



ISBE Infrastructure
for Systems Biology
Europe

Infrastructure for Systems Biology Europe

Deliverable No: D3.1

“Intermediate report on the definition of
criteria and preliminary map of ISBE centres”

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Project funded by the European Commission under the Seventh
Framework program for Research and Technological Development



Project ref. no.	INFRA-2012-2.2.4: 312455
Project title	ISBE – Infrastructure for Systems Biology Europe
Nature of Deliverable	R = Report
Contractual date of delivery	Month 15
Actual date of delivery	Month 13
Deliverable number	D3.1
Deliverable title	“Intermediate report on the definition of criteria and preliminary map of ISBE centres”
Dissemination Level	PU
Number of pages	6
WP relevant to deliverable	WP3
Lead Participant	UvA
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Dissemination level: PU = Public, RE = Restricted to a group specified by the Consortium (including Commission services), PP = Restricted to other programme participants (including Commission Services), CO= Confidential, only for members of the Consortium (including the Commission Services)

Nature of Deliverable: P= Prototype, R= Report, D=Demonstrator, O = Other.

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Preamble

This report summarises the vision of the ISBE Steering Committee on the contours of the three types of ISBE expertise centres. It represents the shared vision on ISBE centres that will be used by the work packages in developing the ISBE infrastructure. This report is the result of Phase 1 of the WP3 road map.

As a next step, WP3 will develop - together with other WPs - a more detailed view on the expertise, structure and functioning of ISBE centres as an effective European infrastructure. Here, the results of the ISBE survey and input from stakeholders and experts will be taken into account.

The relationship between the three types of ISBE centres is depicted in Figure 1.

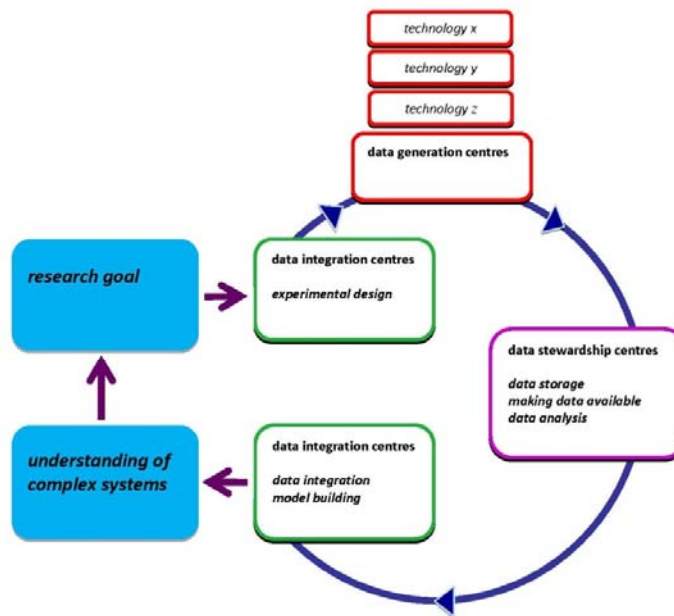


Figure 1: The systems biology cycle showing the elements that must be tuned to be able to perform Systems biology experience and the role the ISBE centres could play in this. Three types of centres are foreseen: *Data integration centres*, which provide expert knowledge in a wide range of modelling approaches and expertise in the combination of diverse data sets in quantitative and predictive models. *Data generation centres*, which give access to a wide range of high-end expertise and equipment essential for the generation of data sets that are fit for integration in quantitative predictive models. *Data stewardship centres*, which offer expertise in data storage, curation and analysis of different types of data sets and give access to all kinds of published data sets that are useful for systems biology. ISBE centres will be tightly linked and able to work together in supporting researchers to complete multiple systems biology cycles and thus giving deep insight into the functioning of complex biological systems.

ISBE expertise centres

1. What infrastructure will ISBE-certified centres offer?

- (network of) persons with specific expertise in the field of systems biology
- (network of) expertise in biological networks
- compute networks
- software and algorithms
- systems biology-oriented data generation and data stewardship
- data security (e.g. patient data and cooperation with industry)
- equipment
- teaching and training in the field of systems biology

2. General properties of all ISBE-certified centres

The central component of the ISBE infrastructure will be a network of interconnected ISBE centres that give access to high-end expertise in systems biology, together covering the complete systems biology cycle (figure 1).

- scientific and technological excellence
- subscribe to the vision and strategy of ISBE and make a long-term commitment to ISBE
- make high-end expertise and infrastructure available to investigators
- team up with other ISBE centres in the context of system biology-driven research programmes
- participate in high level training on data acquisition and modelling technologies and data handling and analysis
- contribute to the development and implementation of standards
- centres will be, or will be represented by, a legal entity that is able to enter into formal agreement with the ISBE central coordination/management
- centres will need to have the capability to provide one or more, internationally competitive services at the European level - it is anticipated that most candidate centres will be from pre-existing institutes with a significant history of robust capability service provision centres will need to be able to demonstrate sustainability of funding

3. What expertise and equipment will ISBE-certified centres made available?

ISBE-certified centres will provide a portfolio of services. This may range from ad hoc basic services up to long-term contracts with international research consortia and with industry. Europe-wide ISBE surveys will give input from the life sciences community about what expertise and services are needed (currently in progress).

a. data generation centres (focus on **data acquisition**)

Data generation centres have the following characteristics:

1. on demand data generation in fields of technologies to be specified based on system-biology needs of the life sciences community (to be analysed by ISBE surveys)
2. make available high-end equipment
3. contribute to technology development
4. able and willing to develop user-specified applications
5. dedicated to generate data sets that are fit for systems biology
6. acquisition of quantitative, high quality data sets
7. standardised data acquisition

b. data integration centres (focus on **modelling**)

Data integration centres have the following characteristics:

1. make available high-end expertise in modelling/data integration and experimental design
2. develop novel modelling approaches
3. develop user-specified modelling tools
4. involved in projects from their beginning (including experimental design)
5. support or carry out modelling projects (mostly in a project-specific collaborative manner)
6. due to the intellectual input that goes with modelling activities these centres will work mostly in a collaborative manner, being part of the project that is supported

c. data stewardship centres (focus on **data**)

Data stewardship centres have the following characteristics:

1. make available high-end expertise and infrastructure in data stewardship
2. contribute to technological developments in their field
3. willing and able to develop user-specified applications
4. expected to be 'dual nodes' with ELIXIR; ISBE centres may filter SB-relevant data subsets from the total data sets available through ELIXIR

4. What is the optimal distribution of ISBE certified centres over Europe?

ISBE envisions (and has agreed on) that the proposed structure will contain a limited number of European-level centres with special expertise plus national centres with a broader set of expertise and techniques. The number and distribution of centres will depend on community needs and is not yet determined.

5. What is the optimal total number of ISBE certified centres?

This question will be addressed in a later stage when it is more clear what the community needs are and which and how many centres respond to the "open" call (parameters to be determined) for centres to become a ISBE centre (call expected to be out in 2014).

6. Coordination and maintaining the ISBE infrastructure

ISBE will have a small central office (in contrast with the option that future ISBE users have to contact ISBE certified centres by themselves). The ISBE office will:

- help researchers identifying the (combination of) expertise that is requested
- coordinate cooperation between the ISBE centres
- provide as communication centre for e.g. funders, charities, GPs, health insurance companies and press
- keep track of new technological developments and their implementation in the ISBE infrastructure
- coordinate training the ISBE training programme that is carried out by ISBE centres
- ensure high quality standards of ISBE certified centres
- coordinate the development of standards