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New roles – new structures? How collaboration and multi sourcing affects central IT

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Abstract

The way to provide IT services in Higher Education Institutions (HEIs) is undergoing transformation. In addition to locally provided services, we now see emerging new structures involving collaborative services, community cloud and commercial cloud offerings. This development cannot leave local IT unaffected. To the contrary, local IT has to develop to keep its role as a valuable provider to the local users in research, teaching, and administration. In our work, we developed structures to enable local IT to cope with these changes in demands and boundary conditions.

1 Introduction

Higher demands from users taken together with shortages of skilled workers and a shift towards public clouds by software and hardware vendors are driving Higher Education Institutions (HEI) towards a multi-sourcing approach. This shift results in new roles and responsibilities for local IT in HEI. With use the term “local IT” for the infrastructure within an HEI that provides IT services and includes the local systems as well as processes and, in particular, people. The focus here lies on an HEI’s central IT service provider, but the thoughts apply to departmental IT, too.

In our opinion, local IT in HEIs face a radical change in how IT services for the university, for research, teaching, and administration are provided (Dittrich & Eifert, 2022). It will become inevitable to source services from the cloud as well as to use collaborative services from other sites from the HEI universe. In consequence, these services sourced externally do not only complement the locally provided services, they also replace them (and have to), at least partially. In the meantime, IT departments that act as providers for other universities will need to evolve into that role of a cross-university service provider as well.

The abovementioned collaborative way to provide services by itself serves various purposes. One is to provide services that are barely available commercially or are economically unfeasible when they are.

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Another aim can be to make a conscious decision that particular services need to be kept under public control in order to secure digital sovereignty which is also a means to keep low dependency from external providers.

An often-heard objection against sourcing is the danger of getting in a vendor lock-in and then being dependent on the provider's benevolence. To manage this risk, HEIs and thus their local IT have to strike a balance between using or embracing the special features of a solution and adhering to official or at least industry standards, allowing for flexibility in changing solutions, if necessary. By committing to this freedom of choice - without limiting oneself - local IT plays an important role in guaranteeing digital sovereignty.

These changes in IT service provision and consumption effect various aspects, including:

- Shifting focus from local users and stakeholders to community users, and stakeholders
- increasing influence from external decision makers (e.g. politics)
- increasing organizational tasks such as for example checking and meeting to regulations, contract management and dealing with more complex license management
- evolving skill requirements

At RWTH Aachen university, these consequences have become gradually perceptible and thus we developed a structure to describe these new roles and pending changes.

2 Defining the new roles

As mentioned above, we see local IT to be responsible to provide services for research, teaching, and administration. There, research often needs highly individualized services. In many cases, these can no longer be provided in the form of bespoke solutions. Rather, they have to be solutions that are assembled from existing configurable building blocks. Customization thus consists of the seamless integration of suitably assembled IT modules and necessary individualization takes place at the workflow integration level.

On this premise, we have identified additional roles for local IT, more than just being the IT provider for a single HEI. To differentiate these roles, we determined distinctive properties where the level of fulfilment differs between each role:

- support
- degree of individualization
- operations
- service development and decision making
- integration into university processes

Fig. 1: Roles for local IT

2.1 IT provider for the university

Local IT will remain responsible for supplying IT services to its organization, encompassing all its departments and researchers. Even more, since digitalization is establishing itself in more and more areas, the dependency of more and more processes on available IT Services with all its constituents (processing power, data, ..) increases the importance of this role. Consequently, it is no longer feasible to provide the full stack of all necessary applications locally. Another non-sustainable approach is to limit supply to centralized and administrative services, leaving teaching and research on their own (as observed at several HEIs). In contrast to this divisive approach, a holistic approach should cater to the service demands of all university branches to supply all the university's processes - the core processes research and teaching in particular - with adequate solutions. Due to these growing demands, this simply is no longer possible relying on locally provided services only.

Whether we are using local resources or Infrastructure-as-a-service (IaaS) / Platform-as-a-service (PaaS) as a basis in the service provider role does not have an effect on the user experience. One key factor is that the cloud service is not directly consumed by the user, but just a part of the final service provided.

The following table describes this role using the distinctive characteristics mentioned above:

characteristic	**expression**	**description**
support	high coverage	1st and 2nd level support is completely provided by university facilities
level of individualization	high	special conditions and requirements at the university can be addressed
operations	high coverage	Central IT is responsible for operation / administration of the service, possibly by using cloud services as a basis
service development and decision making	controlled by university	The decision-making structures required for the further development of the service, like steering and control groups, coordination offices, are within the university.

integration into university processes	high	Integration with other university IT services is easily possible

2.2 IT provider for the community

As IT services are bundled in order to keep a sufficient level of efficiency, offering IT services to other HEIs is a way to more efficiency by upscaling. This is the counterpart of local IT seeking collaborative services, so there must be a sufficient number of IT departments that are capable of offering such services. But even when there is a provider that currently runs a service for local use and is capable of scaling up this service, this imposes a new role: As a cross university provider, many processes that accompany any IT service will have to change.

The following table shows the degree of changes according to the distinctive characteristics.

characteristic	**expression**	**description**
support	medium coverage	1st level is at the "home institution" of a user: authentication, information for authorization, and about the service in general are covered there. 2nd level support with regard to operation is provided by the local IT of the community provider, sometimes in cooperation with other project partners for content-related support.
level of individualization	medium	special conditions at universities in general and their requirements can be addressed. Special features of the university that provides the services can only be addressed in a limited way and in coordination with the community.
operations	high coverage	Local IT is responsible for operation / administration of the service, possibly by using cloud services or in cooperation with other members of the community.
service development and decision making	controlled by community	Further development usually takes place on a project basis in the community. The decision-making structures of the services usually lie within the structures of the community or cooperating partners.

integration into university processes	medium	Integration with other university IT services is not completely possible

From the provider's perspective, the main difference between provider for the university and provider for the community lies within the enlarged user group and therefore growth in the number of stakeholders and decision makers. This leads to a more standardized service.

2.3 Service broker for community and public cloud services

With an increasing number of community and public cloud services available the need to manage those services for the users within the university grows. The role of local IT changes from a provider to a broker on different levels:

- Integrating services into basic university processes like Authentications and Authorization Infrastructure (AAI) or invoicing ("integrative services")
- Central management like configuration and license management
- Contract management
- Defining Regulations
- Mapping of use cases and available services

This does not only refer to public cloud services, but also to community cloud services.

While the other two roles are mostly native to central IT, this new role implies different skill sets and tasks.

characteristic	**expression**	**description**
support	low coverage	1st level support is provided by university, e.g. authentication, authorization if necessary, general service information. 2nd level support for the "integrative services" like authentication, licensing and configuration settings is provided by the university. Other service specific support is not provided by university, but by the respective provider of the cloud service.
level of individualization	low	can only be implemented within the scope of the service options provided by the provider
operations	low coverage	Complete operation lies within the responsibility of the cloud provider, with the exception of the "integrative services"
service development and decision making	controlled by provider	decisions on further development lie entirely outside the university.

integration into university processes	low	Integration into other university services is difficult and depends on the interfaces provided by the cloud provider.

Now, service level management is getting more important, again in the field of tension between users that demand “perfect” services (often without thinking about realistic demands) and the feasible (or affordable) service by any provider.

The bridging between those is necessary in both directions: To give the user side (individuals, departments, the university, ..) a clear understanding what services are supplied under which quality parameters. And, of course, to have an agreement in place with the service provider of any kind that defines these parameters. For local IT this implies the new role to negotiate and to communicate these quality parameters, these “service levels” with their internal users in order to balance between “just good enough” and “desirable” qualities on the one side and affordable contracts on the other. To be able to do so, local IT has to map local use cases and demands on a multitude of local and sourced services.

In order to supply a near-optimal service portfolio to the local users, local IT also has to manage how the various services can be integrated with the university’s process infrastructure (e.g., AAI) and how to combine them to fit into the necessary workflows. This implies the decision which of the sourced services can be used as externally provided and which of them could or should or need to be improved by a local customization or individualization.

3 Structural changes and consequences

The changes in the role of local IT depicted in the previous sections clearly demand a corresponding shift in the skill set of the IT staff. Where in the past the focus laid on providing a full-service stack, beginning from the raw servers, virtualization and OS level, the share of these tasks in creating valuable services is diminishing. A side effect of the former way to supply IT services often relied on many assumptions that were valid with an IT landscape from a single mould: Own Network connects own servers with local users authenticated by own Identity management. With sourcing, every dependency has to be made explicit, there is no simple “inside” and “outside” on the network and so on. Also, support works differently with users as well as services from “the outside”.

The role of local IT will most likely not change to only one of the roles, but as we see at RWTH Aachen university all three of them will apply equally. The organizational structure will not only change due to the different skill set, but also to the priorities and modified processes in the different roles.

Consequently, it is highly important to motivate all staff to take part in this change. The workload added during this change can be attributed partially to the necessary transition in how services are supplied and thus the phase of parallel operation. However, a significant part of this workload is also found to stem from the unwillingness to get rid of once valued services. Here, the staff that ran these services often is aligned with the (often few) users that are accustomed to these services in continuing these legacy services “as ever”. In such cases, IT management has to guide staff and users to the adoption of the new way of service provisioning. It is particularly important that all stakeholders and steering committees agree that without infinite growth, any of these inevitable developments require the cancellation of outdated services.

On the other hand, the need to integrate sourced services with the local process infrastructure, to combine them in order to optimally support the use cases and workflows and to tailor sourced services to local demands is the area where local IT has the chance to play an inevitable role in a university’s

value chain. While administering servers no longer is a differentiation factor, sourcing, brokering and integration are.

4 Conclusion

In the introduction we stated that currently the IT services for HEI are pushed towards a multi sourcing approach which results in new requirements and therefore new roles for the central IT. What we tried to show is that these changes pose a significant challenge not only on IT but on the owners of all IT-supported processes as well. However, we are convinced that these changes are inevitable for HEIs to supply their core processes with suitable IT. Futhermore, they also offer a chance to concentrate the local expertise on local demands and on the brokering as mentioned in section 1.2 while sourcing those parts of IT that do not need to be locally customized.

The definition of these roles helps to express the changes and describe differences. This description helps employees to understand the change and university to manage it.

For local IT, these changes require massive adjustments and, at the same time, open chances to reposition in a changing environment.

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5 Authors' Biographies

Denise Dittrich, M.Sc. has been working at the RWTH Aachen University's IT Center since 2005. She received her Master Degree in Artificial Intelligence from Maastricht University in 2009. From 2010-2012 she was deputy head of the IT-ServiceDesk, thereafter responsible for IT Process support and Identity and Role Management. Since 2016, she is deputy head of the department for Systems&Operation with her focus on providing large-scale central services like E-Learning, Identity Management and Collaboration platforms as well as cloud services. She also leads the EUNIS SIG cloud management.

Dr. Thomas Eifert, received his doctoral degree in solid state chemistry. Since 2013 he holds the role of the CTO of the IT center and is thus responsible for the technological strategy of the IT Center. His particular interests are the mutual dependencies of researchers' requirements and appropriate technical solutions.

Melanie Moritz, M.A. has been working at the RWTH Aachen University's IT Center since 2011. After being responsible for Change and Incident Management as an IT Manager, she is now head of department „IT Service and Security Management". She is interested in adapting processes and organization to current requirements.