

APPENDIX E

OTHER AREAS
(OUTSIDE OF IT)



Contents

1	Production systems.....	3
1.1	Production systems overview	3
1.2	Services and customers.....	3
1.3	Strategy	4
1.4	Projects	4
1.5	Service Levels	5
1.6	Spending and budget	5
1.7	Employees	5
1.8	Necessary Hardware, Software and Facilities.....	5
2	Distribution and Publication Technology.....	6
2.1	Distribution and publication technology overview.....	6
2.2	Services and customers.....	6
2.3	Strategy	7
2.4	Projects	8
2.5	Service Levels	8
2.6	Spending and budget	8
2.7	Employees	8
2.8	Necessary Hardware, Software and Facilities.....	8
3	Regional offices	8
3.1	Regional Offices overview.....	8
3.2	Services and customers.....	10
3.3	Service Levels	11
3.4	Spending and budget	11

INTRODUCTION

In this appendix, the business areas in NRK that perform typical IT-services, but are not part of the IT-department, are described. The areas that will be covered are Production Systems and Distribution and Publication Technology, within NRK's Technology division. In addition, production technology and IT-services performed outside of NRK's headquarters at Marienlyst - at the regional and local offices – are also covered in this appendix.

Each business area has its dedicated section in this appendix, and the structure of each section is equal to the appendices of the sections within the IT-department.

1 PRODUCTION SYSTEMS

1.1 Production systems overview

Production systems is responsible for maintenance and development of Media asset Management, Archive management, Graphics systems, Editing systems, Transcoding systems, Content playout automation, Router control systems, Video servers, Radio systems, Traffic planning, News planning and Publishing tools for web clips (OnDemand and Live).

Production systems' mandate is to integrate, automate and manage systems to deliver according to editorial demands in production and to meet publishing demands according to company strategy. The unit also handles procurement of systems and SLAs with external vendors.

1.2 Services and customers

Production systems serves as a hub of tools to enable content production, publishing and archiving of content. Vital functionality is workflow management of searching for, extracting, publishing and archiving content, and to automate processes.

Customers/users are:

- All editorial units
- All publishing platforms
- All archives
- External content providers and production companies that purchase content

Table 1 presents the service categories provided by Production systems.

Service category	Description
News & Sports editing	70 continuous SAM Editing clients, 500 installed users in Oslo. 12 Regional offices with Adobe Anywhere editing, 500 users (EOL summer 2018)
News & Sports playout	4 studios with automation, graphics, news planning, 76 channels. Video servers, News planning
Traffic system	Publishing planning system, controls publishing linear & OnDemand, rights reporting, EPGs, asset IDs, statistics, and economy
Graphics system	12 systems at Regional offices and a big setup for the main site in Oslo
MAM (Media asset management)	One central system for NRK. Managing TV archive, search, get content, share, publish, automate
Radio systems	Playout, planning, editing, publish, archive radio content to all audio platforms. 15 studios in Oslo, 10 studios in Trondheim and 1-2 studios at each Regional office

Router Control systems	Central hub for managing A/V-lines between studios, from external lines from satellites or OB vans and between offices.
Archives	MAM system handles content assets on a tape robot for TV archive, Origo Radio archive, Still image archive, Digital Music archive and Metadatabank. Serves as a common source in production and as a historical archive. NRK has an obligation to preserve all published content with high quality and with rich metadata.
Transcoding	NRK renders 5 versions of each file for OnDemand publishing before transferred to NEP (NEP, Norway). NRK also has a lot of workflows for transcoding camera file formats to manageable file formats in production and publishing of clips to online platforms.
Live streaming for production and publishing	NRK uses mobile streaming units for live streaming directly from cameras and mobile phones. NRK utilizes hosted streaming encoders from NEP to serve as live streaming to linear TV and web. NRK radio also has mobile live streaming apps for production, both mobile phone and portable solutions.
Digital forwarding (“spedition”)	Accelerate file transfer, web portals for file transfers from internal, external and mobile users.

Table 1: IT-services performed by Production systems

1.3 Strategy

Production systems aims to provide flexible and powerful solutions to achieve strategic goals in publishing and production. The unit evaluates and consolidates existing solutions to bring more money to produce content.

1.4 Projects

The majority of Production systems’ projects are seeking to consolidate and restructure traditional solutions to better meet the future demands and strategic goals.

Project	Timeline	Description
Origo	End 2019	Replacing MAM, restructuring archives, integration platform and common data model.
Router Control replacement	End Q2 2018	Replacing old system and prepare for IP infrastructure in production
Storage replacement	End Q2 2018	Consolidating old storage platforms in production and moving storage for content to standard IT platform.
Replacing graphics solution for the Regional offices	End 2018	Replacing graphics solution for the regional offices with internal developed solution based on HTML.

Replacing playout for the regional Offices	End 2019	Replacing playout solution for the regional offices with internally developed solution based on open source software.
--	----------	---

Table 2: Production systems' planned and ongoing projects

1.5 [Service Levels](#)

NRK has a lot of in-house content production with varying service level demands. The most critical production department is the news department, followed closely by the sports department. Live production in general demands redundancy and handling of unexpected behavior. NRK's publishing platforms also have the highest level of criticality to meet the expectations from the government and audience. Service levels are decided by the service's proximity to NRK's publishing platforms and how many internal users that will be affected by a malfunction in the service.

1.6 [Spending and budget](#)

This information will be disclosed at a later stage in the process.

1.7 [Employees](#)

Production systems has 24 employees in its department. 25 employees outside the department are funded to support systems in Production systems' portfolio. The age of employees range from 24 to 54 years.

1.8 [Necessary Hardware, Software and Facilities](#)

Production systems has a goal of running systems on standard IT hardware and virtualized environment when possible, delivered by NRK's internal IT department. NRK uses open source software in many applications and services, in order to be flexible for rapid changes without commercial discussions.

2 DISTRIBUTION AND PUBLICATION TECHNOLOGY

2.1 Distribution and publication technology overview

Distribution and publication technology has the main responsibility for all systems that are used in NRK for development and publishing of text, video, audio and images to the web. This includes underlying systems and operating systems. Linux is the main OS platform for the publishing systems. The Linux admin team is responsible for the Linux platform and all supporting systems for inventory, automation, orchestration, patching, etc. The team is also responsible for the Windows Server systems running SQL and IIS, as well as the administration of NRK's Azure IaaS and PaaS usage.

2.2 Services and customers

Distribution and publication technology serves the whole of NRK with its services.

Table 3 presents the service categories provided by Distribution and publication technology.

Service category	Description
Linux operating systems	Linux admins are responsible for the operation of the Linux based operating systems, mainly Ubuntu and CentOS. There are also some Red Hat Enterprise Linux systems.
Linux operation tools	Linux admins are responsible for operation tools for inventory, automation, containers, orchestration, patching, monitoring, etc.
Databases	MySQL, MongoDB, etc. are some of the database services
Development tools	Several tools used by developers in NRK are operated by the Linux team
Windows SQL	Provides SQL services for several systems in NRK. Yr.no, Programbank, DIGAS, ENPS, Mediapulse and System Center are representatives of the largest of these systems
Windows IIS	Provides web services for several systems in NRK. Ftp.nrk.no and Yr.no are representatives of the biggest of these.
Microsoft Azure	Several IaaS and PaaS services for several systems in NRK surrounding yr.no, tv.nrk.no and radio.nrk.no
Other cloud platforms	Some systems run on other cloud platforms, such as AWS, Linode and Akamai

Table 3: IT-services performed by Distribution and publication technology

Detailed descriptions of some of the services in Table 3 follow below.

2.2.1 Linux admin

Linux admins' tasks in the day-to-day operations are basically the same as IT's tasks for Windows servers. They have the responsibility for all Linux based servers in NRK and all systems surrounding this, regarding patch management, inventory and monitoring. The main Linux platform in NRK is Ubuntu, but there are also some CentOS and Red Hat Enterprise Linux. Systems that Linux admins use for their operations are, for example, Puppet, Grafana, Nagios.

Linux admins are also system administrators for several systems, like GlusterFS, Docker, Kubernetes, Jenkins, Varnish, Saltstack, MySQL, MongoDB, Confluence, Team Password Manager, Kaleido, Mesos, Shotoku, Stash, etc. All these systems are used for operations or development purposes in NRK regarding Linux systems.

2.2.2 Windows SQL/IIS admin

SQL and IIS admins in NRK are responsible for operations regarding Microsoft SQL and IIS. They also do Windows Server OS operation tasks on the servers that run SQL and IIS. They use the same tools that are used for Windows Server operations in NRK, like SCOM and SCCM.

2.2.3 Microsoft Azure

Some of the employees have Azure as their main responsibility. NRK's Azure platform comprise about 150 IaaS VMs that run various services, as well as a lot of Azure PaaS services. Some of the services used in Azure are Blob storage, .net PaaS, SQL services, CosmosDB, MongoDB, MySQL, Application Insight, Load Balancer, Traffic Manager, Mesos and Docker, Service Bus, Elastic search, Varnish, NGINX, Grafana etc. Some of these systems are equal to the same on premise service in NRK's own data center.

There are plans to move more systems from on premise to Azure. Yr.no will soon run in Azure .net PaaS platform, Kurator is scheduled to move to the cloud, and Stadnavn and urørt are already running there.

All these services run on two Azure datacenters in Europe.

2.2.4 Other cloud platforms

There are also some systems running on other cloud platforms. AWS has some servers for test and development, but these are planned to be phased out completely. Linode has two VMs for external DNS services for NRK. Lastly, there are systems for podcast.nrk.no, static.nrk.no, storage and loadbalancer in Akamai.

2.3 Strategy

Distribution and publication technology does not have an explicit strategy, however automation, hybrid solutions and increased use of clustered/redundant services are central for the delivery and development of its services.

2.4 Projects

Distribution and publication technology's planned and ongoing projects are listed in Table 4. As can be seen in the table, the projects are mainly operational.

Project	Timeline	Description
Upgrading services from old hardware, OS and software	Running	A continuous task of moving services from old hardware, Windows and Linux OS and old databases
More containerization	Running	Moving systems to containers for more resilient services
PostgreSQL	2018	Implement PostgreSQL for services in NRK
Consolidate monitoring solutions	2018	Moving from Nagios to Icinga
Mesos to Kubernetes	2018	Migrate from Mesos to Kubernetes, for orchestration of containers
Ubuntu	H1 2018	Move Ubuntu to latest LTS version
Ipv6	NA	Get NRK services running on ipv6

Table 4: Distribution and publication technology's planned and ongoing projects

2.5 Service Levels

No service levels. All is best effort.

2.6 Spending and budget

This information will be disclosed at a later stage in the process.

2.7 Employees

14 NRK employees. In addition, there are some consultants.

2.8 Necessary Hardware, Software and Facilities

Distribution and publication technology uses IT Infrastructure for most of its systems. The section also has a large amount of systems and services in Azure.

3 REGIONAL OFFICES

3.1 Regional Offices overview

The District Division has 930 employees in total and is the largest division in NRK. The offices produce content for all media platforms, daily live and post-productions, in all genres. The offices are lean and agile. There is a culture for innovation and development in cooperation with editorials.

Roles:

- Technology Development Manager (TDM) – Responsible for production, technology and development in each region. Reports to head of Region
- Operational Manager – Responsible for production equipment at each regional office. Reports to TDM
- IT staff – Each office have 0,5 FTE who work with IT, service and operational issues. Reports to District editorials.

Production and technology in the District Division is organized under five Technology Development Managers (TDM), one for each region. A region consists of three or more regional offices. The staffing and responsibilities of each regional office is standardized through benchmarking. Each regional office has one Operations Manager who reports to the TDM of their region on the varying operational issues in addition to IT. They constitute a local presence for all IT and production environments, when necessary.

In addition, they:

- Follow up technical problems
- Order, upgrades and put into service new equipment
- Tutor local staff
- Introduce new tools and workflows
- Participate in various projects on behalf of the District Division
- Are responsible for transmitting security
- Planning major projects and productions and linking technology and newsrooms.

For the two regional centers in Bergen and Trondheim, there are separate production departments organized under their respective Technology Development Manager. Bergen and Trondheim have additional IT staffing, due to greater production and more employees to support:

- 0.5 FTE in Bergen
- 0.8 FTE in Trondheim

Unlike the other regional offices, there is no dedicated Operations Manager at the Bergen and Trondheim offices.

Trondheim

Trondheim has approximately 250 employees, and is served by a full-time, on premise IT technician. The office consists of two national TV editorials, as well as six national radio editorials. The four largest radio channels in NRK are mainly produced here. Due to the large amount of radio being produced here, 2,5 FTE systems engineers work with radio installations across NRK, as well as 1 FTE who works with radio infrastructure and command systems.

Bergen

The Bergen office has 140 employees facilitating large-scale TV production in news, documentaries, nature, everyday entertainment, reality, multi-camera productions and events like “slow TV”. The office also has some national radio editorials. The Bergen office’s assignment is very diverse, which leads to complex functions and the need for broad competence. Each employee covers different operational functions (including IT) and productional functions. Their IT competence covers most of the production systems and they also work with service and innovation across NRK. The office has moved to Media City Bergen with an IP-based infrastructure.

3.2 Services and customers

What tasks are performed?

IT operations in the districts have many tasks related to production-oriented IT, combined with standard IT tasks. The tasks are performed by the Operation Manager and the 0.5 FTE service/operation/IT. The use of the centralized service desk (2300) and central duty telephones varies in the District Division. Some use these more than others, depending on local expertise and the urgency of the problems.

Table 3Table 5 presents the services provided by the Regional offices.

Service	Description
PC/Mac	Installation, monitors, docking stations
1 st line support	Contact point for errors
Print	Set up
Application support	Outlook, O365, mail groups, etc.
Smart Phones, Tablets	Set up, use of apps and assist with NRK setup
Patching	Servers, clients (critical for transmitting)
Patch testing	Nordland, one of the Regional Offices, performs patch testing before distribution to the rest of NRK
Assist in program production in fields (off site productions)	Networks, servers, contribution and PC / editing equipment etc.
Local Offices-support	Technical operation, setup and support
Software upgrade	Cameras, etc.
Local Network	Documentation, setup and maintenance
Equipment handling	Requirements and orders, packing, shipments and receipts
Effective use of IT-equipment	Administration and efficient utilization
Contact point	For external suppliers, service etc. UPS / generator; follow-up with local service provider.
Assist in program production	IT competence also contributes in program production, prepares workflows and maintains systems directly in program production.

Table 5: IT-services performed by The Regional offices

3.3 Service Levels

No defined service levels. All is best effort.

3.4 Spending and budget

This information will be disclosed at a later stage in the process.