

# More Fun With Information Sharing Exercises

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Multilevel Clustered Exercise Framework: An approach to face the multidimensional challenges of international exercises

## Challenges of international (cyber) exercises

International cyber exercises are facing multidimensional challenges. These are different levels of expectations, contribution, capabilities, and resources. Furthermore there are different organisational backgrounds among playing and planning nations. If these challenges are not considered during preparation and play, it will be an unsatisfactory exercise for many of the players and stakeholders. In our paper we try to face these challenges by a multidimensional approach on the preparation as well on the playing side. We call this the “Multilevel Clustered Exercise Framework” (MCEF). This framework can be used to plan and play international coordination exercises with focus on information sharing.

## Planning workflow

This is the usual exercise preparation process which should be used for every cyber exercise:

- Objectives → expected player actions → storyline → MSEL → play

For the MCEF, we modified this workflow in the following way:

- Objectives + participation commitment → clustered expected player actions → jigsaw storyline → jigsaw MSEL → clustered play

Using the modified MCEF workflow from the very beginning of an exercise planning process means to reduce the additional costs to play a clustered exercise significantly.

## Objective(s)

The MCEF is highly focused on Information Sharing exercises. So Information Sharing should be the primary objective of exercises planned with the MCEF. Optionally, additional (clustered) objectives may be added, but the focus should remain on the objective Information Sharing.

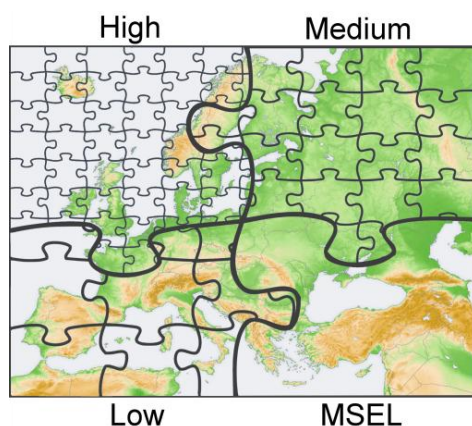
## Clustering of the players by participation commitment

In order to manage all of the participants' expectations, all players and planners have to commit to their level of participation in playing as well as in preparation. There are the following three levels of participation in playing and planning: *Basic*, *Medium* and *High* contribution indicating resources, activities and involvement. Based on these levels the participants are clustered regarding their commitment. As every cluster represents a level of complexity which correlates to the level of expectation at the player side, this approach leads to more satisfied players.

## Jigsaw Scenarios

Based on the clustering of the players the next step is to build a multilevel jigsaw scenario with different granularities. Each player gets a “jigsaw piece” of the overall situational picture. Just by cooperation with other players in the cluster an overall (situational) picture can be created and a solution can be found. By using different granularities in the clusters the committed level of participation is considered. The idea of this is to foster cooperation between the players in each cluster as well as between the clusters. The Jigsaw Scenario is highly focused on the situational picture. The design of the jigsaw must be aligned with the objectives of the particular cluster.

The following picture shows the idea of the multi-granularity / multilevel jigsaw picture for three player levels with different granularities and with one overall “MSEL” jigsaw piece.



## Key + Lock = Treasure

While the jigsaw idea addresses the aspect of an overall situational picture, the idea of Key / Lock Elements is focused on technical aspects. To foster cooperation on a technical level, it is necessary to create technical keys and locks which have to be matched. By bringing together key and lock, the treasure (new information, technical solutions, jigsaw-piece) can be discovered. As an example imagine an encrypted file on a C&C server (lock) which can be read with the correct password found in chat archives (key) and which contains information on adversaries (treasure).

## Additional Supporting Elements

In addition to the jigsaw and key / lock elements media Injects, translation elements, external requests and request from superior agencies can support information sharing and international play and / or can be used to steer the communication between players by ExCon.

## Ideas and Tools

In the appendix of our paper we present some ideas for jigsaw scenarios and key / lock elements, as well as the complete Preparation / Play Participation matrix for immediate use.

## Sharing and Contribution

The paper is available on demand from DE BSI Situation Centre and CERT-Bund ([certbund@bsi.bund.de](mailto:certbund@bsi.bund.de)). We want to encourage readers to contribute with (scenario) ideas, critics and questions. Thanks to all who worked with us on this topic until now.