EICS 2020

# Territoriality theory and Design process for HCI distributed

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Workshop Entrain, Exploring New Territorial User Interfaces : June Session

Anne-Marie Dery-Pinna, Alain Giboin, Sophie Lepreux, Philippe Renevier Gonin. Territoires et IHM Distribuées : Raffinement de Règles et d'une Méthode de Conception de Jeux Multi-Dispositifs. *IHM 2019 - 31e conférence francophone sur l'Interaction Homme-Machine*, Dec 2019, Grenoble, France. pp.7, ⟨10.1145/3366551.3370347⟩. ⟨hal-02388854⟩

Anne-Marie Déry-Pinna, Alain Giboin, Sophie Lepreux, Philippe Renevier. Interfaces distribuées pour jeux de plateau : d'un retour d'expérience à des règles de conception basées sur la territorialité. *IHM 2018 - 30eme conférence francophone sur l'Interaction Homme-Machine*, Oct 2018, Brest, France. pp.1-8. ⟨hal-01899181⟩

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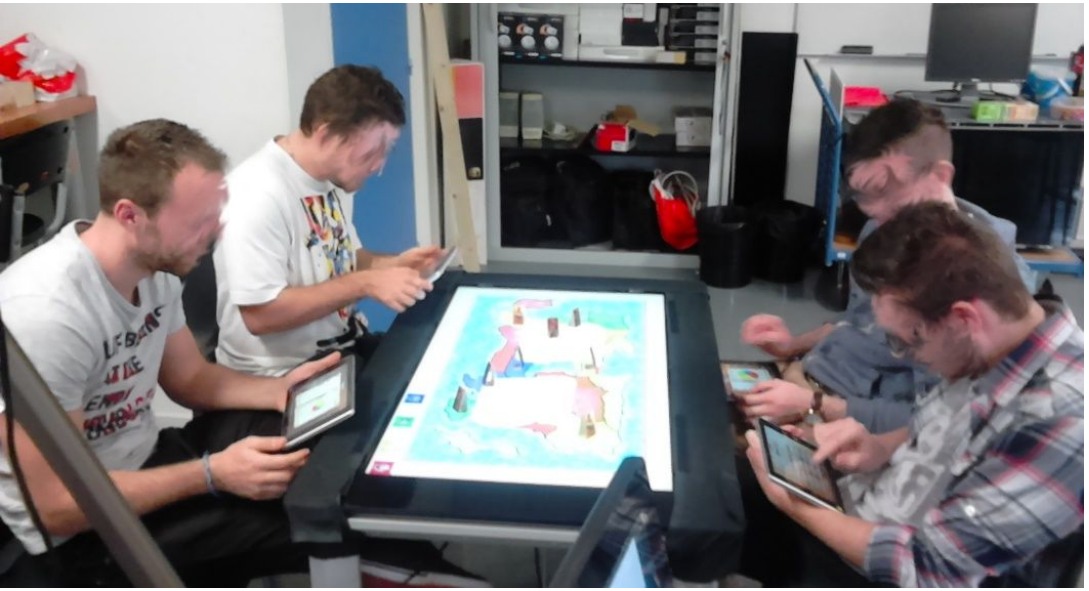
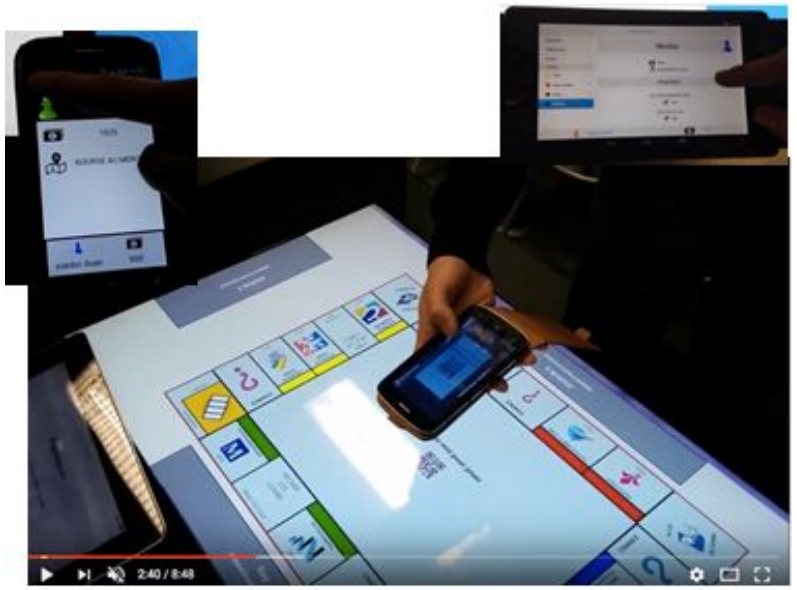
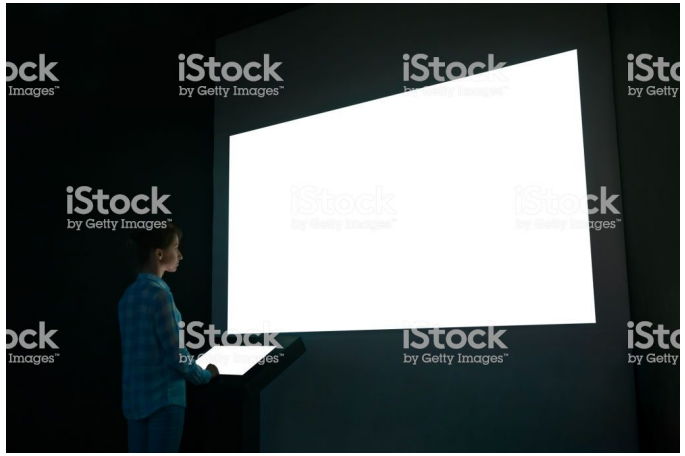
# Context: Distributed HCI

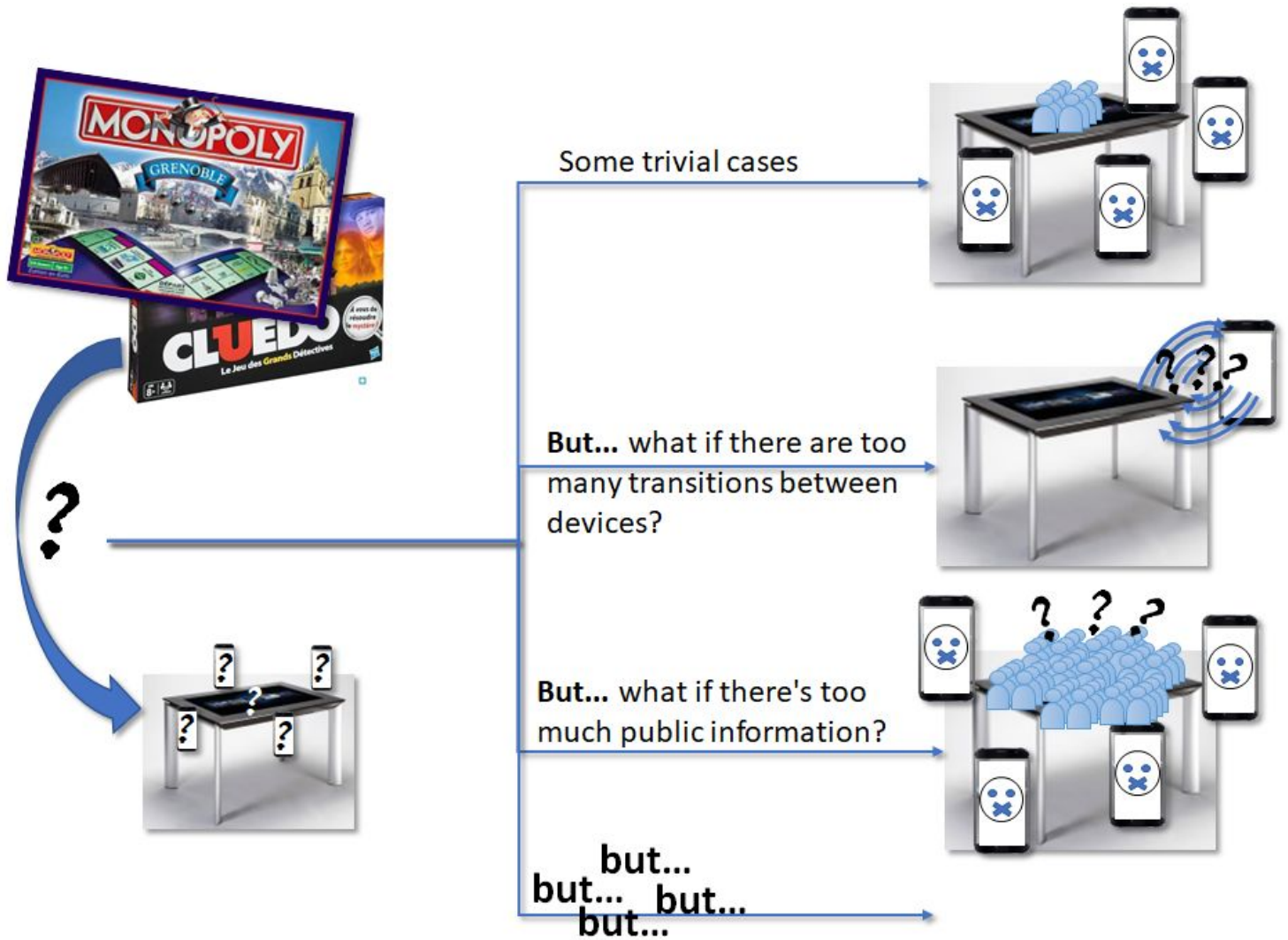




# Problem (1): diversity and specificity of devices

# Problem (2): which UI distribution?



# Goal: Distribution of Tasks on Territories (and Devices)

Starting with task model and knowing the devices...

… avoiding

- cognitive and display overload
- frequent device changes to avoid burdening the interaction..

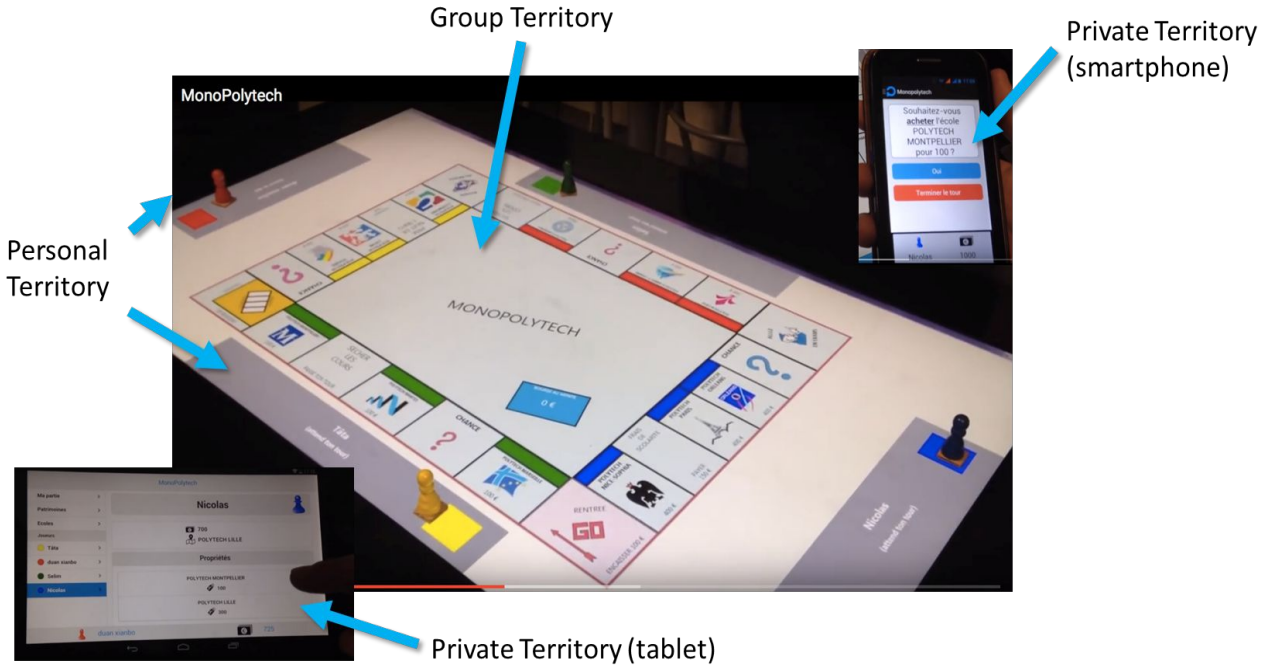
... according to the data type

# Theoretical background

- Task Model
- 5W1H : WHO ; WHY ; WHERE ; WHEN ; WHAT ; HOW
- Territoriality

Data can be :

- visible and manipulable by only one player (VMbO - private data),
- visible and manipulable by all (VMbA – a kind of public data),
- visible by all but manipulable by only one (VbAMbO – another kind of public data).





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- Philip Tuddenham and Peter Robinson. 2009. Territorial coordination and workspace awareness in remote tabletop collaboration. In Proceedings of the 27th International Conference on Human Factors in Computing Systems, CHI 2009, Boston, MA, USA, April 4-9, 2009, Dan R. Olsen Jr., Richard B. Arthur, Ken Hinckley, Meredith Ringel Mor- ris, Scott E. Hudson, and Saul Greenberg (Eds.). ACM, 2139–2148.
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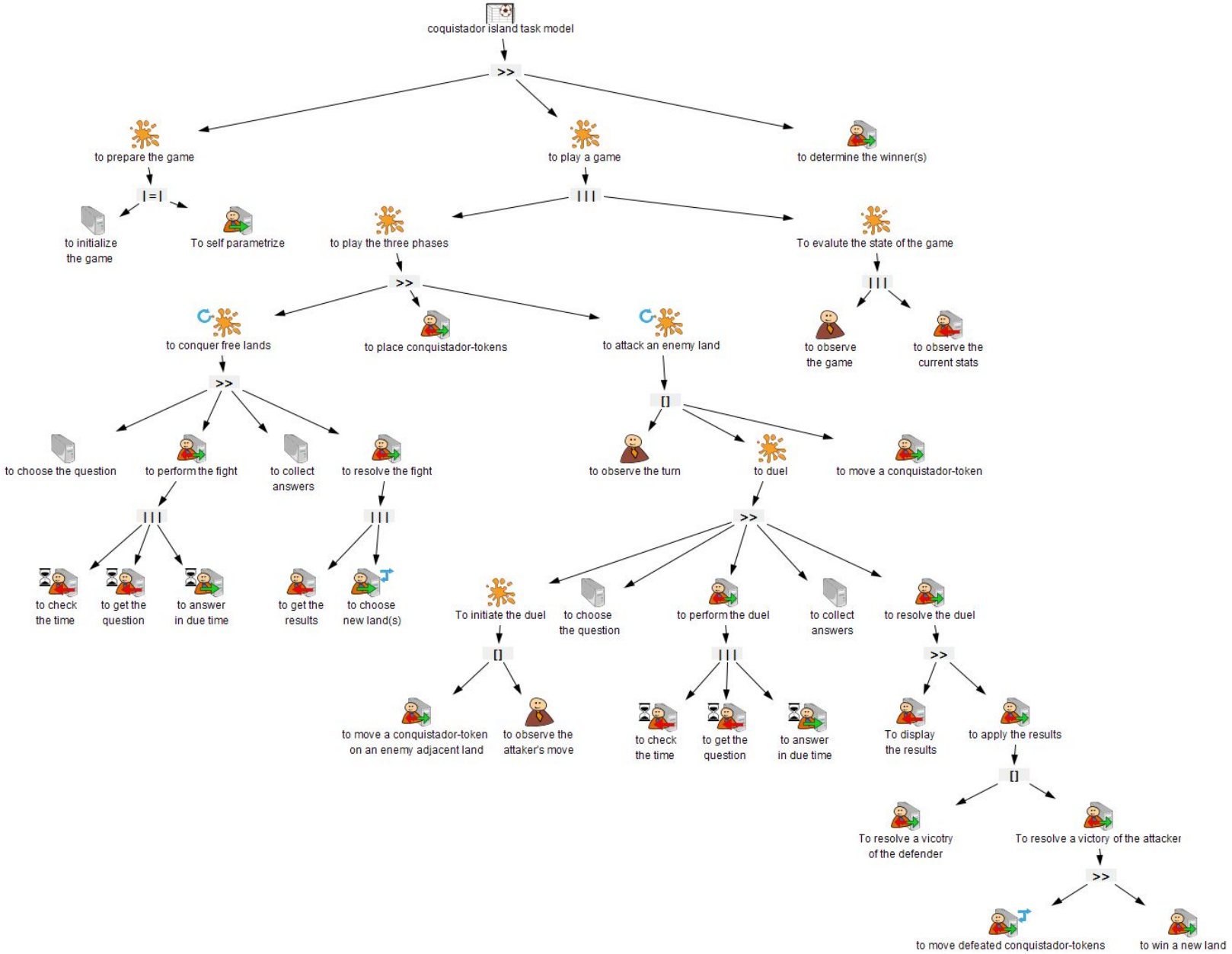
# Design Process : Identification step

| Règles | |
|---|---|
| IR1 | Annotating all tasks with the nature of the data handled. That nature of data can be visible and manipulable by only one player (VMbO - private data), visible and manipulable by all (VMbA - a rst kind of public data), visible by all but manipulable by only one (VbAMbO - a second kind of public data). |
| IR2 | Annotating data (text) input tasks (like typing text) |
| IR3 | Annotating major tasks, i.e., belonging to the minimal set of mandatory tasks to play |
| IR4 | Assigning to all devices the list of possible type of territory |
| IR5 | For each territory type, sorting by priority all possible devices |

# Example with Conquistador Island

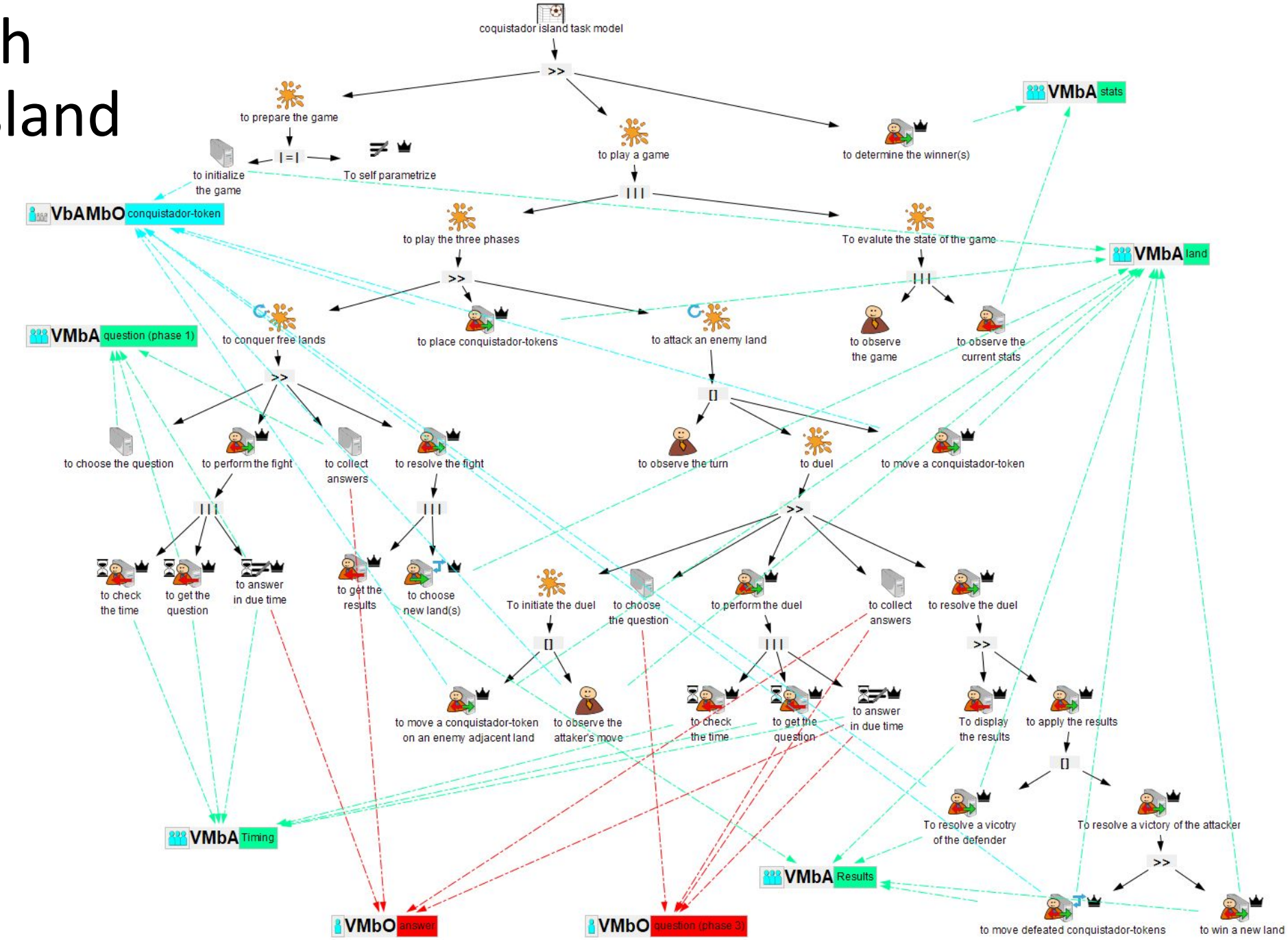
Initial task model of the game



# Example with Conquistador Island

- the tabletop can hold group territories.
- a tablet can hold private and group territories.

- group territory: tabletop then tablet.
- private territory: tablet.



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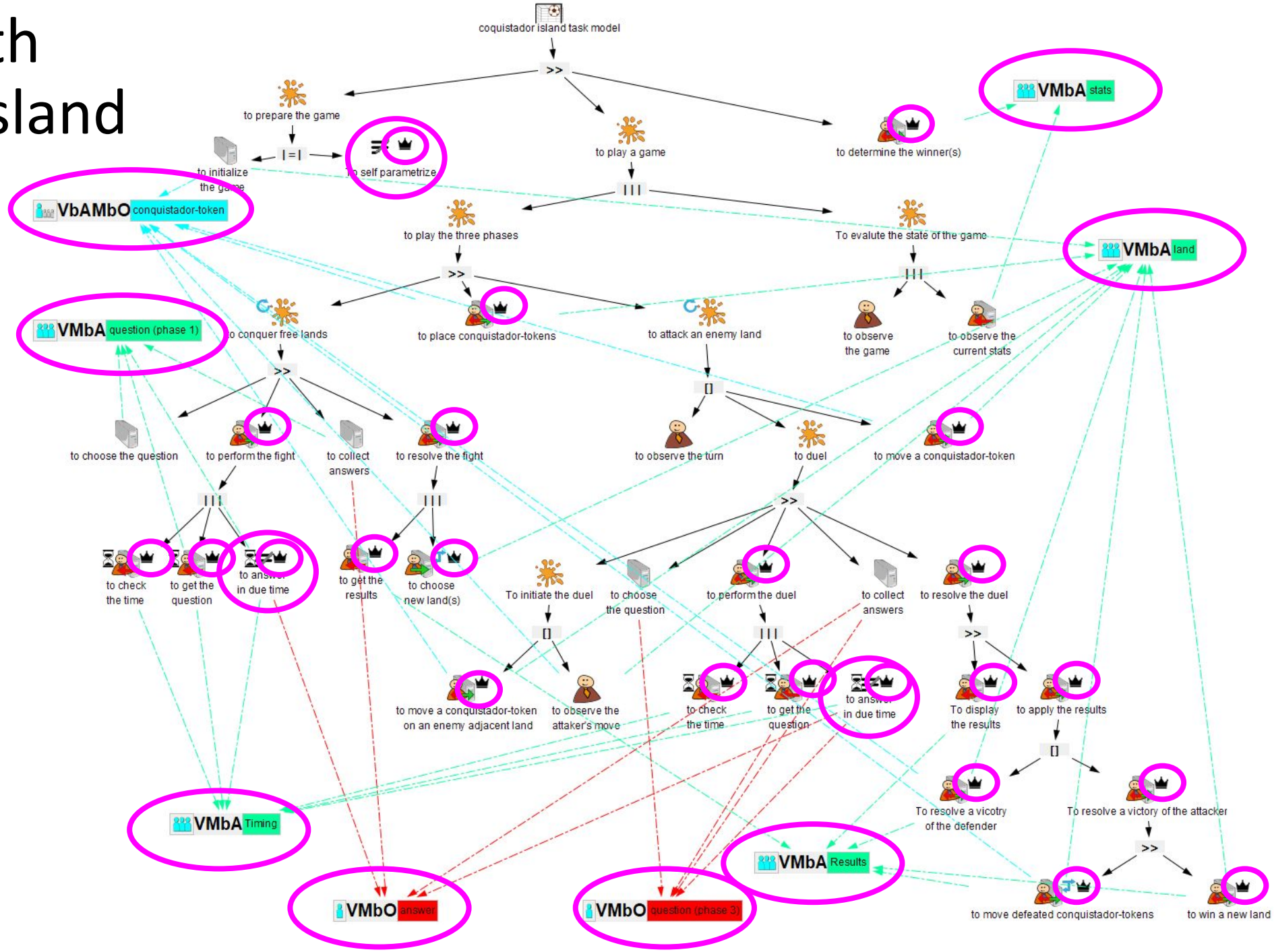

# Design Process : Distribution step

| Règles | |
|---|---|
| DR1 | For each task assignment to a device, determining whether it is within an existing suitable territory or whether to create a new one |
| DR2 | Assigning data (text) input tasks to a private territory |
| DR3 | Assigning tasks handling private data to the pre- ferred device for private territories |
| DR4 | Assigning tasks handling public data to the pre- ferred device for public territories |
| DR5 | Assigning unassigned tasks to devices according to the assignment of the previous or the next task |

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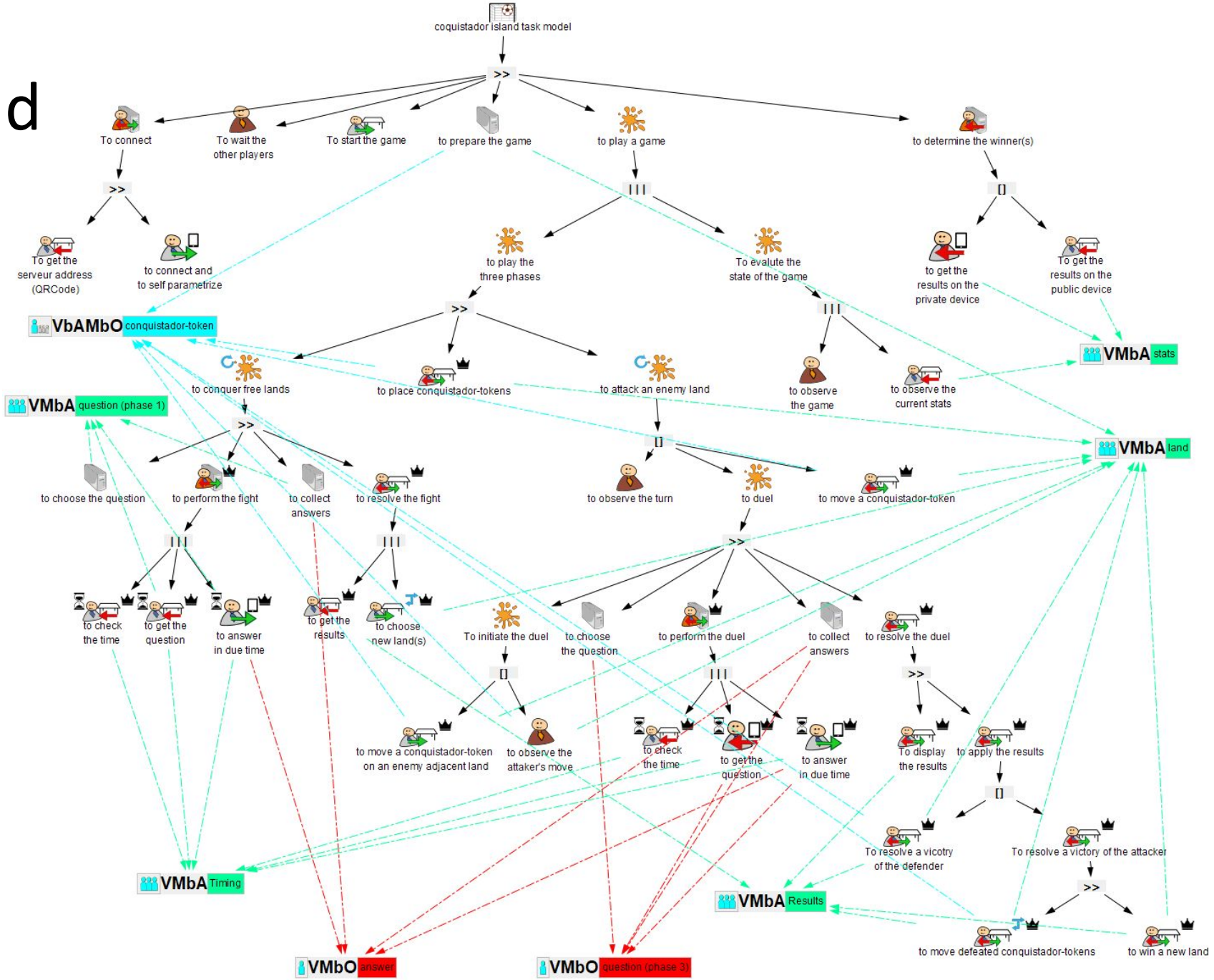

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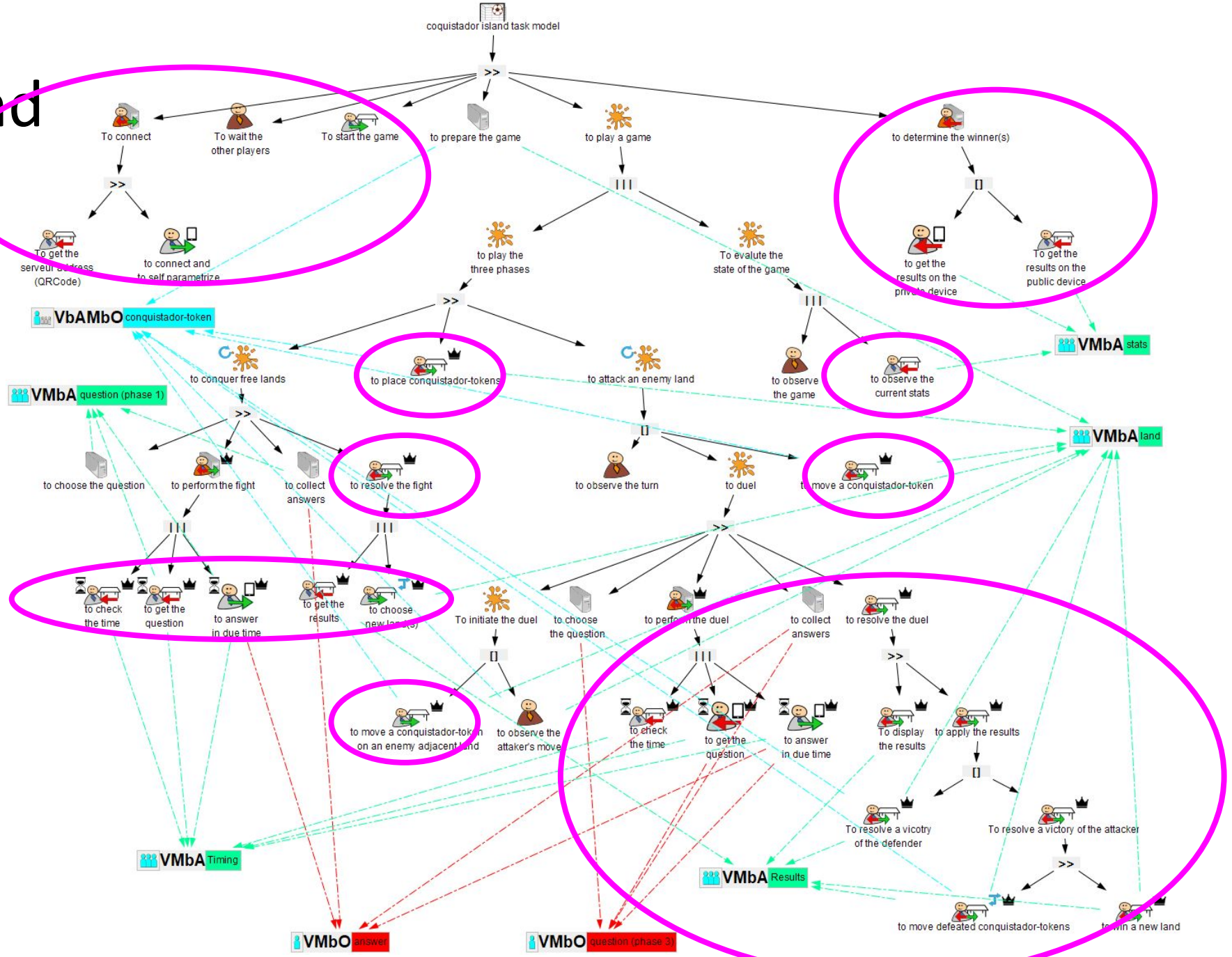
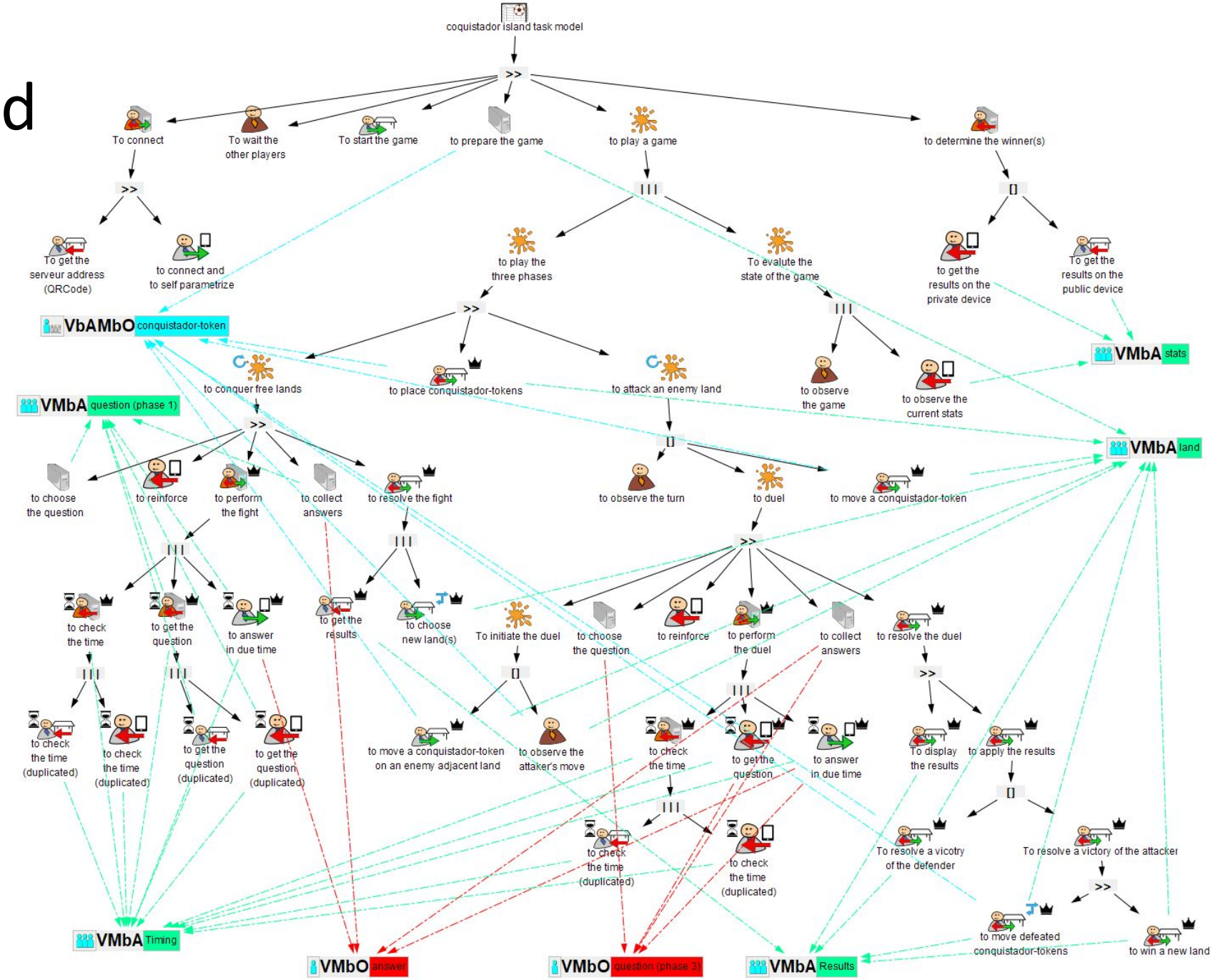


# Design Process : Balancing and transition rules

| Règles | |
|---|---|
| BR1 | If assigning certain tasks to the central device changes the gameplay, then those tasks can be moved to the personal devices |
| BR2 | If the public interactive device is overloaded, major tasks (see IR3) should be given priority |
| TR1 | If there is a device change between two consecutive tasks, then one of these task may be replicated on the other device |
| TR2 | If there is a device change between two consecutive tasks, then a reinforcement feedback may be added |
| TR3 | If there is a change of devices for two (frequent) consecutive tasks, then it is possible to move one of the two tasks from one device to another |

# Example with Conquistador Island



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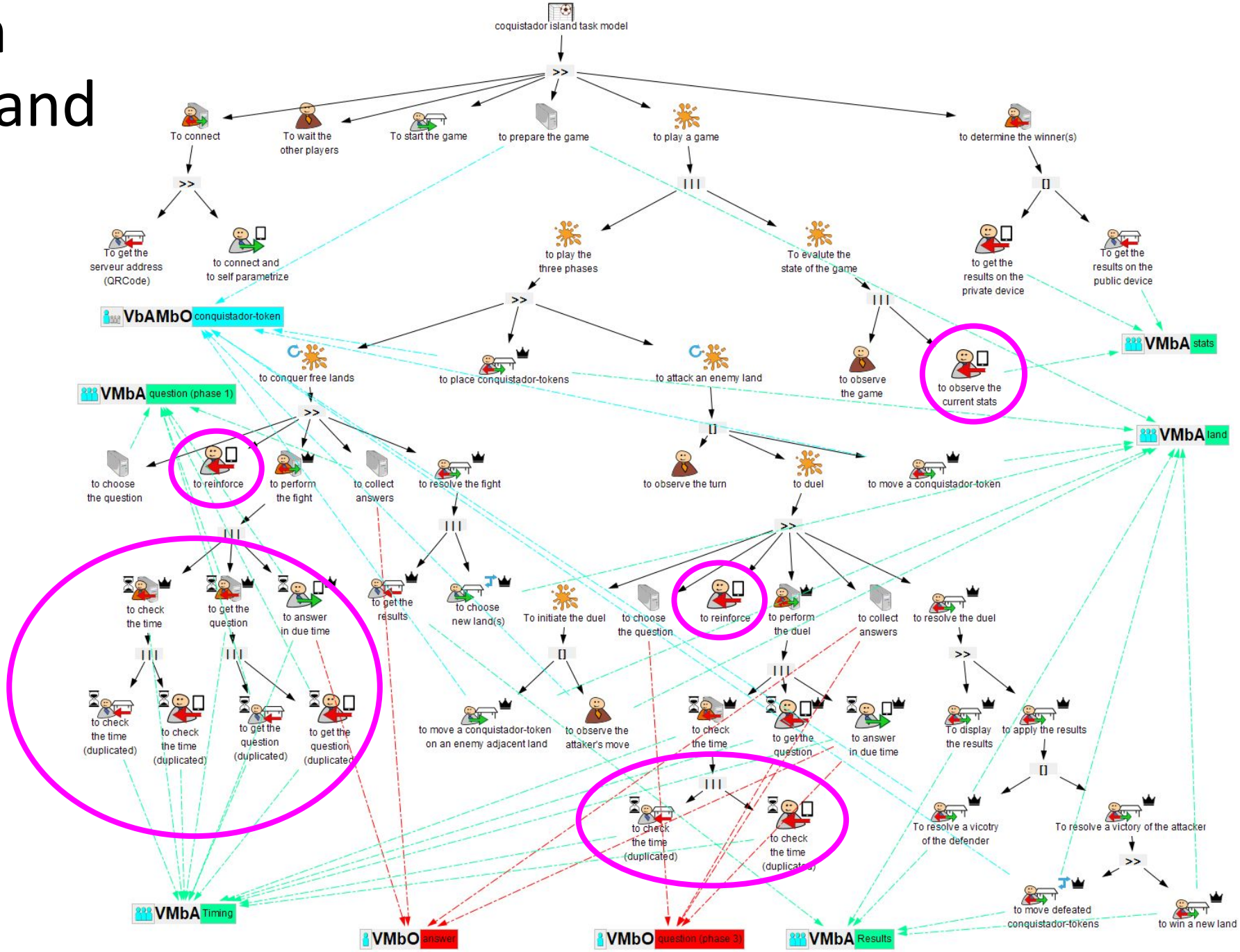

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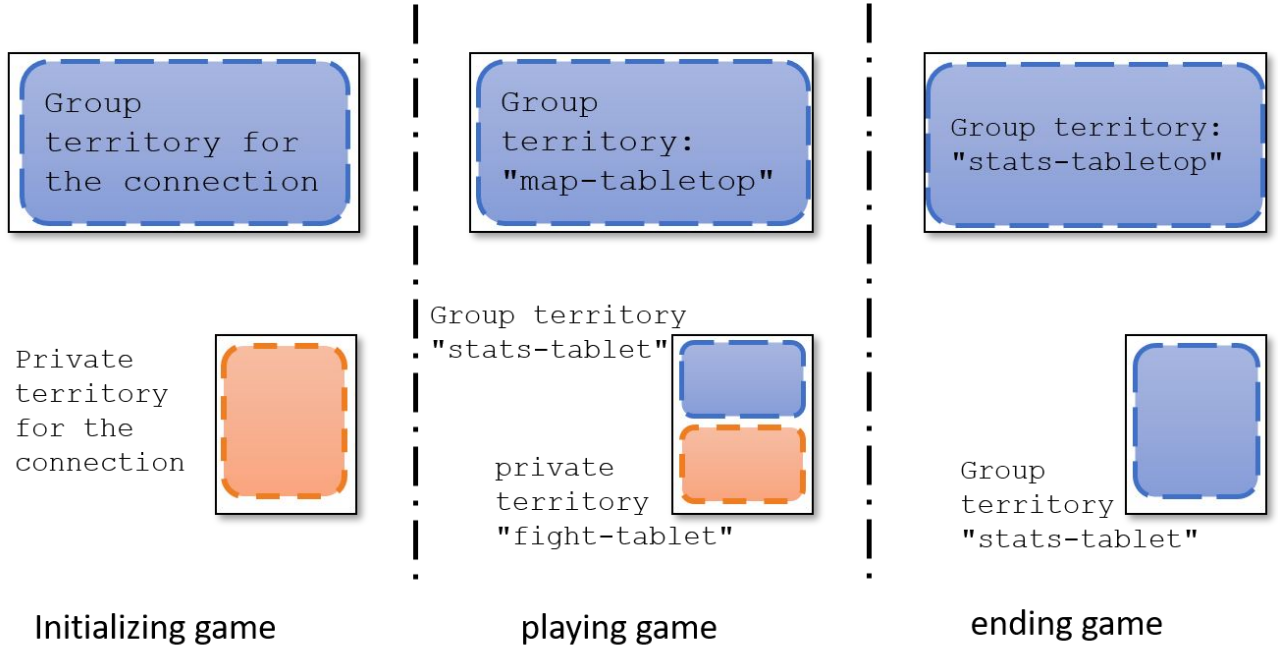
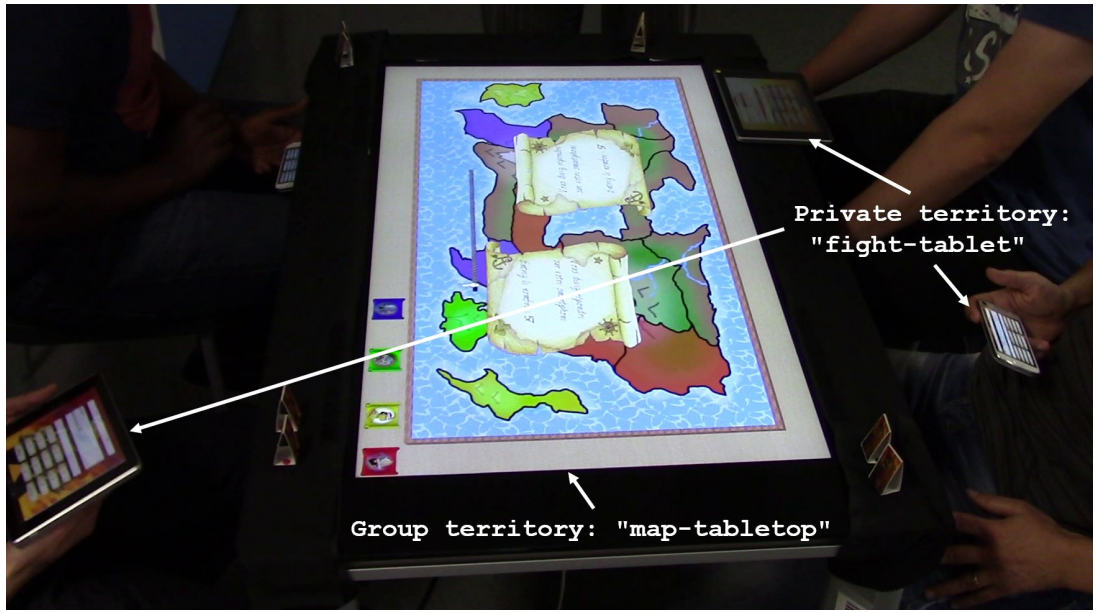
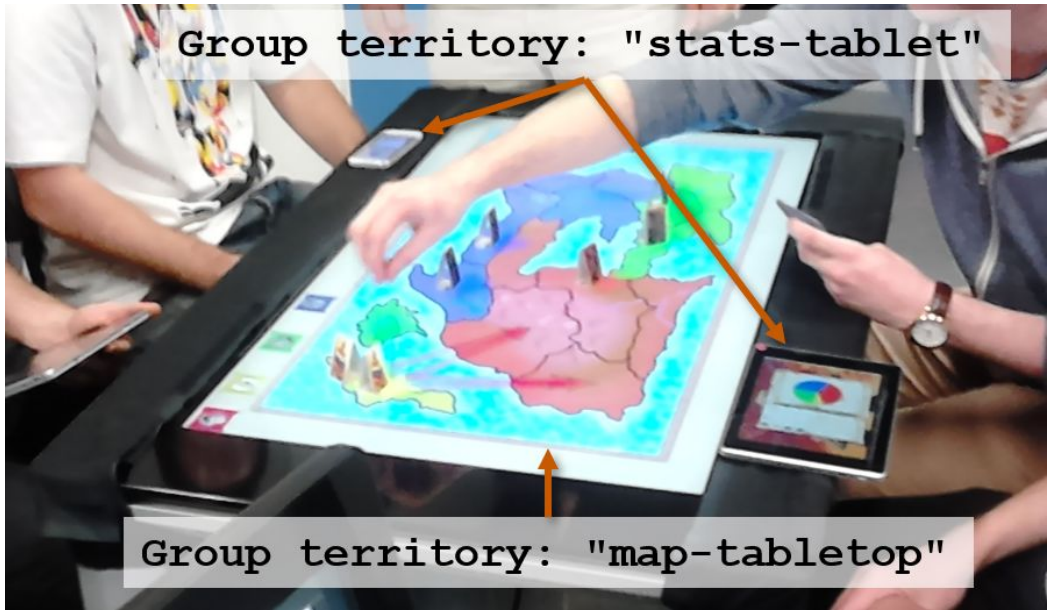


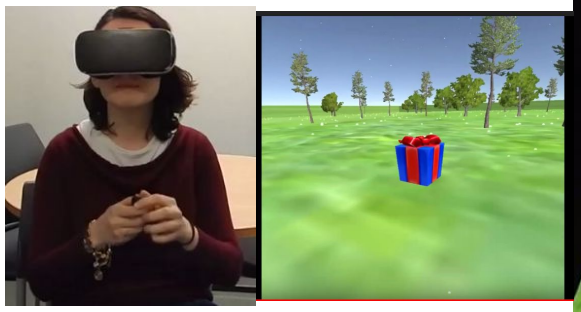



# Perspectives…

- consequences of layout on the distribution

- extending territory from 2D on a screen to…
  - … 3D in the physical environment



  - … sharing different (points of) views