

openAdap.net: A Technical Perspective

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Motivation

Public entities as well as business companies generally provide software based on tailored needs and platforms too narrowly designed.

The richness circulating in the **cyberspace is poorly exploited** because of technical difficulties to share the know-how.

Transdisciplinary applications for newly developed methods of data processing are often limited due to the absence of software accessible to users specialized in other fields of competence.

A **delay** appears until new methods of data processing become available for application across fields of competence and often even within its own field.

The existence of **barriers** in the flow of data access and data processing increase the overall cost of information processing and **restrict its availability to developing countries**.

Objectives

Our project is aimed at breaking the aforementioned barriers, thus **bridging the digital divide in data processing**.

The key is the development of a project that is **independent of a specific type of information**: openAdap.net is an Open Source software platform that provides flexible tools for linking and communicating among all pieces of data processing.

People who develop and provide new methods of data analyses are able to share their contribution and people who have data to process can access these services.

Avoid the "re-invention" of existing software and save time and expenses by the whole society and even prevent incorrect applications.

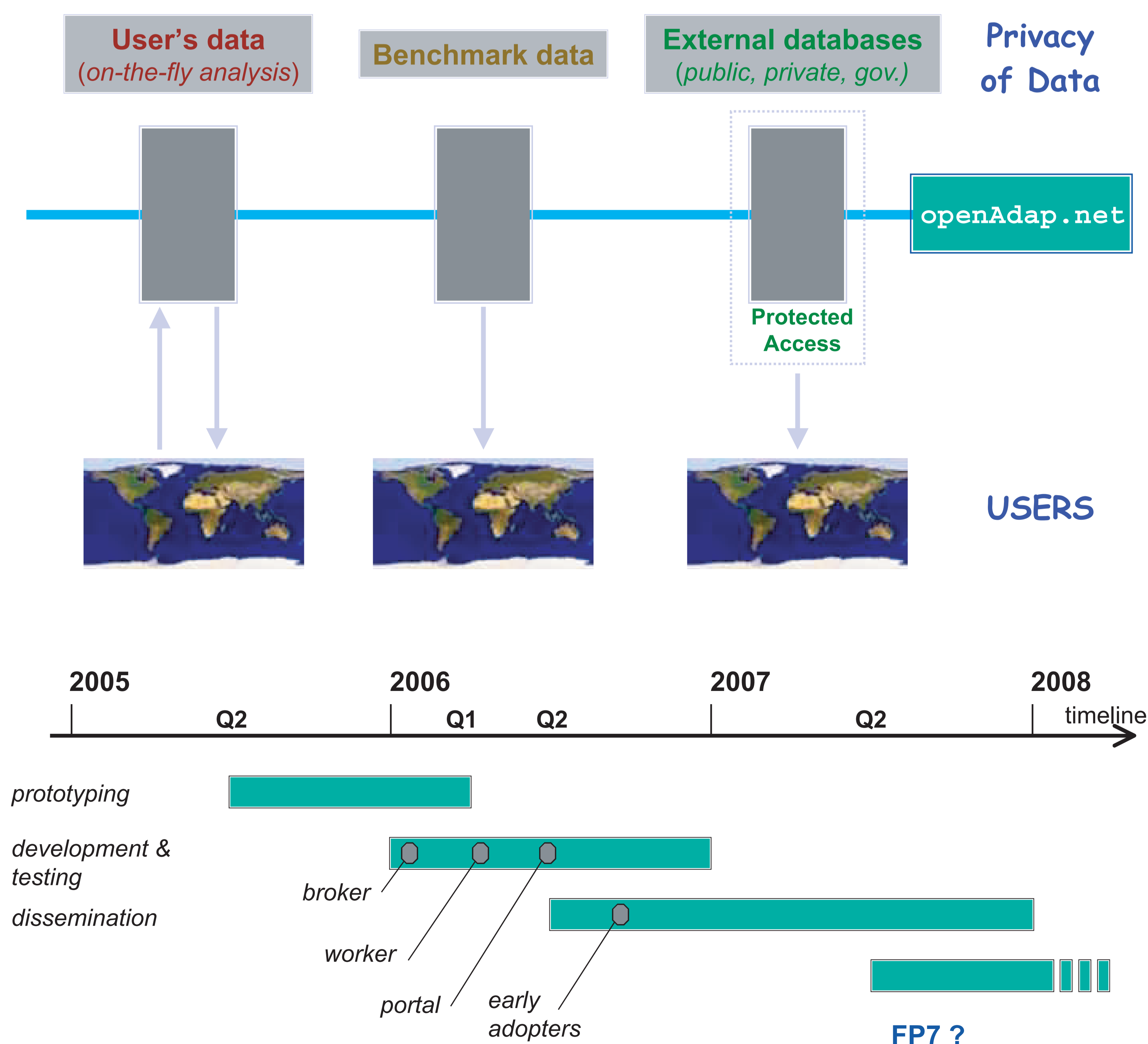
To provide a user-friendly framework for a **virtual community** where analyses and display of results, by means of current Internet browsers, can be obtained by distributing tasks over a network of computers.

To develop a new **openAdap.net protocol (oan://)** for field instrumentation and wireless communication over Internet.

Targeted Users

USER : people interested to process their own data or access data stored elsewhere (e.g. in a public database) and extract the results of their analysis.

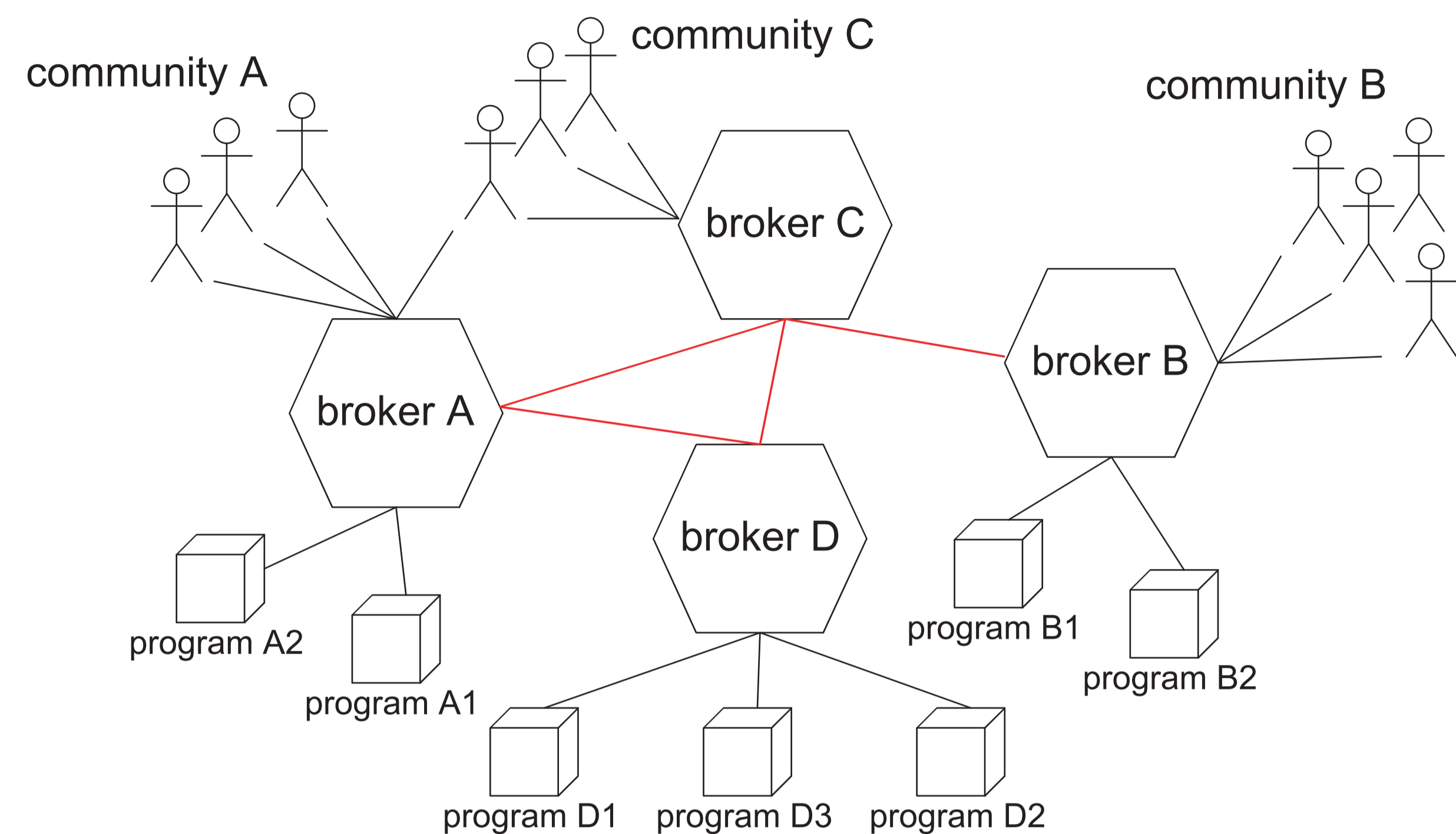
CONTRIBUTOR : people who would like to share their effort with the community, maintaining control and responsibility over their software. Authorship is guaranteed and the community can check and validate the applications.



Virtual Communities

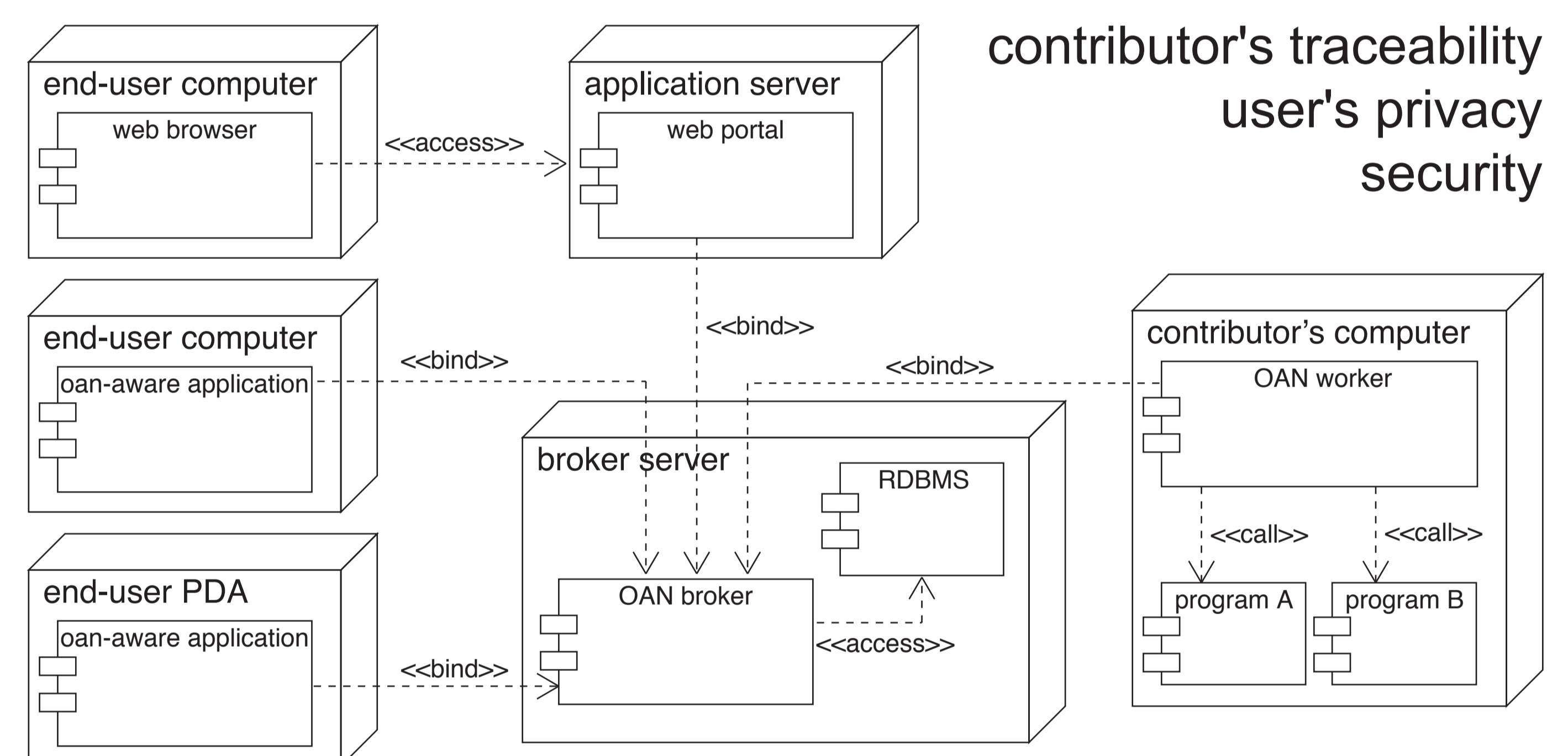
The communities build-up around common interests that are materialized by **sharing a common data format**.

Third parties from all over the world, SMEs in particular, can develop **added value services** (educational, commercial, governmental, ...)



Methodology

	Data treatment distribution	Hardware resource allocation	Hidden execution hosts	Applications sharing	Published application interfaced	Data sharing	Highly dynamic system	Transparent connections users ↔ resources
Grid	X	X	X					
Web Services			X	X	X	X		
P2P						X	X	X
openAdap.net	X	X	X	X	X	X	X	X



Outcomes and Conclusions

Concept proof and **feasibility** have been **validated**. A prototype is active and used on a daily basis by several research groups.

The **openAdap.net prototype** actually deals with multivariate time series in a suitable format for analyses originally developed in physics and successfully applied in financial forecasting and modeling of stock market, analysis of origin of glacial cycles, music, and neurological data in medicine.

Statistical analyses contributed by colleagues in Europe and Japan are made available. A broker deals with queueing batches of computations through Internet and retrieving their results.

Numerical output can be formatted for interpreted by a generic plotting program featuring interactive functionalities (libraries in C and Java are made available to contributors, under LGPL license).

Expression of interests have been committed and we are looking to broaden the Consortium towards the submission of a **FP7 proposal**.

A key element in the next stage of development consists in making the **brokers adaptive and dynamically interconnected** (like a neuronal network). The information will be processed and dispatched among all components following a set of **"learning" rules**, for example taking into account the computing load generated by specific tasks, the number of accesses, etc.

The rules themselves will evolve and **optimize** in an **unsupervised** fashion, thus allowing the emergence of dynamic links among the adaptive brokers. Emergence of nonlinear dynamics will make openAdap.net closer to the **complexity of a living organism**.