Guideline

Step by Step Implementation of an Interoperability Management and Audit System (IntMAS)

Version 1.0

int:net
Interoperability Network for
the Energy Transition

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ABSTRACT

This document is ...

KEYWORD LIST

…

DISCLAIMER

EXECUTIVE SUMMARY

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1 Introduction and Motivation

The application of the int:net project clearly states the overall challenge we are facing: "We have understood that electricity from renewable resources, combined with a smart digital grid infrastructure, is the only way to decarbonise the energy sector. But the transition affects many other sectors: transport, building, agriculture, industrial production etc. To make the transition happen, not only connectivity in the energy sector is needed but energy related processes and products in all sectors need to be aligned. ICT will link the domains and data will be the key to success – if everything fits together. Fitting together means: things must be interoperable as well as concepts and organisations.

To be widely adopted, technology must be easy to be implemented and used. Complex and costly interfaces, complex adaptation efforts, incomparable data sheets and not-open standards hinder adoption of advanced solutions. All actors in the energy system – from operators of generation plants and grids to the end-users in private homes – will always call for plug-and-play or at least easy to configure technical solutions. If hurdles are too high and implementation of new technologies too difficult, the transition towards an intelligent, future prone energy system will be slowed down or put to jeopardy.

It is evident that all ongoing and future changes in the energy and mainly the electricity system will deeply affect the roles and responsibilities of actual actors involved, as well as bring in new participants and stakeholders. With the advent of new actors, devices and appliances, interoperability is an ever growing and changing challenge. it will never be possible to define or even rule a consistent and lasting set of standards or connectivity rules. All actors need to collaborate and continuously strive for building an "interoperability eco-system" with stable and reliable energy value chains built from highly connective, trustworthy and cost-effective elements and sub-systems.

In that situation the int:net project strived and strives to foster interoperability. But what does "foster" mean in practice. Creating standards and rules does not help if vendors don't apply them. Tools have been developed in int:net to better describe the models and to assess the maturity of interoperability in organisations and solutions. Last but not least the idea was born to validate or even certify and label products if they adhere to given standards or common rules. Despite the fact that it would be quite a task to continuously do that: does such a labelling system help when frameworks change and new requirements arise? Such considerations brought the int:net consortium to solution that is now described in this document: Rather than assessing and labelling the level of interoperability of artifacts and products let us check and label organisations with respect to their performance in terms of bringing interoperability forward.

When preparing this **Interoperability Management and Audit System (IntMAS)**, developers have defined for themselves some key requirements:

- The system should be applicable for a wide variety of organisations: developers and vendors of technology, test facilities that validate interoperability of solutions, associations striving to increase interoperability in the energy system or just loose communities.

- A registered brandmark shall be used to honor and display a high performance with respect to interoperability. When after a formal assessment, organisations qualify for using the label they shall be listed in a register and can use the brandmark for their own communication purposes.

- The system shall make sure that the respective organisation keeps moving and improving. In that sense it shall not be the actual performance that is honoured but the quality and credibility of a continuous improvement process.

Above all the proposed model shall take the entire eco-system from pure awareness (which is definitely given nowadays) to a really successful rollout and never ending improvement:

interoperability awareness
⬇
interoperability activities
⬇
interoperability management
⬇
continuous improvement process
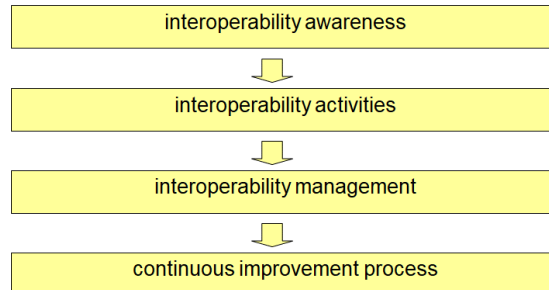
This model in turn means that an organisation can lose the right to use the brandmark, i.e. quality label if it stops improving and contributing to the common goal of the "IntNET family". It also means that there must be an authority that takes responsibility for the assessment and awarding processes. To that end, it was and is a goal of the int:net project to organisationalise an "IntNET" community as the owner of the brandmark and the IntMAS model. Using its IntMAS model and the "int:net approved" label, this organisation will foster and support the harmonisation of interoperability activities throughout Europe by forming an interdisciplinary network of stakeholders, which will engage in a constant exchange on the topic "interoperability in energy relevant domains".

2 Systematic Interoperability Management

While many organisations do or at least pretend to strive for interoperable solutions in the energy domain, few do it in a truly systematic way. There are still a lot of inconsistencies inside and between sub-domains such as generation, transmission grids, distribution grids, building energy systems, etc. Interoperability activities (especially across multiple sub-domains) are often unrelated and even counterproductive, one-shot activities might not be enough - even when well managed and implemented. Only a true management approach can lead to consistent interoperability policies and a high level of interoperability maturity.

The energy system is quickly evolving; relations and interfaces with neighbouring domains such as electric mobility quickly grow in quantity and complexity. Even when interoperability approaches are well managed, no company, no association and no community can get to the maximum level of interoperability performance in one step and stay on that level forever. Therefore, the goal should be to implement **continuous improvement processes** in as many areas as possible.
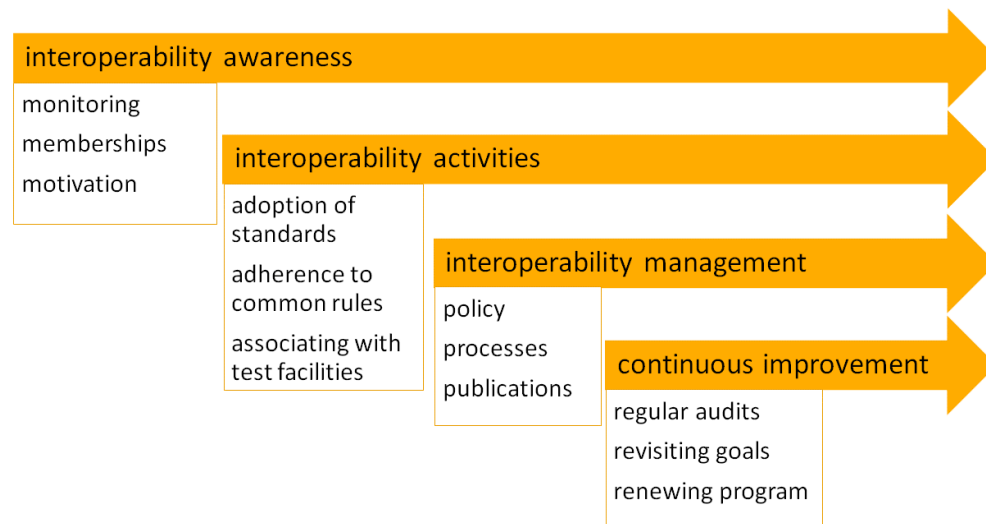
Fig. 1   Advancing the interoperability performance of an organisation

Many describe continuous improvement as the Plan-Do-Check-Act (PDCA) process:

PLAN   Understand gaps between stakeholders' expectations and what you deliver, set priorities for closing gaps, develop an action plan to close gaps.

DO   Implement changes, collect data to determine if gaps are closing.

CHECK   Observe the effects of the change, analyse data, pinpoint problems.

ACT   Study the result, redesign system to reflect learning, change objectives, communicate broadly, retrain people.
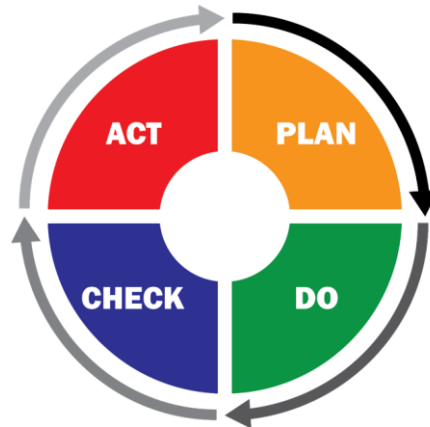
Fig. 2   The Plan Do Check Act Process

Such a continuous improvement process needs commitment, a working structure and controlling on a regular basis. If interoperability is implemented in such a way, we call it an **interoperability management system**. Such a system

- describes the interoperability conditions, risks, policies, plans, projects, practices and compliances with interoperability regulations

- allocates tasks and responsibilities to departments, functions and people

- defines the period and means to control improvement and to report success (or failure)

- describes the process to react on failure and to redefine targets and programmes.

Obviously, there are many benefits to systematic interoperability management:

- A systematic approach uncovers all risks and guarantees full compliance with interoperability models, standards and legislation.

- Well defined structures of procedures, programmes, documentation and continual assessment help to act efficiently.

- A complete assessment of activities and their impact on the energy domain gives a chance to allocate (the always limited) personnel and financial resources in a proper way.

- Public relation activities demonstrate commitment and enforce interoperability action by other stakeholders.

- Structured management systems allow for step-by-step improvement. Systemic approaches help to avoid starting too many projects at the same time.

Interoperability management is not only a task for product developers. It requires commitment and close cooperation of persons in all types of responsible officials in governance organisations, management bodies and employees.

2.1   The *int:net* Approach to Interoperability Management

In 1993, the European Union published a description of the so called Eco-Management and Audit Scheme (EMAS) for systematic environmental management [1]. In the beginning, EMAS was meant for enterprises only. Since 2001 EMAS has been open to all public and private services. EMAS is a management tool for companies and other organisations (like organisations) to evaluate, report and improve their environmental performance. Participation in EMAS is voluntary for organisations operating in the EU and the European Economic Area (EEA). Organisations that follow the EMAS regulation and process can – after an external audit – receive the EMAS label.

The Interoperability Management and Audit System (IntMAS) follows the model, implementation process and successes of EMAS. Many types of organisations such as technology providers, test laboratories or groupings of stakeholders can apply the IntMAS model. After a validation exercise to be defined and implemented by the *int-net Community*, the respective organisation can use the "IntNET approved" logo for its communication activities. The logo is a protected brandmark of the *int-net Community*.
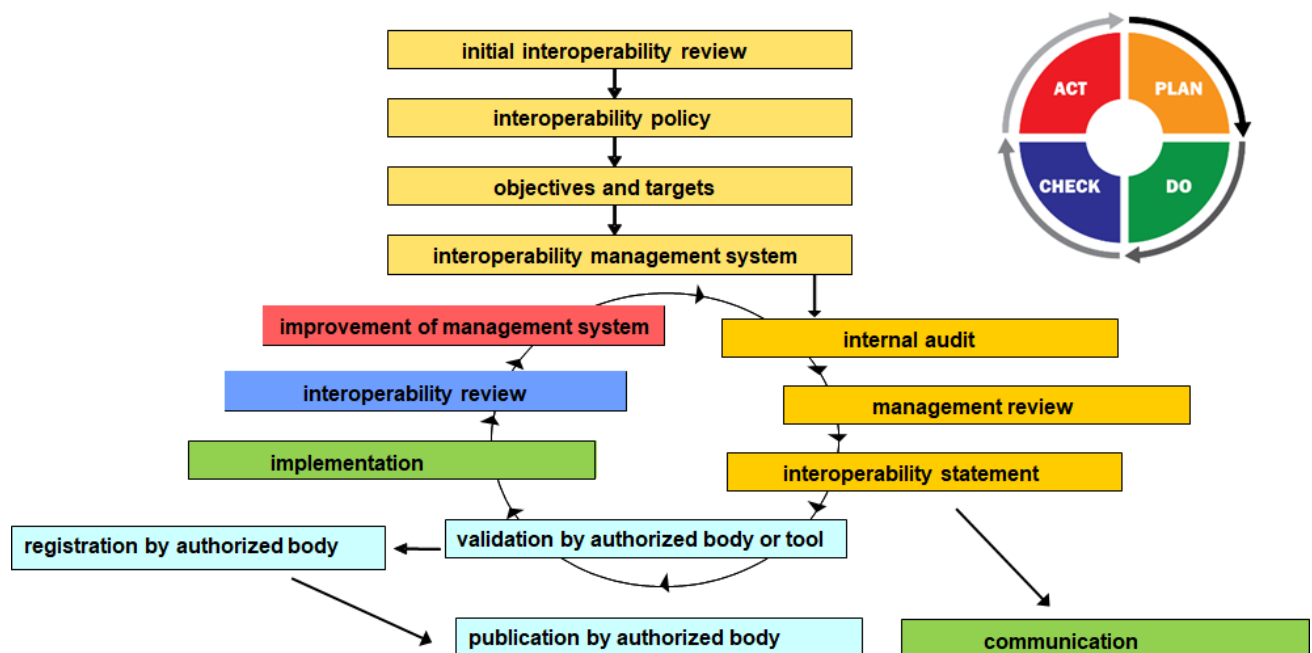

Fig. 3   Schematic Overview of the IntMAS PDCA Process

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[1] see EMAS regulation (EC) No. 1221/2009.

The IntMAS model follows the principle of the above mentioned PDCA cycle. To receive IntMAS registration (and receive the right to use the "IntNet approved" label), an organisation must comply with the following steps (which are pictured in the schematic overview in Fig. 4):

1. Get commitment from relevant management bodies or members of the organization, possibly in written.

2. Conduct an initial interoperability review considering all interoperability aspects of the organisation's activities, products and services, management structures and methods. The purpose of this review is to assess the legal and regulatory framework, existing interoperability management practices and procedures.

   While the definition of IntMAS leaves the assessment of the interoperability status open, the int:net project suggests using the following tools:

   o   for the assessment of test and validation labs: ??? or EMINENT

   o   for the assessment of enterprises, associations or communities: EMINENT
       (see chap. 3.2.4)

3. Formulate the organisation's Interoperability Policy (IP) with long term strategic targets and implementation strategies and have it approved by the senior management or another relevant high level body of the organisation.

4. In the light of the results of the review and taking into account the accepted policy, outline an Interoperability Performance Programme (IPP), i.e. set concrete objectives and targets and define concrete short term (e.g. 3 years) actions to further improve the interoperability performance of the organisation.

5. Establish an effective Interoperability Management System (IMS) aimed at implementing the policy, the performance program for the upcoming period and at achieving the set targets. The programme is typically laid down in an Interoperability Manual (IM) The management system needs to define responsibilities, objectives, operational procedures, training needs, monitoring and communication means. A responsible person must be appointed as the IntMAS or interoperability manager and needs to carefully implement the system and watch the improvement process.

6. Draft a publishable Interoperability Performance Statement (IPS) which lays down the status quo and/or results achieved against the interoperability objectives, describes the short term steps to be taken and the management structures to continuously improve the organisation's interoperability performance.

7. Carry out an (internal) interoperability audit, assessing in particular the management system in place and conformity with the organisation's policy and programme as well as compliance with relevant interoperability regulatory requirements.

8. Conduct a management review to involve and get commitment from senior management.

9. Have the entire system audited and validated by an authorized body or self-assessment tool.

   While the means and criteria for the validation of an IntMAS has not been decided yet, the int:net project suggests the int:net community (IntCom) to take responsibility for the quality of validation. IntCom will either perform the validation itself, assign it to a proven validation organisation or provide a (possibly AI-based) self-assessment tool on its website.

10. Upon receipt of validation results, the IPS will be published on the IntMAS website and the validated

organization can use the IPS and the IntMAS logo in its public relations.

1. Select scope, get commitment, and establish work structures
2. Collect information and assess interoperability performance
3. Develop interoperability policy with strategic targets and actions
4. Formulate a short term interoperability performance programme (IPP)
5. Develop and implement an interoperability management system (IMS)
6. Draft publishable statement of interoperability performance (SIP)
7. Run internal audit to prove consistency and feasibility of the programme
8. Run management review and get approval
9. Have IPP, IMS and SIP impartially validated
10. Create final statement of interoperability performance and do public relations

Fig. 4   Steps in the first cycle of an IntMAS process

The defined system then needs to be fully implemented and practiced in day-to-day work. So a responsible person like the IntMAS Coordinator or interoperability manager needs to carefully implement and watch the improvement process.

After a typical period of three years, the interoperability management system must be formally revisited and corrective actions can be taken to the system. The process requires:

- conducting a further interoperability review to assess results
- preparing updates and improvements for targets, actions and the entire system
- performing an internal audit i.e. review of the management system to check whether the formerly designed and validated system is still valid and what changes need to be applied
- involving upper management again with a management review
- updating the interoperability statement and go for re-validation of the system.

Only after re-validation can the organisation continue to use the IntMAS logo for another three years to prove that it has a functioning interoperability management system.

The IntMAS model does not force all relevant organisations into implementing an interoperability management system. It rather describes requirements of doing it properly for those who decide to do it.

The model outlined in this document will be the basis for the validation of the system in order to get allowance for the use of the "IntNET approved" label. Basically, what will be tested throughout the validation process is:

- The minimum contents of the interoperability policy: compliance with legal and other requirements, serious will to collaborate with other organisations, mainly those responsible for interoperability governance, commitment to continuous improvement etc.

- The quality of the practical assessment of the interoperability status and significant impacts: definition of scope, reasonable process of assessment (particularly maturity model and tools used), feasibility of assessment etc.

- The existence of a functional management system: appointed interoperability manager appointed, clear responsibilities and documented procedures defined, well defined access to documents, training needs and plans in place, formal criteria set for communication with respect to interoperability, etc.

- The process for achieving and keeping the right to use the "IntNET approved" label: have the system validated by an approved auditor or valid self-assessment system, run an annual review, publish interoperability statement etc.

While the validation of the IntMAS needs to guarantee that the interoperability quality is high in all organisations that use the "IntNET approved" label, the model leaves a lot of choices and options to the implementer. Amongst those are:

- full control of the pace of implementation and improvement process

- selection of method to assess the status and significance of interoperability impacts

- complete freedom in defining the number and type of targets and selecting measures

- no restrictions to document the extent and type of publishing of the interoperability statement, means of communication, etc.

- no requirement to re-validate the system – except when use of the "IntNET approved" logo shall continue after the first period

The IntMAS model is the result of multiple experiences with practical quality, environmental and sustainability management systems. As such, it is not just a proposal but also a recommendation that describes proven elements of an implementation process for interoperability management. The model also allows for the implementation of IntMAS in just a part of the entire organisation. In the case of environmental management (e.g. EMAS), technology proving enterprises or municipalities frequently decided to implement the improvement process only for their product development or their planning departments. In an initial phase the responsible persons have to carry out a scoping process to define the parts of the organisation's operations to be assessed, structured and validate. However, it may be difficult to correctly use the "IntNET approved" label if only parts of an organization follow the rules and can be validated.

2.2   Joint Implementation in the *int:net* Community

Despite obvious differences between organisations there are many fields of cooperation and exchanges of experience between them. For example:

- Cooperation in committees of standardization entities
- Testing facilities cooperation
- Regulatory agency involvement for management process compliance
- …
- application for funding for mutual projects focused on interoperability improvements.

For the IntMAS development throughout the int:net project, a community approach was the guiding principle. Organisations with similar portfolios or interests should join forces to implement their interoperability management systems. Collaboration in such clusters allows for:

- learning more about differences and similarities of their members and to create a team spirit
- learning from each other and sharing experiences and solutions in introducing IntMAS
- setting up mutual targets and including mutual/coordinated actions in their interoperability programmes
- using experienced and trained experts from similar organisations to conduct planned internal audits of their systems
- benchmarking interoperability goals and performance against other cluster members.

3 IntMAS Implementation Step by Step

Implementation of IntMAS can be widely facilitated by a good toolkit with simple management instruments like tables, forms, Excel sheets etc. int:net project produced a ready-to-use toolbox with training and working material used in the project. A description of the toolbox can be found in the appendix of this implementation guide. The tools are available from the project website intnet.eu. The step-by-step approach as outlined in chapter 2 and Fig. 4 systematically addresses the requirements of the IntMAS model and the respective validation method. The following chapters describe each step in more detail, hint to relevant tools and give examples.

3.1 Setting the Stage

When, after careful consideration of the pros and cons, an organisation decides to implement an interoperability management system, it first runs a so-called scoping process to select the organisation for which it wants to implement the system. Then, working structures need to be defined and management has to be involved in supporting the implementation process.

3.1.1 Selecting the Scope
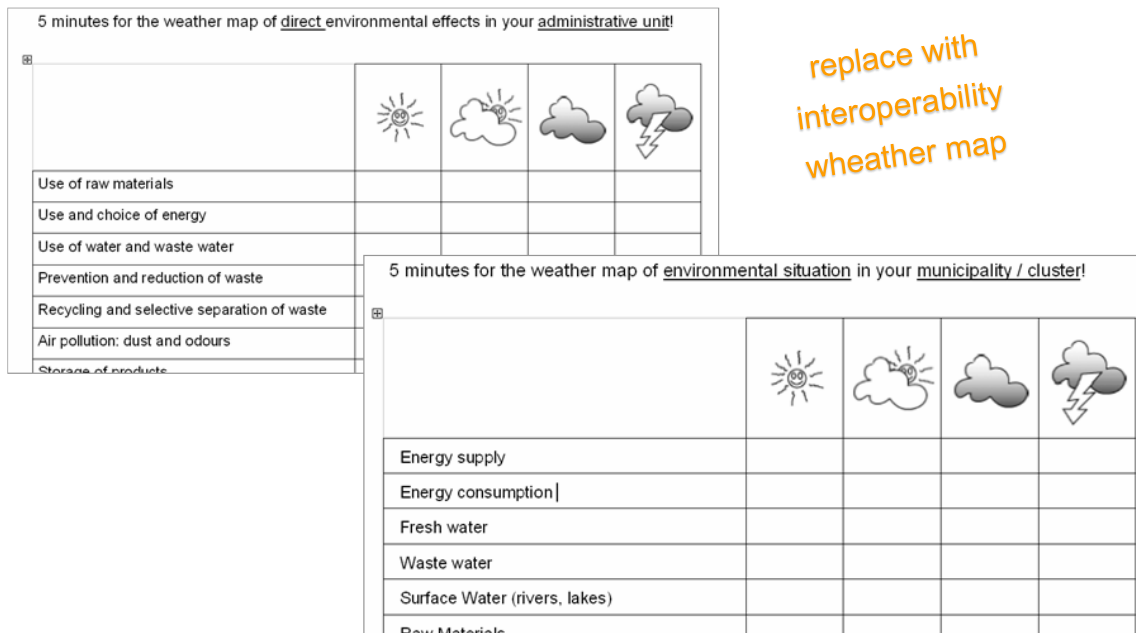
In most cases it is not recommended to do IntMAS for the entire organisation. Only in small organisations (fewer than 500 employees or members) with a small administration (fewer than 30 – 50 employees) can this be managed. In all other cases it is better to start with selected units. Selection criteria can be organisational units where interoperability aspects play a major role, where multiplication functions can be achieved and where a quick and / or good success (e.g. identification of easy financial savings or increased income) can be expected.

Following the respective rules from the EMAS regulation [2], an organisation may choose units smaller than one site (subdivisions) under the following circumstances:

- The subdivision of the organisational location produces clearly defined products, performs services or undertakes activities of its own and the interoperability aspects and effects of the subfield can be clearly identified and differentiated from those of other, non-selected parts of the organisation

- The subdivision possesses its own executive management and administration by means of which to organise and check its Interoperability Management and Audit System and the effects on the energy domain and to undertake corrective measures if necessary.

- The subdivision has been allocated clearly defined responsibilities so that it can achieve sufficient performance levels for approval and maintain the approved interoperability performance standards thereafter.

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[2] For more information see the "Guidance on Entity Suitable For Registration to EMAS", COMMISSION DECISION of 7 September 2001 on guidance for the implementation of Regulation (EC) No 761/2001

The scoping process can be supported by using managing tools like a "Weather Map" or a "SWOT Analysis". Both help to identify those administrative units that most urgently need treatment with interoperability management. For templates and a description of these tools see the IntMAS Toolbox on the int:net project website.

Fig. 5   Weather Maps to Select a Scope for the Interoperability Managements System

3.1.2   Getting commitment from the head of organisation

Sometimes it might be necessary to convince the decision makers to get the commitment to take part in the IntMAS process. Therefore, the following steps are necessary:

- Select people who should be convinced and involved
- Meet with key decision makers to
  - o   describe urgency and present list of benefits of IntMAS
  - o   take away tensions
  - o   discuss result of scoping
  - o   get commitment for allocating work force
- get order to prepare a kick-off meeting and invite key players
- meet with other key players to present first results and invite for kick-off meeting.

To convince decision makers it is important to outline benefits, clearly state what the IntMAS model requires and how many choices the implementers have (see page 10).

3.1.3   Establishing Management Structures

At the beginning it is indispensable to establish some management structures to have enough (wo)manpower to drive the IntMAS implementation process. In fact, this is not a requirement of the IntMAS model but a recommendation based on the experience of many management processes:

- **Appointing an IntMAS Coordinator**

    The IntMAS Coordinator is the project manager for the development and implementation of IntMAS. He/she must have clearly defined responsibilities and authorities, must also have skills and capacity to drive the process. He/she is responsible, for example, for the definition of work steps, tasks, schedules and for developing the roll-out strategy. He/she should have a good overview of the organisation's sub-divisions and be familiar with the responsibilities and means of influence associated with the interoperability aspects of their activities.

- **Involving an IntMAS Consultant**

    Unless there is vast management and project experience with the IntMAS coordinator, he or she should get assistance from an experienced and IntMAS-experienced support person. It was one of the goals of the int:net project to build a team of such experts for the first IntMAS processes to be implemented.

- **Establishing an IntMAS Team**

    The IntMAS Team is a flexible group of members whose experience must relate to respective tasks and steps. The permanent members of the team should be the IntMAS Coordinator, (if involved) the IntMAS consultant(s) and responsible representatives of all departments or units within the project scope. The IntMAS Coordinator is the leader of the IntMAS Team. The IntMAS Team should comprise organisational knowledge, interpersonal and communication skills and project management capability. The IntMAS Team should support the IntMAS Coordinator during the

    o   interoperability performance evaluation (status, compliance and system audits)

    o   establishing of interoperability goals and measures (interoperability programme)

    o   integration of the interoperability management system in the organisation's administrative structure

    o   regular evaluation of the interoperability programme

    o   internal audits (if necessary).

    The IntMAS Team should consist of representatives of all relevant management bodies and interest groups so that both the expert knowledge is available as well as all interested parties are involved. After all, it makes sense to report regularly to the senior management on the project's progress. The executive powers of the organisation are responsible for interoperability management and adopting the interoperability policy and programme, as well as releasing the interoperability statement. So, there is quite some reason to invite upper management persons to become members of the IntMAS team.

- **Establishing an IntMAS Cluster Team**

    One of the ideas of the int:net project was the cluster approach. If organisations decide - which is highly recommended! - to jointly implement IntMAS, it might be

helpful to formally create an IntMAS Cluster Team for the coordination of managing tasks.
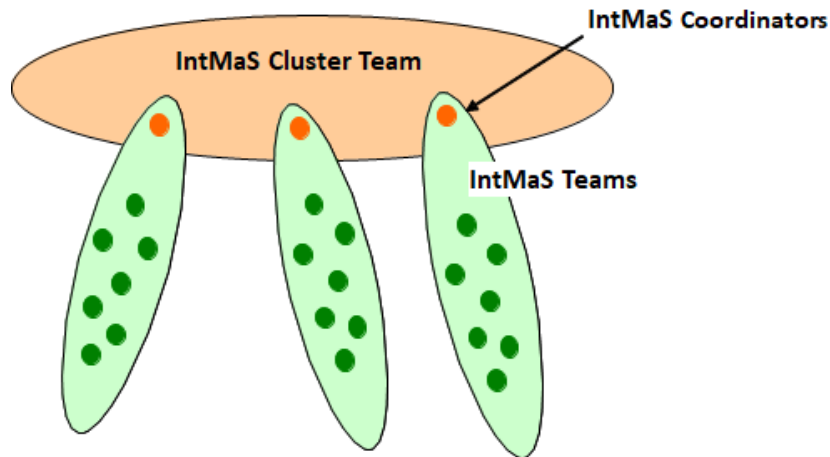
Fig. 6   Work Structure for an IntMAS Cluster approach

Summary of Steps

1. Do an initial analysis of areas of interest (use weather maps and/or SWOT analysis)
2. Prepare a list of all locations / facilities and units in the organization
3. Select possible scopes, i. e. check which locations / facilities / units are most related to identified areas of interest
4. Assess possible scopes against requirements of IntMAS model
5. Assess personnel resources of possible scopes
6. Assign an IntMAS Coordinator, establish IntMAS team and develop a project plan
7. Prepare and run a motivating kick-off workshop
8. Get final decision and commitment in kick-off workshop

Key Points and Hints

- select a feasible scope:
  - relevant but not too big
  - impactful with respect to interoperability
  - useful as a pilot unit with opportunity for expansion
- convince decision maker(s) to support you in strategic and technical terms

3.2 Initial Interoperability Review

The Initial Interoperability Review (IIR) shall be a comprehensive analysis of the interoperability issues, impact and performance related to activities of the organisation.

3.2.1 Goals and Requirements

There are two main goals of the Initial Interoperability Review :

- Collecting all necessary information is key to identify and assess the significant interoperability aspects. Objective is to provide baseline data to allow preparation and development of an Interoperability Policy and Programme.

- The Initial Interoperability Review also has to provide the basis for the Interoperability Management and Audit System to be installed in the upcoming steps. This means that a review of the existing interoperability management practices and procedures is necessary. The objective is to identify areas of strengths and weaknesses in existing interoperability management practices and structures.

The Interoperability Review should cover five key areas:

1. assessment of legislative, regulatory and other requirements to which the organisation has to obey

2. identification of all interoperability aspects with a significant interoperability impact, qualified and quantified as appropriate, and compiling a register of those identified as significant

3. description of the criteria (e.g. performance indicators) for assessing the significance of the interoperability impact

4. examination of all existing interoperability management practices and procedures in the organization

5. evaluation of feedback from the investigation of previous failures or successes.

Concerning the interoperability aspects, IntMAS shall consider all interoperability aspects of its activities, products and services and decide (taking into account the relevant frameworks) which of its interoperability aspects have a significant impact, as a basis for setting its interoperability objectives and targets. An organisation shall consider both direct and indirect interoperability aspects of its activities, products and services. [3]

3.2.2 Interoperability Assessment Process

The Initial Interoperability Review (IIR) enables the organisation to focus on the most important issues, leading to an Interoperability Management and Audit System that is likely to be complete and effective. The IIR should cover activities under both normal and abnormal conditions. All interoperability aspects of the selected scope shall be considered. The significance of these aspects is determined by evaluating the significance of the interoperability effects and impacts that result from the aspects.

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[3] in accordance with a similar definition in the EMA regulation

3.2.3　Assessment of Interoperability Status

It is not necessary to conduct studies and evaluations to assess the relevance of all interoperability aspects. For the first review to be done in IntMAS, it is enough to use simple forms like <mark>xxx</mark> and <mark>yyy</mark> in the IntMAS Workbook. They help to identify and assess:

- relevant process and activities
- interoperability aspects of each activity (short text, type and description)
- importance and influence of the organisation's interoperability performance
- significance of each aspect, dependant on importance and influence

Many other kinds of criteria can be selected and in general it is up to the organization (mainly the IntMAS coordinator) to decide. The IntMAS model offers maximum leeway to implementers. But, for the final (external) audit, the IntMAS coordinator needs to be able to clearly explain the system used to assess the significance of all aspects.

For practical purposes it makes a lot of sense to maintain a database of key figures and documents on

- standards used to maximise interoperability
- processes defined to use the standards
- implementation of interoperability profiles and participation in testing events
- products or other artifacts developed according to a high level of interoperability
- memberships or other relations to groups striving for maximising interoperability
- etc.

With such a standardised set of data it will be much easier to make the required assessment of significance and to establish a reasonable interoperability programme and management system.

3.2.4　EMINENT – a Versatile Tool to Assess the Interoperability Performance

Throughout the int:net project, a versatile tool has been developed, which can be used to assess and monitor for multiple years the status and development of the interoperability performance of the organisation. EMINENT stands for "**E**valuating the **M**aturity of **IN**teroperability in the **EN**ergy **T**ransition". The tool has been introduced as a model that analyses the capabilities – or skills – that are required for an organisation or community to effectively foster, develop and implement interoperable solutions. The process for creating the model and the tool as well as the rationale behind it, is showcased in respective deliverables of the int:net project. The EMINENT tool has been tested with multiple organisations (see example in Fig. 7 ff); and deliverables of the int:net project highlight the challenges and successes that have been identified.

Descriptions and guidelines to use EMINENT are available from:

- User Guide on how to perform a maturity / performance assessment and how to upload the data to the database (maintained by the int:net project and community): https://github.com/int-net/EminentResultsDatabase
- Assessment tool:
  - Online questionnaire : https://ec.europa.eu/eusurvey/runner/Eminent
  - Questionnaire available for re-use and/or modification: https://github.com/int-net/EminentSurvey

EMINENT has first been tested with various communities active in the energy data field:

- int:net community, i.e. the consortium executing that project together with supporters active on the community website https://community.intnet.eu/.
- Common Information Model Working Group (CIM WG), formally established within ENTSO-E with the goal of facilitating the development and the implementation of standardized data exchange formats used by TSOs, Regional Coordination Centers (RCCs), ENTSO-E, and their counterparts.
- Semantic Interoperability Framework (SIF) community, established to leverage the SAREF ontology and to promote interoperability between buildings and the grid to enable the provision of flexibility services.
- EEBus community and association, including the EEBus Living Lab in Cologne.

To show feasibility and applicability in test facilities and vendor enterprises, EMINENT has been applied in:

- AIT Energy Test Lab (?)
- ???.
- Pilots of Horizon-Europe project ENERSHARE

EMINENT centers around the interoperability capabilities of the community or organisation. The tool and its surveys concentrate on the following areas of interest:

Within this capability framework, the following capabilities are further categorized by the following sub-capabilities:

- o **1.1 Community growth** - refers to the expansion, collaboration, and maturation of entities or stakeholders involved in creating, adopting, and advancing interoperable systems and standards
- o **1.2 Knowledge retention** - refers to the intentional preservation and accessibility of critical information, expertise, and insights related to the seamless integration and connectivity of diverse systems and technologies
- o **1.3 Diversity of perspectives** - refers to the inclusion and consideration of a wide range of viewpoints, experiences, and insights from various stakeholders, domains, and disciplines involved in the design, implementation, and governance of interoperable systems
- o **2.1: Integration profile establishment** - refers to the process of defining a set of requirements that outline how different systems or components should interact and exchange information to achieve seamless integration
- o **2.2: Capability of Standardization** - refers to the process of establishing a set of agreed-upon norms, specifications, and protocols that solve the problem stated in the Integration Profile
- o **2.3: Capability of Compliance Testing** - refers to the systematic evaluation and verification processes designed to ensure that interconnected systems, components, or solutions adhere to established standards, specifications, and protocols

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  - o **3.1: Capability of User Base Growth** - refers to the expansion and diversification of the community or user ecosystem that actively engages with and benefits from interoperable systems
  - o **3.2: Capability of Operational Alignment Process** – refers to the context of significant emphasis on the ways in which system and strategic procedures are created and then undertaken to intricately synchronize the day-to-day processes, workflows, and activities of interconnected systems, components, or organizations
  - o **3.3: Tool, Product, and Reference Implementation Development** - refers to the creation and enhancement of software tools, products, and reference implementations that facilitate and exemplify the seamless integration of diverse systems
  - o **3.4: Market Creation** - refers to the strategic efforts and activities aimed at establishing a viable and dynamic market for products, services, and solutions that facilitate seamless connectivity between diverse systems.

As an example, the following shows some results from the test exercise with the Semantic Interoperability Framework (SIF) community. The area of expertise of the participating experts in terms of the SGAM framework can be found in Fig. 7. Given the fact that the SIF community focusses on home energy management products, it makes sense to see most respondents have expertise in the DER and Customer domains.
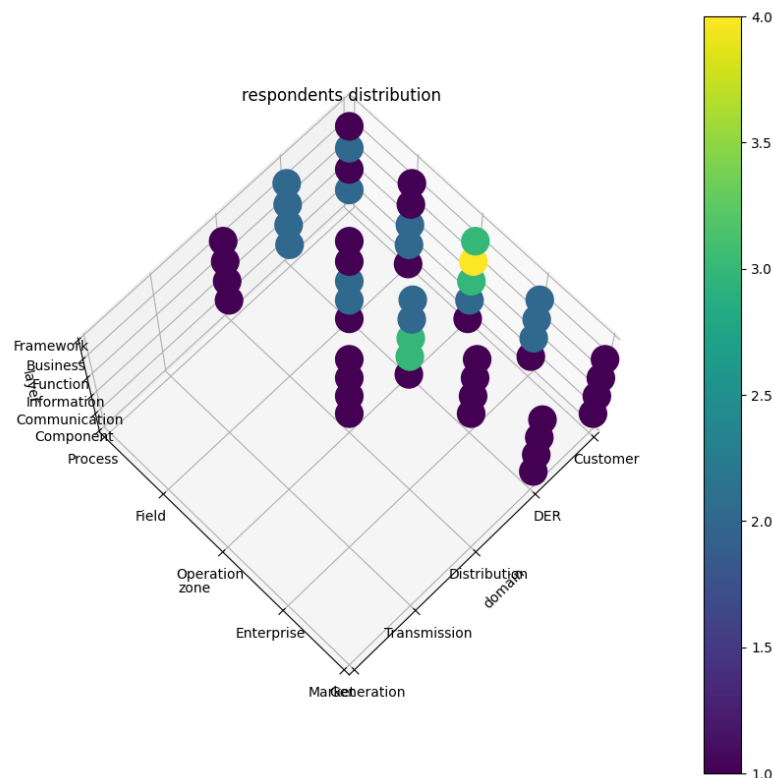
Fig. 7   Overview of area of expertise of the respondents of the SIF community

Respectively, the overall interoperability maturity performance scores for the SIF community can be found in Fig. 8. With overall consistent scores between 2 and 3, this community is quite well rounded. The high scores (of around 3) in 'Standardization', 'Compliance Testing' and 'Market Creation' suggest

that this organisation is very implementation and adoption driven. The lowest score (of a little over 2) for 'Diversity of Perspectives' is a hint towards an opportunity of improvement.
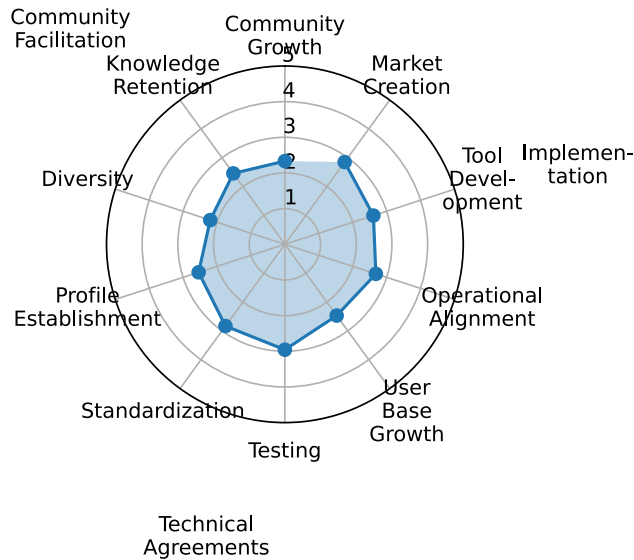
Fig. 8   Overview of Interoperability maturity of the SIF community across all capabilities

3.2.5   Visiting the sites and selected units

The Initial Interoperability Review should comprise a visit to the units of the organization taking part in the IntMAS process. The visiting tour shall include in particular interviews with personnel. For a systematic approach, checklists can be used that help to ensure completeness of the review process.

3.2.6   Legal Compliance Audit

IntMAS requires an index that includes all legislation relevant to the interoperability domain that the organisation is obliged to observe. The index needs to be updated at regular intervals. In the so-called compliance audit, the organization's conformity to legal standards, i.e. the observation of this legislation, is to be assessed. To prepare for such an audit, during the Initial Interoperability Review, the following questions should be answered:

- Has the organisation identified and understood the interoperability legal and regulatory requirements applicable to its activities?

- Has the organisation established and does it maintain a list of all interoperability laws and regulations pertaining to its activities?

- Does the organisation have procedures in place to track changes in interoperability legal and regulatory requirements?

- How does the organisation communicate relevant information on interoperability legal and regulatory requirements to employees?

3.2.7 Initial Interoperability Review Summary Report

Though it is not obligatory, it makes good sense to summarise the most important results and problems at the end of the Initial Interoperability Review process. Such a report should include all findings, their significance and recommendations for solutions. At the end of the implementation process, the IntMAS verifier will greatly appreciate such a report!

Summary of Steps

1. Collect all activities and data with interoperability relevance
2. Evaluate organization's activities and data, and assess the interoperability significance (based on selected and well documented criteria)
3. Select the activities and interoperability effects with most significant importance
4. Create a list of relevant legislation and check the legal compliance
5. Visit the sites and selected units of the organization to involve and motivate people
6. Summarise all results in a written report

Key Points and Hints

- During the Initial Interoperability Review, it is essential to distinguish important from unimportant things.

- Important: purpose of review is to gather, record and analyse data in broad terms, not infinite detail.

- Legal compliance is essential for a successful validation.

- It is quite normal if the Initial Interoperability Review takes time, some weeks or even some months. But the effort pays off: at the end all information will help
    - to establish objectives and targets for the Interoperability Programme
    - to develop an action programme with reasonable measures
    - to establish the Interoperability Management System
    - to write the Statement of Interoperability Performance for the public
    - ???

3.3 Interoperability Policy

The **Interoperability Policy** (IP) hall describe the organisation's overall and long term aims and principles of action with respect to supporting interoperability in the energy domain, including:

- compliance with all relevant regulatory requirements regarding the energy domain and related interoperability and standardization efforts

- a commitment to continual improvement of interoperability performance

- a framework for setting and reviewing interoperability objectives and targets.

3.3.1 Goals and Requirements

Annex 1-A.2 of the EMAS Regulation sets up more detailed requirements for such a policy. IntMAS adopts these and also requires that head of the organisation shall define the organisation's interoperability policy and ensure that it:

- is appropriate to the nature, scale and interoperability effects of its activities, products or services;
- includes a commitment to continual improvement and prevention of disregarding interoperability principles
- includes a commitment to comply with applicable legal requirements and with other requirements to which the organisation subscribes which relate to its interoperability aspects
- provides the framework for setting and reviewing interoperability objectives and targets
- is documented, implemented and maintained
- is communicated to all persons working for or on behalf of the organisation, and
- is available to the public.

3.3.2 Work process

The development of an interoperability policy is the logical starting point for establishing an Interoperability Management and Audit System (see chap. 3.5). The policy can build on the overall ambitions of the organisation as well as on the findings of the Initial Interoperability Review. However, policy writing is quite a task, as it has to bring together the vision and mission of the organisation and its senior management with the problems of everyday life in terms of interoperability in the energy domain.

To produce a first draft document of consistent style and quality it is advisable to create a small team from all relevant levels of the organisation's management and work force (see IntMAS Team in chap. 3.1.3). This team is responsible for identifying and analysing the various issues and writing a policy which reflects those.

Writing the policy, it will be necessary to think very clearly about who will be the "customers" for the policy text. It is likely that the policy will be used to communicate with a wide range of people including

- all staff at all levels within the organization
- the organizations suppliers, contractors and customers
- the general public.

To effectively communicate with these groups, the policy will need to be short, non-technical and general in character but at the same provide the foundation for objectives, programmes of work and operational targets. In essence, the policy must contain the vision and mission of the organization as far as interoperability in the energy domain is concerned.

A quick review of existing policies may help to avoid "re-invention of the wheel". An example created throughout the int:net project is shown in Fig. 9).

> **Interoperability Policy of ???**
>
> ==XXX==
>
> *As a source of ideas here is a policy for EMAS in a municipality:*
>
> *Naujene rural municipal council is a local administration body, which has the right to set up environmental policy on its administrative territory.*
>
> *Naujene municipality goal is to promote the wellbeing of its inhabitants, to ensure the preconditions for sustainable and balanced development of the municipality. Complying with the environmental legislation of the Republic of Latvia and with the integration principles of the European Union to promote diverse economic development, to ensure a healthy, favorable and safe environment for economic development and all inhabitants of the municipality.*
>
> *To achieve these goals, the Naujene rural municipal council has developed the Territorial Planning of the Naujene rural municipal council up to 2015 and started its implementation.*
>
> *Naujene rural municipal council resolves constantly to reduce the negative environmental impacts of municipal activities within the limits of its financial and technical resources:*
>
> 1. *To make decisions that are aimed at improving the environmental quality in the municipality by prevention of pollution, including the reduction of environmentally hazardous emissions to the air, soil and water, prevention of hazardous waste penetration into the environment, promotion of waste separation, reduction of the consumption of energy, water and materials, increase the efficiency of heating systems;*
>
> 2. *To develop an environmental protection plan for the municipality, based on the requirements of legislation of the Republic of Latvia, with the goal to align the requirements of environment protection and the development programme of the municipality with the interests of inhabitants;*
>
> 3. *To educate and involve employees, inhabitants, entrepreneurs and students of the municipality in the environmental management process and environmental problem solving, thus promoting a more responsible attitude towards the environment;*
>
> 4. *To promote rational and economical use of natural resources by promoting the implementation and use of environmentally friendly technologies in municipal institutions and enterprises located on municipal territory;*
>
> 5. *To cooperate with non-governmental and research institutions on a local, regional, and national level in order to solve environmental problems together and to attract investment for the solution of environmental problems.*
>
> *We recognise that in addition to a Policy Statement, actions and improvements are needed. To help with putting the environmental policy into practice and achieving continual improvements of environmental performance an environmental management system has been developed.*

Fig. 9   Example of an Interoperability Policy

The ultimate purpose of the policy is to summarise a strategic discussion of concerned parties. The first groups that will need to see the draft will almost certainly be the senior management and possibly the members of the board and the heads of the departments or units taking part in the IntMAS process. Discussion can be held in a meeting or in a corporate briefing system (e.g. managers collect comments in team meetings). A consultation amongst staff could also be done by an internal newsletter or Electronic Mail via Intranet. Whether an external consultation with a number of stakeholders is needed, should be decided depending on the relation to and activities with external stakeholder groups like interoperability or standardization communities.

To establish the Interoperability Policy as a binding document, the finalised policy will need to be approved by the head of the organisation and / or the Board of Directors.

3.3.3 Policy dissemination

Once approved, it is important for the policy to be circulated widely amongst staff with appropriate information so that it is fully understood and accepted. In addition, it should also be circulated to interoperability stakeholder groups and other organisations in the wider community (especially customers and vendors) and be made available to the general public. The IntMAS verifier may want to know how dissemination of the policy has been carried out.

Summary of Steps

1. Write a draft policy on the basis of the analysis and assessment of the initial Interoperability Review.

2. Consult and first involve key members of senior management and / or member of the board and revise the draft policy if necessary.

3. Get formal approval at the highest levels of management

4. Disseminate the policy to inform partners and get their buy-in.

Key Points and Hints

- Keep the policy slim! However, the Interoperability Policy must reflect all key interoperability issues and responsibilities of the organisation.

- Read policies of other organisations (also of other management systems) to get some inspiration of size, format and contents.

- Involve senior management, the board of directors, business partners, vendors and customers, and (perhaps even) the public, when discussing the draft policy.

- Stay realistic in terms of technical viability and envisioned management support.

3.4 Interoperability Performance Programme

For better understanding of the management instrument "Interoperability Performance Programme" (IPP), first some definitions:

Interoperability Objectives — overall goals for fostering and implementing interoperable solutions (in line with the interoperability policy, see chap. 3.3) that an organisation sets itself to achieve.

Interoperability Targets — detailed performance requirements, quantified where practicable, applicable to the organisation or parts thereof, which arises from the interoperability objectives, and which needs to be set and met in order to achieve those objectives.

Interoperability Programme — a description of the activities and measures (including responsibilities and means to implement) to be taken to achieve interoperability objectives and targets, including the deadlines for achieving the interoperability objectives and targets.

3.4.1 Goals and Requirements

With the above definitions, most of the important requirements to an Interoperability Programme (IP) have already been mentioned. The IP shall contain Interoperability objectives and targets, together with measures and activities to meet those. The IP describes what action the organization (i.e. its management bodies and work forces) plans to take to comply with its own policy and to ensure continual improvement in its interoperability performance. This "action" programme is designed to deliver towards the commitments made in the policy and to manage the significant effects identified during the Initial Interoperability Review.

3.4.2 Work Process

The IntMAS Team possibly together with an external consultant (see chap. 3.1.3) will have the task of outlining a draft of the Interoperability Programme. The programme will be based on the challenges which are obvious or were detected during the Initial Interoperability Review. It shall be related to the overall objectives of the Interoperability Policy and contain targets, measures and a set of clearly defined activities.

Thinking about the targets the IntMAS Team has to ensure that these targets are concrete and point to actions. They need to be SMART:

Specific	clear, unambiguous and easy to understand by those who are required to achieve them
Measurable	clearly defined means to assess achievement of target (in terms of substance and time)
Achievable	linked to realistic measures and reasonable timescale foreseen for achieving the targets
Relevant	related to the work area of those who will be required to meet the targets; addressing actors who have control over their work to be able to meet the targets.
Timed	timescales for achieving the target; open-ended targets will not encourage focused effort on improving performance.

Measures and activities in the Interoperability Programme need to be related to the targets. The IntMAS Team should find a balanced mix of three types of action:

Control	Activities related to aspects which are already being managed. All that is required are checks to ensure continuing compliance.
Improvement	Action addressed towards weaknesses identified during the initial review, or areas where existing management needs to be improved.
Further Analysis	Detailed review of further areas or effects that could not be fully assessed during the Initial Interoperability Review phase.

While governance organisations such as associations, governmental organisations or interoperability communities - other than production companies - have little chance to directly influence interoperability in the energy domain with their day-to-day work, the indirect influence of their work on the interoperability

performance of enterprises and private households can still be large. An Interoperability Programme can address both realms. The programme of a governance organisation will most probably contain activities like "install a training programme for young professionals in the organisation on the big variety of interoperability modelling " as well as "organize webinars and invite vendors of energy related technology to learn about the most important standards to be considered when developing products".

Above all, the programme has to be planned in the light of competing resource priorities. It is important to be realistic in developing the ambition and volume of the programme. Even an interoperability prone organization cannot expect to manage every aspect at once. Identification of the available interoperability management resources, both in terms of staff resources and financial provisions, is essential. However, reasonable goals and measures should not be deleted from the programme simply because the organisation lacks capacity or financial funds. Since IntMAS allows for setting up a long-term interoperability concept (i.e., longer than the validation period, see chap. 3.9), the action plan can well contain entries with distant deadlines.

3.4.3 Fitting the Interoperability Performance Programme to a structured format

It is up to the individual organisation to decide upon the structure of the Interoperability Programme. In some cases, it may be appropriate to adopt the format or approach of existing plans or programmes, such as business plans or quality programmes established in the organisation. Some options are given with templates x and y in the IntMAS toolbox.

3.4.4 Involving Affected Parties

Writing a programme can be achieved relatively quickly. However, getting commitment from all concerned parties can take much longer. There will be at least a need for the programme to be circulated to different levels of management of the organisation. If the action programme contains measures that can only be implemented with the support of partners or civil society there might be a need to invite those parties for a formal consultation.

3.4.5 Management Control of the Interoperability Programme

After approval of the programme by the highest level of the organisation (senior management, board of directors) it is essential to ensure that the implementation of the Interoperability Programme will be initiated and controlled by the IntMAS Coordinator or the IntMAS Team. Otherwise, even the best planned programmes will fail. The main management control considerations are:

- How will we ensure that individual actions are completed?
- What evidence will be used to demonstrate that an action has been completed (e.g., memo, minutes, report etc)?
- Who will initiate corrective action if an action has not been completed?
- How will we check to what degree the entire set of actions has been completed?
- Which are the personnel and economic resources to be invested?

The procedure for management control of the implementation of the Interoperability Programme must be a part of the Interoperability Management and Audit System and should be integrated into existing

management structures as possible. The Interoperability Programme is not a static "one-off ". It should be seen as a dynamic action plan as it will be revised as a result of Interoperability Audits (see chap. 3.6 and 3.9) and Management Reviews (see chap. 3.8). It can also be revised, when actions are completed or when new projects are launched that couldn't be planned when developing the programme. This on-going revision will require a degree of co-ordinated management control and will ensure that continuous improvement in interoperability performance is achieved.

Summary of Steps

1. Write a Draft Interoperability Programme on the basis of the analysis and assessment of the Initial Interoperability Review

2. Derive objectives and targets for the list of significant aspects. In a creative process, develop means and measures to meet the targets

3. Decide upon the most effective projects and put those in the programme. Involve all concerned parties and get their buy-in for the programme.

4. Get formal approval from the highest levels of management.

Key Points and Hints

- Don´t forget that the Interoperability Programme should be a dynamic on-going instrument and that a procedure within the Interoperability Management System is needed to track the implementation of the Programme.

- Clearly distinguish between objectives and targets. Define SMART targets. Try to set quantified aims wherever possible. Clearly assign tasks to functions (or people).

- Add objectives/targets/activities for direct/internal and indirect/external effects as well.

- Develop a realistic set of activities. Use tools to prepare and make decisions like SWOT analysis, decision matrix (see IntMaS Toolbox).

- Bear in mind that an organization is free to decide the number of interoperability objectives to be covered. The decisions might well be related to available budgets and other resources.

Example: Interoperability Performance Programme of xxx				
Significant impacts	**Targets**	**Activities**	**Time frame**	**Responsible person**
The … Department				
The … Department				

3.5 Interoperability Management System

Adopting the definition of the Environmental Management and Audit Scheme (EMAS), an Interoperability Management System (IMS) shall constitute the part of the overall management system of an organisation which deals with interoperability aspects and includes the organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the interoperability policy. That sounds difficult and means in simpler terms that the organisation shall clearly describe what management of interoperability means and how it ensures that relevant interoperability aspects are taken care of. In many cases many parts of that management system are already in place and the IMS can refer to and add to existing structures, procedures, etc. If there are gaps - particularly in those realms for which the Initial Interoperability Review (see chap. 3.2) has shown significant deficiencies in the management system - the implementation process for IntMAS must close these gaps.

3.5.1 Goals and Requirements

To ensure that its Interoperability Management System is understood by all relevant parties and operates effectively, an organisation should develop and maintain adequate documentation. The purpose is to provide necessary information to employees, external supporters, vendors and other interested parties as appropriate. For practical purposes, these records and documents are contained or referred to by a so-called **Interoperability Manual (IM)**. Such documentation shall include:

- the interoperability policy, objectives and targets
- a description of the scope of the interoperability management system
- a description of the main elements of the interoperability management system and their interrelation, including references to related documents
- documents including minutes and records required by IntMAS and
- records deemed necessary to ensure the effective planning, operation and control of processes that relate to significant interoperability aspects
- the Interoperability Program as an annex or linked to the Interoperability Manual as a living document.

Note that "document" can also mean a well-structured and easy to maintain online documentation in the organisation's internal web spaces. Benefits of a well-documented and easy to access IntMAS are:

- Good interoperability practice is incorporated into the culture of the organisation and no longer seen as peripheral.
- Implementation of IntMAS is seen as the responsibility of all staff, and not just the persons responsible for interoperability issues
- The Interoperability Policy and Programme will be implemented and regularly updated.
- Good practice will be maintained even if committed staff leave the organisation.
- New activities will be subject to Interoperability Review and incorporated into the IMS if they are interoperability significant.
- Corporate interoperability and energy domain working groups and committees are given a clear role and this motivates staff and consultants to actively participate.

The IMS should be integrated into the overall management system. A modern approach to implementing a management system looks at the business processes and then designs the management system around existing structures and processes. Instruments should be co-ordinated and integrated for the objectives of the IMS. Thus, acceptance by all levels of organisation staff and decision makers can be reached much better.

3.5.2   Work Process and Documentation

Since documentation is the Alpha and Omega of the IntMAS, first there needs to be a decision on how to develop and maintain an Interoperability Manual and all related documents. The documents of the IntMAS can be managed in any medium (paper, electronic, photos, posters) that is practical, legible, easy to understand and accessible to those who need the information contained therein. There can be advantages to maintaining documents electronically, such as ease of updating, controlling access, and ensuring that all users are using the valid versions of documents.

Typical structure of an IntMAS Interoperability Manual

1   Introduction
2   Organisation
3   Policy, objectives and targets
4   Rules and processes to comply with the policy
    4.1 Management of resources
    4.2 Product and service development
    4.3 Testing and validation
    4.4 Marketing and communication
    4.5 Training and capacity building
    4.6 Networking and cooperations
    4.7 Procurement
    4.8 Business development
6   Communication, Documentation and Training
    6.1 Internal communication
    6.2 External communication using interoperability statement
    6.3 Control of documents
    6.4 Maintaining legal register
7   Monitoring and audit system
    7.1 Direct and Indirect Interoperability effects
    7.2 Internal Audit
    7.3 Management Review
    7.4 Impartial validation
Appendices
- Action program
- Job descriptions and procedural instructions
- Templates
- (List of or links to) relevant interoperability documentation

Fig. 10   Example structure of IntMAS Manual

Usually, the Interoperability Management and Audit System is documented in a manual which reflects all relevant regulations of IntMAS, like

- Overview of the organisation
- Organisation's profile and scope of services and products
- Roles and responsibilities: Management hierarchy and how responsibilities for interoperability management fit into the organisation
- Procedures and instructions for all topics according to the IntMAS requirements.

Since all organisations which are implementing IntMAS must cover more or less the same topics, there will undoubtedly be a lot of similarities between the IntMAS Manuals in different organisations. Therefore, in the int:net project an IntMAS Master Manual has been developed and can be used as a template by all interested organisations [4]. A typical structure is outlined in Fig. 10.

3.5.3 Procedures for Interoperability Key Processes

For effective management of its interoperability key processes (i.e. those related to its identified significant interoperability aspects), an organisation should establish procedures that describe, in appropriate detail, a specific way of carrying out each process. These procedures are either contained in the Interoperability Manual or stored at a specific place (e.g. intranet) and referred to by the manual.

Normally the IntMAS management system will contain a reasonable subset of the following processes and the Interoperability Manual will describe according procedures:

- collecting, identifying and assessing interoperability aspects and impacts (i.e. a description of how to continue the work started during the Initial Interoperability Review)
- identification and maintenance of legal and other requirements (i. e. how to ensure legal or regulatory compliance)
- developing and achieving objectives and targets and the management of the interoperability management programme (i.e. how to develop and control an Interoperability Programme, see chap. 3.4)
- operational control and maintenance of interoperability relevant processes
- internal and external communication
- interoperability training
- documenting, recording and controlling the IntMAS
- auditing, reviewing and continuous improvement (i.e. how to run internal audits and involve the upper management level, see chap. 3.6 and 3.8).

Most of these processes and procedures in their essence will not be new for the organisation. Some will be typical for gaining a higher level of interoperability and will probably not be formalised and present to everybody. This is where during the IntMAS implementation process a formal procedure has to be written and stored. The Master Manual on the IntMAS website contains reasonable templates for those procedures.

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[4] get the template from the IntMAS website at ???

3.5.4 Instruments for Interoperability Management Systems

An Interoperability Management and Audit System is not just some written chapters in a manual. The manual rather gives an overview and refers to all kinds of instruments used to organise interoperability in the whole management and administration of an organisation.

General instruments used to describe responsibilities and duties are:

- organisational flowcharts
- simple listings of tasks for each department or specific functions
- job descriptions
- a matrix with tasks and responsibilities of different persons / functions.

As mentioned above, many processes are already fixed in existing procedures or work instructions. These existing regulations may be used and the IntMAS manual can refer to them without doubling.

For the external verifier, management systems will have to prove that they are implemented and work well. Therefore, records are needed to demonstrate conformity to the requirements of the management system. Wherever possible, existing documentation instruments should be used, such as:

- annual records of the newly implemented standards or interoperability rules
- logs from internal or external test and validation exercises
- folders with certificates for training
- instruction to staff as issued by superiors or human resource office.

Existing planning instruments should be integrated, such as:

- tables to plan inspection and control of development departments
- tables to plan inspection and control of productions sites
- annual training plans for the entire staff.

Furthermore, existing communication structures like daily meetings or notice-boards can be used and supplemented with interoperability topics.

For all mentioned tools, the Interoperability Manual shall only refer to their existence and name the responsible function or person who has to ensure that these tools and documentation are used and adapted as needed. However, while referring to them in the manual, the IntMAS coordinator should make sure that the tools foster and provide for enough interoperability performance. Otherwise, the verifier of the system might not accept them as being part of a functioning Interoperability Management System.

Summary of Steps

1. Charge the IntMAS coordinator with the design, writing, circulation of drafts etc. of the Interoperability Management Manual (IMM) chapters and procedures.

2. Decide upon the format and document storage for the IMM

3. Select the relevant issues that must be managed by the IMS and by that define the contents of the IMM.

4. Establish small working groups for the work on each element of the IMS involving those people who will have to implement the structures and processes.

5. Decide to use existing or develop new processes or procedures to manage tasks related to significant aspects. Choose practical instruments for each element of the IMS.

6. Assign tasks to draft chapters and procedures to experts in the administration. The IntMAS coordinator and, if available, external consultant shall help those experts to prepare chapters of the IMM so they will be accepted by the external verifier.

7. Get the whole IMM with all supplementing documents set into force by the senior management of the administration.

8. Make the IMM available to everybody and make sure that management and employees understand and follow the new Interoperability Management System.

Key Points and Hints

- Keep it brief!

- Rely on the IntMAS Master Manual!

- Wherever possible, simply write down what you are already doing. But reconsider that you are doing it in a reasonably interoperability prone way!

- The key to success is to integrate interoperability responsibilities into the general management system of the institution and into the responsibilities of staff on every level, from the Board of Directors to the simple employee, intern and working student.

- Wherever possible, integrate existing instruments into your interoperability management procedures. Many administrative instruments may originate from existing fields of activity.

- Involve staff in designing those parts of the system which they will have to implement.

- Feel free to change your current system if it is not working well.

3.6   Interoperability Performance Statement

The **Interoperability Performance Statement** (IPS) is a tool for communication and dialogue with the public and other interested parties regarding the interoperability status and plans. It summarises the most important aspects of the Interoperability Management and Audit System (IntMAS) and describes the organisation's performance. It can be used for public relations and as a means to communicate with partners. While other types of management systems do not require such a public statement, IntMAS formally requests such a document as a well-defined interface to stakeholders and the broad public. However, IntMAS implementers are quite free in designing content, size and format.

3.6.1   Goals and Requirements

The aim of the interoperability statement is [5] to provide interoperability information to the public and other interested parties regarding the interoperability impact and status and the continual improvement of interoperability performance of the organisation. Interoperability information shall be presented in a clear and coherent manner in printed form for those who have no other means of obtaining this information. Upon its first external validation and after every subsequent validations (typically every 3 years) the organisation is required to make available as a minimum the following information:

- a description of the organization, organisation or operational unit including a summary of its activities, products and services and its relationship to any parent organisations as appropriate

- a copy of the interoperability policy and a brief description of the interoperability management system of the organisation

- a description of all significant direct and indirect interoperability aspects and impacts, and an explanation of the nature of those

- a description of the interoperability objectives and targets in relation to the significant interoperability aspects and impacts

- a summary of the data available on the performance of the organisation against its interoperability objectives and targets. The summary may include figures obtained using the EMINENT or any other assessment tool.

- other factors regarding interoperability performance including performance against legal or regulatory provisions

- the name and credentials of the interoperability verifier and the date of the last validation.

3.6.2   Work process

Normally the IntMAS Team will have the task to outline a draft of the Interoperability Statement. The IntMAS team could be supported by an external consultant, by competent staff of the Public Relations Department of the organisation or other people with similar function.

If the Initial Interoperability Review was well done and if all data collecting is well organised in the Interoperability Management System, it should not be too big a task to produce the first Interoperability Statement and to update it over the years.

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[5] adopting the definition of the EMAS regulation

3.6.3 Contents and Readers' Requirements

IntMAS statements need not be long. A short, well-presented statement can convey all the appropriate information. This is particularly true for small organisations. In an ideal case everything could fit on 3-4 pages.

Interested parties require different kinds of information. Early consideration of their needs is important in deciding what to include in the Interoperability Performance Statement, what form it should take and how it should be communicated.

Structure of Interoperability Performance Statement (IPS)

Foreword

1. The organisation

    1.1. Administrative Units

    1.2. Tasks

    1.3. Interoperability success stories

2. Interoperability Aspects

    2.1. Assessment of Direct Impacts

    2.2. Assessment of Indirect Impacts

3. Overview of key data

4. Interoperability Policy

5. Interoperability Management System

    5.1. Organisational structure

    5.2. Responsibilities

    5.3. Internal and External Communication

6. Interoperability Performance Programme

7. Glossary

8. Contacts

9. External verification

    9.1. Date and statement of validation

    9.2. IntMAS verifier (if any)

    9.3. Date of next validation planned

    9.4. Registration certificate (if any)

Fig. 11   Example structure of Interoperability Performance Statement

As described above, the IntMAS model has some distinct requirements for the content of the Interoperability Statement. Nevertheless, from the PR point of view it could make sense to consider some additional information, for example

- presentation of the IntMAS team

- examples of interoperability actions (reporting successes)

- background information

- context of implementing IntMAS (" … as a member of a European Life project")

- related activities (e.g. Local Agenda 21)

- future plans ("… expand to other administrative units")

- glossary of terms.

IntMAS does not specify a structure for the SIP or the order in which items should be presented. If an organisation produces an Interoperability Statement covering multiple geographic locations, it should consider how to structure the statement to ensure that the significant interoperability impacts of each site are clearly identified and reported in the common Interoperability Statement. Otherwise the IntMAS verifier will most likely reject the document.

Readers of the Interoperability Statement may want to compare the results of an organisation's interoperability performance over time in order to identify significant trends. It is, therefore, important to include the same type of information in every revision of the statement.

3.6.4   Design and Dissemination

Similar to the process of establishing the Interoperability Programme, it is necessary, after having drawn up a draft of the Interoperability Performance Statement, to get the commitment of all concerned parties within the management and administration of the organisation. As it will be published, the SIP must be approved by the head of the organisation (the executive or the board of directors).

The SIP need not necessarily be printed. It is sufficient to disseminate it via Internet in electronic format and to hand out copies to those interested parties who explicitly ask for it. But, on the other hand side, a well-designed and printed SIP (or a short version of it) could be a practical marketing brochure to demonstrate the organisation's performance, capability and willingness to take responsibility for interoperability in the energy system. In particular, the SIP provides an opportunity to market a positive image of the organisation´s performance in cooperating with peers in the energy domain, with governance organisations, key customers, suppliers, contractors and, last but not least, the employees.

The first SIP will set the standard for subsequent versions. For further statements the focus should not be on changing size and format but rather on reporting the latest status, successful implementation of activities of the Interoperability Programme and changes to the system as consequence of learning and changing frameworks.

Since the SIP contains a proof of validity (either obtained via formal self-assessment or throughout an external audit), it cannot be published before having successfully passed the external audit (see chap. 3.9)

Summary of Steps

For the first Interoperability Performance Statement:

1. Decide who the audience for the statement will be and how the statement will be disseminated.
2. Decide upon the content and format of the statement.
1. Collect information from all previous implementation steps and draft the statement.
2. Include relevant data and comment in the statement if and why important data are not available.
3. Get the commitment of upper management and the heads of the departments or units taking part in the IntMAS process.
4. Present the statement to the external verifier.
5. After verification and registration publish the statement and update it on an annual basis.

Further Interoperability Statements:

1. Describe the most important changes in technical regard and in organisational culture.
2. Give account of the Interoperability Programme implementation and comment without reservation on why targets have not been achieved.
3. Tell about your experiences with and the results of internal Interoperability Audits and Management Reviews.
4. Inform about the nature and number of failures and complaints and the way they have been treated.

Key Points and Hints

- IntMAS Coordinators should check the internet for examples of similar management statements (also from other management system models such as ISO 9000 or EMAS)

- Every single word in the Interoperability Performance Statement has to be true! The verifier will judge the accuracy of data, qualitative and quantitative comments, presentation of data, etc. You need to be able to demonstrate the accuracy of the data, the basis of your value judgements etc.

- Use performance indicators to increase clarity, transparency and comparability of emissions and materials input and output.

3.7 Internal Interoperability Audit

Audits ensure that the activities carried out by an organisation are being conducted in accordance with their established procedures. The audit may also identify any issues with those established procedures or any opportunities for improving them. IntMAS requires two levels of audit:

- Internal audits and Management Reviews (see chap. 3.8) are conducted by the organisation itself. They are part of the Interoperability Management System. Both must be conducted in a formal way, which has to be described in the Interoperability Performance Manual.

- External audits are conducted by an independent, certified interoperability verifier (see chap. 3.9). It has to be noted, that in the future an AI based validation is foreseen.

Fig. 12 shows a reasonable auditing schedule. While in the example external audits (or AI based self-assessments) happen every 3 years, internal audits and management reviews shall be executed every year. However, the internal audit need not cover all realms of the organisation neither all elements of the IntMAS. Topics for the various internal audits can well be distributed over the years.
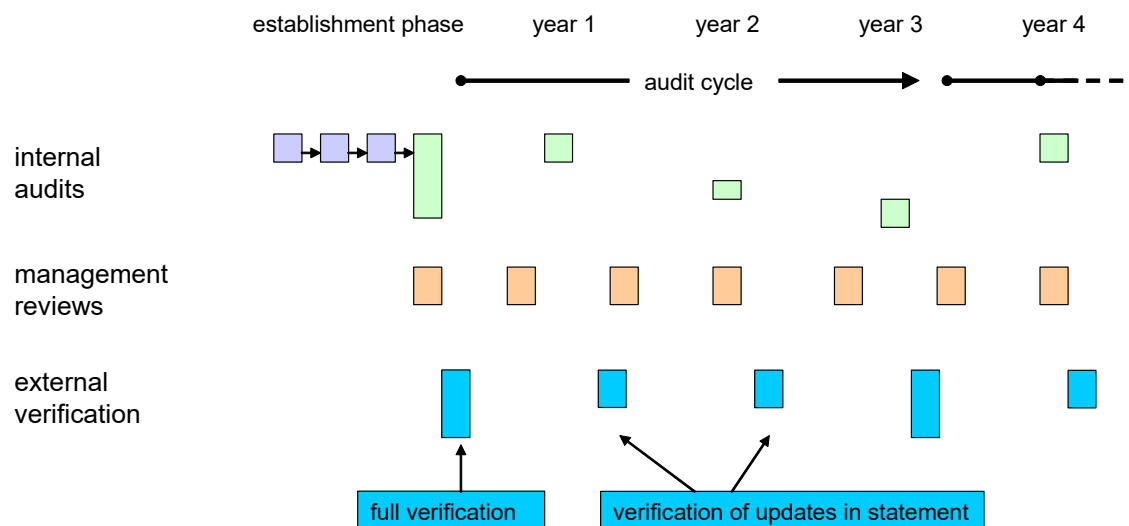

Fig. 12   Time Scheme for IntMAS Audits and Reviews

3.7.1 Goals and Requirements

The objectives of the internal IntMAS audit shall include, in particular, assessing the management system in place, and determining conformity with the organisation's interoperability policy and programme, which shall include compliance with relevant interoperability legal and regulatory requirements.

It is not the role of the Internal Interoperability Audit, for example, to produce monitoring reports on the interoperability programme, or on trends in the interoperability impact of the organisation. This kind of monitoring has to be incorporated into the Interoperability Management System, where it is specified what information will be collected, who will collect it, and when and where the results will be reported and assessed. The purpose of the internal audit is only to check that such records are being kept, that the statistics reported are accurate and that there is a feasible procedure in place to react. In that, the Internal Interoperability Audit differs very much from the Initial Interoperability Review. It focuses much

more on the checking of the functioning of the Interoperability Management Systems than on the interoperability performance as such.

While it is not the purpose of the internal audit, wise organisations use the opportunity of the audit to also check the interoperability status and performance of the organisation in between the formal (external or AI based) audits . One might want to call that an Interoperability Review and do it much like the Initial Interoperability Review (see chap. 3.2). However, it is important to understand that from a formal point of view these reviews are different and that reports need to be kept separate from the documents of the formal audits.

3.7.2   Work process

An Internal Interoperability Audit normally starts with the preparation of an audit programme containing

- the objectives of the audit, such as assessing the management system in place and the compliance with relevant interoperability regulatory requirements,
- the overall scope of the individual audits, such as subject areas covered; activities to be audited; interoperability criteria to be considered and the period covered by the audit,
- the plan for interviews with responsible managers and staff, reviews of documentations and records and inspection of operating conditions and equipment.

The audit programme has to be announced in due time and to everybody, particularly to the people concerned.

Internal audits shall be carried out by persons sufficiently independent of the department and activity being audited to ensure an impartial view. They may be carried out by employees of the organisation (e.g. the IntMAS Team plus some volunteers) or by external parties (employees from other organisations, employees from other parts of the same organisation or consultants). In either case, persons conducting the audit should be competent and in a position to do so impartially and objectively. One advantage of the cluster approach mentioned in chap. 2.2) can be to form an audit team with members from other organisations in the same cluster who are familiar but still independent from the organisation being audited.

After selecting an audit team leader and the other members of the audit team for the first (and other) audits there should be training to get the needed competence.

In preparation of the Internal Interoperability Audit the audit team has to

- create checklists,
- identify the audit reference criteria (e.g. applicable procedures, standards, laws and regulations, management system requirements, contractual requirements) and
- familiarise themselves with the activities and the situation of the unit to be audited.

Audit activities shall include discussions with personnel, inspection of operating conditions and equipment and reviewing of records, written procedures and other relevant documentation. Inter alia, spot-checking of compliance with the Interoperability Management and Audit System requirements should be used to determine the effectiveness of the entire management system.

The Internal Interoperability Audits should normally consider the following questions:

- Does the interoperability policy meet the requirements of the IntMAS model?
- Do the Interoperability Programme and the Management System meet the commitments made in the interoperability Policy?
- Are all statistics or results reported accurate and based on auditable records?
- Is the Management System being followed? Are the measures and activities implemented as outlined in the Interoperability Programme?
- Is the operational unit complying with all relevant interoperability legislation and regulations?

The results of the audit shall be documented by the audit team or its leader in a written audit report. The fundamental objectives of this report are:

- to document the scope of the audit
- to provide management with information on the state of compliance with the organisations' interoperability policy and the interoperability progress of the organisation
- to provide management with information on the effectiveness and reliability of the arrangements for monitoring interoperability progress and impacts of the organisation
- to demonstrate the need for corrective action, where appropriate.

The audit report shall be communicated by the audit team leader to the senior management, the IntMAS Coordinator and to all responsible persons, who were interviewed during the audit.

At the end of the audit process there shall be a plan of appropriate corrective actions.

Summary of Steps

1. Select an audit team leader and members of the audit team by decision of the IntMAS coordinator or the senior management. In case of a cluster approach, ask IntMAS coordinators of other cluster members to join the team.

2. Train the audit team, prepare checklists and announce the audit.

3. Assure a real audit situation according to the IntMAS requirements, with interviews, document checks and site inspections by competent and independent auditors.

4. Document the audit results in a written report and suggest corrective actions to be discussed with the parties concerned and the responsible persons of the management.

3.8   Management Review

The management review involves senior management in the definition and controlling of the Interoperability Management System. It creates buy-in and gives the IntMAS "power of position". According to the typical audit schedule, the Management Review goes along with the Internal Audits (see chap. 3.7).

The Management Review closes the plan-do-check-act loop (see chap. 2.1), upon which an Interoperability Management and Audit System is based. When properly implemented, the management review will contribute to a successful and sustainable IntMAS implementation.

3.8.1   Goals and Requirements

The Management review shall review the organisation's interoperability management system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness. Reviews shall include assessing opportunities for improvement and the need for changes to the interoperability management system, including the interoperability policy and interoperability objectives and targets. The outputs from management reviews shall include any decisions and actions related to possible changes to interoperability policy, objectives, targets and other elements of the interoperability management system, consistent with the commitment to continual improvement. The IntMAS model requires that records of the management reviews be retained.

3.8.2   Work process

It is most appropriate to do the Management Review after the evaluation of the internal audits and after having collected and evaluated the relevant interoperability data of the preceding year. It is recommended that the Management Review should be integrated once a year in a meeting of the senior management or board of directors. Based on the Management Review, the senior management together with the IntMAS Team shall determine the actions required to improve the Interoperability Management and Audit System (IntMAS) to meet interoperability policy, objectives and to ensure continual improvement.

The IntMAS Coordinator should prepare and attend the review meeting and formally present the basic information:

- results of internal audits and evaluations of compliance with legal requirements and with other requirements to which the organisation subscribes
- communication(s) from external interested parties, including complaints
- the assessed and reported interoperability performance of the organisation
- the extent to which objectives and targets have been met
- the status of corrective and preventive actions
- status of follow-up actions from previous management reviews
- changing frameworks, including developments in legal and other requirements and results of research and development projects
- recommendations for improvement.

The agenda of a Management Review should include the above-mentioned topics. For every topic the group should reflect on

- present situation and results
- assessment in terms of compliance and needs to react
- recommendations for improvement
- measures to control the effectiveness of corrective and preventive actions.

Results of the discussion (particularly decisions on new targets, better implementation structures, corrective and preventive actions) must be recorded in a (formless) protocol.

> **Summary of Steps**
> 1. Put Management Review on the agenda of a senior management meeting not less than once a year.
> 2. Prepare an agenda with relevant topics to discuss. Don´t forget to follow the obligatory topics according to the IntMAS model.
> 3. Document the results including new targets and structures, corrective and preventive actions and have them signed by senior management.

3.9 Impartial Validation

Only after a neutral evaluation, the organisation will be allowed to publish its Interoperability Performance Statement and use the IntMAS brandmark.

Impartial Validation comes in two flavors:

- An independent, certified interoperability verifier does the audit on behalf of the owner of the IntMAS model and the respective brandmark.

- Throughout a self-assessment process, an IT (possibly AI) based tool is fed with all relevant information and displays its results.

It is only after the personal or artificial auditor has "validated" the management system that it may be called an "approved Interoperability Management System according to IntMAS".

3.9.1 Goals and Requirements

The function of the interoperability audit is to check independently and without prejudice

- compliance with all the requirements of the IntMAS model

- the accuracy, reliability, credibility and correctness of the data and information in
    - the Interoperability Performance Statement
    - interoperability relevant documentation and information to be provided by the audited organisation.

3.9.2 Corrective actions after verification

The results of the impartial audit shall be discussed in the IntMAS Team. If specific IntMAS requirements have not been met, so called "corrective actions" must be fixed. A major non-compliance indicates a systems fault or other major problem. Minor non-compliances indicate that the overall system, documentation, etc. are reasonable but that there is a need to correct some minor parts of the system or procedures. For minor non-compliances it will be enough to document and report accomplishment of corrective actions. Only for major non-compliances a new validation action needs to be done.

Once the interoperability verification process has proven validity of the interoperability statement, the organisation can apply for using the "int:net approved" brandmark and to be registered and displayed in the IntMAS website. The logo may only be used together with a reference to entry on the website.

Summary of Steps

1. Select a validation method and a verifier or validation tool.
2. Send documents or upload them to be checked by the verifier or tool.
3. Receive validation report and seriously consider non-compliances and recommendations.
4. In the case of non-compliances, complete the needed corrective actions as quickly as possible and redo the validation process
5. After successful validation apply for registration with the owner of IntMAS

Key Points and Hints

- Take recommendations from the verifier or validation tool serious. They can be valuable for improving the system and the interoperability performance. Bear in mind: verifiers may have seen many organisations and can compare!
- Once validated the IntMAS process does not stop. Ongoing tasks are:
  - o to implement the projects and measures of the Interoperability Programme,
  - o to keep the spirit in the organization and the Interoperability Management System "alive",
  - o to execute further internal audits and internal management reviews
  - o to continually improve the interoperability performance.

3.10 Using IntMAS for Public Relations

An "IntNET approved" organisation communicates openly with its stakeholders. It shows to its partners and the interested public the activities and its commitment to interoperability in the energy system.

3.10.1 Using IntMAS as Communication Means

After validation (see chap. 3.9) and registration the organisation can use the "IntNET approved" logo in many types of corporate communications:

- on letterheads or company report,
- on documents and in all other media in which the participation of the organisation in the IntMAS community is communicated, e.g. on websites, on folders, in invitations etc. or in general company advertising
- on validated information in compliance with the rules of the IntMAS model
- in advertising for products, activities and services.

As the IntMAS is awarded to the organisation rather than to a product, the label <u>cannot be used</u>

- on products or their packaging

- on third-party or transport packaging

- in documents containing comparisons with other products, activities and services.

However, without using the brandmark, the organisation can on its products or packaging communicate that and when it has been validated for IntMAS for the last time.

The most credible means of communication is publicising the Interoperability Performance Statement (IPS) on the website or in reports which the organisation publishes. As outlined in chap. 3.6.3, the IPS will contain the time stamp and the results of last validation.

3.10.2 Using the "IntNET approved" label – legal aspects

The brandmark is registered under XXX for YYY. It can only be used by public and private organisations and individuals if they qualify with the trademark statutes published in the XXX-register

….

3.11 Going into a new Cycle of the Continuous Improvement

Each improvement cycle comes to a formal turning point with the validation (see chap. 3.9). But this everything else but the end of something. At the latest with the validation starts the implementation of the Interoperability Programme (IP, see chap. 3.4), relying on the structures that have been defined in the Interoperability Management System (see chap. 3.5).

3.11.1 Implementation and Controlling

It is up to the IntMAS Coordinator to motivate actors in the organization to implement or help implementing the measures and actions outlined in the IP. The coordinator will track and record the implementation steps in an appropriate manner. Each organisation will probably have its own controlling tools. At least there should be a "tick-list" with the IP that allow for following up.

3.11.2 Interoperability Review

While it is not mandatory to undergo a formal review in between the formal cycles of typically 3 years, it is highly recommended to establish well defined processes (see Fig. 12). Senior management should be informed about the outcomes of such reviews an – in case of deviation from the plan – should help implementing corrective actions. While minor changes can be implemented during an IntMAS cycle, major deficiencies identified in the last review before starting a new cycle must be seriously considered and may lead to a major revision of the program in the last step of the old and first step of the new cycle (see 3.11.3).

Controlling and review actions have multiple dimensions and must give answers to the following questions:

- **Have the implemented management structures been appropriate and successful?**
  To answer this a regular "maturity check" could be done with the **EMINENT** tool (see chap. 3.2.4) to not only assess the status but also the progress made in the organization. Of course (e.g. in the case of assessing a test-lab) the quality criteria defined for the first review (see chap. 3.2) should be revisited.

- **Have the planned measures and actions been implemented, and did they unleash the expected results?** The basis of this can be the above-mentioned work program management as typically implemented in an organization.

- **What have been the reactions from stakeholders?** No reaction should be considered a bad reaction and could be the result of lack of communication. Positive reaction can be used for motivation purpose for the next cycle – and negative feedback taken as a challenge for updating the work process if the IntMAS.

Not only the visible results need to be assessed. It could also be the case that the goals and target had been to ambitious or too unambitious. In both cases an update may be advisable.

3.11.3 Updating the Interoperability Management System

In this step, all steps of the initial setup process (see steps 1 to 6 in Fig. 4 and chapters 3.1 to 3.6 respectively need to be revisited and updated as needed. With the subsequent internal audit (chap. 3.7) starts the preparation for the next external validation and the publication of the successes of the previous and the plans for the upcoming period.

Conclusion

<mark><will be added after review></mark>

4   List of Tables

Es konnten keine Einträge für ein Abbildungsverzeichnis gefunden werden.

5   List of Figures

6   List of Abbreviations

A. Annex A

BIBLIOGRAPHY

Im aktuellen Dokument sind keine Quellen vorhanden.

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