Annex 13:
Business Cases Operations

20.01.2022

Content

1. Business Cases

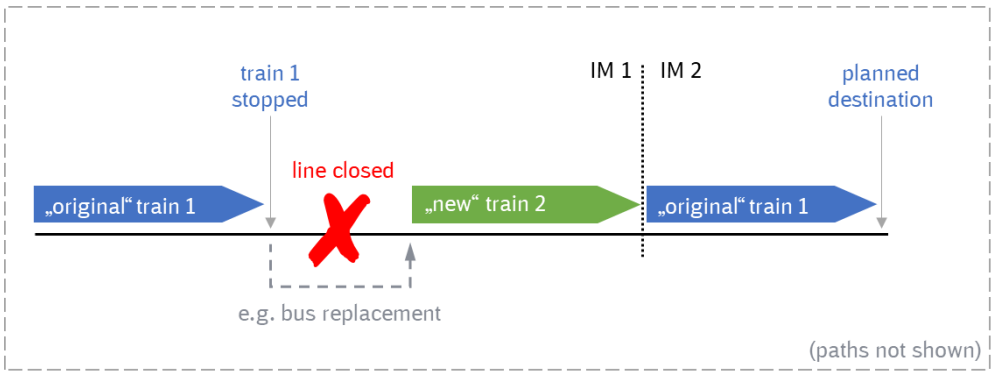
The below procedures are intended for incident management in “hot operations” when time, capability, workload, etc. do not allow to follow the formal planning procedures laid down in the TAF/TAP framework. In principle, it is preferable to handle situations like the below using planning procedures. This should be done if possible.

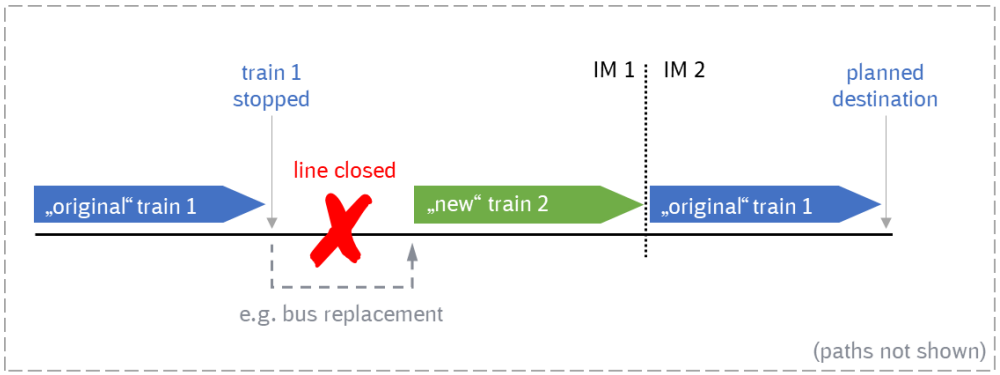
Whenever TAF/TAP-Identifiers are mentioned in the business cases, daily-objects and daily-identifiers (including the start date) are meant.

Abbreviations

- IM = Infrastructure Manager
- MS = MessageStatus (element in all messages)
- PD = PathDetails message
- PSN = PathSectionNotification message
- RU = Railway undertaking
- SM = Station Manager
- TCM = TrainComposition message
- TDC = TrainDelayCause message
- TRF = TrainRunningForecast message
- TRI = TrainrunningInformation message
- TRInt = TrainRunningInterruption message
- TOI = TypeOfInformation (element in PD, PSN messages)
- TOR = TypeOfRequest (element in PD, PSN messages)

1.1. Train run is split

Situation	Train run terminates before reaching its planned destination for example due to an unscheduled line closure (effects of a thunderstorm or the like). For the part of its journey, on which the "original" train is no longer running, it is replaced by another "new" train, which needs an own ReferenceTrainID and (depending on the use case) PathID. 
Procedure	1. ResponsibleRU and IM coordinate by other means than TAF/P-messages (telephone, pre-planned scenarios, etc.) and decide for the course of action described above (alternatives could be rerouting, cancellation, etc.). 2. **Option A: IDs are kept** If the green train will not start before the blue train has arrived, ReferenceTrainID and PathID may be kept (the ReferenceTrainID is "handed" from the blue to the green train). 2. **Option B: New IDs needed** If a new ReferenceTrainID and PathID is assigned: 3. IM sends *PathSectionNotification message [MS: Creation(1), TOR: optional element not applicable; TOI: deactivate path (51)]* for the part of the path of the original (blue) train, that is not used. 4. In general, a new ReferenceTrainID is to be created by the ResponsibleRU, as it is the owner of the train object. If the available time, workload, capability, etc. does not allow this, the allocation of the ReferenceTrainID may be done by the IM on behalf of and in agreement with the ResponsibleRU according to pre-defined rules (e.g. a set of ReferenceTrainIDs defined by the ResponsibleRU for that purpose). 5. IM creates path and PathID for the new (green) train. 6. IM sends *PathDetails message [MS: Creation(1), TOR: Modification (3); TOI: booked(22)]* for new (green) train with the new ReferenceTrainID and PathID. The old ReferenceTrainID and PathID (of the blue train) will be added in the RelatedIdentifier section of the *PathDetails* message. 7. No *PathConfirmed* message for acceptance of the new path by ResponsibleRU is necessary, because it has already accepted in step 1. 8. Normal procedures apply for train preparation and for the run of the new train (TrainComposition, TrainRunning messages, etc.).
Interoperable/ international perspective	The above described procedure will work within one network. However, if the green train is interoperable and passes **onto another network**, the challenge of handling the change of the ReferenceTrainID arises – i.e. the next IMs and RUs expect ReferenceTrainID of the blue train (*TrainRunningForecast* message, etc.) and not the ReferenceTrainID of the green train).

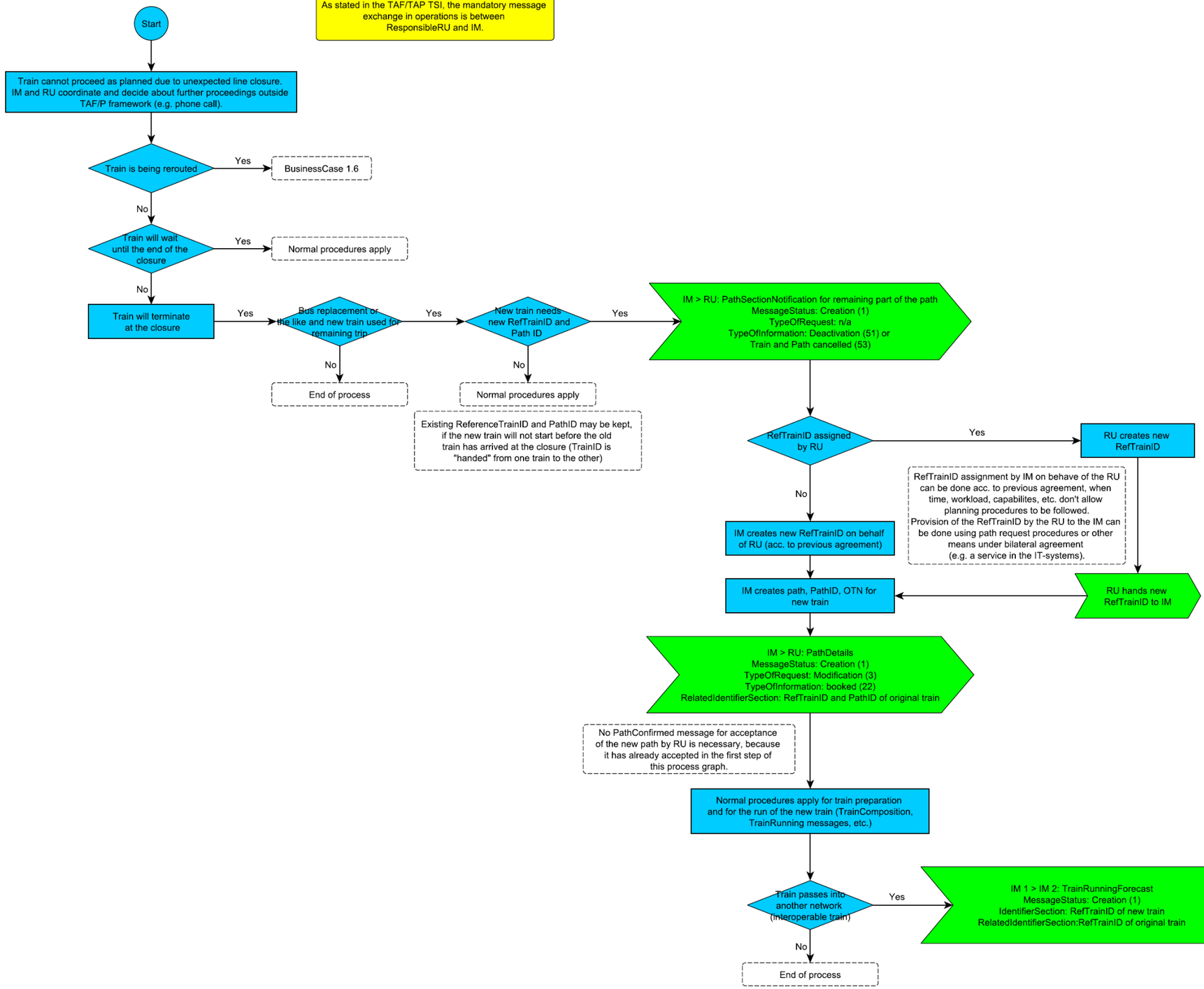
	ReferenceTrainID 2 (green) is therefore only used on the network of IM 1. On the network of IM 2 and all further networks, the train runs with ReferenceTrainID 1 (blue). In the train running messages concerning the second (green) train, IM 1 puts ReferenceTrainID 2 (green) into the identifier section and ReferenceTrainID 1 (blue) into the related identifier section. This includes the *TrainRunningForecast message* to IM 2. 
Remark	While updating the ReferenceTrainID in the systems of all subsequent actors (next IMs, next RUs, SMs) is in theory an option, it would create a huge complexity as this would need to happen within minutes into all depth of the systems (information on connecting services, related Identifier sections, all systems of all actors using the ID, etc.). The risk of some actor downstream of the incident not updating the ID in its system and the resulting confusion has been deemed as too high and unnecessary. Therefore, the above described solution, which confines the change to the network of one IM, has been decided on. Furthermore, even if one actor cannot execute the readout of the related Identifier section, the damage is limited as (in most cases) only the forecast message from the preceding actor will be lost while the rest of the system and linkage of the identifiers remains stable. Updating the ReferenceTrainID on the other hand would require actions by all actors and create heavy damage if that's not possible.

Business Case 1.1: Train run is split

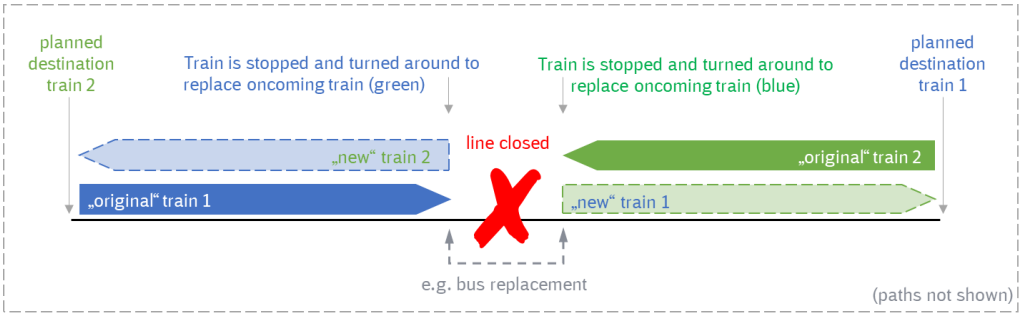
Process is used for Business Case 1.2 (Train is turned around) in an analogous manner.

The described procedure is intended for incident management in "hot operations" and does not replace the procedures used in planning.

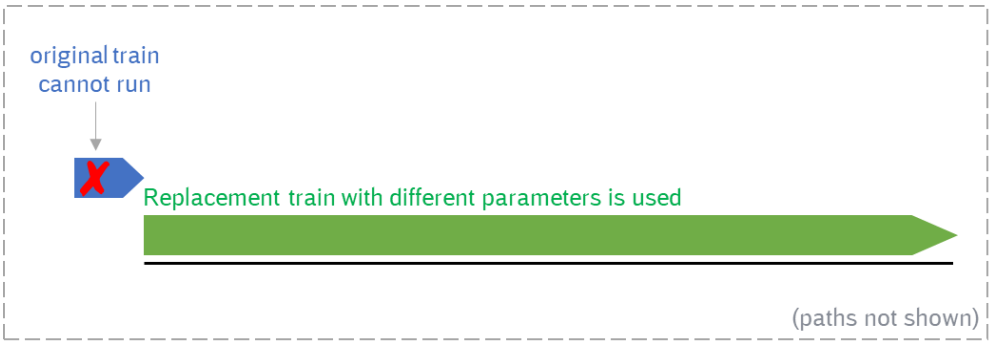
As stated in the TAF/TAP TSI, the mandatory message exchange in operations is between ResponsibleRU and IM.

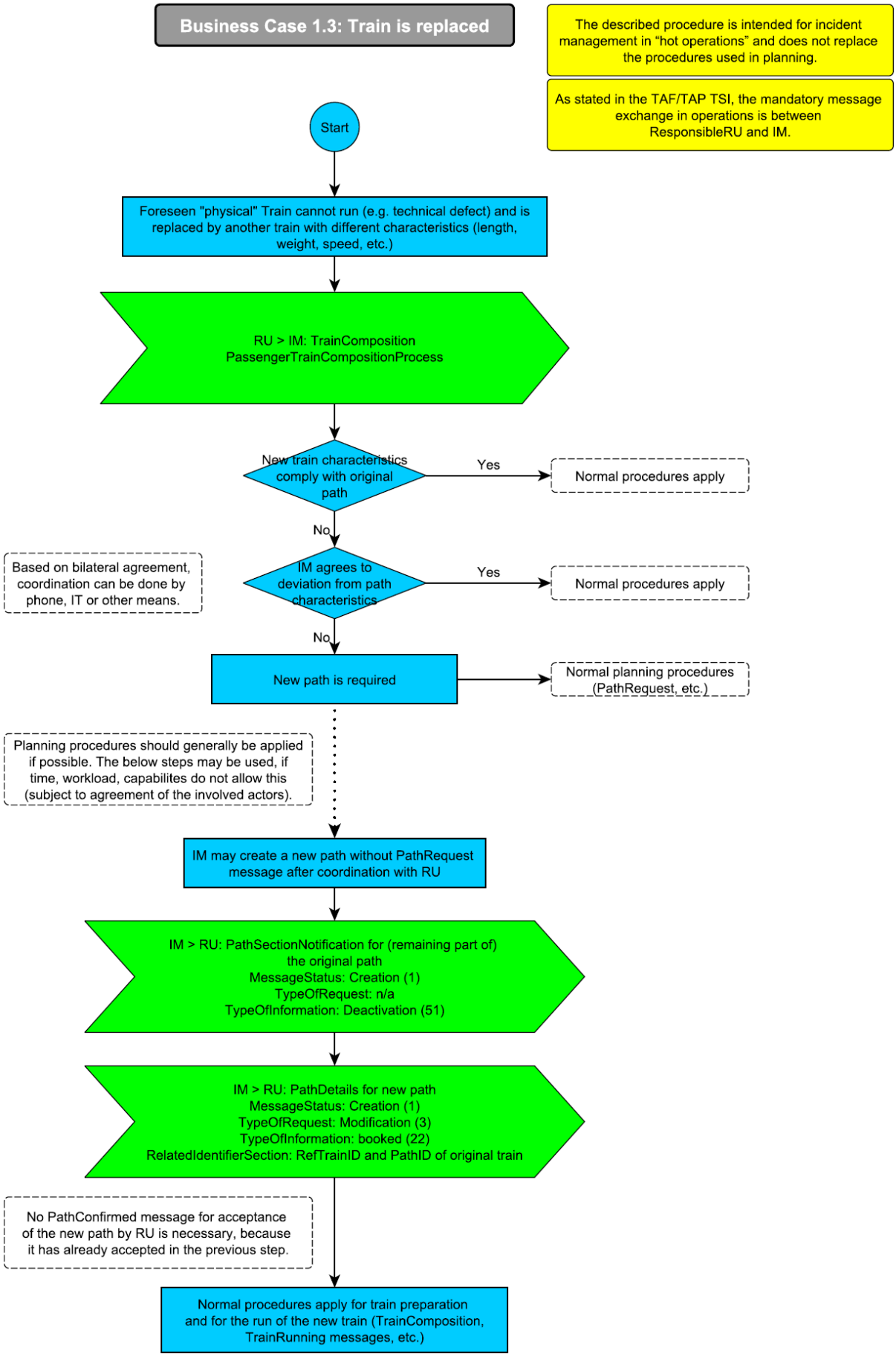


1.2. Train is turned around

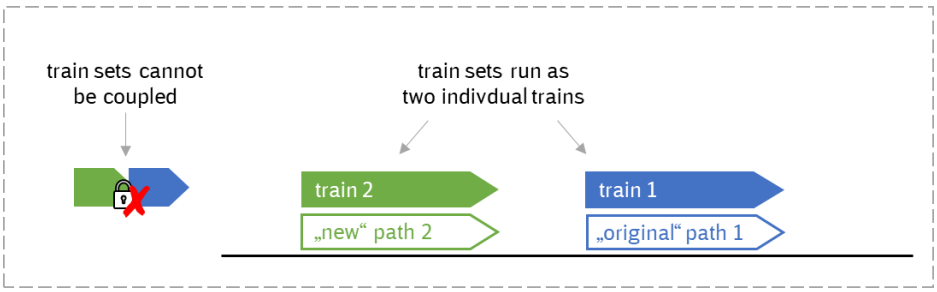
Situation	Situation as in 1.1 but the train is turned around and used for the service of an oncoming train, which also cannot run on that part of its planned journey due to the line closure. The same thing may happen on both sides of the line closure. 
Procedure	Same procedure as described in 1.1 is applied for both trains.

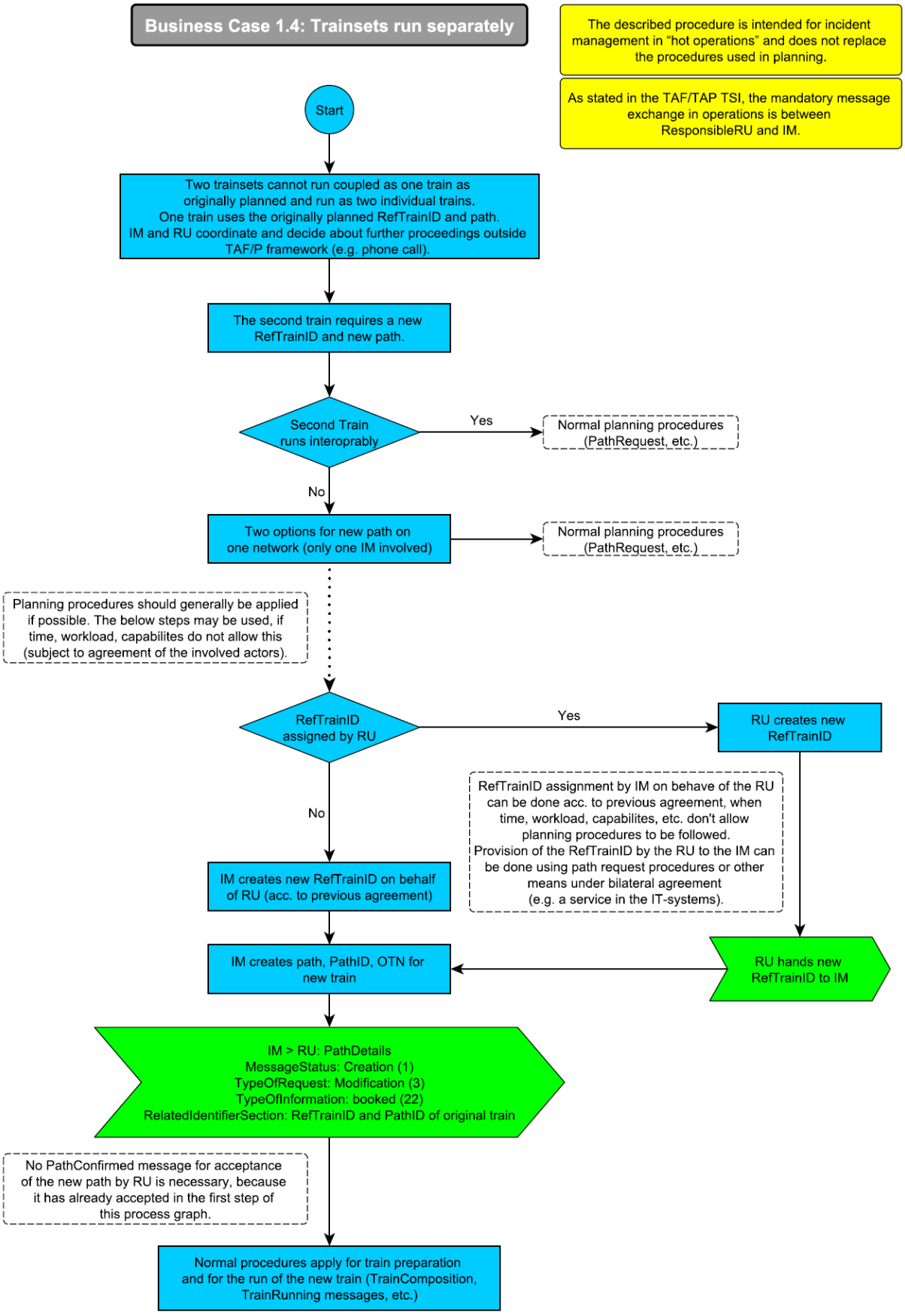
1.3. Train is replaced

Situation	The originally foreseen "physical" train cannot run (e.g. due to a technical defect) and is replaced by another train with different train-parameters (length, weight, speed, etc.). For example, an ICE trainset is replaced by a "conventional" IC train. The same situation can also occur at an intermediate station along the route. 
Procedure	1. The ReferenceTrainID of the original train is used for the replacement train as well (same service). The change of trains is treated as a change to characteristics of the train. 2. ResponsibleRU send *TrainComposition message* to IM. 3. If the characteristics of the replacement train do not comply with the original path (and the IM does not agree to the deviation from the path characteristics), a new path might be required. 4. Depending on the available time, the creation of that new path can be done according to the planning procedures (PathRequest) or according to the operations method described in 1.1 (IM sends *PathDetails message [TOI: booked(22)]* to ResponsibleRU). In that case, the IM sends *PathSectionNotification message* for the complete old path or not used section of the old path.

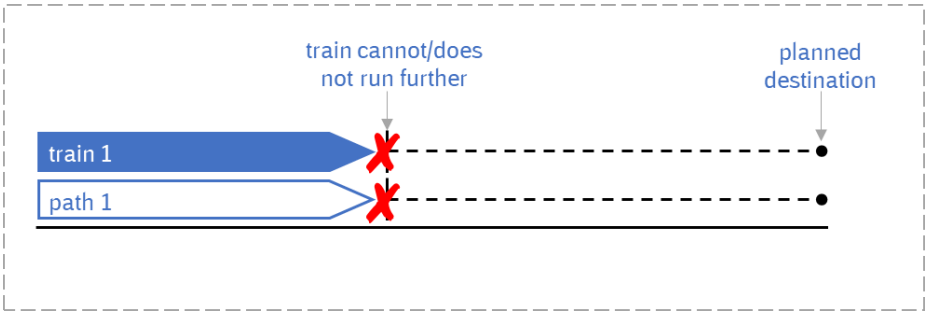

Business Case 1.3: Train is replaced
The described procedure is intended for incident management in “hot operations” and does not replace the procedures used in planning.
As stated in the TAF/TAP TSI, the mandatory message exchange in operations is between ResponsibleRU and IM.
Start
Foreseen "physical" Train cannot run (e.g. technical defect) and is replaced by another train with different characteristics (length, weight, speed, etc.)
RU > IM: TrainComposition
PassengerTrainCompositionProcess
New train characteristics comply with original path
Yes
Normal procedures apply
No
Based on bilateral agreement, coordination can be done by phone, IT or other means.
IM agrees to deviation from path characteristics
Yes
Normal procedures apply
No
New path is required
Normal planning procedures (PathRequest, etc.)
Planning procedures should generally be applied if possible. The below steps may be used, if time, workload, capabilites do not allow this (subject to agreement of the involved actors).
IM may create a new path without PathRequest message after coordination with RU
IM > RU: PathSectionNotification for (remaining part of) the original path
MessageStatus: Creation (1)
TypeOfRequest: n/a
TypeOfInformation: Deactivation (51)
IM > RU: PathDetails for new path
MessageStatus: Creation (1)
TypeOfRequest: Modification (3)
TypeOfInformation: booked (22)
RelatedIdentifierSection: RefTrainID and PathID of original train
No PathConfirmed message for acceptance of the new path by RU is necessary, because it has already accepted in the previous step.
Normal procedures apply for train preparation and for the run of the new train (TrainComposition, TrainRunning messages, etc.)

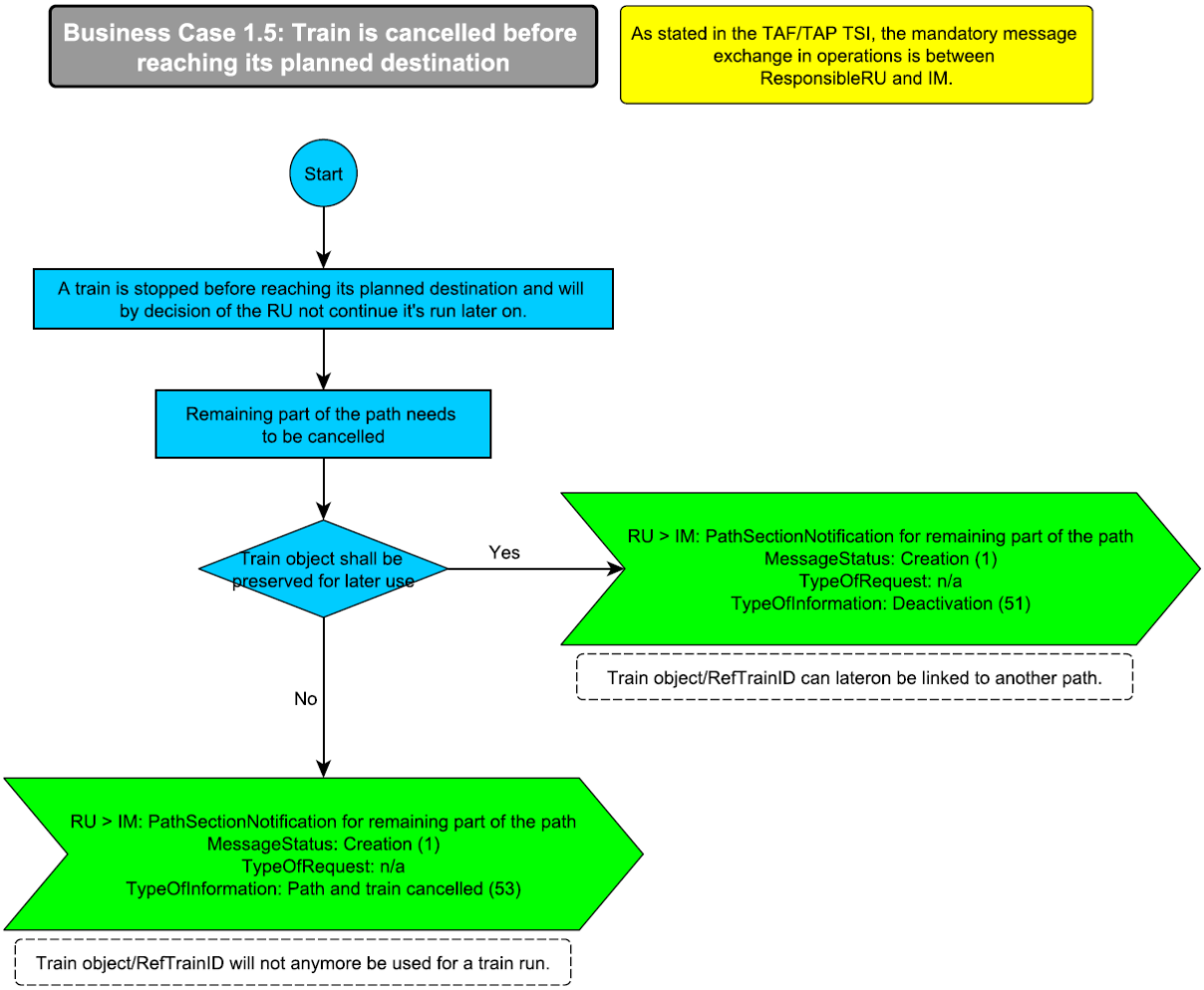
1.4. Trainsets run separately

Situation	Two trainsets of one train cannot run coupled as originally planned (e.g. due to a technical defect) and run as two individual trains. 
Procedure	*<u>Assumption:</u> Both trainsets shall run (running only one trainset would otherwise also be an option).* 1. The first train will run with the original ReferenceTrainID and on the original path. 2. The second train requires a new path and ReferenceTrainID. 3. For interoperable running trains (running on more than one network), the normal path request procedures apply for the green train. 4. For trains running only on one network: Depending on the available time and agreement of IM and ResponsibleRU, the creation of that new path and ReferenceTrainID can alternatively be done according to the operations method described in business case 1.1 (IM sends *PathDetails message [TOI: booked(22)]* to ResponsibleRU).

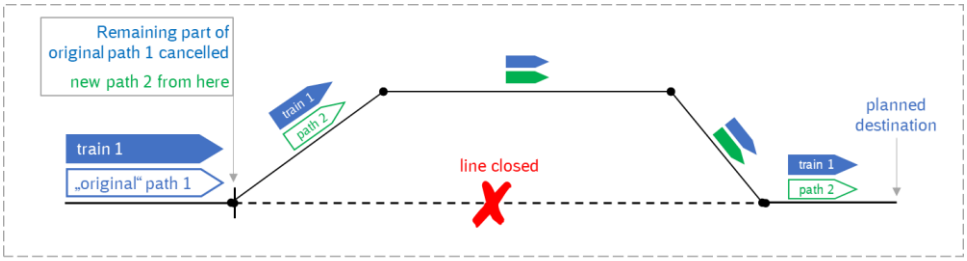

Business Case 1.4: Trainsets run separately
The described procedure is intended for incident management in "hot operations" and does not replace the procedures used in planning.
As stated in the TAF/TAP TSI, the mandatory message exchange in operations is between ResponsibleRU and IM.
Start
Two trainsets cannot run coupled as one train as originally planned and run as two individual trains. One train uses the originally planned RefTrainID and path. IM and RU coordinate and decide about further proceedings outside TAF/P framework (e.g. phone call).
The second train requires a new RefTrainID and new path.
Second Train runs interoprably
Yes
Normal planning procedures (PathReguest, etc.)
No
Two options for new path on one network (only one IM involved)
Normal planning procedures (PathReguest, etc.)
Planning procedures should generally be applied if possible. The below steps may be used, if time, workload, capabilites do not allow this (subject to agreement of the involved actors).
RefTrainID assigned by RU
Yes
RU creates new RefTrainID
No
RefTrainID assignment by IM on behave of the RU can be done acc. to previous agreement, when time, workload, capabilites, etc. don't allow planning procedures to be followed. Provision of the RefTrainID by the RU to the IM can be done using path request procedures or other means under bilateral agreement (e.g. a service in the IT-systems).
IM creates new RefTrainID on behalf of RU (acc. to previous agreement)
IM creates path, PathID, OTN for new train
RU hands new RefTrainID to IM
IM > RU: PathDetails
MessageStatus: Creation (1)
TypeOfRequest: Modification (3)
TypeOfInformation: booked (22)
RelatedIdentifierSection: RefTrainID and PathID of original train
No PathConfirmed message for acceptance of the new path by RU is necessary, because it has already accepted in the first step of this process graph.
Normal procedures apply for train preparation and for the run of the new train (TrainComposition, TrainRunning messages, etc.)

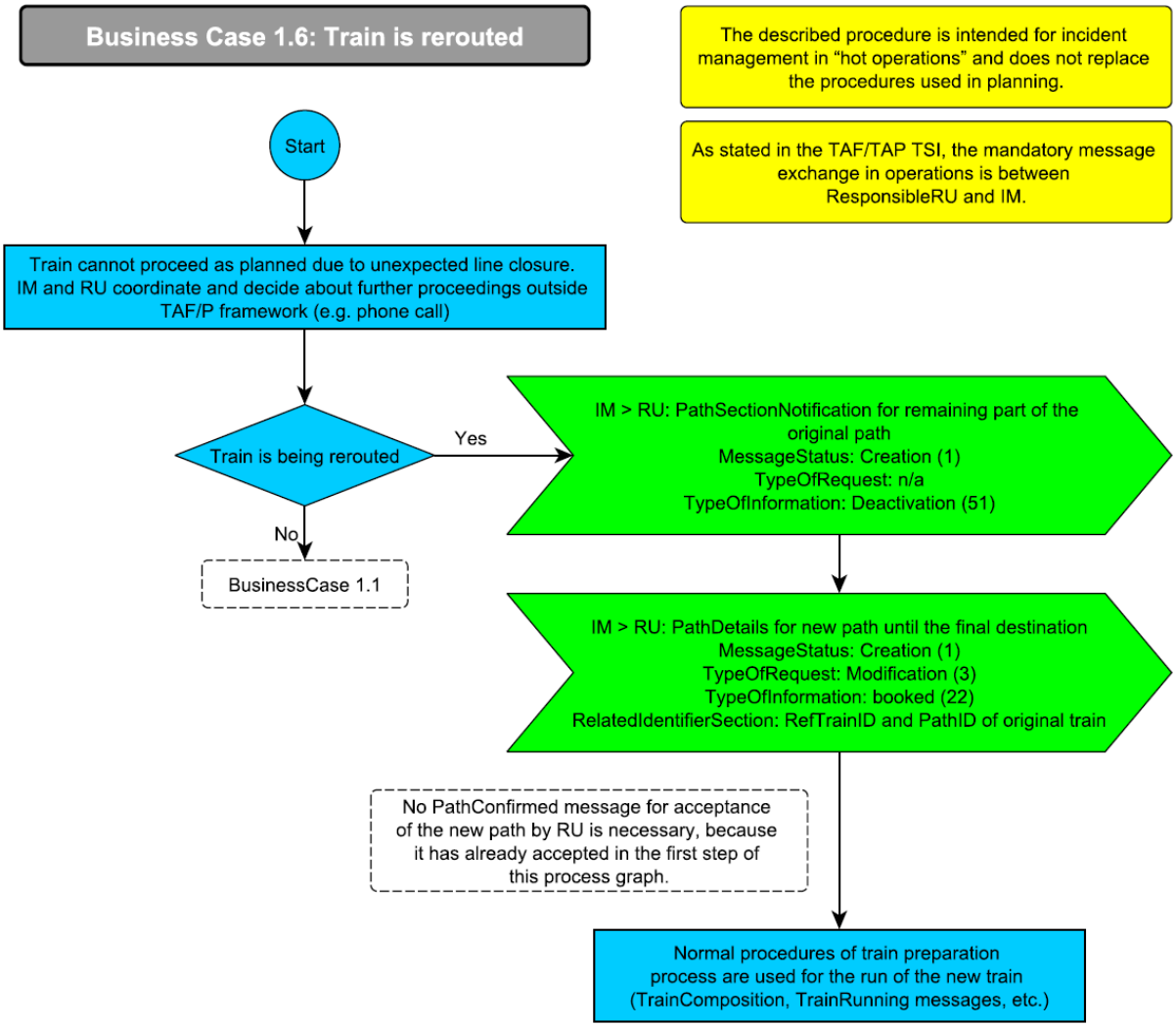
1.5. Train is cancelled before reaching its planned destination

Situation	A train is stopped and cancelled before reaching its planned destination. Frequent reasons for such an event are: 1. Line is closed because of a disruption and the train is not being rerouted and does not wait until the disruption has ended. 2. There is no disruption on the infrastructure but there is a technical defect to the train. 3. There is no problem to the infrastructure or the train but ResponsibleRU decides not to run the train further out of other reasons. It is important to distinguish between the cancellation/deactivation of a path, which can also be done with the *PathSectionNotification message* and the cancellation of the path and the train (in essence to "kill" the train object before it reached its planned destination). Otherwise, the same train object could for example later be linked to a new path object. 
Procedure	1. To "kill" the train object, *PathSectionNotification [MS: creation (1), TOR: optional element not applicable, TOI: Path and train cancelled (53)]* will be send from ResponsibleRU to IM. If the IM doesn't need the additional information of the train being cancelled along with the path, it can treat TOI "deletion" and "Path train cancelled" alike. 2. For international trains, the RU responsible for running the train on the next network has to inform the next IM (depending on the available time this can be the *PathSectionNotification* or planning procedures).


Business Case 1.5: Train is cancelled before reaching its planned destination
As stated in the TAF/TAP TSI, the mandatory message exchange in operations is between ResponsibleRU and IM.
Start
A train is stopped before reaching its planned destination and will by decision of the RU not continue it's run later on.
Remaining part of the path needs to be cancelled
Train object shall be preserved for later use
Yes
RU > IM: PathSectionNotification for remaining part of the path
MessageStatus: Creation (1)
TypeOfRequest: n/a
TypeOfInformation: Deactivation (51)
Train object/RefTrainID can lateron be linked to another path.
No
RU > IM: PathSectionNotification for remaining part of the path
MessageStatus: Creation (1)
TypeOfRequest: n/a
TypeOfInformation: Path and train cancelled (53)
Train object/RefTrainID will not anymore be used for a train run.

1.6. Train is rerouted

Situation	An ad-hoc rerouting of a train is necessary (e.g. due to an unscheduled line closure). 
Procedure	1. ResponsibleRU and IM coordinate by other means than TAF/P-messages (telephone, pre-planned scenarios, etc.) and decide for the action described above (alternatives could be splitting of the train, cancellation, etc.). 2. ReferenceTrainID remains the same. 3. IM sends *PathSectionNotification message [MS: Creation(1), TOR: optional element not applicable; TOI: deactivate path (51)]* for the part of the old (blue) path from the first point of the rerouting until the final destination. 4. IM creates the new path and PathID for the rerouting and the remaining part of the original route until the final destination. 5. IM sends *PathDetails message [MS: Creation(1), TOR: Modification (3); TOI: booked(22)]* for new (green) path and PathID. The old PathID (of the blue path) will be added in the RelatedIdentifier section of the *PathDetails* message. 6. No *PathConfirmed* message for acceptance of the new path by ResponsibleRU is necessary, because it has already accepted in step 1. 7. Normal procedures apply for remaining train run (TrainRunning messages, etc.).


Business Case 1.6: Train is rerouted
The described procedure is intended for incident management in “hot operations” and does not replace the procedures used in planning.
As stated in the TAF/TAP TSI, the mandatory message exchange in operations is between ResponsibleRU and IM.
Start
Train cannot proceed as planned due to unexpected line closure. IM and RU coordinate and decide about further proceedings outside TAF/P framework (e.g. phone call)
Train is being rerouted
Yes
No
IM > RU: PathSectionNotification for remaining part of the original path
MessageStatus: Creation (1)
TypeOfRequest: n/a
TypeOfInformation: Deactivation (51)
BusinessCase 1.1
IM > RU: PathDetails for new path until the final destination
MessageStatus: Creation (1)
TypeOfRequest: Modification (3)
TypeOfInformation: booked (22)
RelatedIdentifierSection: RefTrainID and PathID of original train
No PathConfirmed message for acceptance of the new path by RU is necessary, because it has already accepted in the first step of this process graph.
Normal procedures of train preparation process are used for the run of the new train (TrainComposition, TrainRunning messages, etc.)