



Universität Hamburg  
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## Universität Hamburg Strategy for IT Service Provision

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# 1 Background

The present-day requirements and challenges involved in supporting research, teaching, studies, administration, and management at Universität Hamburg can only be met with an increased and coordinated use of IT.

The main driving forces, framework conditions, and usage scenarios include [1, 6]:

- university reform processes (e.g., internationalization, strategic development planning)
- digitalization of information and communication (e.g., web-based services, mobility)
- value-oriented teaching support (e-learning, e.g., learning platforms, MOOCs<sup>1</sup>)
- computer-supported problem-solving environments (e-science, e.g., simulations, big data)
- administrative and management requirements (e.g., campus management)
- increase in research collaborations at the University, local, and international levels

A review of the current status, objectives, and future development of IT services is therefore necessary. German Research Foundation (DFG) assessors require the IT and network infrastructure to be funded be listed in the University's IT service provision plan. Guidelines for the future-oriented IT service provision must be formulated and continuously updated in line with current needs regarding the maintenance and establishment of excellent research areas, quality assurance in teaching and studies, and reliability and efficiency of administration and management which are mostly dependent on high-quality IT services.

This overarching paper describes the aspects of IT service provision that should be pursued throughout the University in the medium term. It is based on the recommendations of an external IT report [2], the guidelines of Universität Hamburg's committee on information processing (Informationsverarbeitungsausschuss, IVA) derived from this [5], and the strategic university development goals and measures in the field of I(C)T [6], and conforms with the cross-university position paper on IT service provision in the Hamburg higher education system [7]. At Universität Hamburg, IT service provision is also based on the HIS study on IT services at higher education institutions (IT-Dienste an Universitäten und Fachhochschulen) [3]; the recommendations of the DFG Commission on IT Infrastructure<sup>2</sup> [4], the Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF) [17], and the German Science and Humanities Council (Wissenschaftsrat) [18]; and the structural concepts and theories of the German association of higher education IT centers (Verein der Zentren für Kommunikation und Informationsverarbeitung in Lehre und Forschung e. V., ZKI)<sup>3</sup> [1] and the German initiative for network information (Deutsche Initiative für Netzwerkinformation e. V., DINI)<sup>4</sup> [15].

Some IT guidelines providing further specification and regulations outlining the framework conditions, e.g., higher-level laws and policies such as the Hamburg higher education act (Hamburgisches Hochschulgesetz, HmbHG), the Hamburg data protection and privacy act (Hamburgisches Datenschutzgesetz, HmbDSG), and the IT directives and guidelines of the Free and Hanseatic City of Hamburg (among others, the telecommunications directive, information security guidelines), still need to be prepared or revised and standardized. This also includes user regulations and policies on issues such as IT security, networks, backups, the internet, and email. The current versions of the aforementioned IT policies supplement Universität Hamburg's IT framework plan presented here, as do the IT strategies, portfolios, service agreements, and resource analyses of the Regional Computing Center at Universität Hamburg (RRZ) [8], University Administration, and the faculties.

Technical and organizational changes will mean migration projects are also necessary in the future.

These require the provision of sufficient (start-up) funds, based on the University-wide coordination within the *University Steering Committee on IT Supply* (corresponding to a collective CIO) [4], and Executive University Board decisions where required (IT governance, see *Chapter 3*).

<sup>1</sup> Massive Open Online Courses (MOOC)

<sup>2</sup> [www.dfg.de/dfg\\_profil/gremien/hauptausschuss/it\\_infrastruktur](http://www.dfg.de/dfg_profil/gremien/hauptausschuss/it_infrastruktur)

<sup>3</sup> [www.zki.de](http://www.zki.de)

<sup>4</sup> [www.dini.de](http://www.dini.de)

## 2 IT service provision plan

The following lays out Universität Hamburg's cooperative IT service provision plan, based on the coordinated provision of centrally operated and intrinsic academic local infrastructure and services.

The degree of centralization depends on the efficiency, performance, and quality assurance. IT security and data protection are further important aspects (see *Section 2.4*). The design and development planning is coordinated between all involved parties as part of Universität Hamburg's strategy based on the IT governance (see *Chapter 3*).

Universität Hamburg's IT infrastructure is operated as a distributed overall system with the aim of providing integrated cooperative services. In line with the DFG recommendations [4], further development is driven by the concept of "integrated information management," which requires homogenized IT systems and IT service provision as far as possible and necessary in the academic context to ensure efficiency and due to the convergence of data and voice communication via shared and universal networks.

IT services are generally provided by the RRZ via central IT infrastructures (see *Section 2.1*). These are used as extensively as possible to enable all client groups to complete tasks locally. Supplementation with infrastructure/services operated/provided locally is only accepted in special cases. Such cases must be justified and details provided of the devices needed and their integration (e.g., local computers linked to measuring equipment) or the required application support (e.g., local technical responsibility or competence) (see *Section 2.2*).

Cooperative IT services involving others parties, in particular, Hamburg universities or external partners (see *Section 2.3*) should meaningfully complement IT service provision.

### 2.1 Regional Computing Center (RRZ) IT services

As a *central facility of Universität Hamburg* (operational unit pursuant to HmbHG), the RRZ is the authority and service center for the provision of IT services and the operation of IT infrastructure.

The term IT thus incorporates:

- information processing (servers, storage, HPC clusters, and basic IT services)
- communication technology (networks and basic network services)
- multimedia systems (media technology infrastructure and media expertise)

The RRZ supports University-wide and, in some cases, also cross-university processes:

- (a) core processes: research, teaching, studies, and knowledge exchange
- (b) support processes: administration and management

It operates central infrastructure for this and offers services based on information, communication, and media technologies with standard IT solutions, as well as developing specialized IT solutions where required. The provision and operation of the necessary device technology and user support are subject to high quality, performance, functionality, and availability requirements. Depending on the data to be processed, these are subject to special data protection and security requirements in accordance with legal requirements and responsibilities. These requirements must be met in a manner that meets the needs and is cost-efficient. As a rule, this is achieved through a high degree of standardization and centralization, provided that the function- and performance-related requirements are met.

Time and location-independent usage scenarios is based on a suitable IT infrastructure (e.g., a data center to operate the server and storage devices) as well as a campus network with a high data rate and availability embedded in Hamburg's high-speed computer network (Hamburger Hochgeschwindigkeits-Rechnernetz, HHR), coordinated by the RRZ.

The HHR links all of Hamburg universities as well as the State and University Library Carl von Ossietzky (SUB), DESY, and the German Climate Computing Centre (DKRZ) and is connected to the German national research and education network (Deutsches Forschungsnetz, DFN).

The RRZ's functional tasks include:

- infrastructure-related services (planning, provision, and operation)
- application systems (planning, installation, operation, and maintenance)
- user support and knowledge transfer (help desk, consulting, and training, also in person)
- coordination of hardware/software tenders and procurements (in part across the federal state)
- projects (development and content creation)
- project support for the faculties and other institutions  
(creation of the technical prerequisites for research, development of IT plans)

The RRZ belongs to cross-university cooperative networks. It is based on the concept of a “fusion of information infrastructure services” as per the typology for alternative IT service provision structures presented in [3]. Within this framework, the RRZ provides the following services in an integrated manner that are often still organized separately at other universities (e.g., within administration IT, library IT, media centers):

- planning and further development of the HHR
- network sovereignty for Universität Hamburg's entire communication network, including comprehensive WLAN
- telecommunications support (telephony, video conferencing)
- support for scientific computing applications, among others as part of the HLRN competence network<sup>5</sup> and planning and operation of a dedicated HPC cluster for Universität Hamburg [17]
- operation of the campus management system (STiNE), including the specialist control center
- operation and further development of e-learning platforms, in particular e-learning management systems (e.g., CommSy, OLAT) and e-lecture/MOOC systems (e.g., Lecture2Go)
- supervision of the entire media technology, including video conferencing and 3D presentation
- IT service provision for University Administration and the libraries, including workstation systems
- technical system support for Hamburg's local library system (Lokales Bibliothekssystem, LBS)<sup>6</sup>

For an overview of RRZ's services and their further development, see [8]. The RRZ's mission, culture, and tasks are based on its mission statement (Leitbild 2020) [13].

The RRZ will be provided with an adequate budget for staff and resources to fulfill these and new tasks. The amount of staff and resources is determined in accordance to the resources available at other universities. Benchmarks are to be developed in the future using a benchmarking procedure. The RRZ uses these funds at its own responsibility in accordance with commercial considerations.

Further development of the delegation and bundling of tasks as well as the systematic introduction of service-oriented processes within the RRZ is oriented to the generally recognized best practices for IT service management according to the IT Infrastructure Library (ITIL). These are developed according to the specific requirements of the extended portfolio compared to pure IT services (e.g., scientific services, media technology services).

<sup>5</sup> HLRN: North German Supercomputing Alliance (Norddeutscher Verbund für Hoch- und Höchstleistungsrechnen); HPC: High-Performance Computing

<sup>6</sup> For the SUB, Universität Hamburg's departmental libraries, Hamburg University of Applied Sciences (HAW Hamburg), the libraries of the Hamburg authorities, Hamburg's courts and museums as well as the Hamburg State Archive

## 2.2 IT services in the faculties, administration, and central institutions

The IT services that the RRZ provides based on the central IT infrastructures are primarily used to offer IT support for the specific tasks to be performed locally by the various client groups, namely the faculties, administration, central institutions (see *Section 2.1*). They are supplemented with infrastructure/services operated/provided locally only in specially justified cases or for shared/partial services.

Cases can be justified by providing details of:

- the required infrastructure and its integration (e.g., hardware/software that is the subject of the research or computers linked to measuring equipment); or
- the support required for special applications (e.g., local technical responsibility or expertise that is part of the respective local organization).

The director of the RRZ is responsible for general IT supervision. In contrast, responsibility for the content of specialized processes lies with the faculties or University Administration.

As part of a migration to this general plan, faculties are gradually transferring IT infrastructure and services that can be provided centrally for several user groups (“shared services”, e.g., directory services, internet, email, groupware, file services, data backup/archiving, desktop management) to the RRZ. Savings can be expected from eliminating repeated expenses and taking advantage of economies of scale [4]. Striving for these synergy effects and efficiency gains is required to meet the growing IT service provision demands for quality and performance and to relieve scientific and administrative staff of IT-related tasks as much as possible.

Close cooperation between the RRZ and on-site staff is required at an early stage to facilitate the joint technical development and contribute to the altered division of labor. The aim is to pool strengths and expertise in order to facilitate necessary migration work required by increased standardization and centralization and to cover the costs arising for the RRZ due to the expanded user group. Staff relocations with partial changes in supervision are likely in the course of the necessary reorganization processes. The funds required for staff, procurement, and infrastructure in corresponding change management projects and, if necessary, for external support will be provided centrally by the Executive University Board. The Executive University Board ensures, where necessary in cooperation with Hamburg’s Ministry for Science and Research (BWF), that the measures made necessary due to the increase in central infrastructure and services (e.g., an appropriately dimensioned and adequately designed data center [16]) are implemented.

## 2.3 Cooperations and external partners

Universität Hamburg supports collaboration between all Hamburg universities and the SUB aimed at offering only IT services that should be provided by a central provider in Hamburg wherever possible (i.e., according to economic efficiency and performance, taking the expertise of all parties into account) or coordinating the selection and procurement of similar hardware/software required at several locations (e.g., joint planning, framework agreements, and applications for special BWF funds). Development and supply of cross-university IT services is managed by the working group of the heads of the computing centers at all Hamburg universities and the SUB (HHRZ) in addition to the eCampus steering group (chair: BWF; members: the CIOs at the universities and the SUB as well as the HHRZ spokesperson).

The strategy for IT service provision across the entire Hamburg higher education system is based on a position paper agreed by the Hamburg State Rectors’ Conference (LRK) [7]. Funding is provided by the participating universities or obtained from BWF special funds (e.g., for large-scale equipment) or acquired from IT-specific third-party funds.

Cooperation also exists with other IT service providers and associations. In particular, these are currently (see [7, 8]):

- German National Research and Education Network (Deutsches Forschungsnetz, DFN): scientific network
- Dataport: IT service provider for the Hamburg authorities (IT processes for personnel and finance)
- Multimedia Kontor Hamburg (MMKH): project management, consulting, training
- North German Supercomputing Alliance (Norddeutscher Verbund für Hoch- und Höchstleistungsrechnen, HLRN)
- German association of higher education IT centers (Verein der Zentren für Kommunikation und Informationsverarbeitung in Lehre und Forschung e. V., ZKI)
- German initiative for network information (Deutschen Initiative für Netzwerkinformation e. V., DINI)

## 2.4 IT security and data protection

Universität Hamburg needs accurate, trustworthy information and reliable IT to carry out its tasks. The extensive and increasing use of IT inevitably leads to risks that can jeopardize the fulfillment of tasks and which may result in violation of the constitutional data protection rights (employees, students, customers, etc.) to informational self-determination (see e.g., Article 2 of the German Basic Law and Section 1 HmbDSG). Information and the IT systems used for information processing at Universität Hamburg are therefore valuable and worth protecting. The following security goals must always be ensured when processing personal data: confidentiality, integrity, availability, authenticity, binding nature, consistency, revisability, and prevention of misuse. For the most part, this also applies for research data.

The universities in Hamburg (Universität Hamburg, the Hamburg University of Music and Drama, HFBK, HafenCity University Hamburg, and Hamburg University of Technology) have appointed a joint data protection officer, who also provides general assistance on the description of procedures, e.g., forms and handouts. The lead responsibility for the descriptions of procedures to be drawn up in accordance with Section 9 HmbDSG and reviewed by the joint data protection officer lies with the institution responsible for the respective special procedure, i.e., usually University Administration or a faculty. The RRZ or IT security officer (see below) can assist with description of the aspects of IT operations and IT security respectively.

In principle, where data processing is outsourced, the contractor (here: an institution external to Universität Hamburg, e.g., Dataport) must meet the requirements of the client (here: Universität Hamburg), in particular with regard to IT security and data protection. This must above all be taken into account when migrating services and processing contract data (e.g., telephony to VoIP, which is relevant to data protection) as well as when using cloud services (e.g., Dropbox does not meet the data protection requirements). Services must be developed and provided to comply with the guidelines applicable at all universities.

An analysis must be conducted of the workflows at Universität Hamburg across systems, applications, and communication relationships to understand and appropriately protect the multitude of security-critical interactions in electronic workflows. The University-wide coordination of the IT security procedure for continuous adaptation and updating of the necessary organizational, staff, and technical measures is carried out by an IT security officer and their IT security management team, which comprises representatives from the RRZ, the joint data protection officer, University Administration, and the faculties. This plan and Universität Hamburg's information security guidelines [10] are oriented to the guidelines of the Free and Hanseatic City of Hamburg on information security [9] and the ZKI recommendations supported by the university chancellors [14].



Universität Hamburg appoints an information security officer and thus creates a unit under the supervision of the director of the RRZ, who is delegated the president's responsibility for information security as a member of the collective CIO (see *Chapter 3*).

### 3 IT governance

The cooperative provision of services based on information, communication, and media technology (ICT) requires coordination and an organizational framework.

IT-relevant organizational structures and the necessary controls for the entire IT system are defined in Universität Hamburg's IT governance. These in turn support the University's strategic goals for research, teaching, studies, and knowledge transfer as well as administration and management as needed and in accordance with HmbHG.

The *University Steering Committee on IT Service Provision* updates the IT strategy, which is closely linked to the institutional strategy (here: Universität Hamburg's Structure and Development Plan [6]), coordinates IT supply at Universität Hamburg, and carries out joint planning in its function as a collective CIO<sup>7</sup> [4] that assumes the IT-related planning and support tasks of the president/Executive University Board. The chancellor, the director of the RRZ, two members from the faculties appointed by the Executive University Board, and an advisory member work together within this IT steering committee. It is chaired by the chancellor and managed and represented externally by the RRZ.

The collective CIO is responsible for both strategic and operational aspects of IT supply. It prepares any necessary decision proposals for the Executive University Board. To enable overarching planning and decision-making and to verify the compatibility with the IT strategy and IT policies, the CIO must be informed of any development plans and requirements for IT services from the client groups of the faculties/University Administration as well as the central institutions at an early stage.

The client groups communicate with the CIO via their respective *client representative* (usually the dean or head of the respective institution).

The client representatives communicate IT-related operational and strategic information and requirements to/from users and support University-wide coordination and change management processes.

### 4 IT investment procedure

Until 2012, the BWF provided Universität Hamburg with investment funds specifically for information and communication technology (ICT) via its global ICT budget. This purpose-specific budget has formed part of Universität Hamburg's overall budget since 2013. It serves as the basis for a coordinated, strategically planned allocation of funds for IT equipment and is therefore part of Universität Hamburg's IT strategy.

The institutions of Universität Hamburg can apply for ICT investment funds and funds for covering associated costs from this budget. ICT applications must be submitted to the chair of the ICT budget committee (the director of the RRZ, who is also responsible for the central ICT infrastructure funds for IT devices and networks within the CIO committee as the budget owner). At the end of the year, the chair of the ICT budget committee invites applications for procurements planned for the following year.

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<sup>7</sup> In this concept paper, the term "CIO" is synonymous with the IT Steering Committee, which acts as a collective CIO.

The faculties, central institutions, and University Administration summarize and prioritize their individual applications. The client representatives (deans or chancellor) described in *Chapter 3* forward the prioritized applications from their department to the IT budget committee for a preliminary review. Projects that can be financed in a financial year are assigned a project account (WBS elements) on behalf of the chair of the IT budget committee.

Computer equipment for workstations in all areas of Universität Hamburg is considered a top priority and the necessary funds are allocated from the central budget for ICT infrastructure in accordance with the relevant standards at Universität Hamburg. ICT equipment for workstations (PC or laptop) meeting the relevant standards at Universität Hamburg is also always approved in appointment and retention negotiations.

Applications for ICT and large-scale IT equipment (see below) from the RRZ are prioritized, as they form the basis of the IT services for the entire University (e.g., server and storage infrastructure) or are submitted on behalf of client groups (e.g., large-scale IT equipment for HPC). At the same time, care is taken to ensure that funds are also made available for the special requirements of scientific IT and special administration-related procedures.

Preliminary applications for large-scale IT equipment (state and federal funds) and other measures financed from the remaining central ICT funds of the BWF (e.g., cross-university software) are submitted in the same way. The corresponding proposals are only forwarded to the BWF (and, if necessary, from there to the DFG for review) following a technical discussion within the ICT budget committee and after a final decision by the CIO in accordance with the external guidelines. The BWF regularly convenes an ICT planning group to coordinate these applications across all universities within which Universität Hamburg is represented by the director of the RRZ.

Other tasks of the ICT Budget Commission include:

- drafting proposals to pool joint procurements and services to achieve more economical solutions and more efficient operations
- taking the lead in the cooperative development of standards (e.g., for PCs and laptops), and obtaining and regularly updating associated offers
- drafting guidelines and criteria to support applications, recommendations, and decisions and achieve a high level of transparency

For more information on the ICT investment procedure and standardization as well as submitting requests for large-scale IT equipment, see [11, 12] and [www.iuk.uni-hamburg.de](http://www.iuk.uni-hamburg.de).

The lump-sum network funds (“Pauschale Netzmittel”) previously provided by the BWF has been a purpose-specific part of Universität Hamburg’s overall budget since 2013. It is made available directly to the RRZ.

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