

MULTILATERAL INTEROPERABILITY PROGRAMME



MIP Operating Procedures

29 April 2021

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v.1.0.0

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1 Introduction

1.1 Aim of the Document

MIP (Multilateral Interoperability Programme) requirements are fulfilled either by machine procedures implemented in computers or by human procedures executed by system operators and staff personnel. The MIP Operating Procedures (MOP) define part of the human procedures required to operate in a MIP environment. The MOP defines the procedures executed by gateway operators and information system personnel in order to configure the system and to 'keep the system running', from a MIP point of view.

The aim of this document is to serve as a generic source from which to derive specific national procedures tailored to the different national Land Command & Control Information Exchange (LC2IE) service implementations and directly executable by operators.

This document identifies two kinds of procedures, one of which may be loosely termed 'instantiation procedures' and the other which may be loosely termed 'information procedures'.

Instantiation procedures deal with setting up, maintaining and closing the information exchange with a counterpart between Mission Network Participants (MNPs). Instantiation procedures bring the LC2IE service from one state to another. Instantiation procedures start with 'Preparation' which is usually performed when the force is in a pre-deployment stage. There are a number of different setup procedures that are required to get the system into a state of 'Normal Operation'. Other procedures state the course of action during various kinds of disturbances during 'Normal Operation', for example lost communications and error conditions. The Instantiation procedures are in general documented as a sequence of steps that are taken, along with some rules to follow.

Information procedures are required in order to exchange information between systems and to ensure this information is correct and understandable. Information procedures typically are documented as rules to follow.

The MIP Solution supports the ability to exchange Command & Control (C2) information between MNPs in a federation in order to facilitate and improve Situational Awareness (SA) and collaboration among commanders. This will support common understanding and a timely availability of C2 Information. The MIP Solution satisfies the information exchange requirements between forces employing dissimilar Command & Control Information Systems (C2IS) and which - during an operation - have a command, support, or a proximity relationship. The MIP Solution contributes to the creation of a Common Operational Picture (COP) by providing effective management and dissemination of information being exchanged between C2ISs of MNPs. This is achieved by the implementation of a common information exchange schema and mechanism.

2 Definitions, Standards & Protocols and References

2.1 Definitions

Term	Definition
BO	Business Object
BSC	Battlespace Concept
BSO	Battlespace Object
C2	Command & Control.
C2IS	Command & Control Information System.
COP	Common Operational Picture. A single identical display of relevant operational information (e.g. position of own troops and enemy troops, position and status of important infrastructure such as bridges, roads etc.) shared by more than one Command. A COP facilitates collaborative planning and assists all echelons to achieve situational awareness.
IER	Information Exchange Requirement.
IPDG	Information Product Distribution Graph.
ITT	Initial Topic Trees: The initial hierarchy of Topics provided by the MN SMA to be used during the mission, usually (based on) the FMN described Minimum Topic Tree
LC2IE	Land Command & Control Information Exchange.
LC2IE service	Land Command & Control Information Exchange Service: A system that implements the MIP4IES specification to expose the Command & Control information to the Mission Network. This can either be a gateway that exposes the information of the C2IS, or an instance of the C2IS itself.
MIM	MIP Information Model: The semantic reference model provided by MIP, which serves as the basis, from which the information exchange schema are derived.
MIP	The Multilateral Interoperability Programme: An interoperability organisation established by national C2IS users with a requirement to share relevant Command & Control information in a multinational or coalition environment.
MIP4IES	The MIP 4 Information Exchange Specification: The fourth major release of the MIP Specifications, with a minimum version of 4.3. Any newer 4.x version will be inter-version compatible with this minimal version.
MN	Mission Network (a.k.a. Coalition Network): Single governed capability, including the communication and information systems, management, processes and procedures created for the purposes of an operation, exercise, training event, and/or interoperability verification activity, using a flexible and tailored set of non-materiel (policy, processes, procedures and standards) and materiel (static and deployed networks, services, supporting infrastructures) contributions provided by NATO, NATO and non-NATO nations and entities participating in operations.

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MN ML	Mission Network Managed Lists
MN ORBAT	Mission Network Order of Battle: The ORBAT, as defined by the MN SMA during mission preparation.
MN SMA	Mission Network Service Management Authority: Any nation or organization responsible for Mission Network architecture, Mission Network service strategy, and naming, numbering and addressing for the Mission Network. It is a central role in a Mission Network which is assigned by the Lead Commander and which has delegated authority from the Supreme Commander and Mission Participants.
MN TT	Mission Network Topic Trees: The Topic Trees, as defined by the MN SMA during mission preparation, consisting of the Initial Topic Trees combined with all the MNP Topic Tree Extensions.
MNP	Mission Network Participant: Any subject (nation or national/multinational/international body) participating in the mission and contributing an integral part of the Mission Network. A Mission Network participant usually joins the Mission Network by providing a – in this context – MIP Node.
MNP LSO	MNP LC2IE service Operator: who oversees the Attach Procedures as well as the daily operation of the LC2IE service.
MNP TTE	Mission Network Participant Topic Trees Extension: The Topic Tree, based on the Initial Topic Trees, containing the extensions where MNP will publish their information.
MNP ORBAT	Mission Network Participant Order of Battle: The Order of Battle defining the MNP contributing to the mission, to be provided to the MN SMA, who will combine these into the MN ORBAT.
MOH	MIP Operational Handbook.
MOP	MIP Operating Procedures.
NAT	Network Address Translation.
NISP	NATO Interoperability Standards and Protocols.
ORBAT	Order of Battle.
NTP	Network Time Protocol.
SA	Situational Awareness.
SC	Staffconcept
SOI	Standard Operating Instruction.
SOP	Standard Operating Procedure.
SPIF	Security Policy Information File.
WSMP	Web Services Messaging Profile.

2.2 Standards and Protocols

The instructions described in this document are based on the following standards. These standards are normative, i.e. considered prescriptive in order to join a Mission Network (MN).

The implementation for each MNP must adhere to the following MIP4IES specification, partly also outlined in the NATO Interoperability Standards and Protocols (NISP):

- MIP4IES: MIP4 Information Exchange Specification (4.3 or newer)
- MIM: MIP Information Model (5.1 or newer)
- WSMP: Web Services Messaging Profile [ADatP-5644(A)].

Depending on the (security) requirements of the deployment (parts of) the following standards may also need to be implemented.

- Confidentiality Labelling (ADatP-4774)
- Metadata Binding (ADatP-4778, including ADatP-4778.2)
- SPIF: Security Policy Information File (xmlspif 2.0)

2.3 References

Reference	Referenced document
MOH	MIP4-IES Operational Handbook 4.3

3 Conceptual System Description

Problem:

To facilitate and improve Situational Awareness (SA), creation of a Common Operational Picture (COP) and collaboration among commanders in coalition operations, there is a need to exchange Command & Control (C2) information between forces that are employing dissimilar C2ISs.

Solution:

The MIP Solution supports the ability to exchange information between MNPs in a federation using a C2IS in order to facilitate the improved situational awareness and collaboration among commanders that will lead to and support common understanding. The MIP Solution satisfies the information exchange requirements between forces employing dissimilar C2IS and which, during an operation, have a command, support, or proximity relationship. The MIP Solution contributes to the creation of a COP, part of SA, by providing effective management and dissemination of information being exchanged between MNPs C2IS. This is achieved by the implementation of a common information exchange schema and mechanism.

The information exchange of the MIP Solution is based on ADatP-5644(A) Web Services Messaging Profile (WSMP). The information schema is derived from the MIP Information Model (MIM), as a semantic reference.

Concept of Operation:

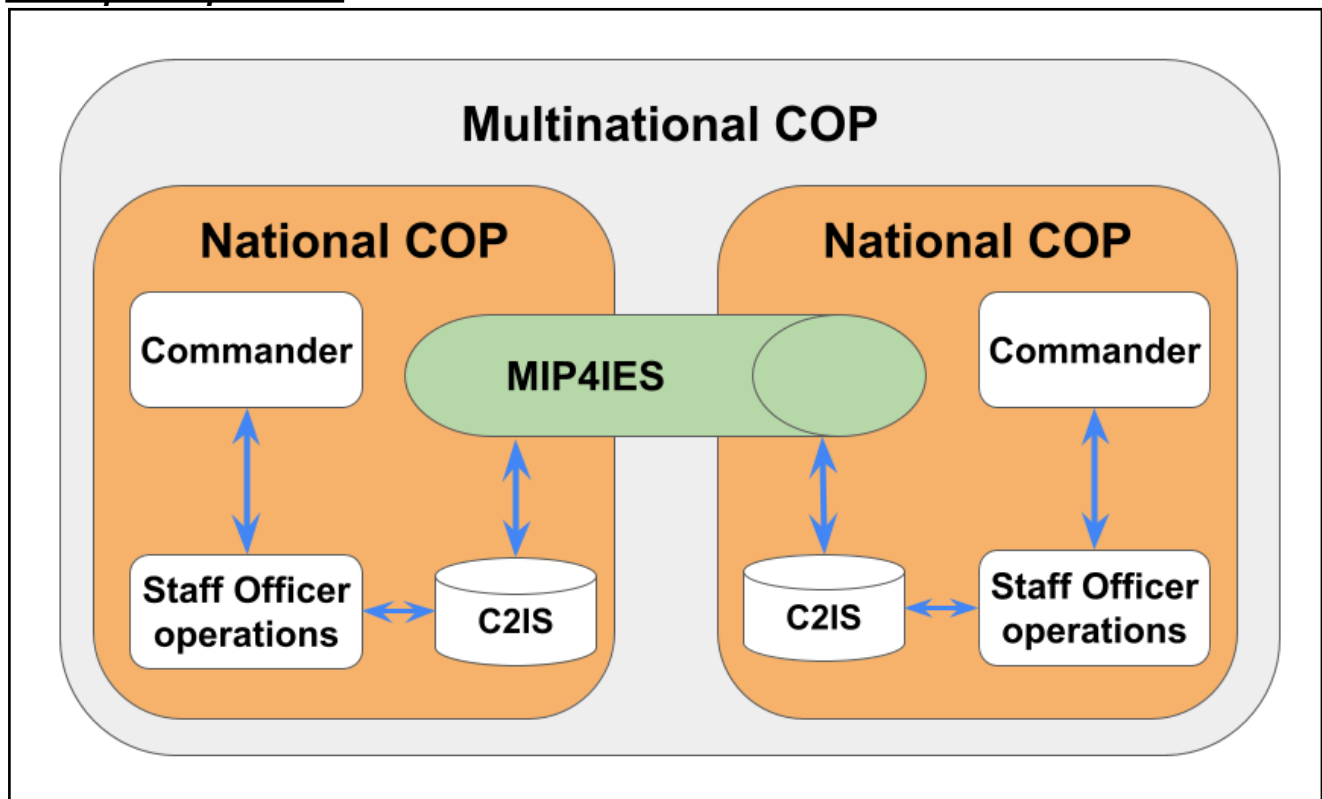


Figure 1 - Concept of the MIP Solution

The MIP concept involves each MNP deploying and providing an interface mechanism, referred to as the LC2IE service. The LC2IE services form an interface between the MNPs. An LC2IE service exchanges information from a (national) C2IS in the national network and the Mission Network.

The COP is created through a predefined set of information exchanges with other headquarters and/or lower formations. The information exchanges include: force locations, operational graphics, significant activities, correlated and uncorrelated functional or domain pictures, provided the MNP's C2ISs support this functionality.

More details about the information that can be exchanged via MIP can be found in the MIP Operational Handbook (MOH).

In general terms MIP is used to exchange C2 Information Products to assist the commanders in increasing their SA. Operations staff are responsible for identifying specific information to be exchanged in order to create the COP. This automated information sharing is accomplished via the LC2IE services. The implementation of the LC2IE service is the National responsibility of each MNP. It may be part of a nation's C2IS or built as a separate gateway. Either way it shall provide the identical physical and logical interface services for the MIP partners as defined in the MIP4IES Specification.

Figure 2 shows the generic network architecture of MIP. The actual location of the LC2IE service as well as the type of network may differ and depends on the specific network topology chosen. This choice depends on the availability of a network infrastructure and the actual battlefield situation.

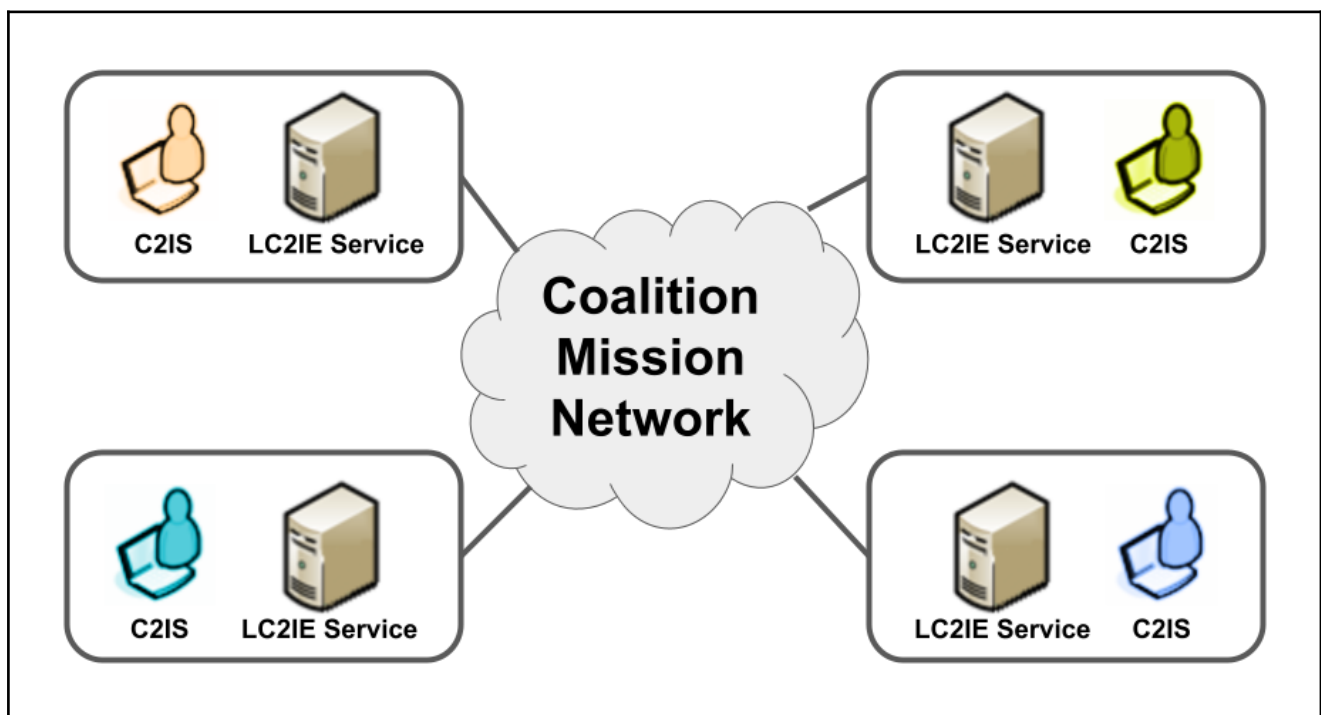


Figure 2 - MIP Generic Architecture

The Mission Network(MN) is used for the interconnection of two or more LC2IE services. The LC2IE service requires common communication functions for data exchange with allied partners. It is a national responsibility to convert the data that is being exchanged – as necessary – into data that is usable for the C2IS of the different MNP.

3.1 The Information Products

Information Products are the basis for Operational Data Exchange between MNPs in MIP.

The following types of Information Products are supported:

- **Recognized Pictures:** which provide a high level means of distinguishing between categories of information, and are expected to be based roughly on capabilities of C2 systems.
- **Generic Overlays:** which provide a great level of flexibility providing Battle Space Objects (BSOs) on an overlay structure they are not categorized, and must not be confused with the Recognised Picture overlay structures. A C2IS has to ensure that a receiver can clearly distinguish between these types of overlay structures and the Recognised Picture overlay structures.
- **Organisation Structures:** which provide a high means of specifying the different types of organisation structures supported by MIP4IES. In addition to expressing the hierarchical relationships between the different organisations, these structures allow specifying personnel strengths as well as main equipment types for the organisations. The currently supported organisation structures are:
 - Friendly Order of Battle.
 - Task Organisation.
 - Non-Friendly Order of Battle.

Typically each LC2IE service provides one or more Recognised Pictures, containing a collection of operationally relevant BSOs like units, equipment and tasks. In addition hereto, any of the other Information Products that are supported by the underlying C2IS.

3.2 The Information Product Distribution Graph

During mission planning the MN SMA organises one or more planning conferences during which all MNPs provide their Information Requirements. Usually this means the Information Managers explain which Information Products are provided, and required by the different MNPs. After this has been established, the distribution of these Information Products is coordinated, typically through an Information Product Distribution Graph.

NOTE: The IPDG is explained in greater detail in section 5.2.4.

The Information Products that are required usually depend on the command and proximity relationships identified in the Order of Battle of the MNP involved. The Information Manager in conjunction with the operational staff should identify the Information Products that are required to satisfy the operational information requirements. In order to produce the correct Graph the MNP will have to consider:

- Which Information Products from other MNP are required to successfully execute the Mission?
- Which Information Products do other MNP require to successfully execute the Mission?

3.3 Exchanging the Information Products

Using the MIP4 Solution Information Products are published on Topics, so that the intended receivers can subscribe to these Topics and receive the Information Products that have been published on them. These Topics should be considered 'technical' communication channels through which Information Products are exchanged. The MN SMA will coordinate with MNP to construct a hierarchical tree of topics that can be used to publish the Information Products. This Topic Tree is the same for all MNP in the network, and doesn't change frequently. Using MIP4IES each MNP creates at least one, (but possibly more) subtopics assigned for publishing their information products. More information about topics can be found in the WS-Topics specification and the MIP4-IES Exchange Mechanism documents. The MIP4IES specification does not enforce any semantics on a topic. As such an LC2IE service could publish any Information Product on any Topic.

However, an LC2IE service should be configured to only produce those Information Products on a Topic for which it was intended.

3.3.1 Implementation Impact

NOTE: The MIP4-IES Exchange Mechanism documents loosely describe this process, the process outlined here also requires MIP4IES implementations to be able to:

- Consume/configure the MN SMA provided set of TopicNamespaceDocuments;
- Support the use of Extension-Topics in these TopicNamespaceDocuments;
- Expose the contained TopicNamespaces in the ResourceProperties;
- Publish on the relevant Topic(s) in the TopicNamespaces that were provided for their implementation.

3.3.2 Publishing the Information Products

During the Mission the agreed Information Products will be published. The distribution graph provides the information required for the MNP LC2IE service Operator (MNP LSO), typically as CIS operator, to configure the LC2IE service.

Based on the Information Product Distribution Graph, the MNP LSO identifies which of the LC2IE service(s), provided by other MNP, are allowed to receive information.

3.3.3 Subscribing to Information Products

At mission joining, a MNP initiates their LC2IE service with all the information provided by the MN SMA, among which the MN Topic Tree, Managed Lists, Mission ORBAT, and the URL to the WsmpSoapParameters of all the systems that they need to connect to using the agreed Information Product Distribution Graph.

Based on the Information Product Distribution Graph, the MNP LSO identifies from which LC2IE service(s), provided by other MNPs, to receive information.

4 States, Procedures and Roles

The MOP basically alters the state of an LC2IE service. An LC2IE service starts off as an unaware machine in a box and ends up as a working LC2IE service. The procedures take the machine from the initial state to the state in which operational data is exchanged. Below is an overview of the phases, states and procedures that perform these state-transitions.

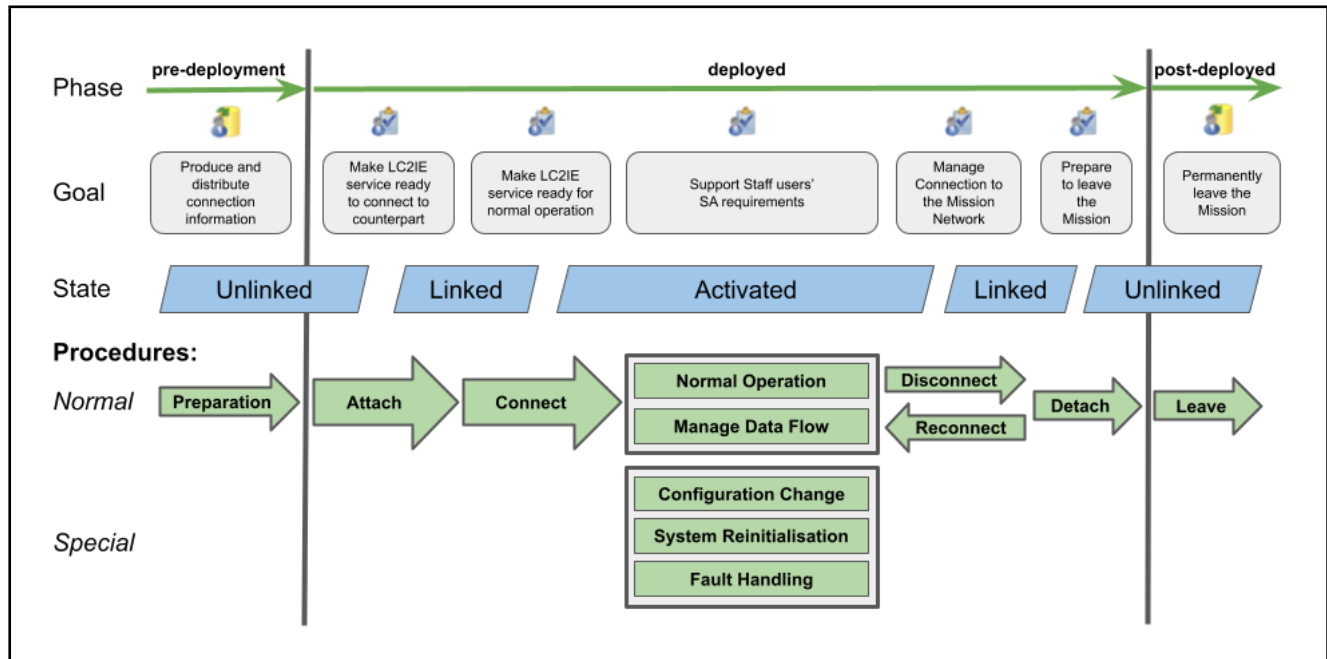


Figure 4 - Deployment Phases

State	Description
Unlinked	The <i>Unlinked</i> state is where the LC2IE service has no configuration data loaded. It is in this state when the <i>Preparation</i> procedure specifies what configuration information is collected and from whom. The <i>Attach procedure</i> takes the computer from this state to the <i>Linked</i> state.
Linked	The <i>Linked</i> state denotes a state where enough configuration information has been loaded into the LC2IE service so that it is ready to subscribe to and accept subscription(s) from other LC2IE services. However the actual subscriptions(s) have not yet been made.
Activated	The LC2IE service is in the <i>Activated</i> state when it is exchanging data with a counterpart. The <i>Connect</i> procedure brings the LC2IE service from the <i>Linked</i> state to the <i>Activated</i> state. Different conditions that must be handled are covered in the <i>Gateway Normal Operation</i> procedure. The <i>Activated</i> state is entered if the LC2IE service is actively providing operational data, receiving operational data or both.

4.1 Phases

For an operation the following phases are described

4.1.1 Pre-deployment

Before the systems are actually deployed onto the battlefield, there is a need for collaboration, to exchange the various parameters required to properly configure systems once they are being prepared before shipping.

In order to properly exchange the documents during this phase one of the following communication Services is required:

Service	Dependency
Email	The MN SMA and MNP can exchange Mission Preparation Documents via email
File exchange	The MN SMA and MNP can exchange Mission Preparation Documents on a file storage, like FTP, GoogleDrive, OneDrive, etc
Collaboration	The MN SMA and MNP can collaborate on the Mission Preparation Documents using a collaboration service, like SharePoint, NextCloud, wikis, etc.

4.1.2 Deployed

This is the main phase of the operation, where all systems should be available from Day 0 after arriving (Day0 interoperability). The configurations exchanged in the previous phase should be preloaded on the systems. The goal is that once the systems are connected they only need to be switched on, and the relevant information subscribed.

The SA services and BSO services depend on the availability of a number of underlying services. Refer to their service instructions for detailed information and requirements on how to set them up in a Mission Network (MN).

In this phase the systems actually need to be connected, for which the following services are required:

Service	Dependency
Communications Services	<p>The LC2IE service rely on access to other LC2IE services and -optionally- time servers over a IP network:</p> <ul style="list-style-type: none"> • LC2IE services require the use of Internet Protocol Version 4 (IPv4) according to RFC 791 for inter LC2IE service communication. • LC2IE services may require the use of Internet Protocol Version 6 (IPv6) according to RFC 8200 for inter LC2IE service communication. (As a replacement of IPv4) • LC2IE services require the use of the HTTP over TCP (Transmission Control Protocol) according to RFC 793.
Time Services	For both the LC2IE service and the C2IS, it is essential to ensure system times are synchronized between MNPs. Time deviations can introduce various problems with the interpretation of data. Each MNP must be able to synchronize its time, for example using the Network Time Protocol (NTP).

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Domain Name Services	Optional. A name service might be required if at least one MNP is using Unified Resource Names (URN). In this case name services infrastructure, Domain Name Server (DNS), is required to be accessible from each LC2IE service.
Certificate Authority Services	Required if HTTPS is utilized.

The LC2IE services of all MNPs must operate at the same security level. The MIP Solution shall not be used to connect systems of different security levels.

4.1.3 Post-deployed

After the Detach procedures have been followed the system will leave the battlefield, no further procedures are required, and no services to support them.

4.2 Procedures

4.2.1 Normal Procedures

As shown in the overview, a number of procedures need to be executed.

Procedure	Description
Preparation	The Preparation procedure describes the steps that must be taken to be able to prepare for the Attach procedure. This mainly includes the collection and distribution of Technical Data in order to be able to establish a connection.
Attach	The Attach procedure describes the steps that have to be performed by MNPs to join the Mission Network.
Connect	The Connect procedure brings the LC2IE service in the Activated state, which means that the LC2IE service is able to exchange operational data.
Normal Operation	In the Activated state the LC2IE service actually is exchanging operational data. The Gateway Normal Operation describes the procedures on how to deal with all situations that can occur during normal operation.
Manage Data Flow	These procedures describe how to control the flow of data, both from a Data Provider and a Data Receiver point of view.
Disconnect	This procedure is used when the LC2IE service will no longer be connected to other MNPs. The disconnecting MNP can either reconnect at a later point in time (using the Reconnect procedure) or permanently leave the Mission Network (using the Detach procedure).
Reconnect	This procedure describes how to reconnect the LC2IE service to the Mission Network after having been temporarily disconnected.
Detach	This procedure describes the steps that have to be taken to be permanently removed from the Mission Network; for example when a MNP leaves the mission.
Leave	This procedure describes the steps that have to be taken after leaving the Mission Network

4.2.2 Special Procedures

As shown in the overview, a number of procedures need to be executed.

Procedure	Description
Configuration Change	During a deployment, the configuration of an LC2IE service may need to be changed. This procedure describes how to prepare and execute those changes.
National C2IS Reinitialization	During an operation, a MNP may need to reinitialize their C2IS or LC2IE service because of national circumstances. This procedure describes how to prepare and execute those changes.
Failure Recovery	This procedure describes the possible errors that can occur and how to resolve them.

4.3 Roles and Responsibilities

In a MIP Deployment the following roles are identified:

- MN Service Management Authority (MN SMA)
- MNP LC2IE service Operator (MNP LSO)

Below is an overview of the responsibilities for each of the roles; the roles mentioned in par. 1.4.2 and 1.4.3 may be attributed to one person.

4.3.1 MN Service Management Authority (MN SMA)

For each Deployment there is one MN SMA who is responsible for mission-wide LC2IE related tasks. In a deployment some of these tasks might exceed the responsibility of the MN SMA (the Mission Network might for example be controlled by someone else). In that case these tasks are the responsibility of the MN SMA. For simplicity, in the remainder of this document we will however refer to the MN SMA in these cases. The following tasks are the responsibility of the MN SMA:

- Complete the 'MIP4-IES MN SMA Initiation Directives for MNP' and distribute it to the MNPs.
- Compile the received 'MIP4-IES MNP Planning Information for MN SMA' forms of all participating MNPs into a 'MIP4-IES MN SMA Configuration Directives for MNP' and distribute this to all MNPs.
- Ensure Time Synchronization infrastructure is configured and established.
- Maintain and distribute the following artifacts to the MNPs:
 - Information Product Distribution Graph (IPDG);
 - Mission Network Managed Lists (MN ML);
 - Mission Network Order of Battle (MN ORBAT),
 - Mission Network Topic Tree(s) (MN TT);
- Ensure if required that Name services and Certificate Authority infrastructure are configured and established.

4.3.2 MNP LC2IE service Operator (MNP LSO)

Each MNP that provides an LC2IE service, has a MNP LC2IE service Operator (MNP LSO) who is responsible for the following tasks:

Participate in creating the Information Product Distribution Graph.

Complete their 'MIP4-IES MNP Planning Information for MN SMA' form in accordance with the received 'MIP4-IES MN SMA Initiation Directives for MNP'.

Adhere to and ensure mandatory requirements have been met such as IP-address, IP-port and routing.

Install and configure their LC2IE service according to the 'MIP4-IES MN SMA Configuration Directives for MNP' from the MN SMA.

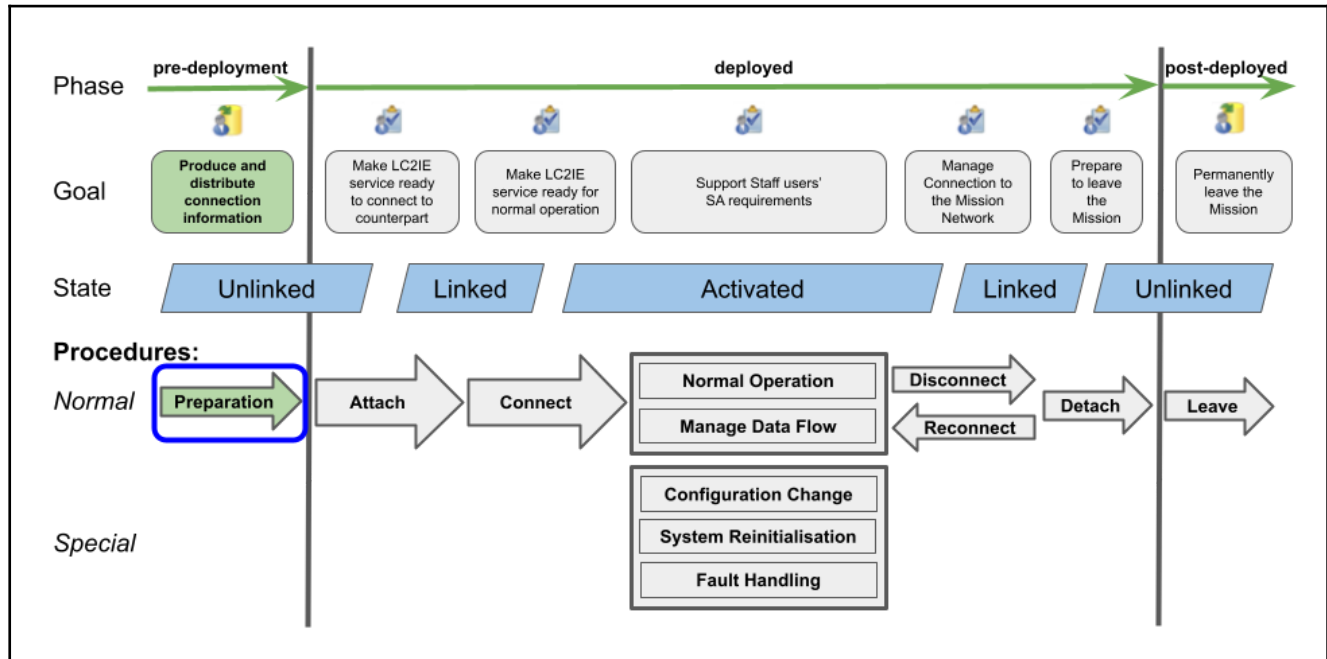
Ensure that Time Synchronization is established for both the LC2IE service and the National C2IS.

The daily management of the National LC2IE service.

The procedures described in this document are intended to be translated into national procedures, SOPs and SOIs that are to be executed by the MNP LSO.

5. Normal Procedures

5.1 Preparation



The Preparation procedure describes the steps that must be taken to be ready for the Attach procedure. This mainly includes the collection and distribution of technical configuration data. This chapter describes the parties that are involved in this procedure, the roles they have and the forms that have to be filled in and distributed to enable the LC2IE services to connect and exchange operational data.

5.1.1 Assess Requirements and Capabilities

This section describes the early planning procedure, where MNPs are solicited for their roles in the mission, what information they will provide (either in raw form or as a 'managed picture'), what information they need to consume to do their job, as well as their technical MIP4 capabilities

MN SMA will need to have to solicit this information from MNPs, and will need to produce an information product summarizing the requirements and capabilities

The Information Exchange Requirements (IERs) are specified in the mission planning phase and show the information required for each of the units involved in the mission; the Force Commander and the MNPs are responsible for these IERs.

All participating MNP LSOs must confirm their MIP minimal operational capabilities to the Mission Network Service Management Authority (MN SMA). This will enable Information Management Planners (S6) at all levels to take each other's system limitations into account and establish alternative means of overcoming these limitations for example using SOPs and SOIs that describe the use of phone, email, chat or SharePoint.

National LC2IE services built to MIP3IES specifications are capable of exchanging all data as published by their data dialect. However, it is important to recognise that national C2IS implementations may limit the amount and quality of data available to the end user, thus restricting the full range of potential MIP capabilities.

5.1.2 Prepare Topic Tree

Based upon the output of 'Assess Requirements and Capabilities', the specific MIP4 Topic Tree for a MN will need to be prepared. This may be a common Topic Tree that all MNPs use, or it may be a mixture of MNP-specific Topics. In either case, the output should be a defined list of TopicNamespaceDocuments, describing one or more Trees of Topics (names and operational usage)

5.1.3 Initial Distribution of Managed Lists

The MN SMA is responsible for the distribution of the Managed Lists, this can be done through email or a mission preparation collaboration environment like SharePoint. When the Mission is in the Deployed phase this information can be shared on a location within the Mission Network, that is reachable by all MNP.

NOTE: The initial distribution of the Managed Lists enables the LC2IE service to be configured for these Managed Lists before the systems are shipped. The configuration usually involves the MIP GO mapping all the individual values in those lists to the values that are used within the C2IS, where the proximity of support staff is useful.

5.1.4 Information Product Distribution Graph

The Information Product Distribution Graph (IPDG) is a visualization of the data flow between the units involved in the mission.

It is important to realize that the actual data flow can be different from the hierarchical organization structure of units for example due to communication limitations. In the IPDG given in Figure 3, the TUR battalion has no direct communication with the ITA brigade, therefore the USA battalion is used to forward the data between the ITA brigade and the TUR battalion.

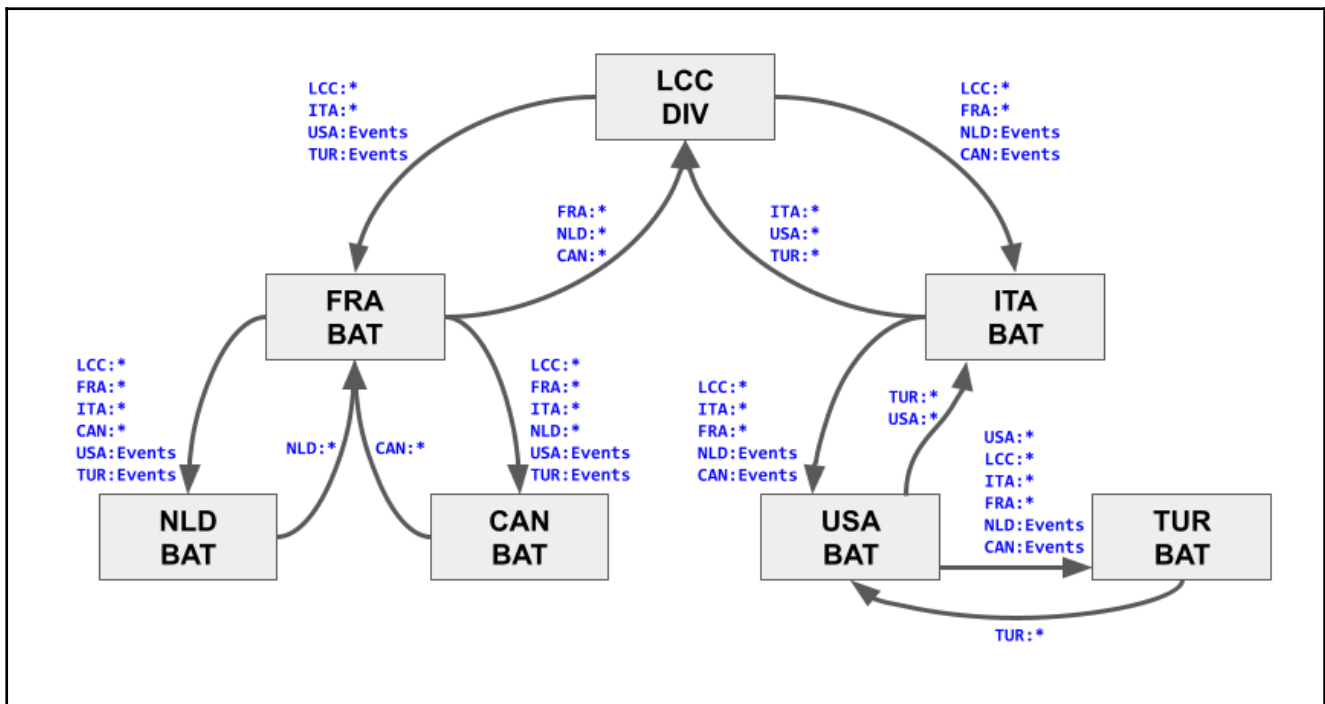


Figure 3 – Example of an Information Product Distribution Graph

5.1.5 Configuration Forms

This section contains the configuration forms for all the participating roles, together with the descriptions and explanations of how to fill in the forms. All fields in the configuration forms are labelled with identifiers in order to facilitate cross-references within this document.

Each form is available as a separate Annex that can directly be used. The next paragraphs explain each form in more detail.

5.1.5.1 The 'MIP4-IES MN SMA Initiation Directives for MNP' form

This form holds general configuration information required by the MNP LSO. The MN SMA shall fill in the forms and distribute them to the responsible MNP LSOs. This form is available as Annex A.

5.1.5.2 The 'MIP4-IES MNP Planning Information for MN SMA' form

This form holds configuration information specific to each MNP LSO. The MN SMA needs this information in order to compile the overall MIP4-IES Connection Overview. Every MNP LSO shall fill in this form and send it to the MN SMA. This form is available as Annex B.

5.1.5.3 The 'MIP4-IES MN SMA Configuration Directives for MNP' form

This form is the collection of all MIP4-IES Connection Information from all MNPs. It is distributed from the MN SMA to all MNP LSOs in the Mission Network. This form is available as Annex C.

5.1.6 Procedure Details

This section describes the actual procedure to be followed.

Roles

- Initiating MNP:
The MNP LSO that initiates the preparation procedure.
- MN SMA:
The Mission Network Service Management Authority.
- Other MNPs:
The MNP SLOs of the MNPs that the Initiating MNP must be able to reach according to the IDPG.

Initial State

- The Initiating MNP has not performed any preparation and is in the 'Unlinked' state..
- The Initiating MNP is not aware of any other MNP on the Mission Network.

End State

- The Initiating MNP has the Configuration Information of all other MNPs on the Mission Network.
- All other MNPs on the Mission Network have the Configuration Information of the Initiating MNP..

Procedure Steps

The following actions have to be performed:

Step	Who	Action to perform
1	Initiating MNP & Other MNPs	Make sure the requirements mentioned in the Initial State are met.
2	MN SMA	Establish Network Infrastructure.
3	MN SMA	Establish infrastructure to synchronize time (for example using the Network Time Protocol (NTP)) and infrastructure for name services and certificate authority.
4	MN SMA	Provide the completed ' MIP4-IES MN SMA Initiation Directives for MNP ' form to all MNPs.
5	Initiating MNP	Fill out the ' MIP4-IES MN SMA Configuration Directives for MNP ' form and send to the MN SMA.
6	MN SMA	Review the ' MIP4-IES MN SMA Configuration Directives for MNP ' form and send back to the Initiating MNP, if any modification is required
7	MN SMA	Compile a (new) version of the ' MIP4-IES MN SMA Configuration Directives for MNP ' form and distribute to all MNP.
8	Initiating MNP & Other MNPs	Configure the LC2IE service using the ' MIP4-IES MN SMA Configuration Directives for MNP ' form.
9	Initiating MNP & Other MNPs	Ensure the LC2IE service is properly configured to process the Managed Lists.

NOTE: When the Mission is already active and a MNP is joining later steps 2 and 3 should already be in place.

Validation Steps

Once the procedure steps have been completed, the following validation step(s) must be performed by the MN SMA:

No.	Validation Step	Result
MIP4-1-1	Confirm the Network Infrastructure is established.	Network Infrastructure established
MIP4-1-2	Confirm the infrastructure to synchronize time, name server and certificate authority is established.	Infrastructure to synchronize time, name server and certificate authority are established
MIP4-1-3	Confirm sending the 'MIP4-IES MN SMA Initiation Directives for MNP' form to the MNP LSOs.	Confirmation sent Including Initial Topic Trees (ITT), Managed Lists and SPIF
MIP4-1-4	Confirm that the 'MIP4-IES MN SMA Configuration Directives for MNP' forms are received from all joining MNPs.	Confirmation received Including MNP Topic Trees Extension (MNP TTE) and MNP ORBAT.
MIP4-1-5	Confirm that the 'MIP4-IES MN SMA Configuration Directives for MNP' form is sent to all MNPs.	Confirmation sent Including a MN Topic Trees (MN TT) and combined MN ORBAT

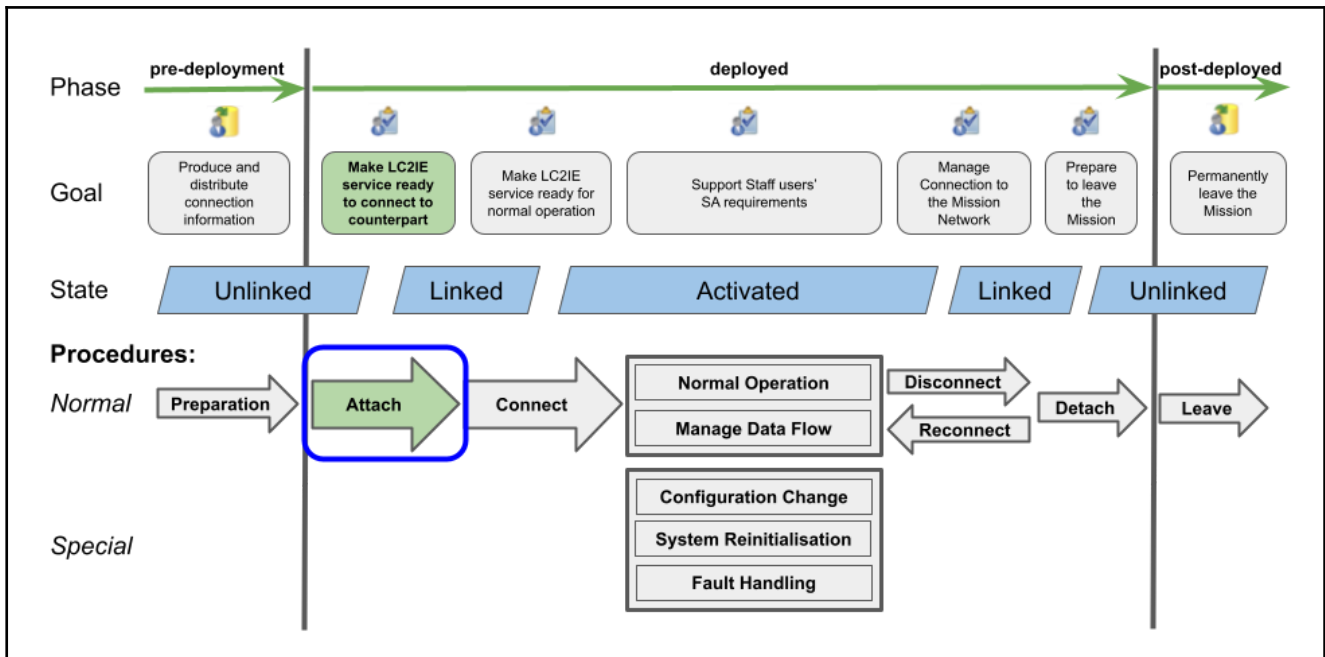
Once the above-mentioned procedure is completed, the following validation steps must be performed by the Initiating MNP:

No.	Validation Step	Result
MIP4-1-6	Validate that it has received the form 'MIP4-IES MN SMA Initiation Directives for MNP' is received.	Confirmation received
MIP4-1-7	Validate that the 'MIP4-IES MN SMA Configuration Directives for MNP' form is received.	Confirmation received

Once the above-mentioned procedure is completed, the following validation steps must be performed by the other MNP:

No.	Validation Step	Result
MIP4-1-8	Validate that the 'MIP4-IES MN SMA Configuration Directives for MNP' form is received.	Confirmation received

5.2 Attach



In the Attach procedure (a.k.a. Technical Setup procedure) the LC2IE service is configured and the connection parameters of other MNPs on the Mission Network are loaded. The necessary information for this has become available in the Preparation procedure. The connections are tested, but not established yet.

Roles

- Initiating MNP:
The MNP LSO that initiates the attach procedure.
- MN SMA:
The Mission Network Service Management Authority.
- Other MNPs:
The MNP SLOs of the MNPs that the Initiating MNP must be able to reach according to the IDPG.

Initial State

- The LC2IE service of the Initiating MNP has been configured during the preparation phase.
- The LC2IE service of the Initiating MNP is on-site and off-line (no connection to other MNPs).
- Mission Network and National LAN have been established.
- LC2IE service is in the state 'Unlinked'.

End State

- The LC2IE service of the Initiating MNP on-line.
(IP-connectivity to the LC2IE services of other MNPs has been verified).
- The time in the LC2IE service and the National C2IS is synchronised.
- The LC2IE service of the Initiating MNP is in the 'Linked' state.
- The C2IS of the Initiating MNP has been verified to be operational and connected to the LC2IE service.

Procedure Steps

The following actions have to be performed:

Step	Who	Action to perform
1	Initiating MNP	Make sure the requirements mentioned in the Initial State are met.
2	Initiating MNP	Physically establish a network (ethernet) connection to the Mission Network.
3	Initiating MNP	<p>Perform time synchronization for the LC2IE service and the National C2IS. Make sure to select the correct time-zone that is used in the mission (usually ZULU unless otherwise specified by the MN SMA).</p> <p><i>NOTE: The correct time-zone used in the mission must be properly configured on the time server and the display time on the C2 system.</i></p> <p><i>NOTE: This is not related to the format and timezone used during the exchange of information, this is defined in other parts of the MIP4IES specification.</i></p>

Validation Steps

Once the procedure steps have been completed, the following validation step(s) must be performed by the Initiating MNP:

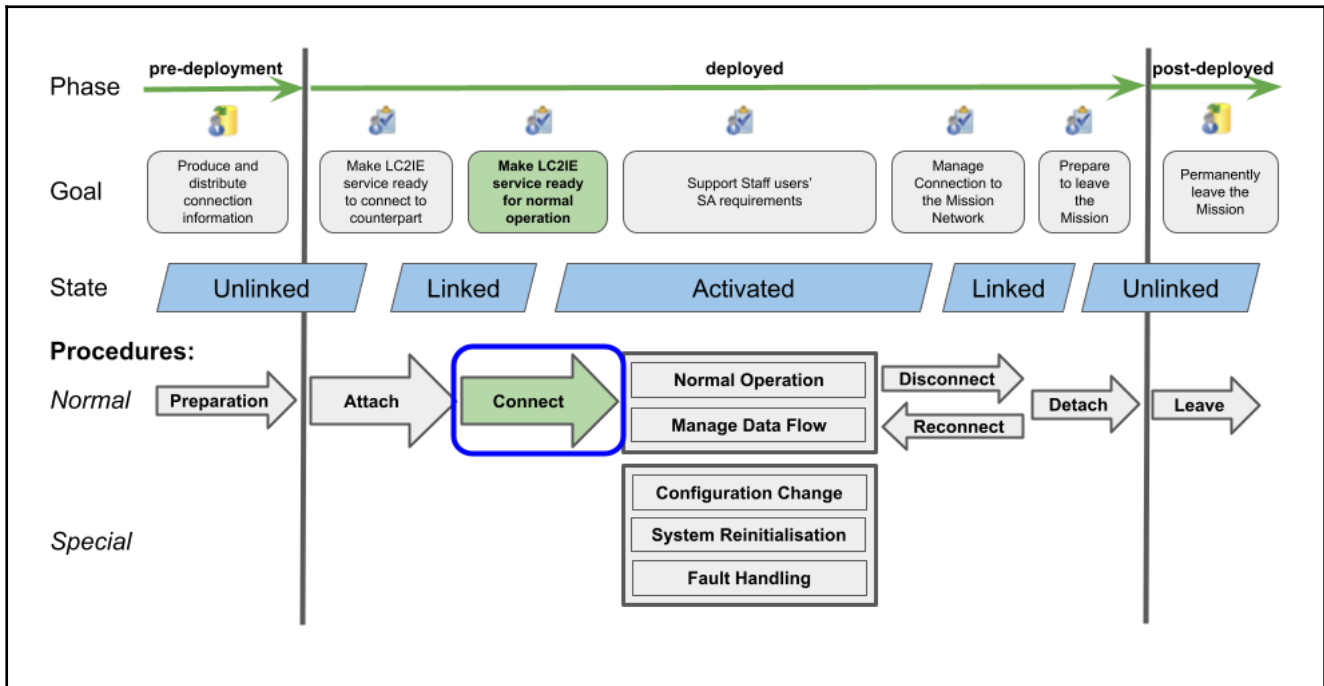
No.	Validation Step	Result
MIP4-2-1	Validate that the time on the LC2IE service and the National C2IS is synchronised with the Coalition.	Time is synchronised
MIP4-2-2	Validate that names can be resolved by the infrastructure: Name services. At command-line: nslookup <name on the network>. This should return the IP for this name.	Names are resolved.
MIP4-2-3	<p>Validate that certificates can be validated.</p> <p>Open a web browser and access an HTTPS url. The "View certificate" functionality from the browser MUST show the certificate as trusted and valid.</p>	Certificates are showing as valid.
MIP4-2-4	<p>Validate that the own LC2IE service is properly configured:</p> <p>Open a web browser and access the local configuration URLs. (Field 1a and 1b from the 'MIP4-IES MN SMA Initiation Directives for MNP' form.)</p>	The request must be answered by the local LC2IE Service
MIP4-2-5	<p>Validate that the other LC2IE services can be reached:</p> <p>Open a web browser and access the configuration URLs. (Field 2f and 2g from the 'MIP4-IES MN SMA Configuration Directives for MNP' form.)</p>	The request must be answered by the remote LC2IE service

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Once the above-mentioned procedure is completed, the following validation steps must be performed by the other MNPs:

No.	Validation Step	Result
MIP4-2-6	Validate that the new LC2IE service can be reached: Open a web browser and access the configuration URLs. (Field 2f and 2g from the 'MIP4-IES MN SMA Configuration Directives for MNP' form.)	The request must be answered by the new LC2IE service

5.3 Connect



The Connect procedure (a.k.a. Operational Setup procedure) is initiated by the MNP that needs to reach the Activated state; in other words: At the end of the Connect procedure the MNP has configured the LC2IE service to be able to manage the operational data flow.

More details about the flow of Operational Data can be found in section 5.5 (Manage Operational Data Flow).

Roles

- **Initiating MNP:**
The MNP LSO that initiates the connect procedure.
- **MN SMA:**
The Mission Network Service Management Authority.
- **Other MNPs:**
The MNP SLOs of the MNPs that the Initiating MNP must connect to according to the IDPG.

Initial State

- The Initiating MNP is in the 'Linked' state with respect to the other MNPs. Which means there are no active connections to the other MNPs' LC2IE services.
- The other MNPs are in the 'Linked' state with respect to the initiating MNP. Which means there are no active connections to the initiator MNP LC2IE service.
- The other MNPs have ensured that the LC2IE service will accept connections from the Initiating MNP.

End State

- The LC2IE services of the Initiating and other MNPs are in the Activated state, and connected to each other.
- The LC2IE services of the Initiating and other MNPs have subscribed to each other's Topic(s) according to the Information Product Distribution Graph (IPDG).

Procedure Steps

The following actions have to be performed:

Step	Who	Action to perform
1	ALL	Make sure the requirements mentioned in the Initial State are met.
2	Initiating MNP	Inform the MN SMA – as soon as possible – about the intent to connect and the exact date & time of the connect.
3	MN SMA	Inform the other MNPs about the connect and exact date & time of the connect.
<i>wait until the time of connect has been reached¹</i>		
4	Initiating MNP	Open the connection to the other MNPs, by Subscribing to their topics in accordance with the Information Product Distribution Graph.
5	Other MNPs	Open the connection to the initiating MNP, by Subscribing to it's topics in accordance with the Information Product Distribution Graph.

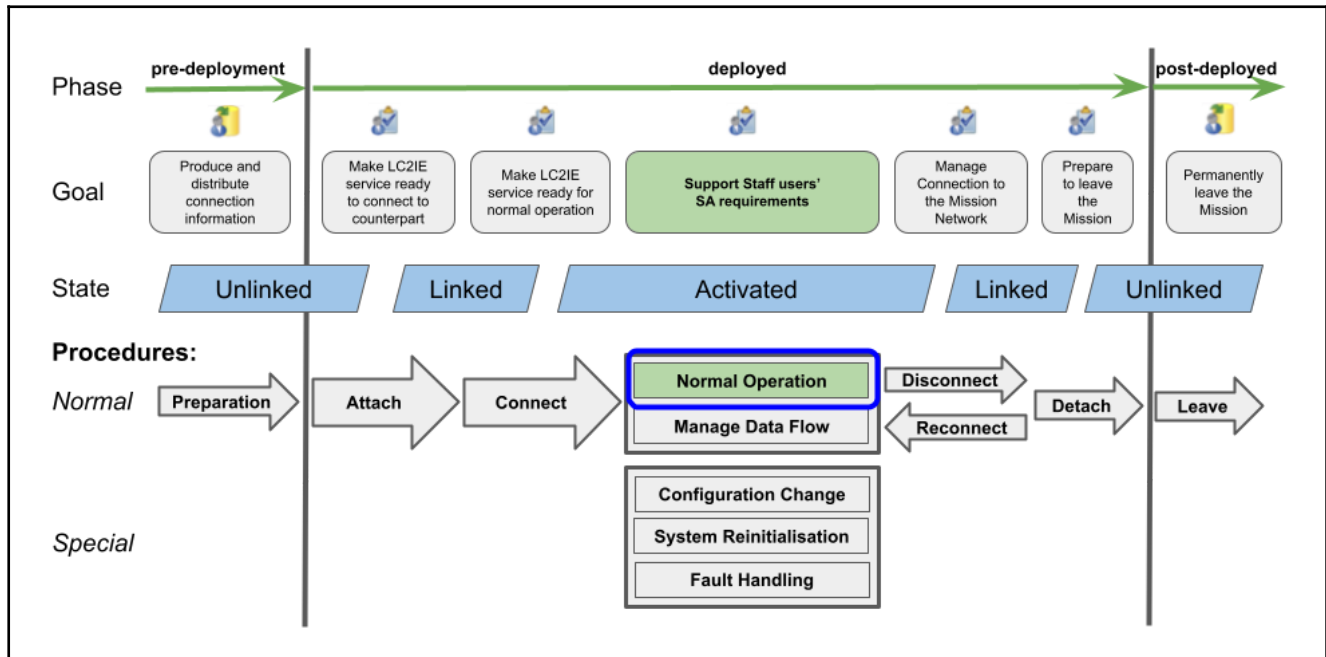
Validation Steps

Once the procedure steps have been completed, the following validation step(s) must be performed by the 'Initiating MNP':

No.	Validation Step	Result
MIP4-3-1	Verify that the COP in the National C2IS corresponds with the COP in the C2IS of the 'Other MNP'. Only subscribed topic(s) have to be taken into account.	Both COPs correspond

¹ An implementation of an LC2IE service should allow operators to specify that a MNP will connect at a specific date-time, however this is also an action that can be done manually by an operator at that specified date-time.

5.4 Normal Operation



This is the main mode of the LC2IE service. Once two or more LC2IE services are configured and the initial exchange of data (Connect) has been accomplished, the LC2IE services will continue to operate using the management guidance discussed in this section. The MNPs exchange information through their LC2IE services as dictated by the operational requirements. The main task of the MNP LSO is to monitor network availability to ensure the exchange of information is guaranteed. This includes handling unexpected situations.

The following areas will be described at a high level:

- Network availability.
- Configuration Changes.

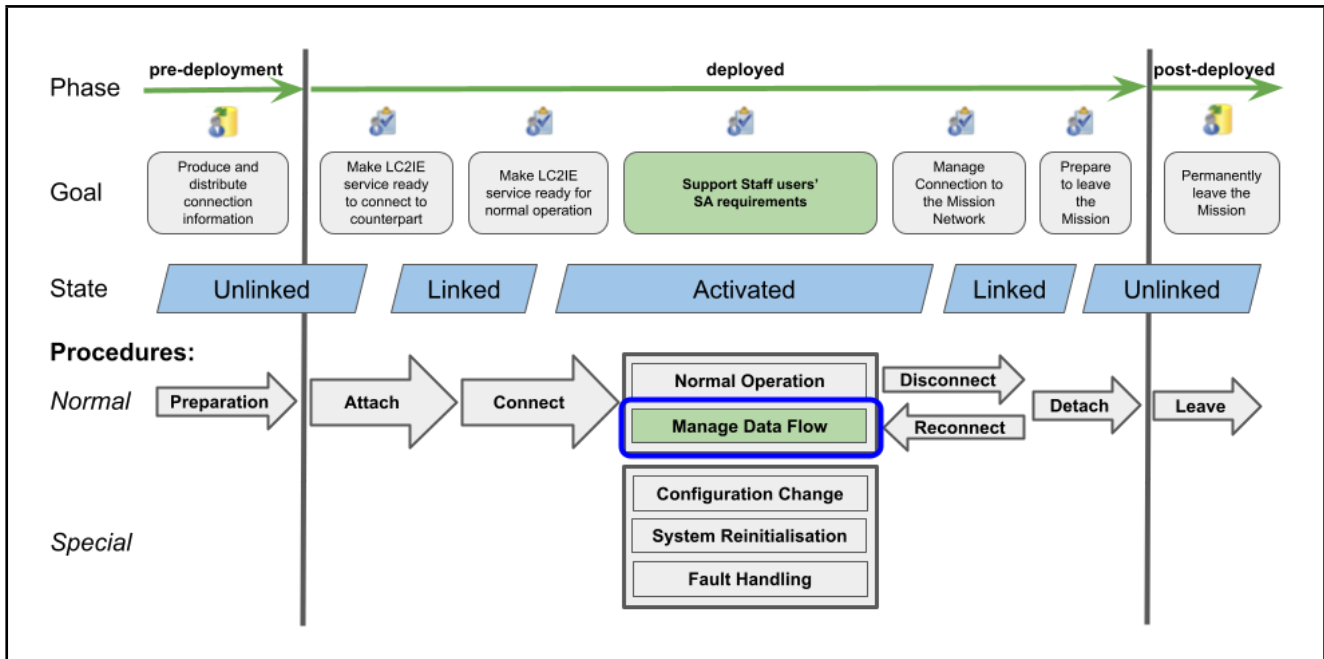
This chapter does not contain any procedures itself; it mainly serves as a reference to other procedures.

5.4.1 Network Availability

The day-to-day normal operation of the LC2IE service will in due course result in a change in the gateway's initial availability status; specifically, that the gateway is disconnected from the Mission Network for some time, and then is relocated or restarted. Some disconnections will be intentional and controlled, such as for maintenance or operational requirements, but some will be due to network failures. The following areas will be discussed in separate procedures:

- **Disconnect:** The LC2IE service is temporarily not available for any other LC2IE service; for example because of relocation of the LC2IE service.
- **Reconnect:** The LC2IE service resumes normal operation after being temporarily unavailable.
- **Detach:** The LC2IE service will be removed from the Mission Network; for example because the MNP leaves the mission.

5.5 Manage Data Flow



For administrative, technical or operational reasons the operational data flow may have to be managed. This chapter explains how that may be achieved; it does not contain strict procedures.

Data flow into and out of a node can be controlled either by the Data Provider, or by the Data Receivers with which it is exchanging data ('partners').

5.5.1 Manage information flow as Publisher

A Publisher cannot force that operational Information Products are received by LC2IE services from MNPs. It depends on the LC2IE service from those MPNs subscribing to the Topics on which the Information Products are published. The Data Provider can only control the flow of Information Products by selectively publishing them on the relevant Topics.

5.5.1.1 Disabling information flow

A publisher can control the outgoing flow of operational information by selectively allowing subscriptions, or by selectively ending existing subscriptions. An LC2IE service can selectively publish Information Products on the different Topics.

NOTE: An LC2IE service may relay received Information Products to other MNPs on the network that are subscribed to the Topic the Information Product was published on.

5.5.1.2 Re-enabling information flow

A flow of Information Products that was refused or stopped by a Publisher by refusing or ending a subscription can be re-allowed at any later point in time when a new Subscription is requested. Once refused or ended a subscription can not be restarted, a new subscription can only be initiated by the Subscriber.

The steps to re-enable the data flow are:

- MNP LSO invites other partner MNP LSOs to re-subscribe to the relevant topic(s).
 - partner MNP LSO re-subscribes to the relevant topic(s).
- (NOTE: technically this will also automatically trigger a resynchronisation)

5.5.2 Manage information flow as Subscriber

A Subscriber can only control the flow of incoming Information Products by subscribing to and unsubscribing from topic(s) on which Publishers publish their Information Products.

5.5.2.1 Subscribing to topics

Subscribing to a topic will automatically cause operational data – if any – to start flowing. When subscribing the Provider and Consumer will initiate a synchronisation, after which the Provider will send notifications when changes occur.

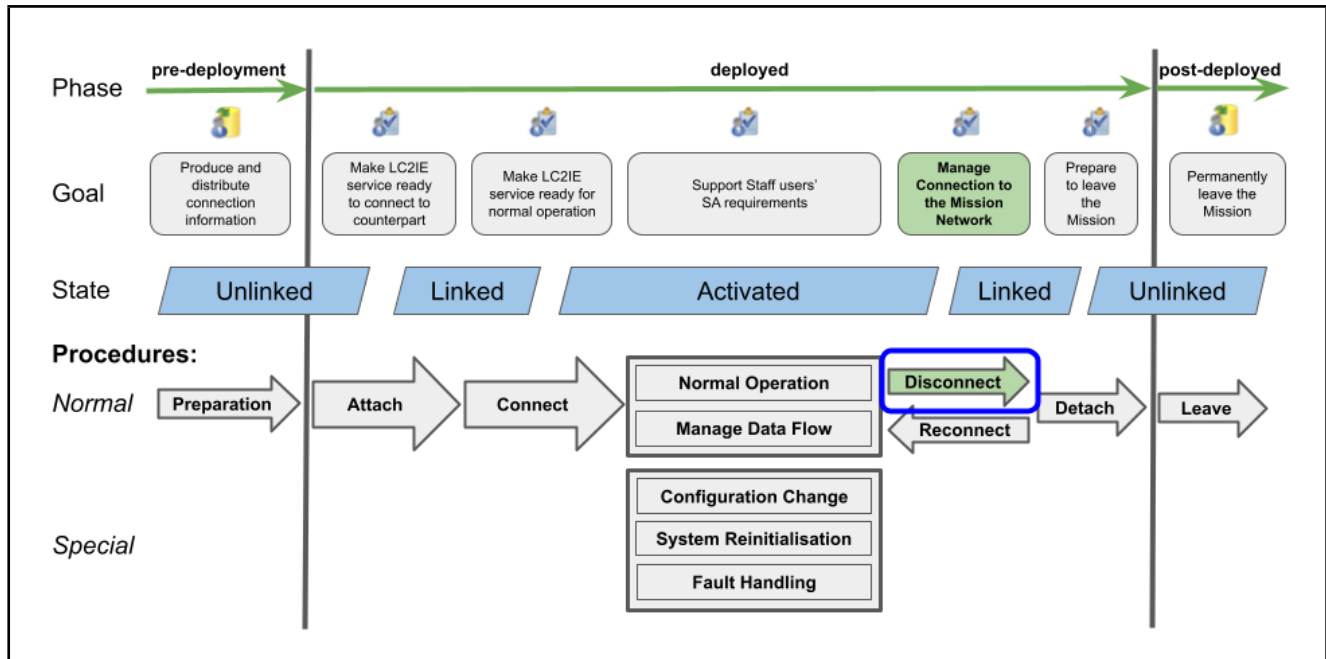
Please refer to the **system specific** LC2IE service documentation for specific instructions on how to subscribe to a Topic.

5.5.2.2 Ending Subscriptions

Ending subscriptions will effectively stop incoming operational data flow for (updates on) the Information Products inside those topic(s).

Please refer to the **system specific** LC2IE service documentation for specific instructions on how to unsubscribe from a Topic.

5.6 Disconnect



Disconnecting the LC2IE service implies that the LC2IE service will no longer be connected to other MNPs. The disconnected MNP can either reconnect at a later point in time (following the Reconnect procedure) or permanently leave the Mission Network (following the Detach procedure).

The Disconnect procedure changes the LC2IE service from the 'Activated' to the 'Linked' state (Configuration information is loaded in the disconnected LC2IE service, but there are no active connections).

During Normal operation the LC2IE service will have provided several Information Products to other MNP. During the Linked state the MNP is no longer able to provide the information using the exchange mechanism. This means MNP that are not up to date cannot get the latest information. Furthermore, when this procedure is executed as a preparation for a 'Detach' procedure, the MNP needs to take care of what happens with the published Information Products after disconnecting from the MN. This paragraph lists the possibilities.

Information Products must not no longer be available on the network:

The MNP may decide that some Information Products must be deleted before disconnecting (e.g. data that is no longer operationally accurate, like boundary overlays, or organisation structures). To delete data, all MNP must be subscribed, or resubscribe in order to properly process the delete.

NOTE: Systems will likely keep the information in storage for legal reasons, however the Information must no longer be presented as 'current', or forwarded to another MNP.

Information Products can be temporarily not available on the network:

For Information Products whose availability is not operationally of critical importance, there is no issue of being temporarily unavailable, for these Information Products no action needs to be taken. However, this is not an option when preparing for a 'Detach' procedure.

Information Products must remain available on the network:

Some data may still be operationally relevant for other MNP, in this case the information must remain available on the network. This can be accomplished by another MNP on the network temporarily 'taking ownership' of the information. This means that this MNP will continue to provide the Information Products on the Topics that were published on.

NOTE: When the MNP is planning to 'Detach', this can also be permanently.

NOTE: The MNP may also make these Information Products available as exported files on a location on the mission network that is and remains accessible to all other MNP.

Roles

- Initiating MNP:
The MNP LSO that initiates the disconnect procedure.
- MN SMA:
The Mission Network Service Management Authority.
- Other MNPs:
The MNP SLOs of the MNPs that the Initiating MNP is linked to.

Initial State

- The LC2IE service of the Initiating MNP is in the 'Activated' state, with respect to the other MNPs.
- The LC2IE services of the other MNPs are in the 'Activated' state, with respect to the initiating MNP.

End State

- The LC2IE service of the Initiating MNP is in the 'Linked' state, with respect to the other MNPs.
- The LC2IE services of the other MNPs are in the 'Linked' state, with respect to the initiating MNP.

Procedure Steps

The following actions have to be performed:

Step	Who	Action to perform
1	ALL	Make sure the requirements mentioned in the Initial State are met.
2	Initiating MNP	Inform the MN SMA about the intent to disconnect and the exact date & time of the disconnect.
3	MN SMA	Inform the other MNPs about the disconnect and the exact date & time of the disconnect.
<i>wait until the date & time of disconnect has been reached²</i>		
3	Other MNPs	Close the connection to the initiating MNP, by closing all subscriptions to any of it's topics.
4	Initiating MNP	Close the connection to the other MNPs, by closing all subscriptions to any of their topics.

² An implementation of an LC2IE service should allow operators to specify that a MNP will disconnect at a specific date-time, however this is also an action that can be done manually by an operator at that specified date-time.

Validation Steps

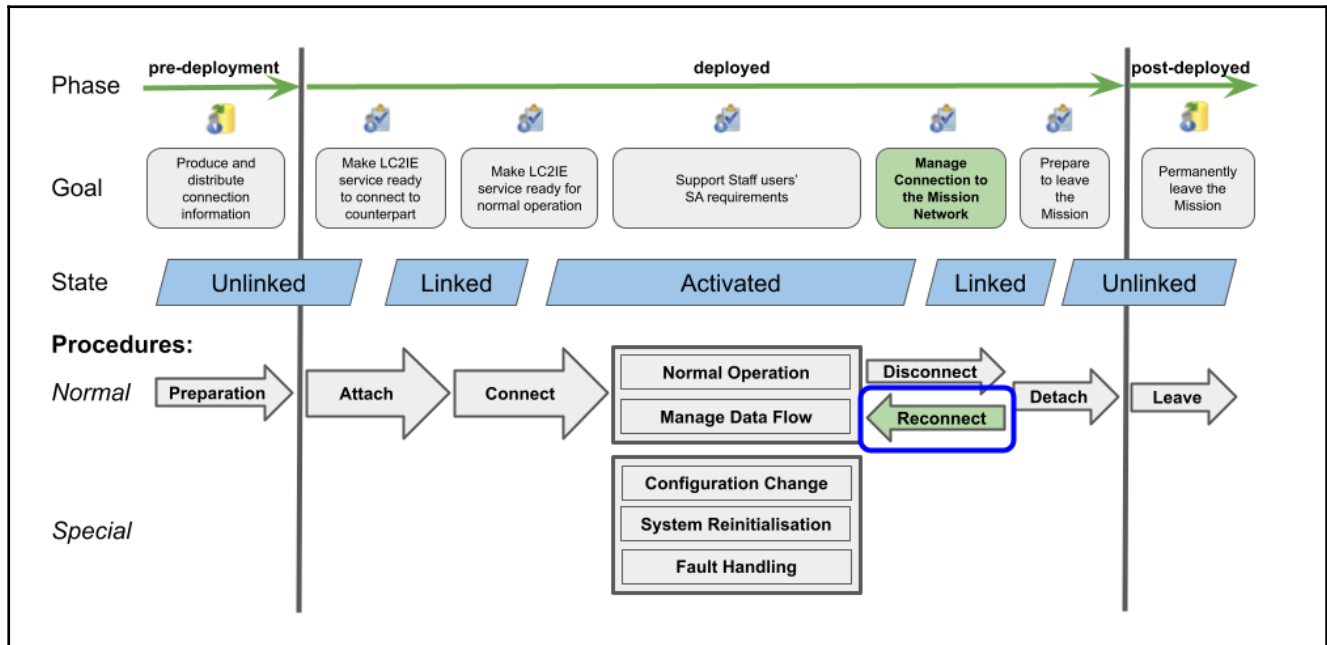
Once the procedure steps have been completed, the following validation step(s) must be performed by the 'Initiating MNP':

No.	Validation Step	Result
MIP4-6-1	Validate that there is no open connection to any other LC2IE service; there will also be no operational data exchange.	No open connection with other MNPs.

Once the procedure steps have been completed, the following validation step(s) must be performed by the other MNPs:

No.	Validation Step	Result
MIP4-6-2	Validate that there is no open connection to the LC2IE service of the disconnected MNP; there will also be no operational data exchange.	No open connection with disconnecting MNP.
MIP4-6-2a	If possible, the Other MNPs can renew a subscription to confirm it is no longer possible to communicate with the Disconnecting MNP.	Other MNPs fail to renew.

5.7 Reconnect



A Reconnect is the situation where a disconnected MIP Node connects to other MNPs again and resumes normal operation. For example a Reconnect is required when the MIP Node has moved to a new location.

Roles

- Initiating MNP:
The MNP LSO that initiates the reconnect procedure.
- MN SMA:
The Mission Network Service Management Authority.
- Other MNPs:
The MNP SLOs of the MNPs that the Initiating MNP has been linked to

Initial State

- The LC2IE service of the Initiating MNP is in the 'Linked' state, with respect to the other MNPs.
- The LC2IE services of the other MNPs are in the 'Linked' state, with respect to the initiating MNP.

End State

- The LC2IE service of the Initiating MNP is in the 'Activated' state, with respect to the other MNPs.
- The LC2IE services of the other MNPs are in the 'Activated' state, with respect to the initiating MNP.

Procedure Steps

The following actions have to be performed:

Step	Who	Action to perform
1	ALL	Make sure the requirements mentioned in the Initial State are met.
2	Initiating MNP	Inform the MN SMA about the intent to reconnect and the exact date & time of the reconnect.
3	MN SMA	Inform the other MNPs about the reconnect and the exact date & time of the reconnect.
<i>wait until the date & time of reconnect has been reached³</i>		
4	Initiating MNP	Open the connection to the other MNPs, by Subscribing to their topics in accordance with the Information Product Distribution Graph.
5	Other MNPs	Open the connection to the initiating MNP, by Subscribing to it's topics in accordance with the Information Product Distribution Graph.

Validation

Once the procedure steps have been completed, the following validation step(s) must be performed by the 'Initiating MNP':

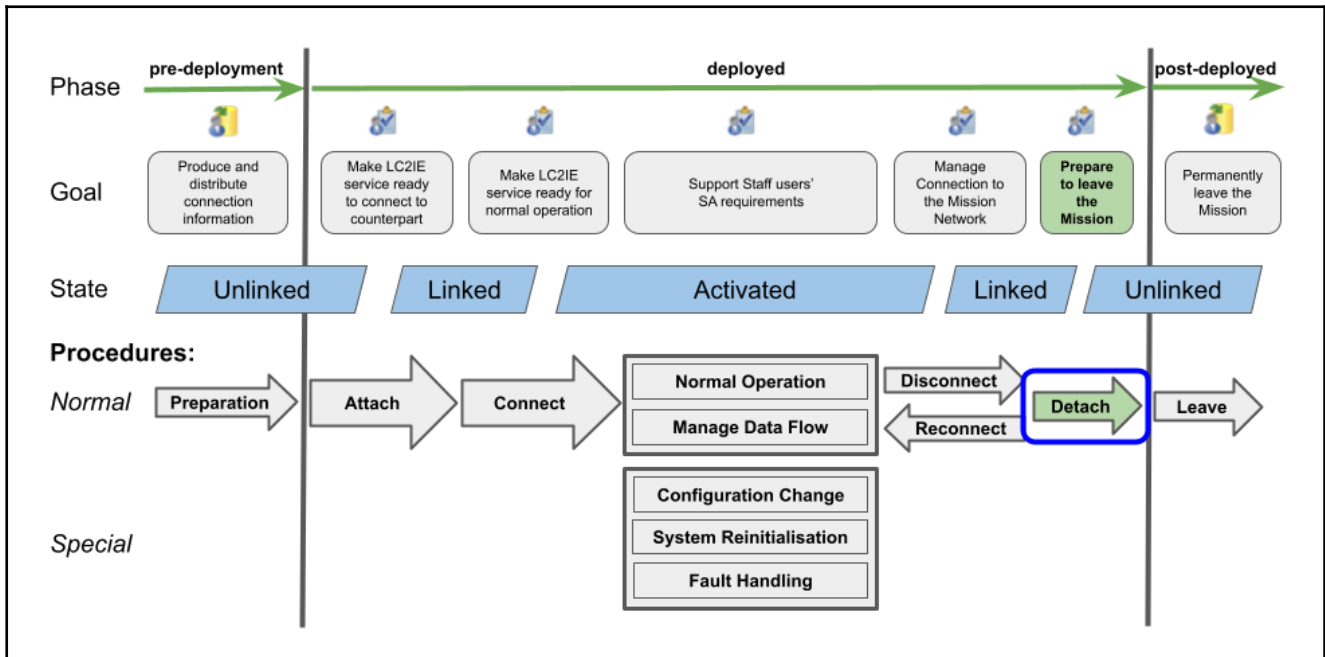
No.	Validation Step	Result
MIP4-7-1	Verify that the COP in the National C2IS corresponds with the COP in the C2IS of the 'Other MNPs'.	Both COPs correspond

Once the procedure steps have been completed, the following validation step(s) must be performed by the 'Other MNP':

No.	Validation Step	Result
MIP4-7-2	<i>If the 'Other MNP' was connected to the Reconnecting MNP as Data Receiver:</i> Verify that the COP in the National C2IS corresponds with the COP in the C2IS of the 'Reconnecting MNP'.	Both COPs correspond

³ An implementation of an LC2IE service should allow operators to specify that a MNP will reconnect at a specific date-time, however this is also an action that can be done manually by an operator at that specified date-time.

5.8 Detach



A LC2IE service that performs a Detach indicates that it wants to be removed from the Mission Network (for example because the MNP leaves the mission).

The Detach brings the LC2IE service from the Linked state (Configuration Information is loaded, but there are no active connections to other LC2IE services) into the Unlinked state (No Configuration Information is loaded).

Roles

- **Initiating MNP:**
The MNP LSO that initiates the detach procedure.
- **MN SMA:**
The Mission Network Service Management Authority.
- **Other MNPs:**
The MNP SLOs of the MNPs that the Initiating MNP has been linked to.

Initial State

- The LC2IE service of the Initiating MNP is in the 'Linked' state, with respect to the other MNPs.
- The LC2IE services of the other MNPs are in the 'Linked' state, with respect to the initiating MNP.

End State

- The LC2IE service of the Initiating MNP is in the 'Unlinked' state, with respect to the other MNPs.
- The LC2IE services of the other MNPs are in the 'Unlinked' state, with respect to the initiating MNP.

Procedure Steps

The following actions have to be performed:

Step	Who	Action to perform
1	ALL	Make sure the requirements mentioned in the Initial State are met.
2	Initiating MNP	Inform the MN SMA about the intent to detach and the exact date & time of the detach.
3	MN SMA	Inform the other MNPs about the detach and the exact date & time of the detach.
<i>wait until the date & time of reconnect has been reached⁴</i>		
4	MN SMA	Compile a (new) version of the ‘ MIP4-IES MN SMA Configuration Directives for MNP ’ form and distribute to all MNP.
5	Other MNPs	Remove the LC2IE service details of the Initiator MNP from the LC2IE service.
6	Initiating MNP	Physically close the network (ethernet) connection to the Mission Network.

Validation Steps

Once the procedure steps have been completed, the following validation step(s) must be performed by the ‘Initiating MNP’:

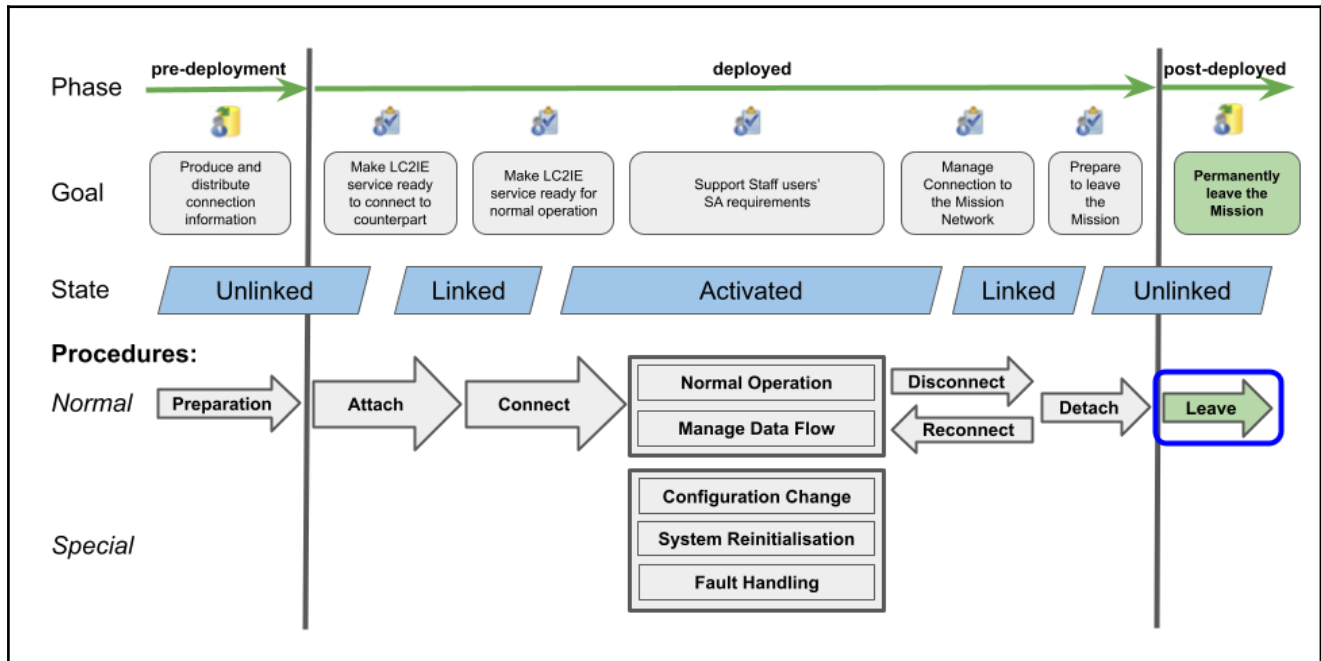
No.	Validation Step	Result
MIP4-8-1	Verify that the Detaching LC2IE service is removed from the Mission Network.	Detaching Node is removed from the Mission Network

Once the procedure steps have been completed, the following validation step(s) must be performed by the ‘Other MNP’:

No.	Validation Step	Result
MIP4-8-2	Verify that the Configuration Information of the Detaching node is removed from the LC2IE service.	Configuration information of the Detaching Node is removed from the LC2IE service
MIP4-8-3	Verify that the outgoing subscriptions of the Detaching node that are deemed to be no longer relevant are removed/hidden from the LC2IE service.	Outgoing subscriptions of the Detaching Node are removed from the LC2IE service.

⁴ An implementation of an LC2IE service should allow operators to specify that a MNP will detach at a specific date-time, however this is also an action that can be done manually by an operator at that specified date-time.

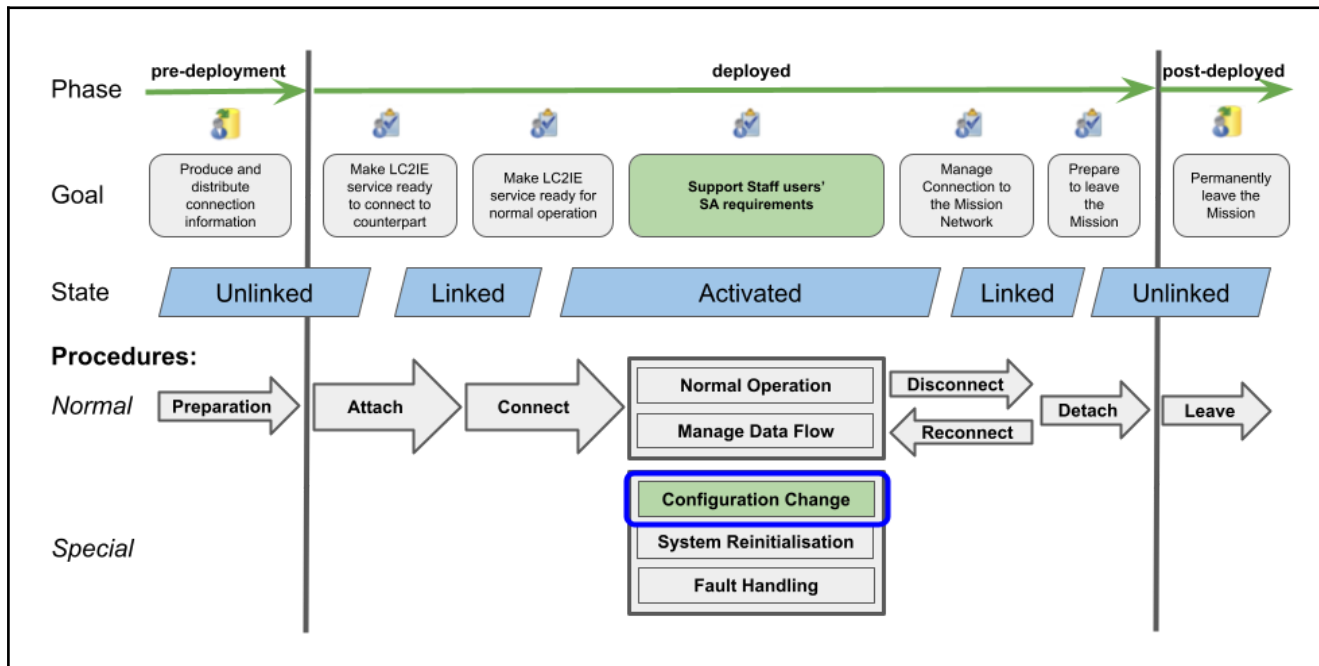
5.9 Leave



This procedure has no steps to perform for the LC2IE service.

6 Special Procedures

6.1 Configuration Changes



Any change in the configuration that has an impact on all MNPs will be coordinated by the MN SMA. A reconfiguration may require an LC2IE service to change all or part of its configuration (IP-address and IP-port, URN or URL).

NOTE: A MNP Joining or Leaving the Mission Network, will result in these configuration changes.

The Configuration Change procedures can be initiated due to the following reasons:

- **Own LC2IE service Configuration:** (MNP LSO initiated)
MNP LSO sends updated "MIP4-IES MNP Planning Information for MN SMA" to MN SMA.
MN SMA sends updated "MIP4-IES MN SMA Configuration Directives for MNP" to MNP LSOs.
- **Other LC2IE service Configuration:** (other MNP LSO initiated)
Other MNP LSO sends updated "MIP4-IES MNP Planning Information for MN SMA" to MN SMA.
MN SMA sends updated "MIP4-IES MN SMA Configuration Directives for MNP" to MNP LSOs.
- **Mission Configuration** (MN SMA initiated)
 - **Managed Lists:** The MN SMA provides the updated Managed Lists, as well as effective datetime (so the list can be published in advance, giving time for MNPs to adapt), MNPs apply the updates to their system to ensure they will be active from the specified effective datetime.
MN SMA sends updated "MIP4-IES MN SMA Initiation Directives for MNP" to MNP LSOs.
 - **Information Product Distribution Graph:**
The MNP LSO of all MNP have agreed to an updated Information Distribution during a collaborative session, the MN SMA will process the results into a new MN TT and IDGT, and provide these to the MNP LSOs.
All MNP LSO sends updated "MIP4-IES MNP Planning Information for MN SMA" to MN SMA.
MN SMA sends updated "MIP4-IES MN SMA Configuration Directives for MNP" to MNP LSOs.
 - **Mission ORBAT:**
The MNP LSOs provide their updated MNP ORBAT to the MN SMA. The MNP LSO of all MNP have agreed to an updated combined Mission ORBAT during a collaborative session. The MN SMA distributes this ORBAT to all MNP, which will use this ORBAT for addressing purposes, from the included effective-datetime.

*All MNP LSO sends updated “MIP4-IES MNP Planning Information for MN SMA” to MN SMA.
MN SMA sends updated “MIP4-IES MN SMA Configuration Directives for MNP” to MNP LSOs.*

Roles

- **Initiating MNP:**
The MNP LSO that initiates the configuration change procedure.
- **MN SMA:**
The Mission Network Service Management Authority.
- **Other MNPs:**
The MNP SLOs of the MNPs that the Initiating MNP has been linked to.

Initial State

- The MNP that wants to apply the configuration change has old Configuration Information in the LC2IE service.
- All other MNP LSOs need updated Configuration Information in their LC2IE service (from the MNP that will perform the Configuration Change).

End State

- The MNP that wants to apply the configuration change has applied the change.
- All other MNPs have the updated Configuration Information in their LC2IE service.

Procedure Steps

In the event of only network changes (IP-address, IP-port, URL or URN), the following steps shall be executed:

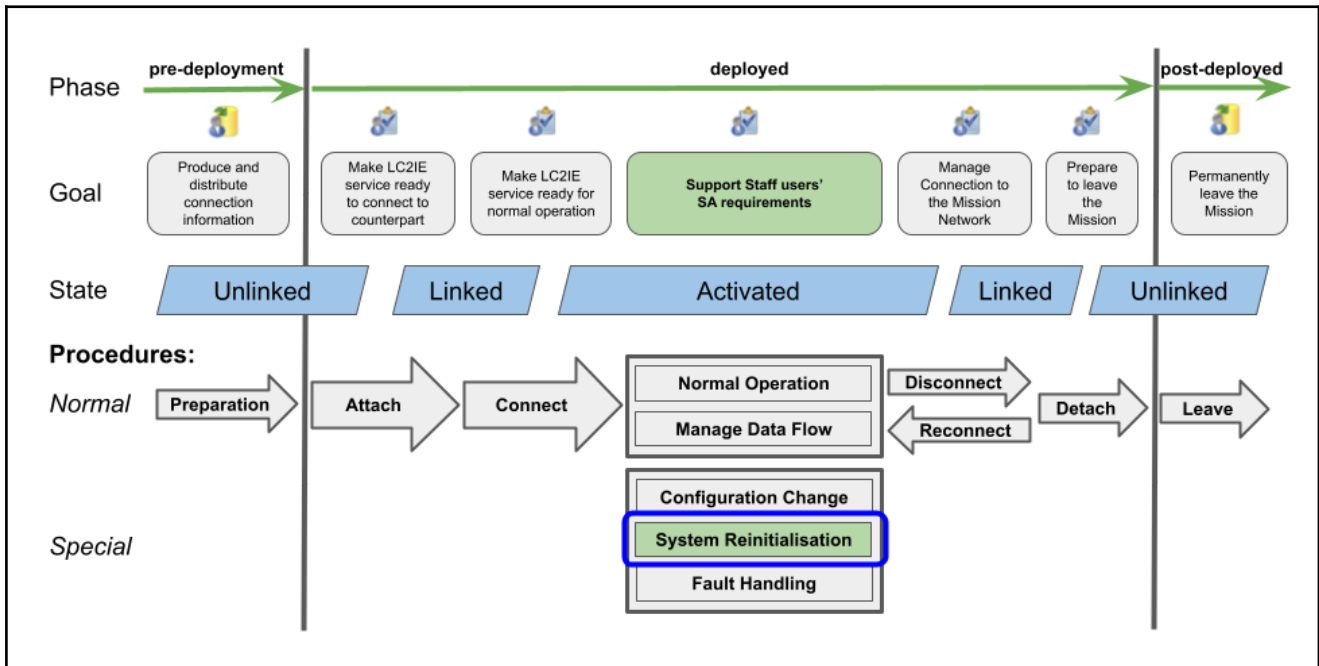
Step	Who	Action to perform
1	ALL	Make sure the requirements mentioned in the Initial State are met.
2	MN SMA	Only if the MN SMA initiated the change (e.g. modifications in the Mission Network): MN SMA sends the updated ‘ MIP4-IES MN SMA Initiation Directives for MNP ’ form to all MNPs.
3	Initiating MNP	Update the ‘ MIP4-IES MN SMA Configuration Directives for MNP ’ form and re-send to the MN SMA..
4	MN SMA	Review the ‘ MIP4-IES MN SMA Configuration Directives for MNP ’ form and send back to the Initiating MNP, if any modification is required
5	MN SMA	Compile a (new) version of the ‘ MIP4-IES MN SMA Configuration Directives for MNP ’ form and distribute to all MNP.
6	Initiating MNP & Other MNPs	Configure the LC2IE service using the updated ‘ MIP4-IES MN SMA Configuration Directives for MNP ’ form.
7	Initiating MNP & Other MNPs	Ensure the LC2IE service is properly configured to process the latest Managed Lists.

Validation Steps

Once both parties (the MNP that changed its configuration and all 'Other MNPs') finished the steps in one of the previous paragraphs, the following validation steps must be performed by both parties:

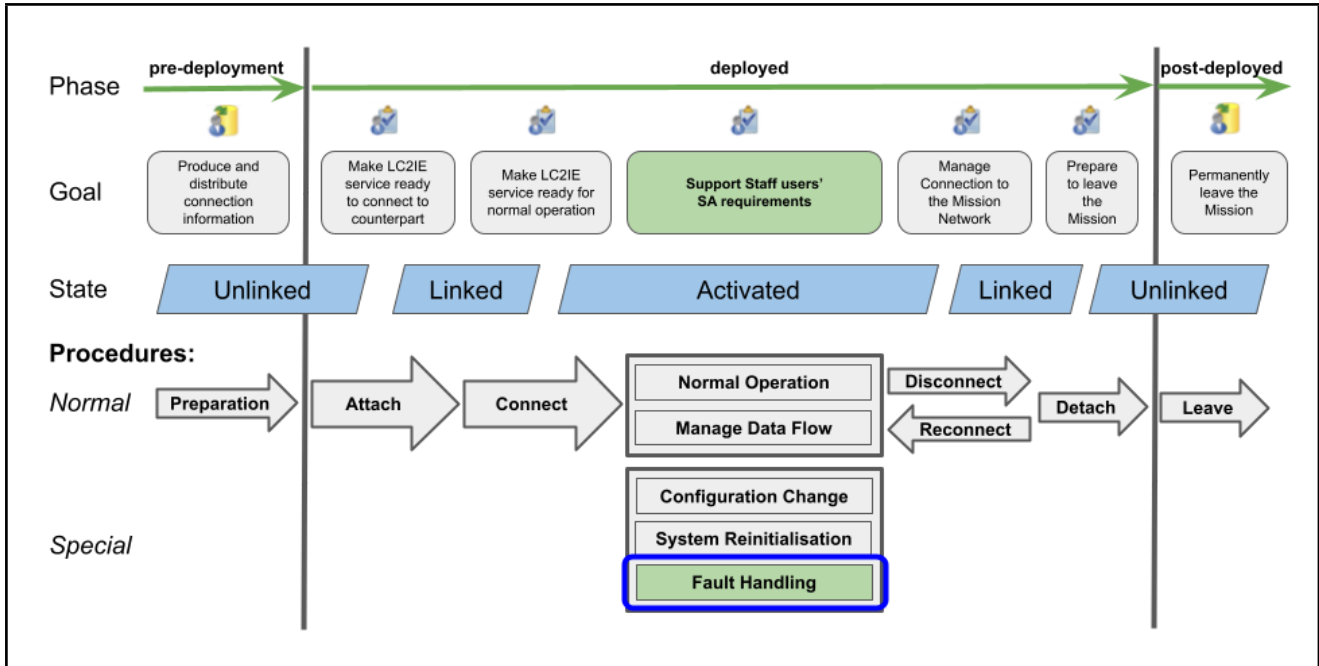
No.	Validation Step	Result
MIP4-9-1	Verify that the change in configuration is applied.	Configuration changed
MIP4-9-2	Verify that the COP in the National C2IS corresponds with the COP in the C2IS of the 'Changing MNP'.	Both COPs correspond

6.2 System Reinitialisation



This section describes the procedure to follow when an LC2IE service needs to be reinitialised. There may be a variety of reasons why a system may need to reinitialise, which are not relevant to this document. However when an LC2IE service initialises this must be seamless as seen from the other MNPs.

6.3 Fault Handling



This section describes known workarounds and procedures to follow when operations of an LC2IE service result in an unexpected error. The table below lists the procedures for the errors that are foreseen.

NOTE: Newer versions may include additional errors and procedures.

NOTE: An LC2IE service should offer the operations listed, however a system implementer may have chosen not to explicitly offer any of the operations.

Operation	Error	Procedure to follow
Load/Update MN-SMA Configuration Directives.		
Add MNP LC2IE service		
Remove MNP LC2IE service		
Enable MNP LC2IE service		
Disable MNP LC2IE service		
Subscribe to Topic		
Unsubscribe from Topic		
Export a Topic		
Import a Topic		

Annex A: MIP4-IES MN SMA Initiation Directives for MNP

MN Mission Details	
1a Mission Network / Event	
1b Time Zone for Mission / Event	
1c Valid From Date / Time	
1d Version number	

MN SMA Point of Contact	
2a Name	
2b Telephone	
2c E-Mail address(es)	

MN SMA provided services	
3a Mission Time Server	
3b Mission Domain Name Server	
3c Mission Certificate Authority	

MN SMA Planning Information for MNP	
4a Maximum Subscription Duration	
4b Managed Lists	<u>attachment(s)</u>
4c Security Policy Information File(s) (SPIF)	<u>attachment(s)</u>
4d Initial Topic Trees (ITT)	<u>attachment(s)</u>

A.1 Accompanying Notes for Form 'MIP4-IES MN SMA Initiation Directives for MNP'

- Field **1a**: The name of the mission network, event, exercise or operation.
- Field **1b**: The time zone in which the mission network, event or operation occurs.
- Field **1c**: The date and time at which the MN SMA is attending or available for this mission network, event or operation.
- Field **1d**: The version number of this form. Each time the content of the form is changed by the MN SMA, a new form with a new version number is submitted to the MNP LSO (e.g. 1, 2, 3).
- Field **2a**: The name of the MN SMA.
- Field **2b**: The phone number to contact the MN SMA.
- Field **2c**: The email address(es) to contact the MN SMA.
- Field **3a**: The Fully Qualified Domain Name (QFDN) of the time-server.
- Field **3b**: The Fully Qualified Domain Name (QFDN) of the Domain Name Server (DNS).
- Field **3c**: The details of the Mission Network Certificate Authority.
- Field **4a**: The maximum subscription duration (less than 5 minutes)
- Field **4b**: The managed list files to be used during the mission. (Attached as an XML files using the OASIS Genericcode schema)
- Field **4c**: The security policy information to be used during the mission. (Attached as an XML file using the SPIF schema)
- Field **4d**: The Initial Topic Trees, which the MNP will use to add the MNP specific Topics and create the MN TT. (Attached as Topic Namespace Documents, XML file, using the schema defined in WS-Topics)

Annex B: MIP4-IES MNP Planning Information for MN SMA

MNP LC2IE service Configuration Information	
1a WSMP Service Provider Service Description	
1b WSMP Service Consumer Service Description	
1c Additional IP-Endpoints	

MNP Point of Contact	
2a Nation / Unit	
2b Name	
2c Telephone	
2d E-Mail address(es)	
2e Location / Time zone	

MNP Planning Information for MN SMA	
3a MNP Topic Trees Extension (MNP TTE)	<u>attachment(s)</u>
3b MNP Order of Battle (MNP ORBAT)	<u>attachment(s)</u>

B.1 Accompanying Notes for Form 'MIP4-IES MNP Planning Information for MN SMA'

- Field **1a**: Specifies the URL at which the Service Description for the Provider can be obtained. Note that this URL must be resolvable during the mission. The content returned by this URL is formatted using the WsmpSoapParameters, defined by WSMP.
- Field **1b**: Specifies the URL at which the Service Description for the Consumer can be obtained. Note that this URL must be resolvable during the mission. The content returned by this URL is formatted using the WebServiceDescriptionLanguage (WSDL).
- Field **1c**: Lists the additional IP Endpoints (IP Address of FQDN and Port) required for MNP to access in order to exchange information with this LC2IE service. This information should be used to configure firewalls to allow traffic to these specific endpoints.
- Field **2a**: The name of the nation or the name of the unit for this MNP.
- Field **2b**: The name of the MNP LSO.
- Field **2c**: The phone number to contact the MNP LSO.
- Field **2d**: The email address(es) to contact the MNP LSO.
- Field **2e**: The time zone in which the MNP LSO is during the mission network, event or operation, if different from the mission time zone.
- Field **3a**: The MN Topic Trees Extension (MN-TTE) with the MNP specific Topics, for the MN SMA to combine into the MN TT. (Attached as Topic Namespace Documents, XML file, using the schema defined in WS-Topics)
- Field **3b**: The MNP Order of Battle, for the MN SMA to combine into the MN ORBAT. (Attached as Friendly Order of Battle, XML file, using the schema defined in MIP4IES)

Annex C: MIP4-IES MN SMA Configuration Directives for MNP

MIP Configuration Directives	
3a Mission Network Topic Trees (MN TT)	<u>attachment(s)</u>
3b Mission Network ORBAT (MN ORBAT)	<u>attachment(s)</u>
3c Information Product Distribution Graph (IPDG)	<u>attachment(s)</u>

This section is repeated for every MNP that is required to exchange information

MNP Connection Directives	
2a Nation / Unit	
2b Name	
2c Telephone	
2d E-Mail address(es)	
2e Location / Time zone	
2f WSMP Service Provider Service Description	
2g WSMP Service Consumer Service Description	
2h Additional IP-Endpoints	

C.1 Accompanying Notes for Form 'MIP4-IES Connection Overview'

- Field **3a**: The Mission Network Topic Trees, to be used by all MNP to publish-on/subscribe-to. (Attached as Topic Namespace Documents, XML file, using the schema defined in WS-Topics)
- Field **3b**: The Mission Network Order of Battle. (Attached as Friendly Order of Battle, XML file, using the schema defined in MIP4IES)
- Field **3c**: Specifies the path at which the Information Product Distribution Graph can be obtained.
- Field **2a**: The name of the nation or the name of the unit for this MNP.
- Field **2b**: The name of the MNP LSO.
- Field **2c**: The phone number to contact the MNP LSO.
- Field **2d**: The email address(es) to contact the MNP LSO.
- Field **2e**: The time zone in which the MNP LSO is during the mission network, event or operation, if different from the mission time zone.
- Field **2f**: Specifies the URL at which the Service Description for the Provider can be obtained. Note that this URL must be resolvable during the mission. The content returned by this URL is formatted using the WsmpSoapParameters, defined by WSMP.
- Field **2g**: Specifies the URL at which the Service Description for the Consumer can be obtained. Note that this URL must be resolvable during the mission. The content returned by this URL is formatted using the WebServiceDescriptionLanguage (WSDL).
- Field **2h**: Lists the additional IP Endpoints (IP Address of FQDN and Port) required for MNP to access in order to exchange information with this LC2IE service. This information should be used to configure firewalls to allow traffic to these specific endpoints.