

Learning Networks

connecting people, organizations,
autonomous agents and learning resources to establish
the emergence of effective lifelong learning



Learning Technology Development Programme 2003-2008
Educational Technology Expertise Center (OTEC)

Rob Koper, april 2003

Text available at: www.learningnetworks.org

OpenUniversiteitNederland

Position of the Programme

Related to OUNLs mission:

- Development & Delivery of *Innovative* Higher Distance Education for *Lifelong Learners* in *collaboration* with other institutions and networks
- Frontrunner in *innovation* of education.

Related to OTECs mission:

- Perform Research, *Technology Development*, Implementation and Education into Educational Technology field. *Four Programmes*.

Within the Academic field

- Learning Technologies; Educational Technology eLearning

Objective

Develop a coherent set of new learning technologies (tools, specifications & models) to establish a new effective, efficient, attractive and accessible approach for higher, distributed lifelong learning, called *learning networks*.

Network in the interpretation of:

1. Network of interacting, heterogeneous lifelong learners, experts, tutors, learning resources and tools in some knowledge domain
2. Network of interacting distributed devices (e.g. computers, mobiles)
3. Network of interacting providers for lifelong learning resources and services (institutions, libraries, publishers, associations, companies, ...)

Some key issues

- Put the (lifelong) learner center stage
- Establish interactions between distributed actors and resources that are not possible today in an efficient manner. Efficient means:
 - Increase interactions of learners with learning support resources (e.g. increase feedback), without increasing (or better: decreasing) the workload for the staff members involved.
- Main instruments:
 - Models, principles and rules to establish self-organized, distributed lifelong learning
 - agent technologies to support the actors in the learning process (learners, tutors/experts, developers) and
 - interoperability specifications and standards (e.g. for portable learner dossiers, competencies, architectures, etc.)

Programme themes

1. *Learning Networks Integrated*
Overall functionality, use-cases, models & principles
2. *Make & Use Activities Nodes in Learning Networks*
How to Make and Use Activity Nodes in Learning Networks
3. *Learner Positioning in Learning Networks*
How to position new and existing learners in a Learning Network (e.g. measure and map existing competencies)
4. *Navigation in Learning Networks*
How to navigate in Learning Networks, using & exchanging learning tracks, learning routes and learning patterns in Learning Networks

Programme

Theme 2: Make & Use Activity Nodes

project project project
project project

Theme 3: Learner Positioning

project project project
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Theme 1: Integration

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Theme 4: Navigation

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General Outcomes

1. *Artifacts* (technological objects: tools, instruments)
2. *Specifications* (describing technological activity, i.e. methods, procedures and standards specifying how to make & use interoperable artifacts)
3. *Models and rules* grounding the functioning of artifacts and specifications (technological knowledge)

Outcomes are *published and public domain* (journals, standards, books, chapters, PhD thesis, reports with detailed documentation, prototypes made available via websites as open source)

Examples of specific outcomes

Tools (e.g. agents), models & specifications:

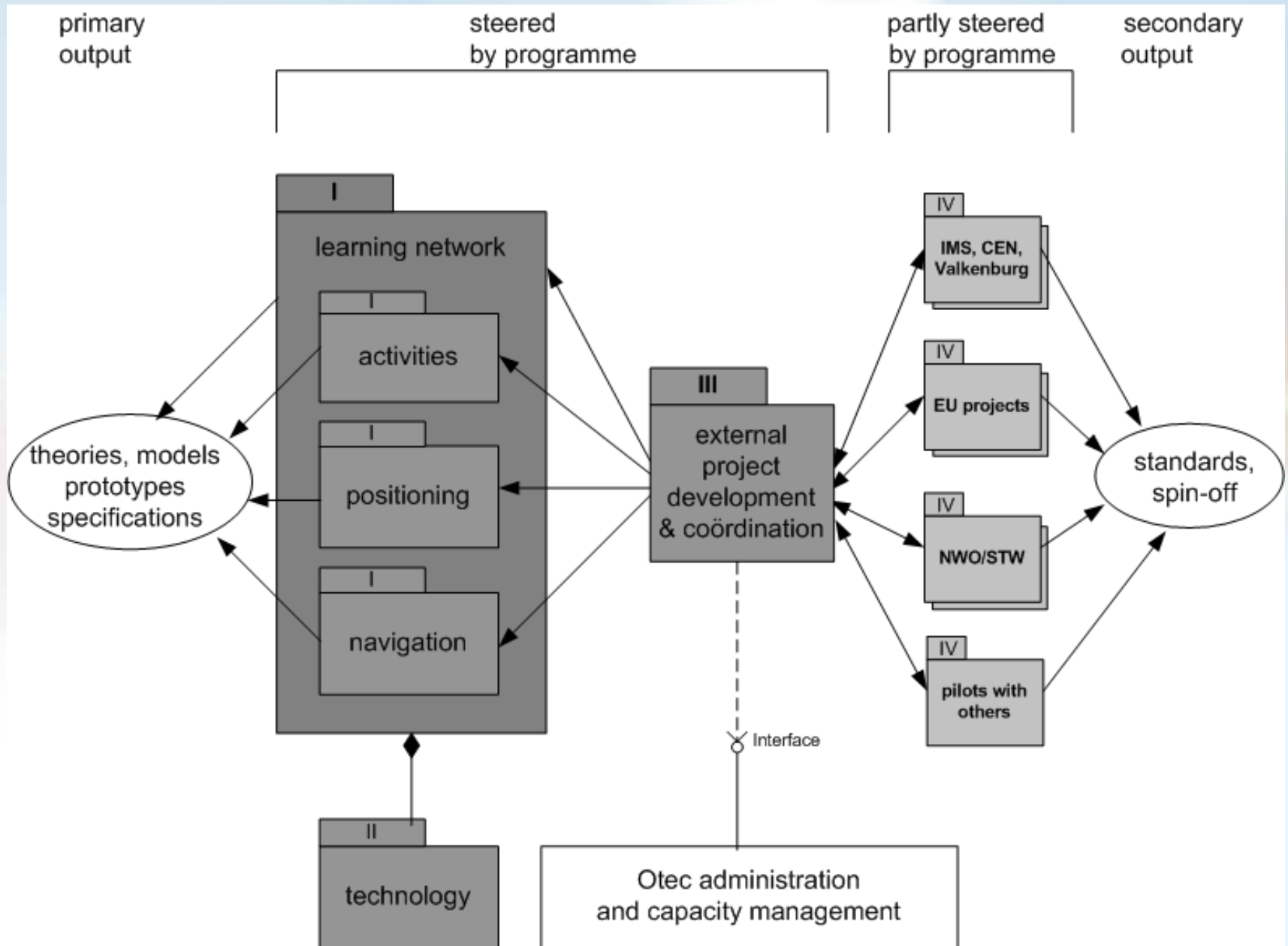
- That support learners (and tutors) to plan a learning route in a learning network (given current learner position and a learning goal)
- That support tutors (and learners) to provide feedback to learners on their productions (designs, reports, thesis, essay questions, etc.)
- For the positioning of learners in a variety of curriculums/learning networks independent of institutions to facilitate lifelong learning (and to prevent future 'omboekingsoperaties')

Examples (continued)

Tools, models & specifications:

- for the effective & efficient development and (re-) use of activity nodes (by developers, tutors and learners)
- That provide feedback about the relative position of the learner in the network
- To match learner profiles to support the navigation decision process (what to do next).
- For the use of tracks, routes, maps and patterns in learning networks
- Architectures for an interoperable learning network (eLearning architectures)
- ...

Structure of projects



Framework

- Theoretical foundations
- A first elaboration
 - Use case model
 - Physical network
 - Logical structure

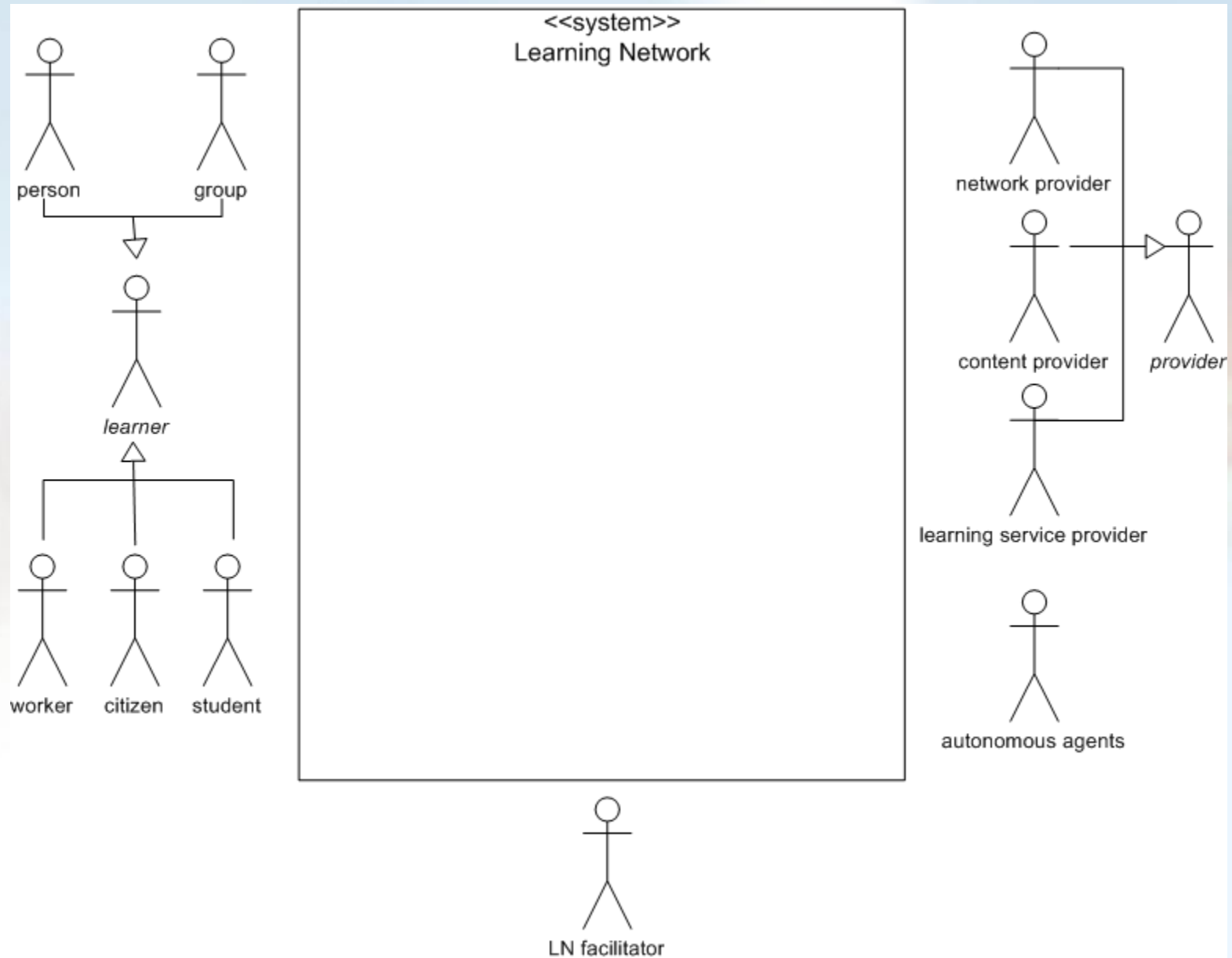
Definition of a Learning Network

The use of ICT networks to connect people, institutions, learning artifacts and autonomous agents in such a way that the human network becomes self-organized and will give rise to effective lifelong learning in a certain knowledge domain among the participants

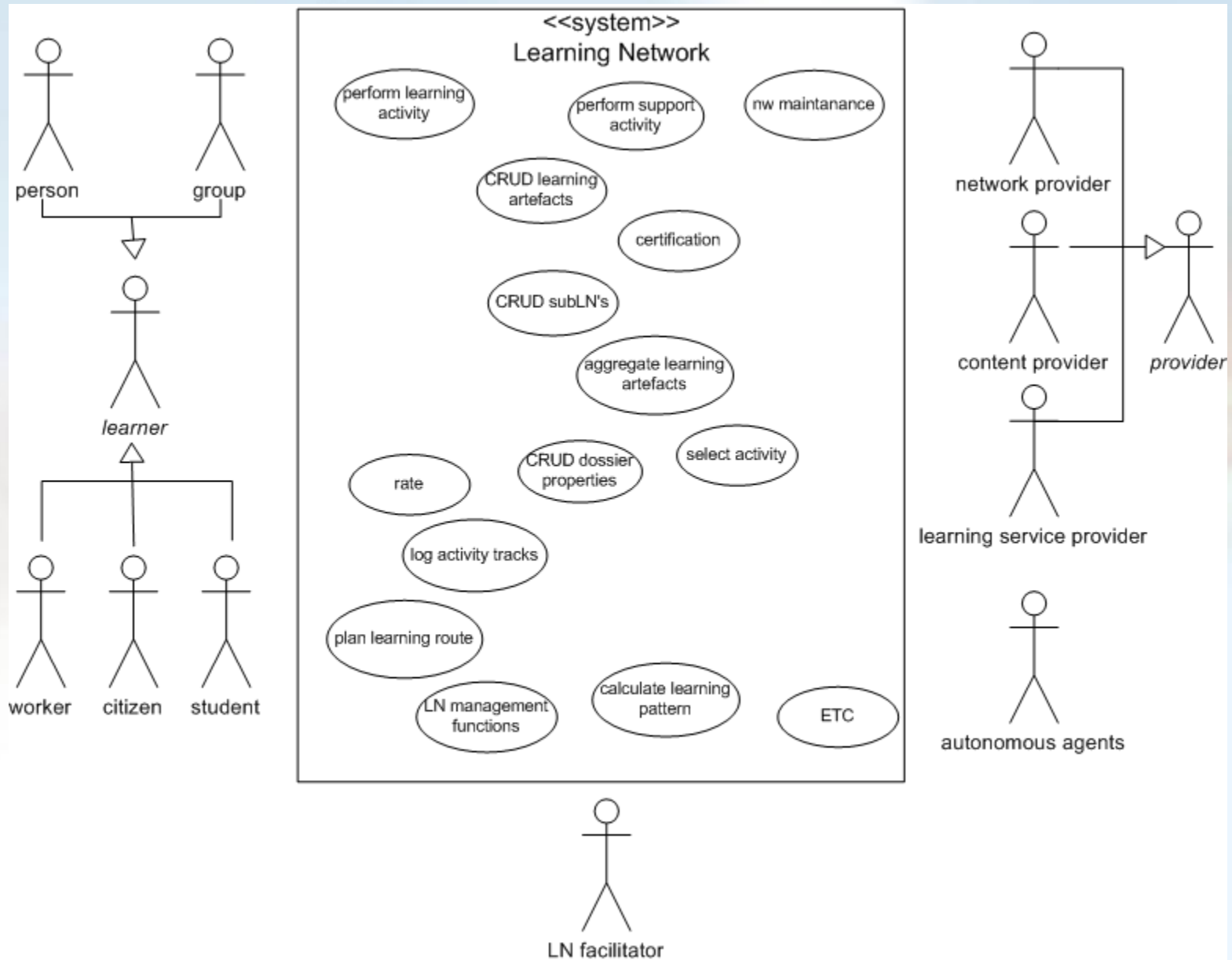
Grounded in work on

- Life long learning theories & models
- Networked/distributed learning theories & models for higher education (e.g. distance education; technology enhanced learning; eLearning; (a)synchronous learning networks; ...)
- Autonomous Agents (distributed Artificial Intelligence in Education)
- Complexity theory, self-organization, emergence
- Self-directed learners and groups
- Knowledge Management
- Organization theory
- ...

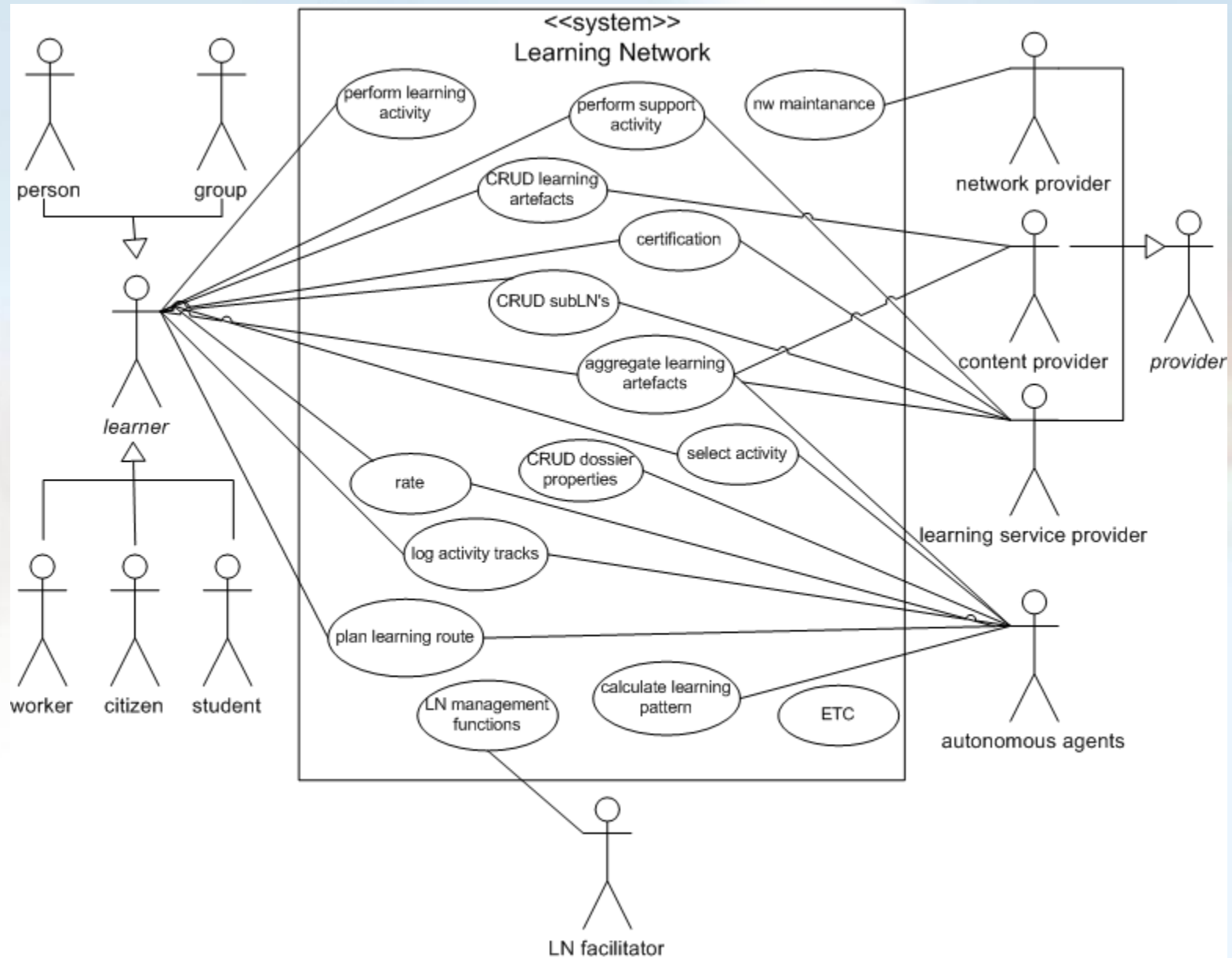
Initial Use Case Model



Initial Use Case Model



Initial Use Case Model



connected networks

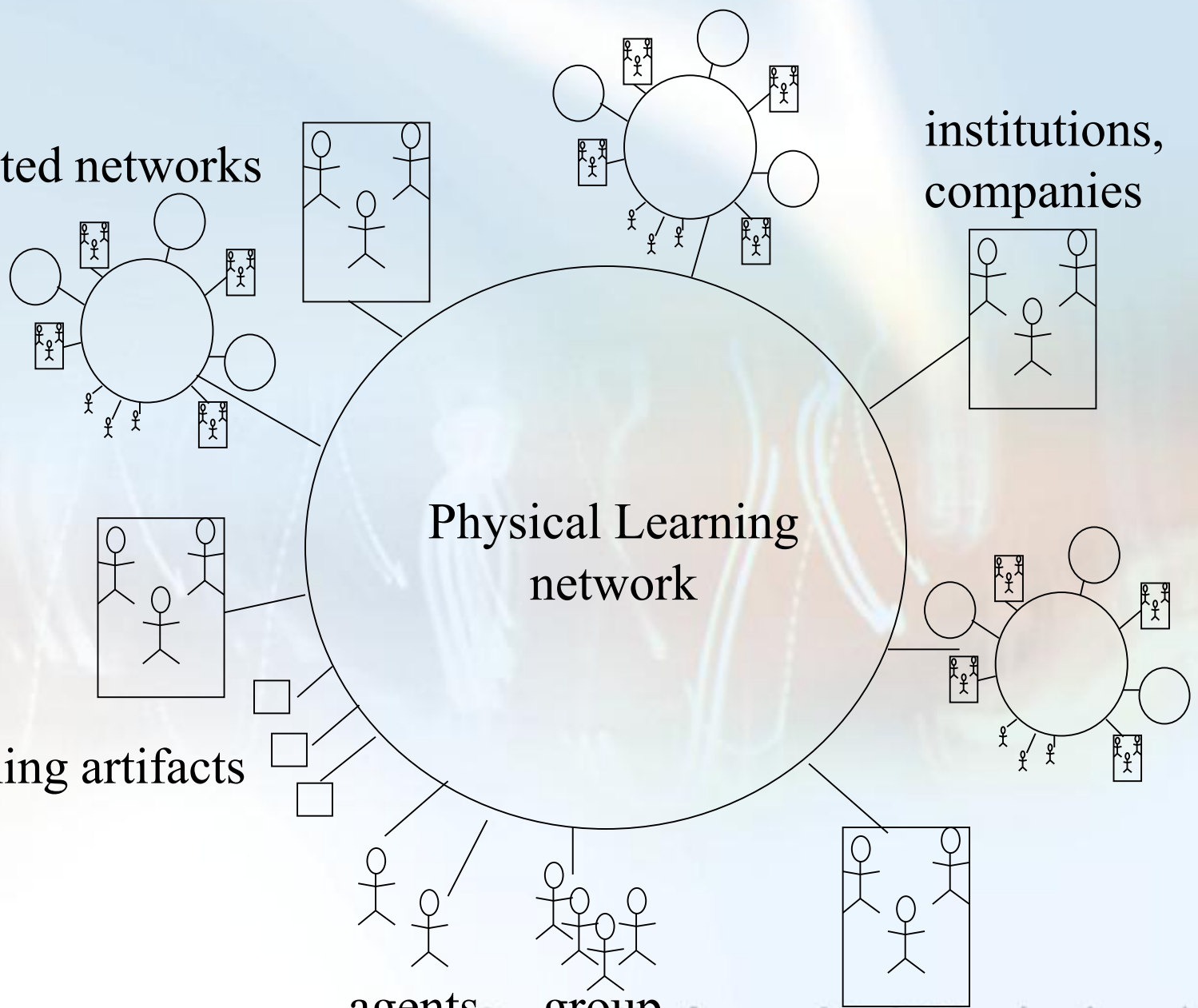
institutions,
companies

Physical Learning
network

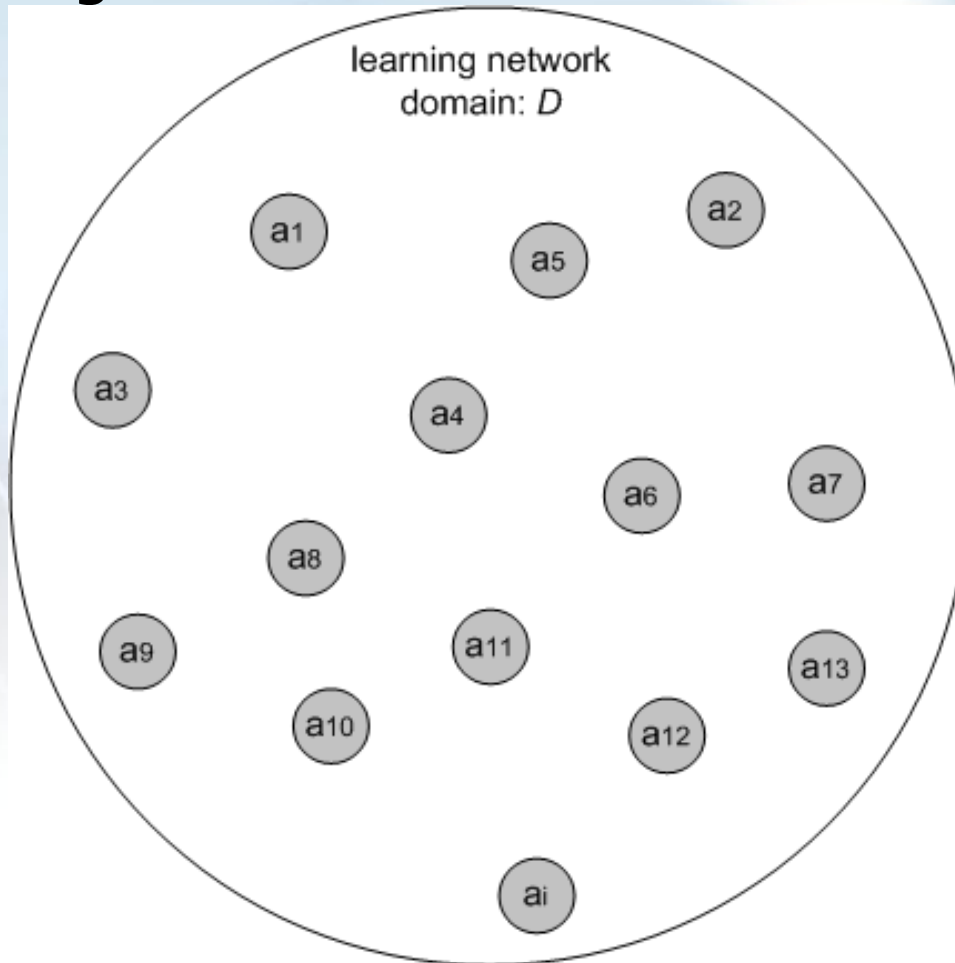
learning artifacts

agents

group



A logical *learning network* can be represented as a connected, directed graph of '**activity nodes**' within some knowledgedomain

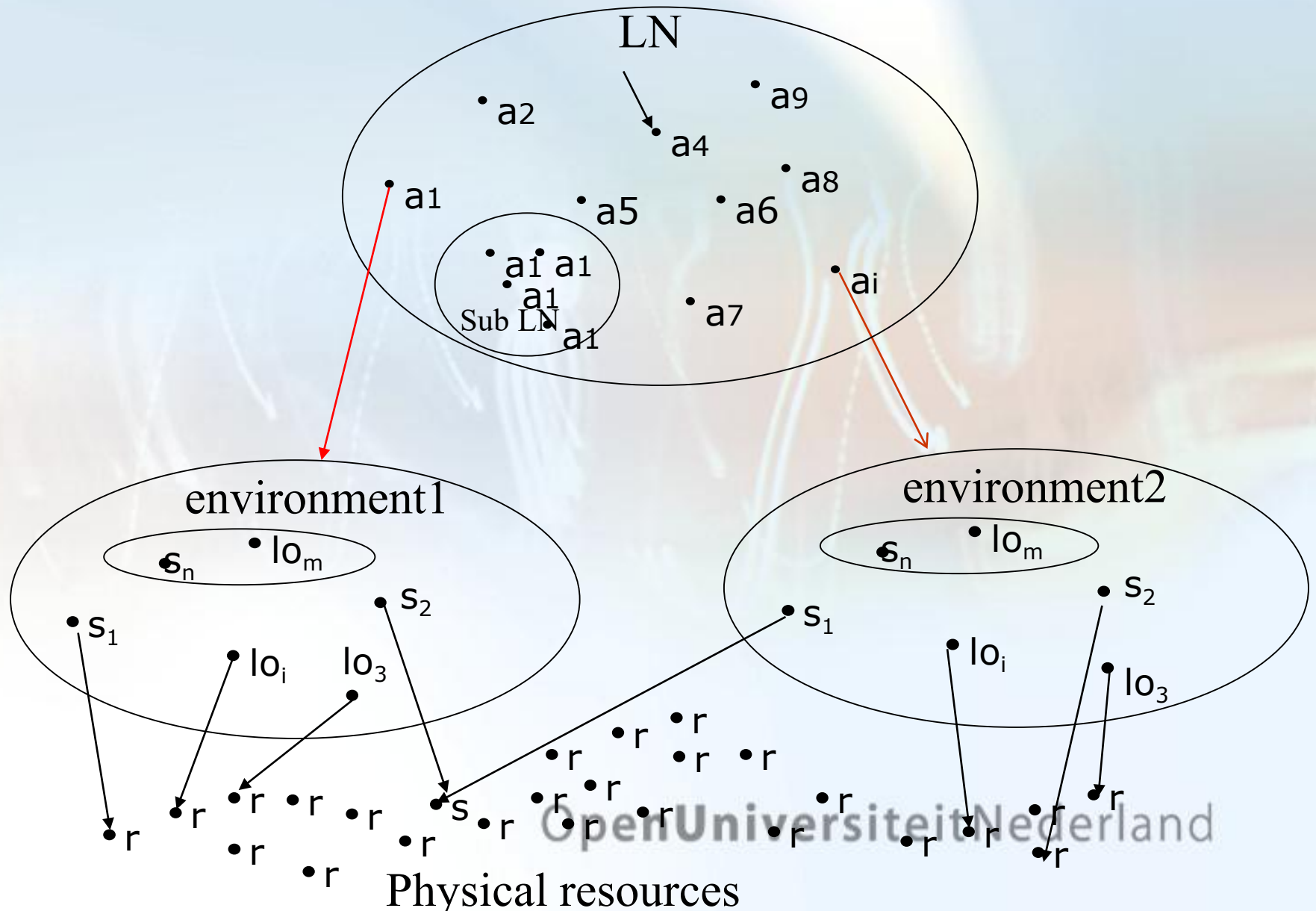


learning network = set of activities = $\{a\}$

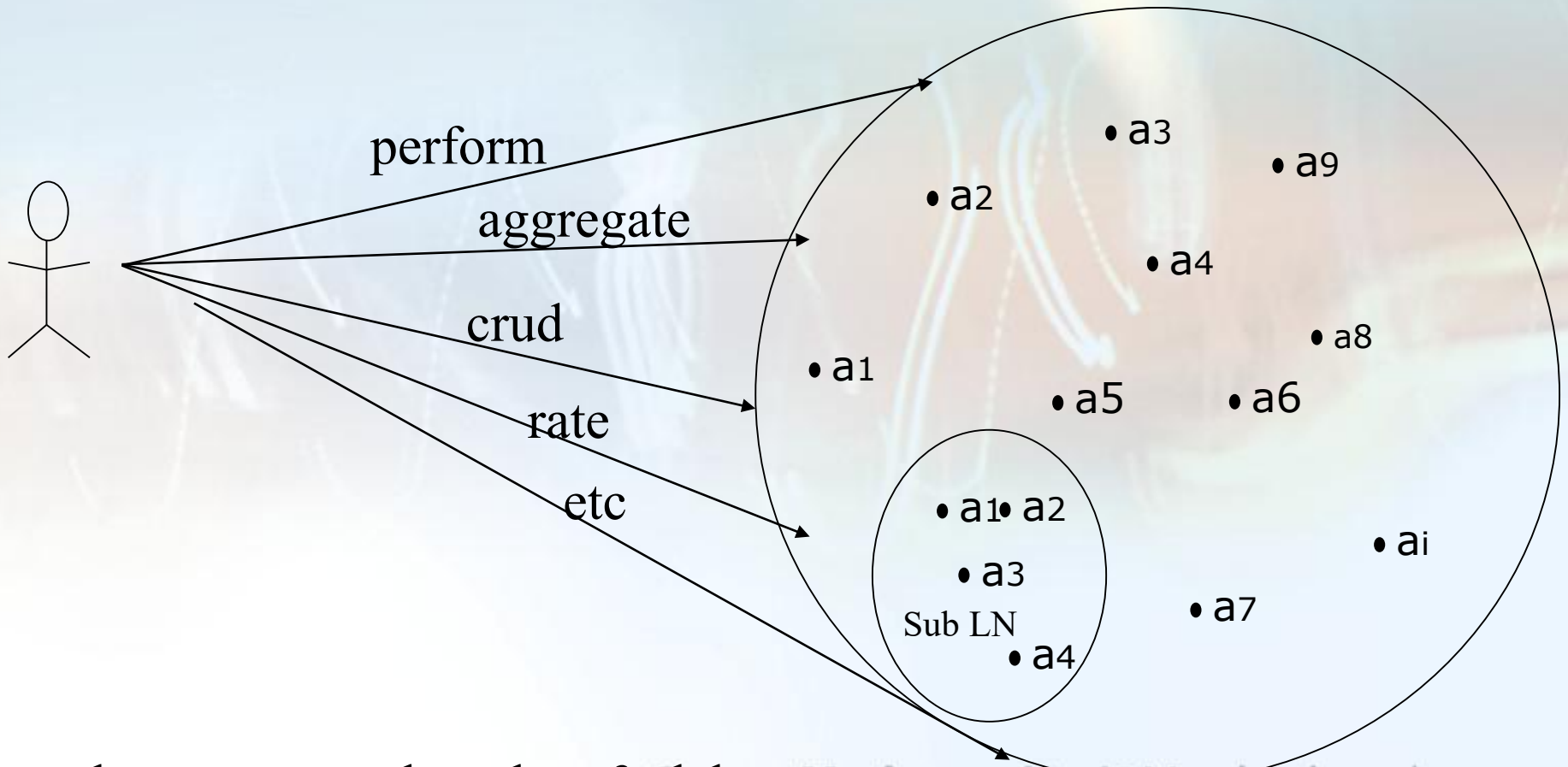
'Activity Nodes' in a learning network are modeled with IMS Learning Design

1. Activity Node =
the smallest reusable instructional unit (synonym:
study task)
2. Every activity node is described as a
unit of learning containing:
 - exactly one learning activity, possibly with
some sub-activities specifying preparatory
activities, the key activity and some closing
activities (in an activity structure)
 - zero or more support activities

An activity is related to an *environment* with learning objects and services, referring to physical resources

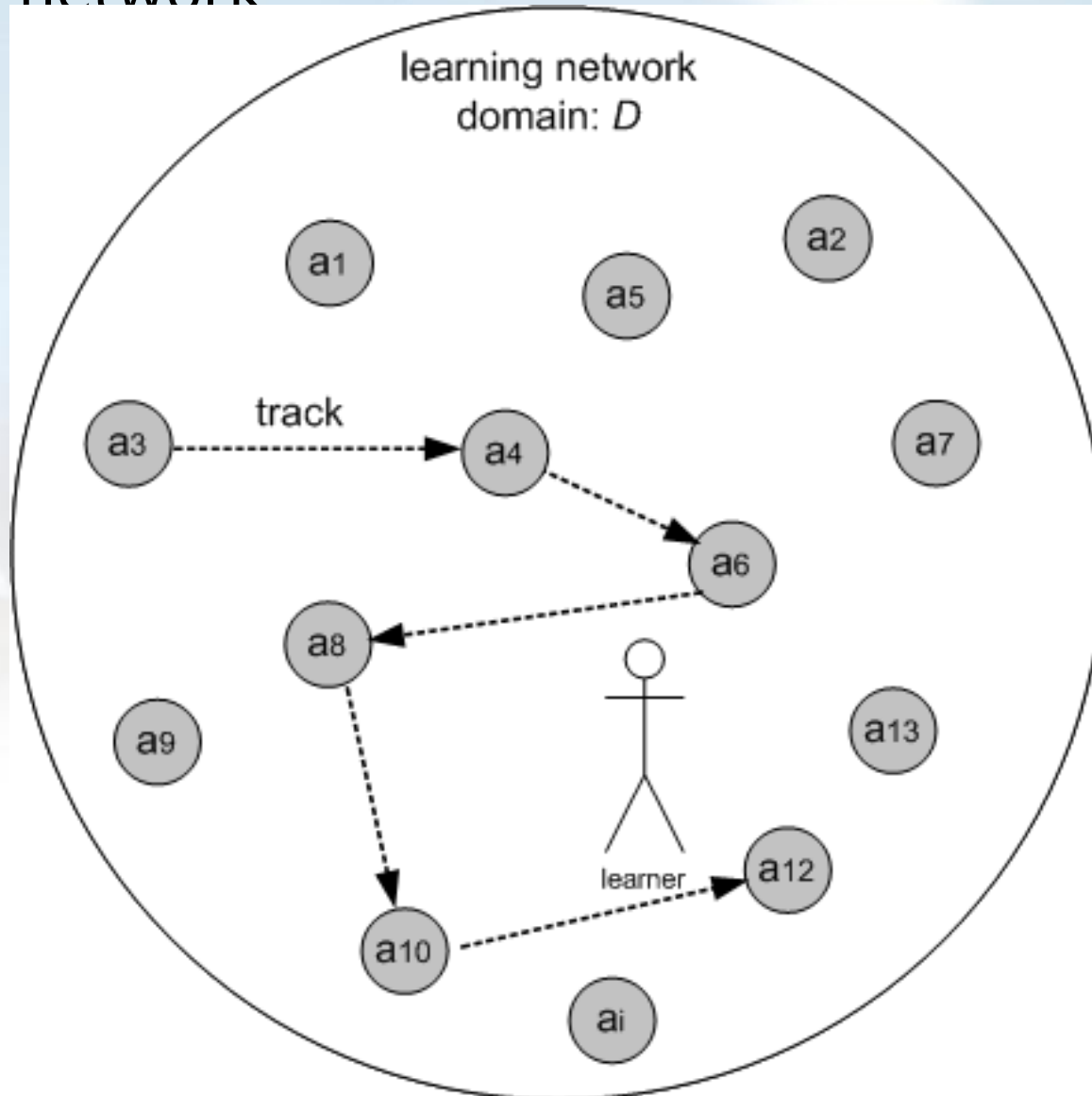


users can



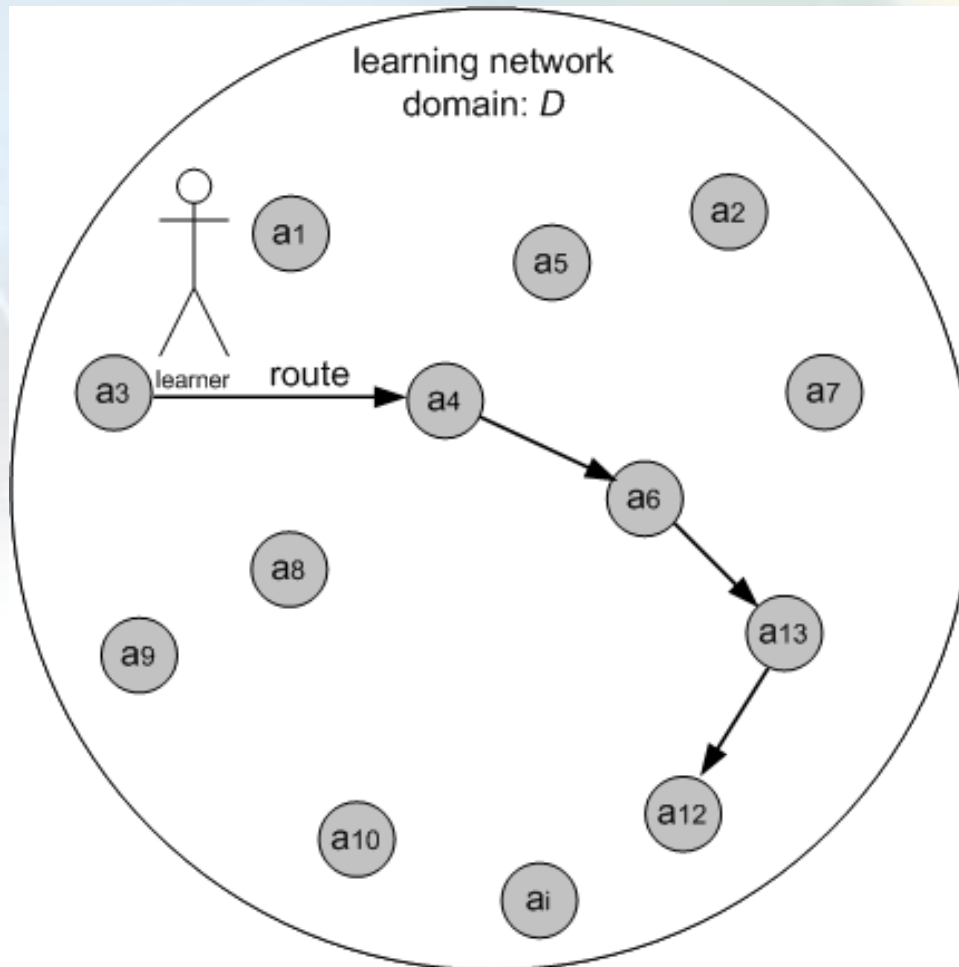
crud = create, read, update & delete

A *learning track* represents the path between activities that one learner has followed in the learning network

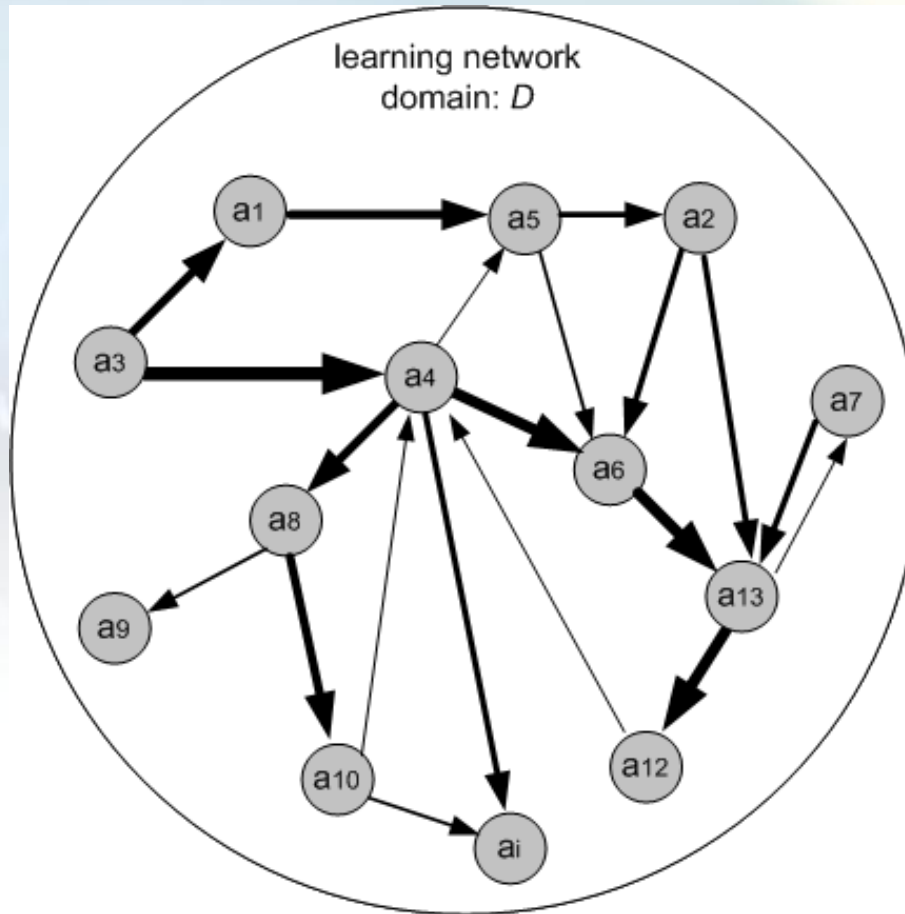


A 'learning route' (*syn. learning plan, unit of learning*) is a planned path in the network, aggregating activities: into ordered sets:

- individual routes (personalized units of learning)
- routes for groups (regular courses and curricula)



A *learning road* is a frequency labelled edge, with $\text{frequency} > 0$, indicating the number of tracks of many learners. A *learning road map* is a graph of all the nodes and the roads



Line thickness reflects frequency. OpenUniversiteitNederland

A *learning pattern* is a generalized learning path (e.g. for inductive planning of units of learning)

End