = Federal Ministry of Transport, Building and Housing

The whole IVBB project now consists of a large number of sub-projects and activities which are constantly being improved upon. This paper summarises the most important points.

II. BACKGROUND, HISTORY

The Federal authorities had been using the Bonn Federal authorities' network (BBN), which was based on ISDN technology, since the eighties. In 1994, a call for tender was launched to expand this network to Berlin. As a result, Deutsche Bundespost Telekom (now Deutsche Telekom AG) created what may be termed the "IVBB entry solution" (also referred to as the "IVBB minimal concept"), an expansion of the BBN to include connections between Berlin and Bonn and a network infrastructure in Berlin.

The plan to implement the broadband IVBB in the medium and long term was drawn up in 1995. In parallel, the Federal Office for Security in Information Technology (BSI) developed the IT security concept for the IVBB. The Federal Cabinet decided in March 1996 to work with Deutsche Telekom AG to expand and operate the permanent, broadband IVBB, working from the existing BBN. An independent engineers' office was to oversee the work.

In October 1996, after a call for tender had been launched, the consultancy firm Gora, Hecken & Partner (GHP) and its partner TEKON Ingenieurbüro was awarded the contract to draw up the implementation concept and to supervise and care for the work needed to realise it. The concept was submitted in June 1997 and coordinated with the highest Federal authorities. On 5 January 1998, the Federal Ministry of the Interior and DeTeSystem Deutsche Telekom Systemlösungen GmbH signed the IVBB contract. The contract is to run for at least ten years (until the end of 2008) with a one-off advance right to terminate at the end of 2003.

Over time, additional services (in particular e-mail) were added to the ISDN services offered in the BBN (telephony, fax). In 1997, common Intranet (IVBB Intranet) and central Internet access for all IVBB users were set up (IP backbone). A central firewall protects the gateway between the users' networks, the IVBB Intranet, and the Internet. The IP backbone has become a vital element of the IVBB as a whole: The significance of common Intranet and Internet access is increasing continually. Today, a large number of other IP-based services are carried out via the IP backbone. Model projects, in particular the POLIKOM projects promoted by the Federal Ministry of Education and Research, offer opportunities for early experience in the introduction and use of new and innovative technologies.

When operation of the broadband IVBB network was launched, the services of the IVBB entry solution were transferred (transitional services) to form the "start-up services" together with new services which were added. The BBN was switched off.

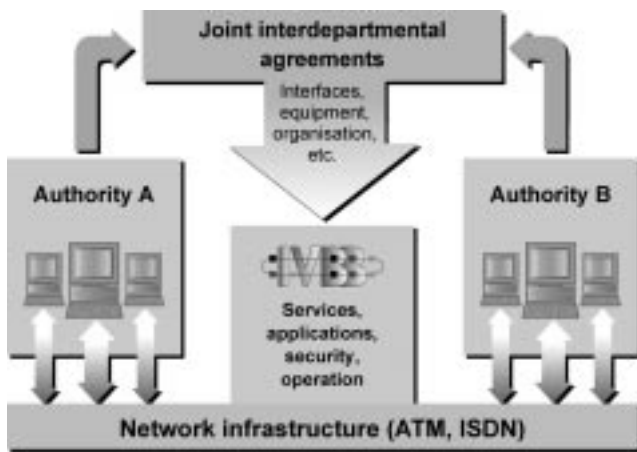
III. PROJECT PARTICIPANTS

The Co-ordination and Advisory Board of the Federal Government for Information Technology at the Federal Ministry of the Interior (KBSt) heads the planning and implementation of the IVBB.

Coordination with IVBB users is carried out in the "Inter-ministerial Co-ordination Committee for Information Technology in the Federal Administrative Apparatus (IMKA)". Recently, the IVBB Steering Committee was created. It carries out the tasks of the user advisory board provided for in the IVBB contract, which allows user requirements as to operation and services provided to be taken into account.

An IVBB Commission of Experts appointed by the Federal Minister of the Interior (nine members from industry, academia and the administration) followed the development of the IVBB until the start of full operation with expert reports, encouragement and suggestions.

The BSI is involved in the security aspects of the project (in the broadest sense of the word) and ensures, in particular, the implementation and continuation of the IT security concept. The independent consultancy firm Gora, Hecken & Partner (GHP) and its partner TEKÖ Ingenieurbüro supervise and care for the work in implementing the concept. The KBSt, BSI, GHP and TEKÖ together carry out the various tasks in the day-to-day running of the project on the client side.



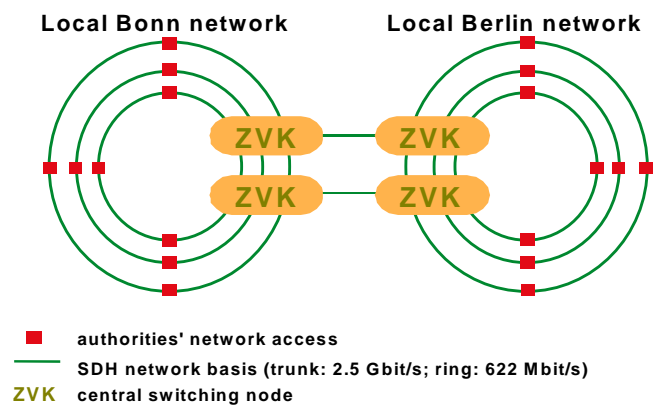
Interfaces between the central IVBB components and IVBB users

DeTeSystem, as a contractual partner of the Federal Ministry of the Interior, and other participants at Deutsche Telekom, implement and operate the IVBB.

There are many other participants, such as telecoms suppliers or other authorities and firms, creating, testing or operating services and applications in a large number of sub-projects.

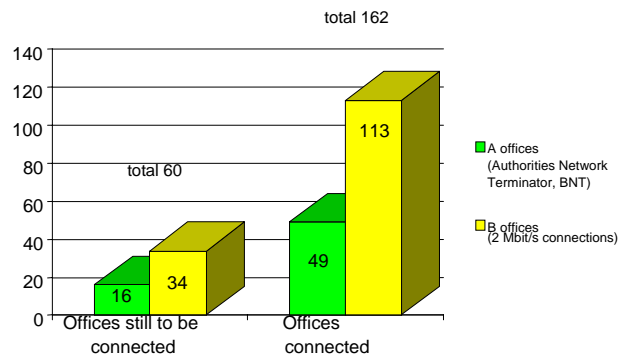
IV. THE BROADBAND IVBB: IN FULL OPERATION SINCE JANUARY 1999

Full operation of the IVBB was launched in January 1999, and was therefore on time for the start of the removal activities. The basis is a separate, high-performance, future-safe broadband network based on synchronous digital hierarchy (SDH) with high availability. The users are connected via the so-called Authorities Network Terminator (BNT) with a bandwidth of 188 Mbit/s (A offices). Authorities with a reduced bandwidth requirement (branch offices, subordinate Federal authorities) are connected via S_{2M} (2 Mbit/s bandwidth) interfaces (B offices). In total, approx. 30 000 participants will be using the IVBB.



Topology of the IVBB

The process of connecting the offices has been going on since 1998. Test operations began in August 1998. Once the move to Berlin is complete, about 200 offices will be served by the IVBB.



Connection situation on 8 December 1999

The IVBB can be reached from the public network via its shared dialling code 01888. This can also be used to connect to the public network ("break-out traffic"). A call for tender resulted in DeTeSystem and MCI WorldCom being commissioned with inter-exchange connections.

The high demands on the availability, confidentiality and integrity of communications are met through appropriate security measures. On principle, communications within the IVBB are encrypted. If technically possible and economically justifiable, end-to-end security is to be achieved at user level, for instance for electronic document exchange.

V. LINKING VIA THE AUTHORITIES NETWORK TERMINATOR

Berlin and Bonn are linked using trunks with a transfer rate of 2.5 Gbit/s. Within the two cities, SDH rings have been set up with 622 Mbit/s each. A maximum of three locations are connected to each ring.

The authorities are physically connected to the IVBB transport network via the Authorities Network Terminator (BNT). From a technical point of view, it comprises an Add-Drop Multiplexer (ADM) and, where appropriate, a terminal multiplexer (TM), and is subject to IVBB network management.

The IVBB provides the authorities with the BNT in a basic interface configuration which can be adapted as needed.

Physical interface modules		
Interface	Quantity	
1. 64 Kbit/s (via a terminal multiplexer)	8	
2. S ₀ (via a terminal multiplexer, connection of up to eight terminals)	8	
3. 2 Mbit/s	8	
4. S _{2M} (30 ISDN user-information channels and one signalling (D) channel)	8	
5. SDH 155 Mbit/s or: ATM 155 Mbit/s	1	
	1	
6. SDH 34 Mbit/s	optional	

Table 1

VI. SERVICES AND APPLICATIONS IN THE IVBB

As the project progresses, the significance of the services and applications of the IVBB grows continuously. It is only when these are used and accepted by participants that the IVBB can achieve its goals.

The following services are in the so-called IVBB "shopping basket" at present (Table 2).

No	Services in the IVBB shopping basket	Type	Time of implementation			
			Transitional service	Start-up service	New service	Optional
1.	ISDN (64kbit/s up to 2Mbit/s) at the BNT (access type A) or via leased lines (access type B)	B		X		
2.	ATM (STM-1) at the BNT	B		X		
3.	IP via ATM at the BNT (broadband IP)	B		X		
4.	ISDN services (e.g. telephony, fax)	Z	X			
5.	IP via ISDN	Z	X			
6.	X.25	Z	X			

			Time of implementation			
			Transitional service	Start-up service	New service	Optional
7.	Broadband Intranet (IP backbone on ATM basis)	Z		X		
8.	Use of Internet services (HTTP, FTP, DNS, news)	Z	X			
9.	E-mail (X.400)	Z	X			
10.	E-mail (SMTP)	Z	X			
11.	Multipoint video conferencing, use of the Multipoint Control Unit (MCU)	Z	X			
12.	Point-to-point video conferencing (incl. application sharing, joint viewing / editing)	T	X			
13.	IVBB information service (in the Intranet)	Z		X		
14.	Directory service (X.500)	Z		X		
15.	Corporate network for one user based on a LAN link	Z	X	X		
16.	Corporate network for one user based on a PBX link	T	X	X		
17.	Parliament TV stage 1 (1 channel with 48kb in the IP backbone)	Z				X
18.	Computer Based Training (CBT) in the Intranet	Z			Pilot complete	
19.	Sphinx (digital signature and encryption for electronic document exchange)	Z			Pilot running	
20.	Workflow	T			Pilot running	
21.	Parliament TV stage 2 (MPEG 1, MPEG 2, TV terminal equipment)	Z			since 9/99	
22.	VS communication (classified material)	T			in preparation	
23.	Database access (e.g. EU documents, OLIS)	Z			X	
23a.	EU documents	Z			since 9/99	
23b.	OLIS	Z			since 9/99	
23c.	NJW (Neue Juristische Wochenzeitung)	Z			from 1/00	
24.	T.120 Server for data conferencing (joint editing / joint viewing)	Z				X
25.	Centrex (virtual PBX)	Z				X
26.	Voicemail/voice mailbox	Z				X
27.	Fax store	Z				X

No	Services in the IVBB shopping basket	Type	Time of implementation			
			Transitional service	Start-up service	New service	Optional
28.	Talking e-mail	Z				X
29.	Tele-interpreting service	Z				X
30.	Conversion services	Z				X
31.	Access services (authentication)	Z				X
32.	Voice services / value-added voice services	Z				X
33.	Billing (tools for internal user invoicing)	Z				X

Table 2

Type: B =basic IVBB services,
T=transparent transmission service provided by user components,
Z=service covers central components in the IVBB

Security and conversion functionalities are implemented using the appropriate service. Decisions are taken as and when needed concerning the introduction of the optional services.

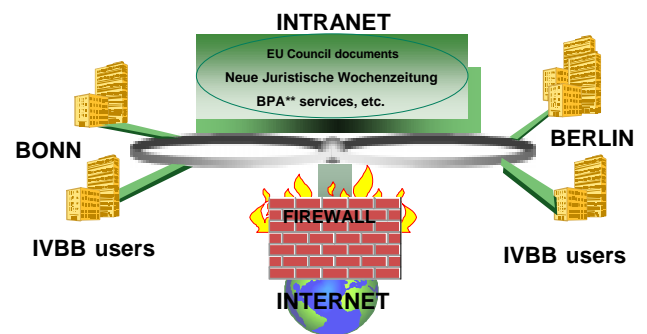
The IT training concept for the IVBB forms the basis for supplementing the Federation's further IT training in order to meet the IVBB-specific training requirements. A pilot scheme for computer-aided learning revealed that such offers do make sense and are needed, but that they should be provided on internal, and not central IVBB servers.

IP BACKBONE: THE FEDERATION'S INTRANET AND SECURE INTERNET ACCESS

The IVBB is the platform for the IVBB Intranet and provides central Internet access. The following protocols are supported here:

- World Wide Web (WWW),
- File Transfer (FTP),
- Domain Name Service (DNS),
- News,
- Terminal link (Telnet),
- Electronic mail (e-mail, X.400 and SMTP),
- To come: secure video conferencing

At present, no other services are being offered for security reasons.



** BPA = Federal Press and Information Office

Intranet and Internet access in the IVBB

The IVBB Intranet is to be an information hub for all users, who can place information on this network as they see fit. This is information typically not available on the Internet, perhaps non-public information. The IVBB Intranet therefore offers the authorities a "publicity stage". Self-descriptions and press releases are by definition intended more for the Internet (cf. Chapter 7 for the services now provided in the Intranet).

The central firewall performs two functions: On the one hand it protects users against intruders from the Internet. On the other, users are protected against internal intruders. Internet access is split between Bonn and Berlin.

ELECTRONIC DOCUMENT EXCHANGE (E-MAIL)

The IVBB e-mail system offers the possibility of electronic document exchange both via Internet mail (SMTP) and on the basis of the Message Handling System (X.400). The interoperability of these two systems is guaranteed by SMTP X.400 gateways. The exchange of documents between IVBB users is encrypted.

The IVBB provides a central Message Transfer Agent (MTA) which performs the switching function for e-mail (relay MTA). The users' Message Transfer Agents communicate via TCP/IP with the relay MTA.

Each participant in the IVBB e-mail service has his/her own easily identifiable address. A central X.500 directory service is offered to search for e-mail addresses and telephone numbers.

VIDEO CONFERENCING

Video conferences in the IVBB are carried out either on the basis of the telephone network (ISDN, H.320) or the data network (IP, H.323).

The IP-based systems, which achieve higher video quality, are initially being used within the Ministries which have linked their local networks (LAN) in Berlin and Bonn via the IVBB. Currently, the necessary security system for inter-ministerial communication is being worked on.

The ISDN systems are also used between Ministries and in communications with third parties. So-called gateways ensure that the two worlds are able to interoperate.

As a central service, an MCU (Multipoint Control Unit) is provided to make conferences with more than two participants possible.

IVBB INFORMATION SERVICE IN THE INTRANET

Providing comprehensive information to all participants in a project is vital to its success. This applies in particular to the IVBB because of its size, the large number of participants and the range of services offered.

The IVBB information service is one of many elements serving to meet this need and it is gradually being expanded to become a central information hub. It addresses all participants in all authorities connected by the IVBB. Furthermore, there is specific information for the IT sections with users who are entrusted with implementing the IVBB services in situ. From a technical point of view, the IVBB information service has been implemented as a Web server within the IVBB Intranet. Web technology permits flexible access to information on other servers through links between them.

The information service is initially orientated towards the IVBB "shopping basket". Extensive information is available for every service provided in the "shopping basket":

- Methods of access and services offered,
- Explanations of the technical and organisational conditions to be created for the users so that participants can use the service at their workplaces,
- Explanations of the use of the service at the workplace,
- Description of the components used in providing the service,
- Notes on security,
- List of available fonts which can be downloaded,
- Planning, etc.

Additionally, the IVBB offers general information, for instance points of contact, procedures for reporting faults, explanations of the User Help Desk, Service and Test Centre and Distribution Centre. The necessary forms are available electronically. Making fault reports and asking for services can be carried out directly by electronic means by the user's designated administrators.

PARLIAMENT TV

Parliament TV has been considerably expanded within the framework of the move to Berlin. Five channels are now available: Deutscher Bundestag (with Videotext), Bundesrat, Bundespressekonferenz e.V. (Federal Press Conference Association), remote video contributions from the Federal Press and Information Office and, until the move to the new building, an audio channel from the Chancellery.

The channels are transmitted by satellite. Special encryption nevertheless creates a closed user group. In addition to the actual users, namely the Ministries, other participants all over Europe can also be supplied.

Each recipient has a receiver. The channels are usually provided via the users' broadband cable networks. They are also, however, offered as IP multicasts for inclusion in the appropriate data networks.

SPHINX: PILOT SCHEME TO INTRODUCE DIGITAL SIGNATURES

User-friendly, manufacturer-interoperable integration of digital signatures and encryption in applications is currently being tested in the SPHINX pilot scheme (in particular e-mail programs).

It is hoped to introduce a universal smart card for all smart card applications (private key for digital signatures and encryption, access control, time registration, cashcard, and others).

Staff from Federal, Land and local authority administrations, as well as industry and associations, are taking part in the trials.

The requirements made of the security infrastructure and the aims in testing are:

- Inter-manufacturer interoperability. This means that signed, encrypted messages can be exchanged between products from different manufacturers. Anything less would considerably restrict the flexibility of e-mail.
- High user acceptance, orientated towards value for money and the user-friendliness of the products (integration into familiar e-mail software),
- Future-proof security infrastructure,
- Uniformly defined security level for technical components and organisational measures, which is also verifiable in individual cases,
- Testing and developing functionality,
- Estimation of the staffing, financial and organisational effort.

The participants have already come very close to achieving these aims during the tests. Now, the preconditions required in order to offer broad use of digital signatures and encryption are to be created initially in the IVBB. In parallel, in the framework of a third test phase, further functionality is to be included and tested, in particular the X.509V3 certificate format and interoperability with the S/MIME mail exchange format.

VII. INFORMATION IN THE IVBB INTRANET

The IVBB Intranet (www.ivbb.bund.de) forms an intermediary between the internal Intranets and the Internet. The following information is available. Information about the Internet is not included here:

Directories:

- X.500 directory: Phone, fax and e-mail directories, as well as the responsibilities of the IVBB users, including the Federation's address list (information is currently being prepared by the authorities.)

Electronic version of publications:

- juris database
- Neue Juristische Wochenzeitschrift (New Law Weekly - NJW)

Specialised databases:

- Services offered by IVBB users in the IVBB Intranet:
- Press and Information Office of the Federal Government (BPA), e.g. news
- Federal Ministry of Labour and Social Affairs (BMA)
- Federal Academy for Public Administration (BAkÖV) in the Federal Ministry of the Interior
- Co-ordination and Advisory Board of the Federal Government for Information Technology (KBSt) in the Federal Ministry of the Interior
- Federal Office for Security in Information Technology (BSI)
- Procurement Agency of the Federal Ministry of the Interior (BeschA)
- Added to these are the services provided by the Federal institutions on the Internet.
- Projects database of the Federal Government (Federal Chancellery)
- EU Council documents (use of the EU Council Secretariat is taken over for the IVBB Intranet)
- OECD documents (access to the OLISnet)
- IT further training, IVBB training concept

Information for those moving house:

- Accommodation available in Berlin and Bonn

IT information:

- IT in the Federal administration: IT guidelines, series of publications, letters and recommendations, etc., of the Co-ordination and Advisory Board of the Federal Government for Information Technology
- IVBB information: info server (service.ivbb.bund.de), services offered by the Co-ordination and Advisory Board of the Federal Government for Information Technology, IVBB information letters

There are also mailing lists, e.g. "EU documents" and "IVBB information".

Further information services are under preparation:

- Search engine for the IVBB Intranet
- Access to existing databases

- Link to library systems (access to catalogue information, research, etc.)
- Electronic version of the periodical *Arbeitsrechtliche Praxis* (Labour Law Practice - AP) (summer 1999)

VIII. SUPPORT FOR IVBB USERS

Various organisational units have been set up to support IVBB users.

- User Help Desk (UHD)
The User Help Desk is the central service unit of the IVBB. It is responsible for accepting, collecting and solving IVBB users' main IT problems related to their use of the IVBB. This central user service guarantees that the user has contacts available who have considerable knowledge of the central IT components, services and applications. The central UHD does not replace the internal user service of each department.
- Service and Test Centre (STC)
The service and test centre provides effective quality assurance for the IVBB infrastructure and user support, both in the introductory and operational phases of components. Here, tests can be carried out with the IVBB standard configuration.
- Distribution centre
Here, IVBB components which are needed to expand the network or as replacement appliances are stored and distributed.
- Network Management Centre (NMC)
It is vital to use high-performance network and system management in order to control the system landscape of the IVBB. Here, components and network elements provided by a variety of manufacturers are centrally supervised.

IX. OUTLOOK, INFORMATION NETWORK OF THE FEDERAL ADMINISTRATION

The "Information Network of the Federal Administration (IVBV)", the corporate network of all Federal institutions, is to facilitate efficient communication and information provision within the whole Federal administration. The IVBV covers access to central IVBB services and to central information. The link to the networks of the Länder and to European and international partners is a natural part of the scheme.

An implementation proposal for the IVBV is currently being drawn up, taking account of the networks which are available in subdivisions of the Federal administration, and other legal, functional, technical and economic factors. On this basis, a call for tender will be launched in 2000 to find a carrier / service-provider.

Under the motto "IVBB – Quo Vadis?" the KBSt set in motion a discussion process to cover the medium- and long-term further development of the IVBB. In a workshop with representatives from industry, academia and associations, expert opinions were consulted and brought together to make a forecast on the basis of scenario techniques. The results are to be made available in the spring of 2000, and will form the

basis of the discussion and decision-making in the IVBB Steering Committee on measures to be taken.

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- Guideline for action "IT-supported processes", Vol. 35, 1997
- Berlin-Bonn Information Network: Overview and Implementation Concept, Vol. 39, 1998
- Concept for Selecting electronic Files, Vol. 40, 1998
- DOMEA Final Report, Vol. 41, 1998
- SPHINX End-to-end security pilot scheme, Vols. 42+44, 1999
- SPHINX: PKI Organisation Manual, Vol. 46, 1999
- Further publications:
- "IVBB aktuell" - quarterly newsletter for the target group of IVBB participants (www.ivbb.de). The intention is, in particular, to approach users within the authorities in order to provide them with an insight into the background, technology and services offered by the IVBB. The focus is on practical information concerning the use of Intranet and Internet services,
- Web services offered on the Internet (www.kbst.bund.de),
- Book entitled "Berlin-Bonn Information Network ", Fossil-Verlag 1998.