

Decision support tool for containerization problems

Introduction

- Examining an optimal configuration for the **containerization level** of the sourced products using a new modular dimensioned container concept named **NMLU (New Modular Load Units)**.
- Addressing the business case of a supply network with a set of plants, a cross-docking distribution center and a set of store zones with various demand levels.
- Comparing the transportation and handling costs at each level of the supply network for the two following cases: (1) **The current packaging scenario** and (2) **the NMLU packaging scenario**
- Developing a **decision support tool** to address the NMLU's impact on supply chain performance in terms of the handling and transportation costs.

Motivation

As-Is packaging

Context

Capacities' exploitation

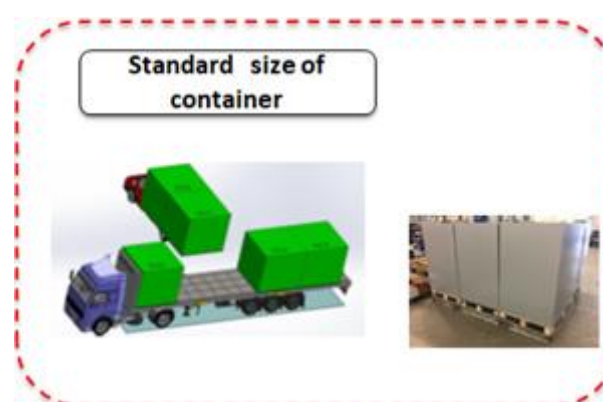
- Products' quantities are not optimized compared to containers capacities
- Containers' handling and transportation cost is high
- Loading and unloading time is high

Operational costs

The way containers are designed and supplied is not economically sustainable for the company

GOAL

Improve the design, handling, and transportation of containers from the supply sources to the stores in terms of economic and ecological performance



NMLU packaging scenario

VISION

Packaging using NMLU

Optimize sequentially for each product:

- The sizes of boxes (tier 2) to synchronize with the demand level
- The choice of the best size of containers (tier 4) to handle

Dimension ?

Product?



Capacity?

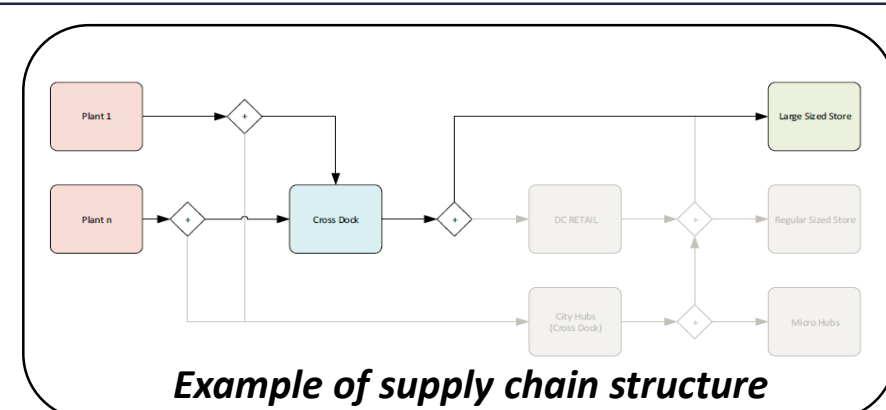
Impact?

Design?

- ✓ Encapsulate goods in modular dimensioned container to increase efficiency,
- ✓ Minimize the operational costs
- ✓ Optimize the size of handled containers

Methodology

- Given the structure of a supply chain network



The company can compare the As-Is and NMLU scenarios regarding:

1

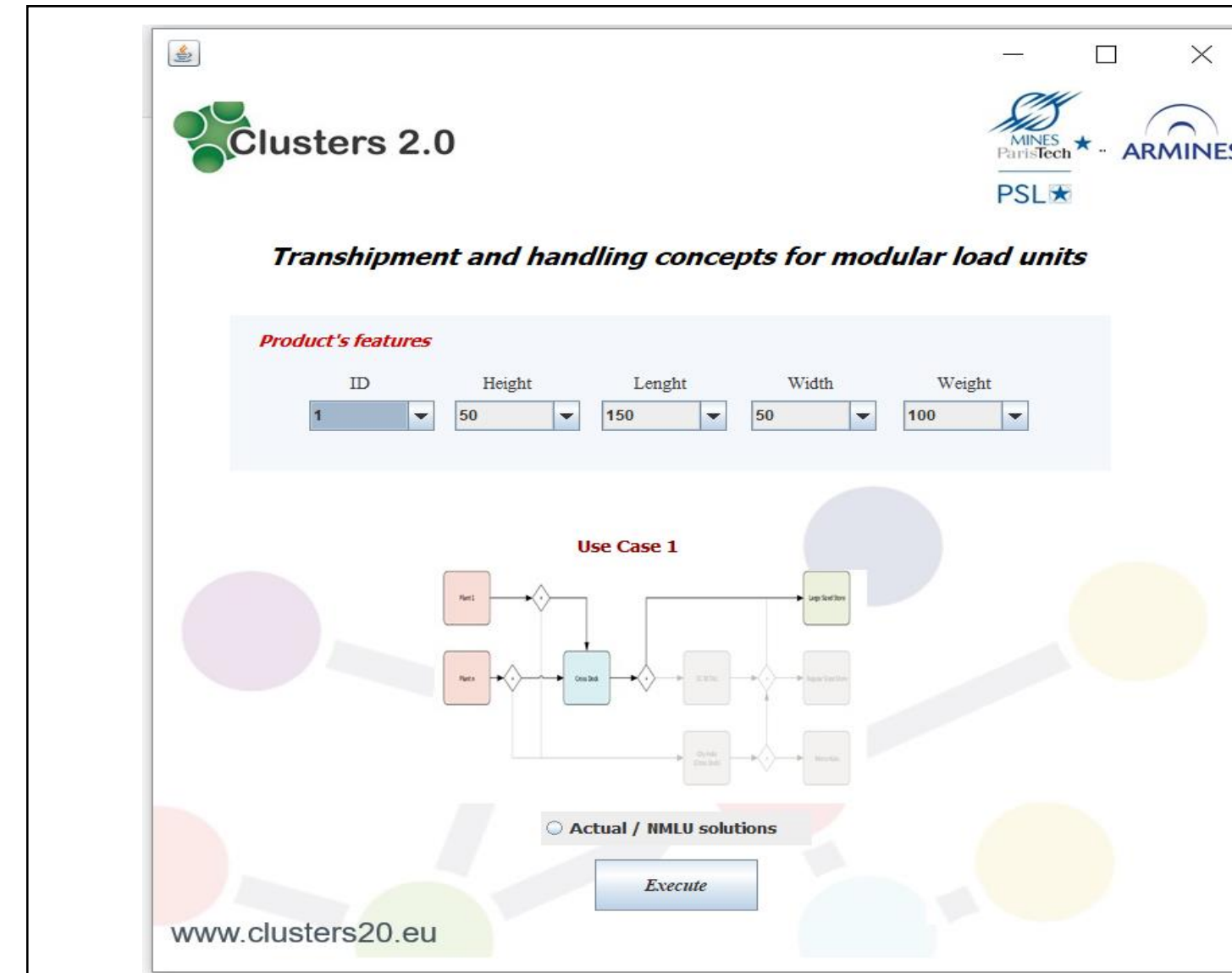
The transportation costs

2

The handling costs

NMLU-Decision Support Tool

Main frame of NMLU's tool

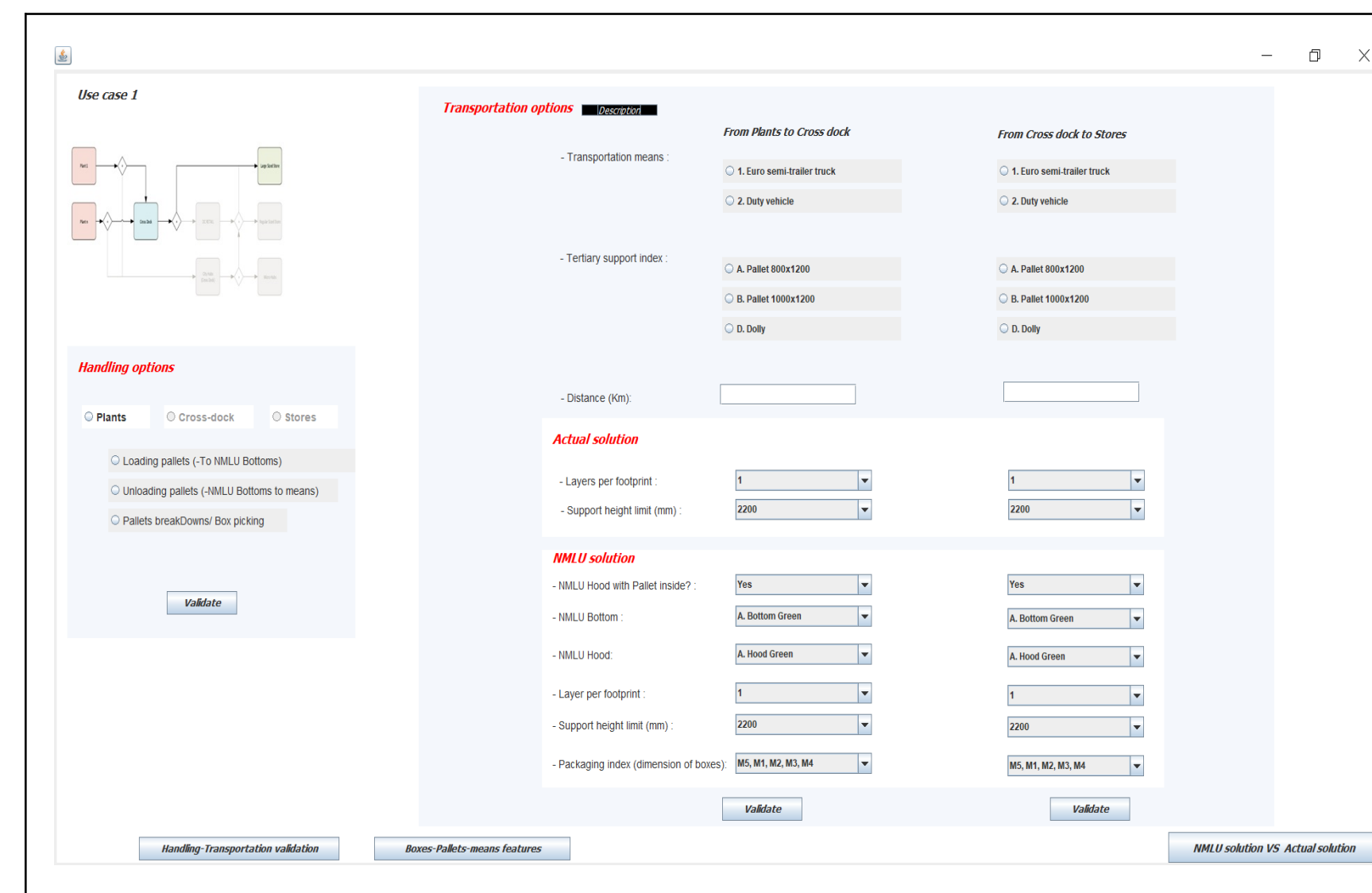


Frame 1

Users select:

- The product to be shipped
- The features of the product
- The supply chain structure

The trip planning

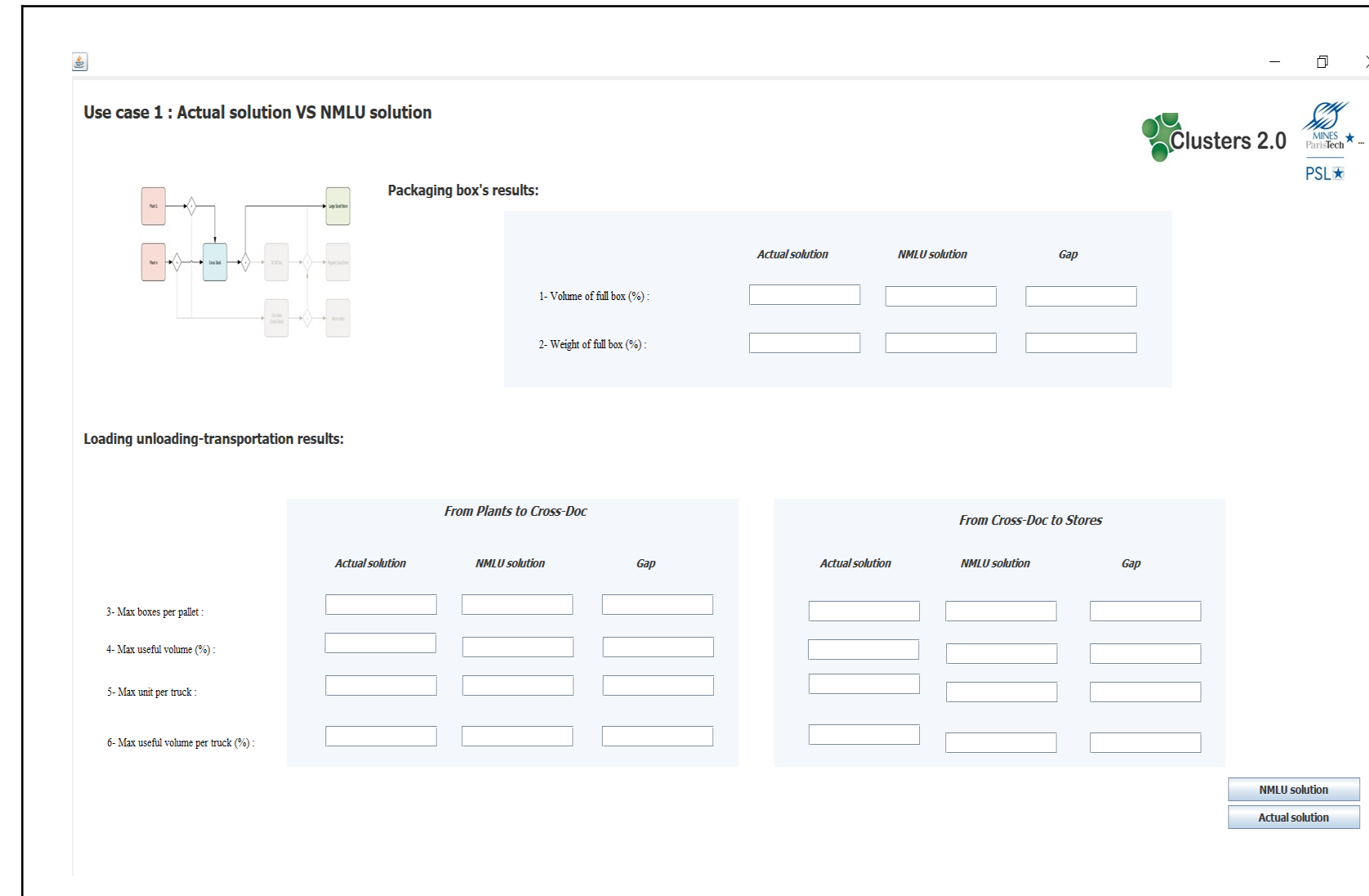


Frame 2

Users select for each level:

- The handling options
- The transportation options

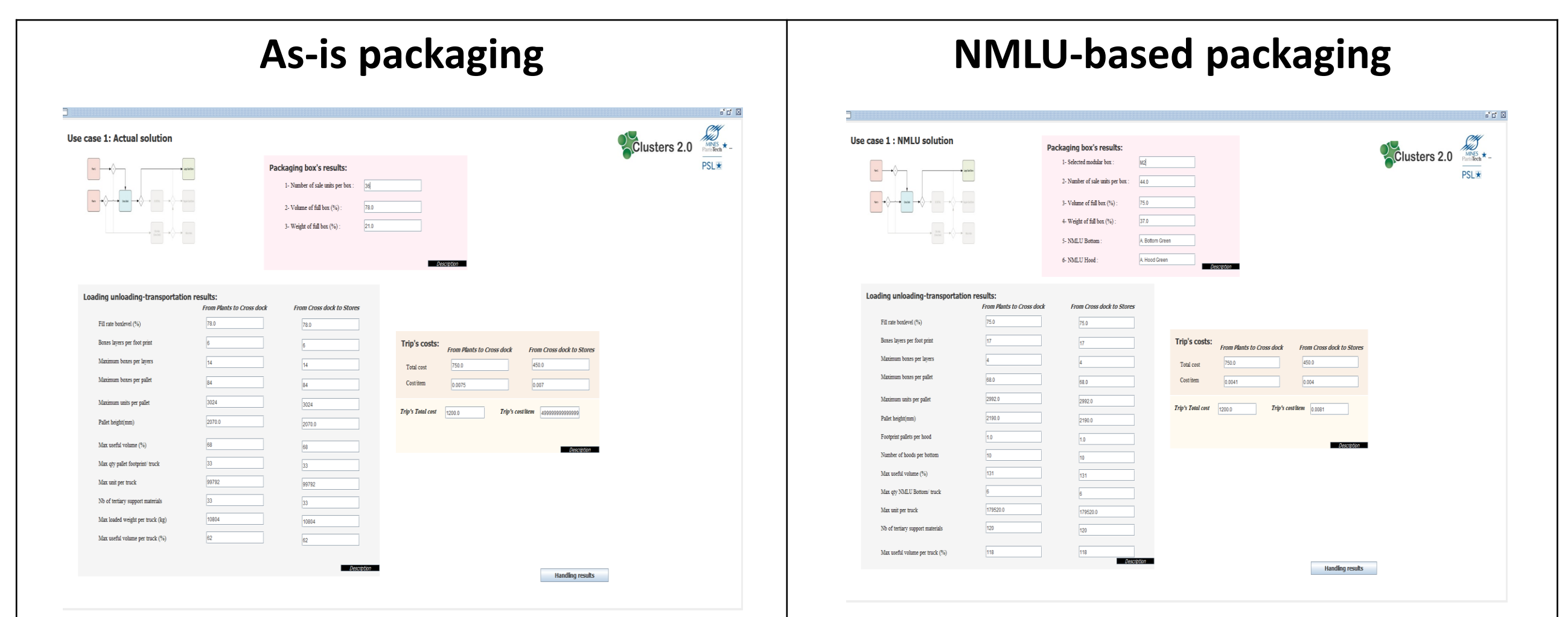
Actual VS NMLU results



Frame 3

- Compare transportation and handling costs for actual and NMLU packaging scenarios

Handling and transportation results for each scenario



Conclusions

- ✓ A packaging problem considering the positioning of boxes at particular containers is studied
- ✓ A decision support tool addressing the NMLU's impact on supply chain performance is developed
- ✓ A significant diminution of the unused containers' volume was observed when we compared the as-is and NMLU packaging scenarios

