UNIVERSITÉ DE LORRAINE

4ᵗʰ Workshop on Service Orientation in Holonic and Multi-Agent Manufacturing

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Session title:**Physical Internet Simulation and Modelling - PISM**

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Short presentation: the Physical Internet (PI, π) was presented by B. Montreuil as a response to the unsustainability of today's logistics systems (www.physicalinternetinitiative.org). The aim is to reverse the actual situation on three points of view:

- From an economical perspective, the goal is to unlock significant gains in global logistics, production, supply chain and transportation.
- From an environmental point of view, a reduction of the logistics induced global energy consumption, greenhouse gas emission and pollution is expected.
- From a societal perspective, the goal is to enhance the quality of life of the different actors (e.g. truckers, logistic workers…) implied in the logistic systems, and to better serve the needs of the world's population.

The term Physical Internet exploits a metaphor from the Digital Internet, which is based on routers transmitting standard data packets under the TCP-IP protocol. A core enabling technology to make the PI a reality is the encapsulation of goods in modular, reusable and smart containers, called π-containers. The π-containers range in modular dimensions from the size of a large cargo container to the size of a small box. The ubiquitous usage of π-containers will make it possible for any company to handle and store any company's products because they will not be handling and storing products per se. Instead they will be handling standardized modular containers, just as the Digital Internet transmits data packets rather than information/files.

The concept of the Physical Internet is still in its infancy age and numerous research issues must be addressed before the Physical Internet and Interconnected Logistics become reality. Here are some examples:

- Designing π-containers able to support decisional activities via embedded intelligence
- The study of the impact of modular containers on shipped volume
- The study of the impact of this open network on the freight distribution
- The design of π-facilities, allowing the quick and flexible transfer of the π-containers. This design must take into account the scheduling of the resources (trucks, conveying systems…) and the routing of the π-containers
- The study and the design of an open information system to monitor and manage π-containers flows
- The decentralized control of logistics operations

In this context, the aim of this session is to present key recent advances in the modelling and simulation in the field of Physical Internet.

Keywords: Physical Internet, Interconnected Logistics, Simulation, Modelling, Intelligent products, Holonic and multi-agents systems.

Important dates:
- Full Paper Submission: May 22, 2014
- Notification of Acceptance: June 22, 2014
- Final Paper Submission: September 8, 2014