Baltic Ring – D3: Organisational and Operational Model

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1 Executive Summary

This document is the Baltic Ring project deliverable number 3. The Baltic Ring project was established to investigate available resources, deliver a design blueprint, and describe organisational and operational models for a federated optical network interconnecting the countries around the Baltic Sea. The goal behind the blueprint was to define a prototype solution for the basis of discussion, decision-making and later enhancement.

The project was financed by the Nordic Council of Ministers as part of the strategy to implement a knowledge infrastructure for the Fifth Freedom in the Baltic Sea area [11].

Section 2 describes shortly the questions the deliverable is addressing.

Section 3 discusses the background and starting points for the project assignment. The NRENs and their current activities similar to the Baltic Ring are revised. The task is proportioned to the background information and the scope of the work is refined. The Baltic Ring project work and research methods are described.

Section 4 discusses five approaches to the task at hand. The aspects are discussed in order to decide what kind of solutions are feasible for the current case. The reasoning is used for choosing the final suggestion in the subsequent sections.

Section 5 introduces the suggested agreement framework, describes the key concepts or definitions and highlights the essential agreement terms. Agreement templates are compared with each other for illustrating the differences.

Section 6 gives a suggestion the questions of organisational setup and governance model. The reason for choosing the type is explained. The line organisation structure and the planned tasks for each organisation body is described.

Appendixes contain templates for the levels given in section 5. In addition, a template for minutes of the steering group is drafted for making the first meeting easier.

2 Introduction

The purpose of this deliverable is to address the organisational and operational model for the prospective Baltic Ring consortium. The task was divided into two subtasks or results, which are:

- Result 4 (R4): An agreement framework.

- Result 5 (R5): A design for an organisational framework and governance model for a federated operating consortium.

Agreement framework means the agreement structure, which is required to establish the co-operation. In addition, finding the general or initial terms was expected. The organisational framework stands for the description of the necessary organisation structure needed to initiate the co-operation and sustain it in the long-term. The question of the governance model is described with a organisational type and a compact description of the principles and work methods. These results are judged to lay the administrative foundations for co-operation.

3 Background and Starting Points

3.1 Participating Organisations

The Baltic Ring consortium would consist of ten research and education networks, which are defined by geographic boundaries. The Ring was specified to encircle the Baltic Sea, which has nine shore countries. The countries and corresponding national research and education networks (NRENs) are listed in Table 3.1.

Country	NREN Acronym[1]	NREN Name	Website
Denmark	FSKnet	Forskningsnettet	www.forskningsnettet.dk
Estonia	EENet	Estonian Educational and Research Network	www.eenet.ee
Finland	Funet (CSC)	Finnish University and Research Network	www.funet.fi
Germany	DFN	Deutschen Forschungsnetz	www.dfn.de
Latvia	SigmaNet	Academic Network Laboratory of the Institute of Mathematics and Computer Science, University of Latvia	www.SigmaNet.lv
Lithuania	LITNET	Academic and Research Network in Lithuania	www.litnet.lt
Nordic Countries	NORDUnet	Nordic Infrastructure for Research and Education	www.nordu.net
Poland	PSNC	Poznan Supercomputing and networking center	www.psnc.pl
Russia	RUNNet	Federal University Computer	www.runnet.ru

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Country	NREN Acronym[1]	NREN Name	Website
		Network	
Sweden	SUNET	Swedish University Computer Network	www.sunet.se

Table 3.1: The Baltic Ring participant organisations

Notes:

1. The name of the legal entity is indicated in parenthesis, if the familiar NREN name is the name of a service.

The participant organisations are naturally bound by the legislation in their corresponding countries. Some of the organisations have a wider area of activity than networking only. Examples of this are CSC and PSNC, which are both supercomputing centres as well. In addition, there are differences in the NRENs' user base and usage policies. For example, some of the NRENs provide their services to private companies, while others are limited to educational and academic users only.

Further information about the participant organisations can be found in the TERENA Compendium [1], a survey of the status and activities of NRENs in Europe, which has been published yearly since 2001.

3.2 Existing Physical Networking Co-Operation

The NRENs have a national mission, given to them by their governments, to provide networking services in their respective countries. Because both research and networking are international in nature, there are existing co-operation agreements and areas of co-operative activity between the prospective consortium participants. This section summarises the most significant activities.

3.2.1 GÉANT

The GÉANT project [2] is a wide-reaching collaboration between the European NRENs. It strives to provide comprehensive and reliable networking services for the project participants based on the GÉANT network, the high-bandwidth pan-European research and education backbone that interconnects NRENs across Europe and provides worldwide connectivity through links with other regional networks. GÉANT started in 2000 and the member base has been increasing since the beginning. GÉANT is co-funded by the participating organisations and the EC.

Operational support is managed by DANTE [3], which is also the managing partner and the project coordinator. DANTE is a limited company established in the United Kingdom.

The GÉANT management system consists of two committees, the Project Management Team and the Project Coordinator [2].

The Policy Committee (NREN PC) has a representative from each partner in the project and is responsible for setting and overseeing overall policy. Authority for supervision is delegated by the Policy Committee to the Executive Committee. The Executive Committee runs the project at an executive level and consists of a small group of NREN PC members, who are elected by the NREN PC. The Executive Committee meets more frequently than the NREN PC (every 6 to 8 weeks), and is primarily responsible for preparing the yearly work programme for the project, for quality assurance and for supervision relating to its implementation.

The Project Management Team consists of two Project Managers (the DANTE General Managers), supported by the Project Office, and representatives of the all the project Activities. These cover the Project Management and Networking, Services Operation, Research and Innovation, and Technical Coordination. The Project Managers have the day-to-day management responsibility. As the Project Coordinator DANTE provides overall project management and coordinates the project's various activities. It is responsible for financial and administrative work, including delivering progress reports to the EC, for public relations, and for overall communications between the project and the EC.

3.2.2 NORDUnet

The NORDUnet network is the Nordic infrastructure for research and education [4]. It is executed as a collaboration between the NRENs of the five Nordic countries through a limited company, NORDUnet A/S, which is based in Denmark. NORDUnet provides high-level operational networking services to its joint owners. The history of NORDUnet dates back to 1986, when the NORDUnet programme, financed by the Nordic Council of Ministers, was established. The change to the limited company model was introduced in 1992. NORDUnet's activities are funded by the owners.

The NORDUnet A/S board consists of representatives from each of the Nordic NRENs. The board manages overall political and strategic issues. Day-to-day management is performed by the NORDUnet A/S Management Team. NORDUnet A/S acts as the Nordic representative towards GÉANT, DANTE and GLORIAD.

3.2.3 GLORIAD

The Global Ring Network for Advanced Applications Development (GLORIAD) [5] is a collaboration between 15 countries in order to create a global fibre-optic ring of networks around the northern hemisphere. The GLORIAD ring is operational and provides connectivity services to the scientists, educators and students in the partner countries. The history of GLORIAD goes back to 2004, when the United States, Russia and China launched the first phase of the network, "Little GLORIAD". The collaboration was expanded and/or the network upgraded in 2005, 2006, and 2007, with new partners including NORDUnet (2007). The latest development in the GLORIAD collaboration is the "Taj initiative" (2009), which brought in India, Egypt, Singapore, Vietnam and Greenland and introduced a redundant fibre route around Eurasia.

The GLORIAD collaboration is structured as a program with a board and an operational body. The board has members from each of the participating countries. Day-to-day management of the network is carried out by the Centre for International Networking Initiatives, which is

housed in the University of Tennessee, in the United States. The activity is financed by the partner countries.

3.2.4 GLIF

The Global Lambda Integrated Facility (GLIF) is an international virtual collaborative organisation, which provides lambdas for data-intensive scientific research and supports middleware development for lambda networking [6]. Administration and activities are organised into working groups, which address different research and operational issues. Practical workgroup administrative support is provided by TERENA; financial support is provided by sponsoring organisations.

The GLIF itself doesn't provide operational services, but offers a shared portal for announcing resources provided by the participating organisations. The GLIF infrastructure can be seen as a global facility for use by scientists and projects, and a global laboratory for network engineers to collaborate on developing lambda networking technologies, middleware and applications. Thus GLIF is an association or forum for promoting lambda networking, which leaves deployment to its members.

The GLORIAD program is a GLIF member. Of the potential Baltic Ring participants, NORDUnet, RUNNet, PSNC and DFN are members.

3.2.5 Peer-to-Peer Solutions – Cross-Border Fibre

The technology shift from router-based networks to Dense Wavelength-Division Multiplexing (DWDM) networks gave NRENs the opportunity to expand their networks. In addition, it enabled networking technologies to be harnessed for completely new areas of research, since, for example, demands on backbone capacity were no longer such a significant show-stopper. The limiting factor has moved to the cost of the connectivity services versus the achieved benefits.

Some NRENs have established mutually beneficial bilateral co-operations using cross-border fibres (CBF). The primary reason for such co-operation is the economic benefit it brings to implementing communications circuits for the NRENs' user base and international projects. As the NRENs have a good understanding and knowledge of the communications infrastructure in their domain, they can optimise the solutions. This in turn delivers benefit to the research community, as end users can afford to use the enhanced communication services in their projects.

The CBFs are based on bilateral agreements. Very little administrative structure is needed, except when new circuits are required. These are negotiated on a case-by-case basis. CBF interconnections can be compared to IP peering, which is the fundamental method behind building the Internet.

3.2.6 Multi-Domain Networking between NRENs

The case for multi-domain networking has been developed in multiple research projects, including the GÉANT (GN2 and GN3) projects. The present authors have discussed a model where multiple networks would be under the control of a joint provisioning system. The

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concept has been demonstrated to work in a testbed environment, but there's no known deployment in operational networks.

Table 3.2 below summarises the involvement of the Baltic Ring participant organisations in major international networking activities.

NREN Acronym	GÉANT	NORDUnet	GLORIAD	GLIF	P2P[1]	Multi-Domain[2]
Forskningsnettet	X	X	X			
EENet	X					
Funet (CSC)	X	X	X			
DFN	X			X		
SigmaNet	X					
LITNET	X					
NORDUnet	X	X	X	X	X	X
PSNC	X			X	X	
RUNNet	X		X	X[3]		
SUNET	X	X	X		X	

Table 3.2: The involvements of the Baltic Ring participant organisations in some major international networking activities

Notes:

1. P2P means existing peer-to-peer CBF connections to other NRENs.

2. Multi-domain means participation in trials, where multiple NRENs are present.

3. RUNNet participates in GLIF via the e-ARENA consortium.

3.3 The Baltic Ring Network and Current NREN Activities

The NRENs around the Baltic Sea operate and administer large networks with millions of users in total. The proposed physical interconnections and additional hardware for completing the missing parts of the Ring are not excessive, but are directed towards routes with which they are unfamiliar. In addition, any new commitments and investments must be fully and carefully justified for deployment to be successful.

For most NRENs, establishing a Point of Presence (PoP) in another country has not been common practice in recent years. In addition, there may be fundamental restrictions in the NREN's statutes that limit the operation or acquisition of services in other countries.

All of the prospective Baltic Ring NRENs have been involved in international networking activity. This activity has been related to international lambda connectivity in ring structures and CBFs. All the NRENs also have experience of dark-fibre-based networks. These factors give a firm foundation for blueprinting, with the prospective partners starting from similar positions.

3.4 Principles for Baltic Ring Administration and Governance

The small amount of potential new Baltic Ring infrastructure doesn't justify large expenditure on administration and maintenance in the operational phase. Instead, low-overhead models and functional organisation should be preferred, where the existing NREN functions and operational methods are supported and built on. Also, usage and deployment should be easy from the NREN participants' point of view.

The initial administrative solution should be light. The setup should, however, allow the collaboration to change and evolve, should the partners consider that necessary. In addition, a reasonably quick decision-making mechanism should be enabled, both for decision-making inside the Baltic Ring group and for answering the end users' requests for services.

3.5 Out of Scope

Ownership of the physical network and the equipment has been left out of the analysis. There are several approaches to the issue, each of which is very case-dependent. It is expected and assumed that the participating NRENs will be able to find a satisfactory solution.

Ownership of the coordination function has also been left to the participating NRENs to decide. The coordinator can be selected from one of the participating NRENs, or outsourced to some third party.

3.6 Project Work and Research Methods

The information in this deliverable is based on industry literature and web sources, visits to NRENs and personal interviews. The literature and web sources were identified by reviewing recent work done in this field, and were supplemented and updated by the visits to NRENs. The NREN visits also revealed the local needs and preferences in each country. Personal interviews and correspondence were used to clarify issues and details.

4 Flexible Approach

The authors recognise that the proposed organisational and operational solution to the Baltic Ring must be flexible enough to suit all participating NRENs, accommodating the differences in their respective situations, preferences and requirements. The initial framework should also allow room for expansion and provide growth paths for the activity.

Five aspects were therefore selected to define the desired organisational and operational model:

- Level of commitment.
- Administrative investment.
- Service portfolio complexity.
- Rate of progress.
- Acceptable use.

The objective was to use these aspects as adjustable variables, which affect the proposed setup by allowing certain activities to be enabled or postponed.

The following sections discuss each of these aspects and clarify the reasons behind the proposed solution.

4.1 Level of Commitment

The partners may have different views on commitment level, resourcing and how binding the co-operation should be. The views may vary from mild interest to eagerness.

Possible reasons for the differences include the degree of added value received compared to current activities. In the early phases, the benefit for some NRENs may be small in many scenarios, which would justify the lack of interest. On the other hand, networking introduces significant areas of overlap and common interest for each of the participating NRENs, which should provide an incentive to commitment.

Given the operational nature of the collaboration, the Baltic Ring network must satisfy a minimum level of usability for the first-phase services and users. Administratively, this is usually accomplished with Operational Level Agreements (OLAs) or Service Level Agreements (SLAs) between the parties. In recent international development projects, the term Service Level Specification (SLS) has also been used for the part of the framework that defines the parties' obligations.

However, it is not feasible for NRENs to claim compensation from each other. In the early phases, Baltic Ring agreements should not contain any damages. Rather, agreements related to operation will be more like declarations or statements of intent. These intentional operational declarations should be understood more as well-founded unilateral announcements of the intended operational level.

Sustaining the operational level and usability is likely to be a complex matter. It can be supported with an initial service, which would run on the Baltic Ring from day one. This service could contain many distinct technical services, serving different end-user needs. The service portfolio should include elements where the NRENs themselves are in the role of the user. This would make development easier and hasten the speed of service finalisation.

The proposed model provides a path for increasing the operational commitment level. It starts by classifying the operational level of the different Baltic Ring resources. For example, the NREN can classify their CBFs differently to their backbone services. When operational experience has been gained and the networks mature, a reclassification cycle can be performed. The existing services can be re-evaluated, new services introduced and obsolete services revoked.

4.2 Administrative Investment

The administrative effort can be divided roughly into two categories:

a) The administrative work done to support the collaboration in the Baltic Ring co-operative entity. This is the work needed to maintain the collaboration bodies and the basic functions.

b) The corresponding administrative work needed inside the member organisations. This is the work needed to manage the activity (active) and to interact with the collaboration bodies (reactive).

In the early phases, as the co-operation is established, the amount of category b) work will be significant. The new collaboration bodies will need guidance and input. As the activity matures, the flow of reporting will become steady and the meeting cycles will settle down. The work in both a) and b) categories will reach an optimum, sustainable level.

The balance of work between the categories is dictated by the level of control the partners consider it necessary to have. The more control required, the greater the administrative work created. This is an example of internally created administrative churn.

If the co-operation is successful, the usage and expansion will create a constant workflow to category a). If the administrative tasks are not shared well enough, this will result in a flow of decision-making in category b). This is an example of externally created administrative churn caused by positive progress.

4.3 Service Portfolio Complexity

The Baltic Ring network would be a powerful addition to the NREN's toolbox. It would enable a wide range of possible applications, even if the NREN limited its use of the network to the transport layers only. It is therefore very tempting to promote the service base and develop it rapidly. A wider service base could serve the users better, which in turn could result in more significant results in the field of education and science.

However, to have a large service base when resources are limited is not an optimal solution. Each service requires attention and actions from the collaboration. In addition, the implementation and support of a complex service set will introduce additional work for the NRENs. If some of the services are rarely used, they are potentially problematic, as there is no opportunity for the technical staff to accumulate operational experience and expertise. Additional difficulties may arise from the international dimension of problem-solving, which may be time-consuming.

As the number of services increases, so too does the need for marketing and user support. It may be difficult for the end users to differentiate between the services and to choose the best one if they are too similar. Providing end-user support for seldom-used services is potentially as troublesome as the operational problem-solving mentioned above. In the later phases of the service life cycle, the termination of the services will also introduce a work spike, when carried out properly.

A very limited service set is easy from both the end-user and administration point of view. The challenge is to select the services so that they meet the users' needs. This can be

achieved by involving the users in the service development and selecting the services that correspond to most needs. The service portfolio is discussed from the technical point of view in [8, Section 3.1].

4.4 Speed of Progress

The desired timetable is a major factor in planning. The requirements of the NRENs with regard to timing are influenced by such considerations as their development and financing cycles. The Baltic Ring pre-study project has found that the NRENs' key cycles are not synchronised, and that a compromise is therefore needed. The process that affects most of the prospective partners is the EU's Seventh Framework Programme for Research and Technological Development (FP7), which funds projects in which the NRENs are participating.

In order to serve the timing needs of all the partners a gradual approach can be used, where some parts of either the physical ring or the co-operation structure are built before others. Apparently disconnected activities – between two partners, for example – may well serve a common goal.

The choices made in the administration structure and service portfolio also have an impact on, and should take into account, the speed with which NRENs are able to progress. Labour-intensive options will slow down the service introduction and lead to a temporary vacancy in the resources. The key factors for the collaboration are the time needed to agree and respond to the unresolved questions and the speed of decision-making on operational issues. Both of these depend on the swift availability of accurate information.

4.5 Use Control

All NRENs have Acceptable Use Policies (AUPs) or comparable policy documents. The documents describe the intended and allowed use of the networks. It is general practice for NRENs to make their AUP available on their website. A good collection of example AUPs can be found in one of the documents produced by the Porta Optica Project [9, Appendix A]. The policies vary both in length and detail. Some of them bear a similarity to the service catalogues.

The AUPs reflect both the local preferences and the requirements of the legislation in each country. Fitting together and unifying the different AUPs of the participant NRENs is a very challenging task, which should be approached with caution. The Porta Optica document [9, p. 3] introduces an example consortium AUP and discusses the alternatives.

The document suggests that a distributed model, based on the commitments made in the consortium agreement, could also give a reasonable and valid basis for use control. This is because the consortium member countries are already signatories to treaties in relevant, related fields such as Intellectual Property Rights (IPR), and the publicly owned NRENs are de facto bound by these. In addition, unethical behaviour is out of the question for the NRENs for obvious reasons.

Whichever model is selected, use control should be agreed to the level where the co-operative entity can make management decisions on a clear basis. For encouraging and advancing uptake, it would be beneficial to grant use permission to relatively large, but well-defined user groups in the early phases of the initiative.

5 Agreement Framework

5.1 General Structure

The suggested agreement framework consists of three different documents:

a) Baltic Ring Memorandum of Understanding (MoU): a letter of intent, the initial agreement.
b) Baltic Ring Resourcing Framework Agreement: the set of rules for using the Ring resources.
c) Baltic Ring Deployment Agreement: a tool for reserving resources from the Ring for the time being.

The MoU is intended to secure the parties' general agreement to the proposal. The work done to refine and finalise the MoU and the related development projects will serve as a tool for developing the community. Second, rules for resourcing and use are discussed and agreed using the Resourcing Framework Agreement. These two documents may be enough to administer the Ring effectively; however, to anticipate a possible further requirement, an example agreement template for special deployments is included. An example of a special deployment is a bilateral agreement for a light path connection.

The proposed solution reflects the principles and scope identified in sections 3.4 and 3.5. In addition, the preferences discussed in Section 4 have been taken into account. The choices are summarised in Table 5.1. The agreements are expected to lead to setting up deployment projects, which would follow the targets given in

It is recommended that the partners develop and refine the suggested framework. The Porta Optica Co-operation Agreement template [9, p. 7] provides an excellent point of comparison and supplementary material. The main difference is that the solution suggested for the Baltic Ring divides up the items that need to be agreed, both into separate documents and into separate timeframes. These separate elements can be negotiated independently and more quickly. The different agreement stages involve different people from the co-operative entity's administrative body and from the NRENs.

Aspect[1]	Early Stage[2]	Late Stage	Remark
Level of Commitment	Medium[3]	High	Importance is increasing.
Administrative Investment	Low	Low	Shared and well-delegated administration.
Service Portfolio Complexity	Low	Low	Simple solutions are sought.
Speed of Progress	High	Medium	The services are wanted in use rather quickly.
Use Control	Low	Low	Each NREN is responsible for their respective users.

Table 5.1: Summary of suggested administrative targets for the Baltic Ring collaboration.

Notes:

1. The Aspects are as in Section 4.
2. Early Stage corresponds to the early time phases in the co-operation.
3. High, Medium and Low denote the expected level.

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Phase / Remark	Cost Level	Schedule Strictness	Risk Level	Resource Needed	Quality of Deliverables
Early Phase	Medium[1]	High	Low	Medium	High
Late Phase	Low	Medium	Low	Low	High
Remark	Front financing	Minimise delays	Well-planned assignments	Optimise maintenance phase	

Table 5.2: Summary of suggested future Baltic Ring deployment project targets.

Notes:

1. High, Medium and Low denote the expected level.

5.2 Key Definitions – Cornerstones of Collaboration

i.   **Federated network**. The Baltic Ring network is based on a federated model, which means that the network is contributed, owned and operated by the national research and education networks of the countries in the Baltic Sea area. This key limitation allows several possibilities for realising the federation, including a single federation, a federation of smaller federations, or a mixture of smaller federations and individual NRENs. NORDUnet can be seen as a kind of federation already, which would suggest that the mixed approach might be the optimum.

ii. **The Baltic Ring partners**. The partners in the Baltic Ring consortium are from the Baltic Sea area, which means nine countries and their NRENs in the first phase. The key goal of the consortium is to have all the Baltic Sea NRENs involved and active in the co-operation. The member base can be expanded as the cross-border networks evolve and as the consortium sees appropriate. Natural partners can be found from the countries that are direct neighbours of the initial partners. Expanding the member base is not an absolute critical success factor, but it may support the initial intention of supporting e-Science in the area and advancing the principle of the fifth freedom.

iii. **Duration of the partnership**. The Baltic Ring collaboration is expected to be a long-term partnership. Thus the solutions that are sought will be for time periods of five years or longer. This would support the consortium members best and give them a basis on which to build their own development roadmaps.

iv. **Co-operation in the cross-border infrastructure**. The heart of the Baltic Ring collaboration is the will to co-operate with other NRENs in the field of cross-border infrastructure. Without this the Ring cannot be completed. Because of local regulations and laws, the different sections may best be prepared and built as bilateral undertakings between the neighbouring countries. The individual undertakings will contribute to the shared overall cause.

v.   **Information sharing**. The co-operation will not work without information sharing. The information exchange needs to cover cross-border networking, the related services and other activities. This is especially important for development projects, as it gives the consortium partners the opportunity to provide feedback. The sharing should respect any confidentiality and non-disclosure obligations to third parties.

vi. **Technical compatibility**. In order for the communications network to be usable, the systems involved must be technically compatible. This is why the participating NRENs should agree on a common, consistent approach to developing their systems. This applies particularly to the cross-border infrastructure and other demarcation points where different networks meet. Much greater freedom can be tolerated inside the national networks, as they serve different needs to the shared infrastructure.

5.3 Essential Agreement Terms

i.   **Intended use**. The Baltic Ring aims to support the development of high-quality research and education networking. Thus the network is dedicated to education, research and scientific use and users. This should not exclude the possibility of research collaborations with commercial partners, if this is seen as useful and relevant. The enabling of mobile and teleworking is a necessity to the research community, which may reflect in the usage of the Ring. The harnessing of services from the commodity Internet is also acceptable.

ii. **Resource sharing**. The federated networking model is based on resource sharing. In practice, this can include, for example, loaning, renting, swapping or bartering, depending on the case. The partners have the natural right to decide what infrastructure they are willing to provide for common use. In addition, the partners may withdraw their contributions if they see necessary. The partners are expected to announce their contributed services and resources to the consortium.

iii. **Sharing terms**. The partners are expected to follow fair, reasonable and non-discriminatory (FRAND/RAND) terms in their activities within the consortium. This means that all requests should be handled equally and with no unnecessary delays. Free access is not requested; the partners are allowed to bill for the use of their infrastructure, to cover their expenses.

iv. **Liabilities and commitments**. The liabilities arise from the obligation to follow the administrative and technical commitments. The technical responsibilities for the shared systems are more detailed and restrictive than the administrative ones, for operational reasons. In the early phases the liabilities are few. It is suggested that the level of commitment is increased gradually, especially when the resourcing framework is introduced. It is suggested that the commitments are collected in a separate appendix of the resourcing framework.

v.   **Support structures**. The collaboration support structures include administration and management, coordination and technical co-operation. The partners contribute to maintaining the support structures in terms of both planning and upkeep. The partners can influence and control the development of the support structures, which should lead to sustainable and balanced setups.

5.4 Agreement Templates

Templates for the MoU, Resourcing Framework Agreement and Deployment Agreement can be found in Appendix A, Appendix B and Appendix C respectively. The templates have been designed using the same layout and content structure as far as possible. Each item in the templates contains some preliminary suggested text. Italic text with square brackets is used for sections where text needs to be filled in. A summary comparison of the templates can be found in Table 5.3.

Aspect	Agreement / Project				Comments
	MoU (A)	Resourcing Framework (B)	Development Projects	Deployment Agreement (C)	
Timing	Initial phase	Early phase	As necessary	Middle phase onwards	
Legally binding	None	Low	Tight	Medium	Depends on operation nature
Number of partners	All	All	Variable	Variable	The use and development touches the partners unevenly
Type of commitment	Administrative	Administrative and technical	Administrative and technical	Technical	Ways of action are agreed first
Financial liabilities	None	Low	Medium	Medium	Actual use cases cause financing needs

Table 5.3: Comparison of the different Baltic Ring agreement types.

The templates are intended to be refined and edited until the content is sufficient and acceptable. It should be noted that the parties are expected to launch separate development projects as the Ring is gradually established (see also Table 5.2 on page 16). It is suggested that the management and financing of these initiatives are performed by the Baltic Ring Steering group as development activities which are agreed on a case-by-case basis.

6 Organisational Setup and Governance Model

6.1 Overview – Building the Community

For the Baltic Ring to succeed, a wide involvement across the NRENs is vital. The organisational structures should reach and cover all the relevant parties, but still fulfil the requirements of the administrative targets (as summarised in Table 5.1 on page 14). To meet the targets, the organisational setup should build on existing structures and use existing channels and methods – for communication, for example. Research and education networking is work in progress in all the participant countries. The Baltic Ring co-operation is well-placed to give extra depth and possibilities to this work.

The governance model should allow sufficiently fluent communication between the partners. The decision-making processes should be fair and equal. The structures should be flexible enough to accommodate change and development. These principles will enable the consortium to react in a timely manner and build the Ring efficiently. The expected administration tasks are illustrated in Figure 6.2 on page 23, which also shows how they are associated with development on the service and support layers.

The workload for the participants was profiled to be low or reasonable. However, there are some tasks that cannot be avoided. The administration and coordination of the co-operation need some additional effort, since the consortium must have its own processes and structures. The development efforts and projects may have temporary organisational structures, which do not impose long-term overheads on the consortium. The operation of the final Baltic Ring and the operational services it delivers, however, will create constant maintenance work.

6.2 Choosing the Operational Model for Collaboration

Of the various models for formal co-operation, the association and consortium models are most appropriate for the Baltic Ring. A more elaborate approach could be to establish a foundation or a limited company, but these measures were considered premature and were not investigated. Of the two alternatives, the consortium model was chosen for simplicity. A consortium can be developed into an association with straightforward steps. Further formalisation depends heavily on the success of the collaboration.

The initial Baltic Ring consortium bodies are suggested to consist of:

- A steering group – the administrative, directive and decision-making body.
- A coordinator – supports the work of the consortium.

Two further roles are seen as emerging with the introduction of operational services:

- Network supervisor – responsible for the general technical operational level of the network.
- Technical support team – helps the network supervisor and is responsible for long-term planning.

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The line organisation of these bodies is shown in Figure 6.1 below; their tasks and work methods are described in Section 6.2.1.
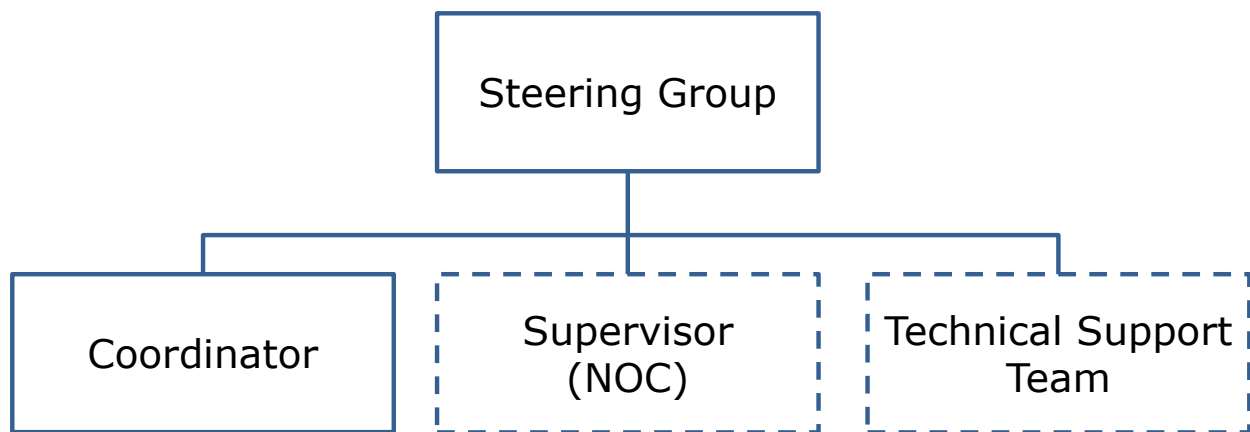

Figure 6.1: Line organisation chart for the consortium.

Notes:

- A solid line denotes bodies in place for the initial phase.
- A dashed line denotes bodies established in subsequent phases.
- Work sharing follows the principles of functional organisation, where the tasks, responsibilities and authority are delegated to a high degree.
- NOC = Network Operations Centre.

6.2.1 Tasks and Work Methods

6.2.1.1 Steering Group

The steering group consists of representatives from the partner organisations. A partner can assign another member of the steering group as a proxy should he need to be absent.

The steering group has the authority to make conclusive decisions concerning the Baltic Ring consortium required that at least half of the members are present. The steering group has a veto on decisions made by other consortium actors and bodies.

The steering group elects one of its members to chair its meetings and another member to be responsible for financial planning and budgeting. The role of steering group secretary is taken by the coordinator (see Section 6.2.1.2).

The steering group uses meetings as its work method. The meeting cycle is initially three times a year. E-meetings can be used. The meetings have a pre-defined agenda, which is submitted to the participants a week beforehand. Meeting minutes are kept. The chair of the steering group is responsible for arranging the meetings.

The steering group strives for unanimous decisions. If this is not possible, the item is tabled until the next meeting and an administrator is elected to find a solution to the subject in question.

A suggested template for the steering group agenda can be found in Appendix D on page 32. The agenda covers the main practical aspects of the co-operation.

6.2.1.2 Coordinator

The coordinator may be a person, a group of people or an organisation, and is nominated by the steering group.

The coordinator supports the activities of the consortium by performing the tasks assigned by the steering group and acting as a liaison towards the development projects and other Baltic Ring activities. The coordinator acts as steering group secretary, and supports the preparation of these and other consortium meetings. Information management and document handling are also the responsibility of the coordinator.

6.2.1.3 Technical Support Team

The Baltic Ring technical support team consists of people nominated by the NRENs.

The technical support team supports the federated operation of the Baltic Ring and technical co-operation among the participants NRENs. The technical support team is also responsible for maintaining the long-term technical integrity of the Baltic Ring platform. The work is accomplished through information exchange, maintaining and developing the Baltic Ring technical documents, responding to queries raised by the steering group, and supporting the supervisor process.

The technical team uses named persons to prepare and draft the given assignments or subject matters. The drafts are discussed and solutions are negotiated inside the technical team. As the agreement or solution is reached, it is communicated to the steering group.

The technical support team may have a role in change management, fault handling and incident management [9, 2.1]. Establishing the technical support team is included in the Resourcing Framework Agreement at such time as the parties enter into closer technical co-operation. The team can be founded also before signing if seen well-founded.

6.2.1.4 Network Supervisor

The network supervisor is a group of people or a process established by the steering group. The activity may be outsourced partially or totally.

The supervisor keeps the network operational by monitoring its status, initiating fault resolution and communicating with the peer groups. The supervisor is responsible for delivering the necessary reports and data to the steering group and other named parties. The various aspects of operation that fall within the supervisor's sphere of authority are discussed in Baltic Ring Deliverable 4: Support and Funding [10].

The network supervisor's activities are most efficiently covered by establishing a Network Operations Centre (NOC). The steering group can decide when it is suitable to do this.

6.3 Consortium Administration Options

Three different flavours of administration and governance were identified in the analysis. These can be characterised by a description of their initial actions as follows:

a) **Regulation model (strict)**: the consortium starts by defining an acceptable use policy, which is used as the source material for producing an accurate co-operation agreement between the partners. The solid administrative basis is in turn utilised to launch joint development projects, which would start to realise the network.

b) **Co-operation model (mild)**: the consortium produces a memorandum of understanding, where the partners list their intentions. The work is continued with an agreement on rules for resourcing, which will serve as a foundation for deployment agreements. The consortium partners are trusted to follow the joint guidelines and implement the Ring with multi- or bilateral projects, which are loosely coordinated by the consortium.

c) **Ad-hoc model (loose)**: the consortium skips the formal establishment process and proceeds straight to defining an action plan, where the necessary measures are identified. Responsibilities are assigned and a coordinator function is established. The partners define a loose framework for leasing the resources in the shared pool.

The co-operation model (b) was chosen as the best way to fulfil the administrative targets (summarised in Table 5.1 on page 14) given the background (see Section 3 on page 5). The regulation model was seen as very time-consuming, since it would involve consolidating the different NREN policies. The ad-hoc model would be the fastest and lightest way to proceed, but it was judged unrealistic at the moment. Thus out of the two viable options, the loosely formalised co-operation model is preferred to the policy-driven approach.

The choice doesn't mean that policies are not needed. Rather, the effort is deferred and divided, and the policies are formulated and negotiated as needed during the development.
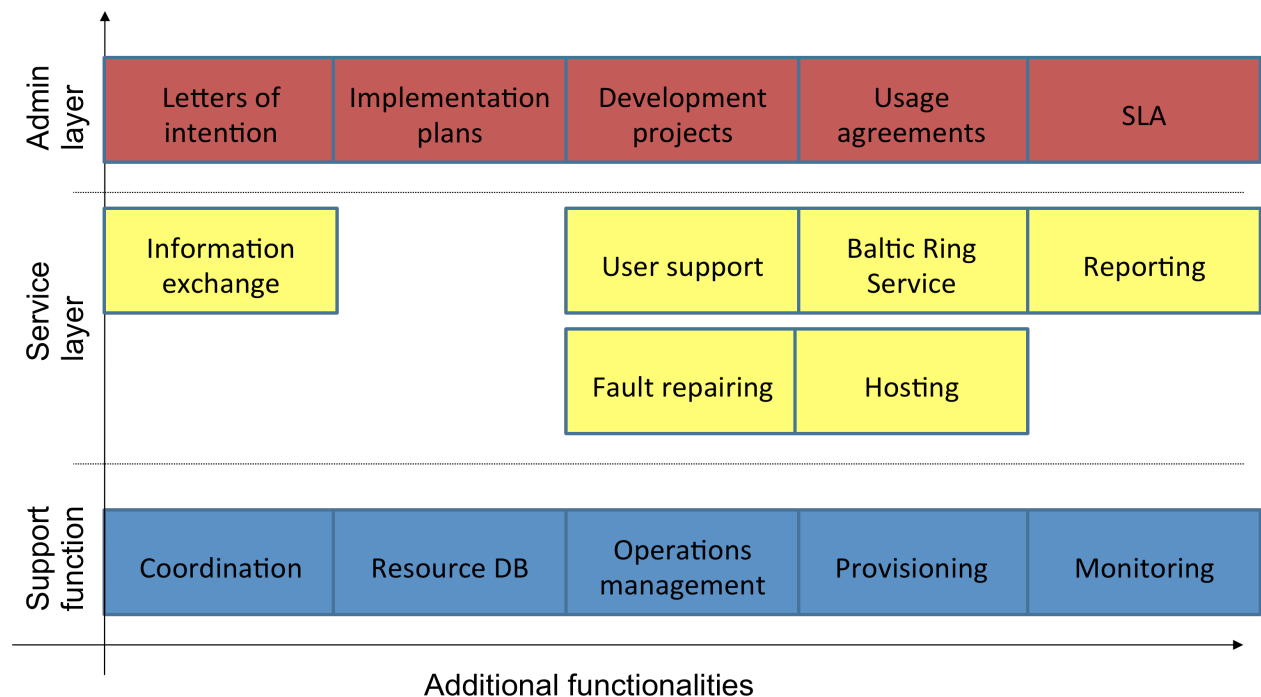
Figure 6.2: Dependencies between support functions, services and administration in the Baltic Ring consortium.

Notes:

- The items on the same horizontal level are interconnected and dependent on each other. The preceding items are prerequisite to the items that follow.
- The needs relating to organisational growth and development are tied to the growth of activities and should go hand in hand.

7 Summary

The Baltic Ring project suggests that a simple collaboration organisation would be established using the consortium model. The task would be carried out by first establishing the steering group for management. The steering group would in turn start the coordination activities, the technical support team and supervisor operations. The solution gives high level of flexibility and steering possibilities to the partner NRENs.

For the agreement framework a three-layer structure is suggested, which consists of Memorandum of Understanding (MoU), Resourcing Framework Agreement (RFA) and Deployment Agreements. The MoU serves as a founding document. FRA and Deployment Agreements define the co-operation in more detailed terms. The items needed to agree are divided to multiple layers for giving a possibility to reach unanimity more easily. The solution supports the various decision-making mechanisms in different countries.

The actual building of the Baltic Ring is suggested to done in separate development projects. The projects would be coordinated loosely by the Baltic Ring consortium for maintaining the integrity and usability for all partners.

The next steps for the NRENs would be to evaluate the proposed model and agreement framework. After the supplements it is suggested that that the revised MoU would be signed.

8 References

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[10]   J. Miettinen, J. Oinonen, J.Myyry, "Baltic Ring Deliverable 4: Support and Funding", Baltic Ring (2011).

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9 Glossary

AUP   Acceptable Use Policy

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CBF	Cross-Border Fibre
DWDM	Dense Wavelength-Division Multiplexing
e-ARENA	National Association of Research and Educational e-Infrastructures
EU	European Union
FP7	Seventh Framework Programme for Research and Technological Development
FRAND	Fair, reasonable and non-discriminatory
GLIF	Global Lambda Integrated Facility
GLORIAD	Global Ring Network for Advanced Applications Development
GRID	Global Resource Information Database
IPR	Intellectual Property Rights
MoU	Memorandum of Understanding
NOC	Network Operations Centre
NREN	National Research and Education Network
OLA	Operational Level Agreement
PoP	Point of Presence
RAND	Reasonable and non-discriminatory
RFA	Resourcing Framework Agreement
SLA	Service Level Agreement
SLS	Service Level Specification

10 Appendices

Appendix A   Baltic Ring Memorandum of Understanding Template

Appendix B.   Baltic Ring Resourcing Framework Agreement Template

Appendix C.   Baltic Ring Deployment Agreement Template

Appendix D.   Steering Group Agenda Template

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Appendix A. Memorandum of Understanding Template

Memorandum of Understanding for Baltic Ring

I.   Parties

[Listing and description of the parties with the official acronyms.]

II.   Purpose of the Memorandum

The purpose of the Memorandum is to establish an international co-operation body, the Baltic Ring Consortium for advancing the Baltic Ring.

III. Interpretation of the Memorandum

This Memorandum is not a contract but a declaration of intention. It is not legally binding under international public law. This Memorandum is interpreted according to the spirit of co-operation to undertake shared objectives.

IV.   Objective of the Memorandum

The co-operation body will pursue the task of establishing a fibre optic network ring around the Baltic Sea and promote research and education networking in the area.

V.   Benefits

The new ring network will improve connectivity and add resiliency to the research and education networks around the Baltic Sea. In addition, added capacity will enable new kinds of research in an affordable way.

VI.   Financial Issues

Financial decisions and arrangements are agreed on a case-by-case basis. The financial decision-making is intended to lead to steady progress towards a working and sustainable service.

VII. Laws and Regulations

The co-operation and joint activities are subject to the laws and regulations of the respective countries.

VIII. Administration and Governance

The competent and nominated representatives of the Parties constitute a steering group. The Parties will strive to make decisions by general consent. The steering group has the authority to make conclusive decisions concerning the Baltic Ring consortium required that at least half of the members are present. If an insuperable obstacle arises, the Parties will terminate this Memorandum.

IX.   Contributions

The Consortium Members intend to:

1. further develop the Baltic Ring network
2. allocate and nominate a representative or a proxy to participate in the Baltic Ring development as a member of the steering group.
3. work together for developing high-performance connectivity
4. develop together cross-border infrastructure
5. share information concerning cross-border networking and related services
6. respect the confidentiality of the information they have obtained from the other Parties in the activities within this Memorandum
7. agree together upon their communication to the public concerning the activities within this Memorandum

X.   Amendments

Amendments to this Memorandum can be made with a unanimous decision by the Parties. The Parties can accept a new signatory to this Memorandum by a unanimous written assent.

XI.   Effective Date

The effective date for this Memorandum is *[X.Y.2011]*.

XII. Coming into Effect and Duration

This Memorandum will come into effect between the Parties that have signed it on the Effective Date. The Memorandum will remain in effect for five (5) years, after which it can be renewed. If a Party decides to withdraw before the due time he must notify other Parties six (6) months in advance.

Agreed upon and signed by:

Organisation name:

Signature:

Name:

Title:

Date and place:

[to be copied the necessary number of times]

Appendix B. Resourcing Framework Agreement Template

Resourcing Framework Agreement for the Baltic Ring

I.   Parties

[The listing and description of the parties with the official acronyms.]

II.   Purpose of the Agreement

The purpose of this Agreement is to define the procedures for using the shared resources in the Baltic Ring.

III. Interpretation of the Agreement

The interpretation is performed according to the generally accepted principles of international law and the spirit of co-operation to undertake the shared objectives of the Baltic Ring.

IV.   Agreed Terms

The Parties hereby agree to:

1. be technically compatible in a reasonable way for making the Baltic Ring services possible and interoperable
2. maintain the research network and research network services listed in a separate Appendix A. These resources are necessary for the operation and functioning of the Ring.
3. offer these services to each other with fair, reasonable and non-discriminatory (FRAND) conditions, cost and efforts
4. inform other Parties on the available and withdrawn shared resources for supporting the planning and offering of the services
5. support the needs and networking initiatives of the other Parties within reasonable degree
6. support the construction, maintenance and fault repairs of the shared services
7. allocate and nominate a representative or a proxy to participate the Baltic Ring technical team
8. *[more terms]*

V.   Financial Issues

Financial decisions and arrangements are agreed on a case-by-case basis between the Parties involved.

VI.   Laws and Regulations

The co-operation and joint activities are subject to the laws and regulations of the respective countries.

VII.   Damages and Limitations of Liabilities

The Parties are not liable of consequential damages caused by the activities within this Agreement. The damages and liabilities are agreed on case-by-case basis between the Parties involved. In any case, the maximum liability shall not exceed the amount of related immediate cost.

VIII. Settlement of Disputes

In the event of dispute the Parties will seek solution by negotiation. If an agreement cannot be found the Parties may ask mediation by a third party. If the mediation doesn't give a solution, the Parties may be consider terminating the activity causing the dispute.

IX.   Administration and Governance

The responsibility for applying, monitoring and reporting the realisation of the items in this Agreement is assigned to the Baltic Ring Steering Group.

X.   Amendments

Amendments to this Agreement can be made with a unanimous decision by the Parties.

XI.   Effective Date

The effective date for this Agreement is *[X.Y.2013]*.

XII.   Coming into Effect, Duration and Termination

This Agreement will come into effect between the Parties that have signed it on the Effective Date. The Agreement will remain in effect for three (3) years, after which it can be renewed. Any Party can terminate this Agreement on his behalf with a written notice delivered six (6) months prior.

Agreed upon and signed by:

Organisation name: _____

Signature: _____

Name: _____

Title: _____

Date and place: _____

[to be copied the necessary number of times]

Appendix C. Deployment Agreement Template

Deployment Agreement for Baltic Ring Resources

I. Parties

This agreement is made between *[Organisation A]*, hereafter Owner and *[Organisation B]*, hereafter User.

II. Subject of the Agreement

The Owner grants the User the permission to use the following resources (hereafter Resources):

Resource1:   *[define the resource]*

Resource2:   *[define the resource]*

[. . .]

III. Interpretation of the Agreement

The interpretation is performed according to the *[international/national]* law.

IV. Compensation for the Usage

The User compensates the Owner *[describe the means and compensation time periods]*.

V. Terms of Use and Service

The Resource(s) will be used according to the Agreement on Resourcing Framework.

1. The User will utilise the Resources using good IT maintenance practices.

2. The User is liable for damages caused by his actions to the Resources.

3. The Owner is responsible for maintaining the Resources and having them available for the User.

4. *[The additional terms are included as the Appendixes. The Appendixes are interpreted and used in the order they are listed]*

VI. Coming into Effect and Duration

The agreement will come into effect on *[X.Y.20ZZ]* and be valid for two (2) years. Either side can terminate this Agreement with a written notice delivered six (6) months prior.

VII.   Damages and Limitations of Liabilities

> The amount of damages shall not exceed the monetary value of the Compensation (Article IV). *[Additional terms if necessary]*

VIII. Settlement of Disputes

> If the mediation doesn't give a solution, the Agreement may be terminated according to terms of the Article VI. *[Additional terms if necessary]*

IX.   Appendices

> Appendix A. Additional terms *[if necessary]*
>
> Appendix B. Owner general agreement terms *[if necessary]*
>
> Appendix C. User general agreement terms *[if necessary]*

Agreed upon and signed by Owner:

Organisation name: _____

Signature: _____

Name: _____

Title: _____

Date and place: _____

Agreed upon and signed by User:

Organisation name: _____

Signature: _____

Name: _____

Title: _____

Date and place: _____

Appendix D. Agenda Template

Baltic Ring Steering Group Meeting

Date:

Site:

Participants:

1. Opening

2. Administrative and financial issues

    [open/outstanding issues, administrative reports and updates, decision-making]

3. Technical issues

    [open/outstanding issues, technical reports and updates, decision-making]

4. Development projects

    [open/outstanding issues, reporting and steering the joint development, decision-making]

5. Co-operation and outreach

    [open/outstanding issues, co-operation and interaction with third parties, decision-making]

6. Any other business

7. Closing and next meeting

8. Summary of the decisions of this meeting

9. Issues being resolved

    [searching for unanimous decision]