



# Infrastructure for Systems Biology Europe

**Deliverable No: D3.2**

“A set of criteria for ISBE centres and a map of physical or distributed European Institutions that may comply with these rules”

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



<b>Project ref. no.</b>	INFRA-2012-2.2.4: 312455
<b>Project title</b>	ISBE – Infrastructure for Systems Biology Europe
<b>Nature of Deliverable</b>	R = Report
<b>Contractual date of delivery</b>	Month 30
<b>Actual date of delivery</b>	Month 30
<b>Deliverable number</b>	D3.2
<b>Deliverable title</b>	“A set of criteria for ISBE centres and a map of physical or distributed European Institutions that may comply with these rules”
<b>Dissemination Level</b>	CO
<b>Number of pages</b>	6
<b>WP relevant to deliverable</b>	WP3
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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

The aim of ISBE is to create a pan-European infrastructure for systems biology that empowers life scientists to understand living organisms to a much higher precision and in a predictive way. This will allow intervention in the functioning of biological systems in a predictive and rational manner. The infrastructure will enable scientists in academia, the health sector and industry to access and exploit the full potential of data-driven computational modelling of complex biological systems with the required reproducibility and validation. It will provide the expertise, tools and resources to address current and future grand challenges in healthcare, agriculture and industrial biotechnology, thereby enhancing the wealth and well-being of European citizens.

ISBE will do this by constructing and managing a distributed infrastructure of interconnected national Systems Biology Centres (nSBCs) that will provide resources and services, coordinated at the national and European levels. ISBE will comprise a two layer 'hub and spoke' model. At the national level, the nSBC would typically be hosted by a leading university or research institute, linking to other universities and research institutes, all contributing to ISBE. At the European level, the hub for the whole of ISBE will be the Central ISBE Office (CIO) for administrative, legal and governance aspects, with one of the nSBCs coordinating the operational delivery, including responsibility for pan-European issues relating to standards and training. ISBE will provide services, tools and resources in four main types of coordinated activities: a) modelling, data integration resources and services, b) stewardship of data, models and tools, c) standardisation and d) education and training. These coordinated activities will be interlinked to greatly improve findability, accessibility, interoperability and re-usability of data.

This report summarises eligibility criteria for institutions that are interested in joining ISBE as a service provider by becoming a national Systems Biology Centre.

## Criteria for ISBE national Systems Biology Centres

### Building on national strengths

ISBE will build on existing European resources, and draw on the technological and research strengths of its members, to provide a coherent and comprehensive package for users of the infrastructure. Where possible, ISBE will map onto existing structures and coalesce facilities under a single banner, creating ease of access for users and avoid duplication of resources for providers. ISBE is presently undertaking an audit of existing infrastructure to identify current national strengths and priorities. ISBE will build on these and other national research facilities and expertise in line with national strategies. In this way ISBE will be able to both integrate these facilities at the European level and broaden access to their services. In doing so, past, current and future investment of national funding organisations and governments will be strengthened. Under the ISBE umbrella each country will be able to continue to develop its own distinct scientific expertise, resources, services and community activities.

### An integrated European infrastructure

Research is increasingly moving away from single groups working on individual projects towards larger distributed teams and consortia that require access to high-end knowledge, expertise and services. This is key in fully realising the European Research Area. By integrating systems biology activities at a European level, ISBE will facilitate complex and comprehensive research programmes that are able to compete on an international scale, boosting European research competitiveness and meeting the needs of its governmental, academic and industrial stakeholders. ISBE will also work with countries with no current national access to systems biology resources and expertise by giving

their researchers access to state of the art systems biology infrastructure and assisting them in the establishment of new national infrastructures. At a European scale nSBCs will be interconnected, enabling users' needs to be matched to an array of international providers, resources and expertise. ISBE will interlink the complementary expertise in its nSBCs, creating a strong common point of delivery for research assets and services.

### Becoming a national ISBE Systems Biology Centre

ISBE's nSBCs will synergistically provide overlapping and unique expertise and services, ensuring that ISBE operates as an effective and cohesive provider giving European added-value. Listed below is the set of eligibility criteria for national research institutions interested in becoming an ISBE nSBC.

- located in and supported by a EU Member State or Associated State
- a single legal entity represents the institution(s) forming the nSBC
- subscribe to the aims and strategies of ISBE
- evidence of a reliable and effective governance and management structure and financial stability
- contribute where possible to the three domains of expertise and services of ISBE:
  - integrative modelling
  - stewardship and standardisation
  - brokerage to refer users to research centres (not necessarily associated with ISBE) that are able to generate integratable and model-compliant experimental data
- proven high scientific quality in ISBE-relevant fields of expertise and services
- contribute to the ISBE-driven development and implementation of community standards and SOPs
- participate in ISBE training and education activities

### Managing the research infrastructure

#### The coordinating nSBC

It is expected that a significant fraction of user support will be handled by individual nSBCs. Managing individual nSBCs within the context of European infrastructure will be the responsibility of the national authorities. More complex or extensive user requests may require the cooperation of two or more nSBCs working together to provide the requested services. This will require a continuously updated overview of the scientific and technical abilities of all nSBCs and coordination of their services. Also the development of standards and ISBE's teaching and training activities will require coordination of the activities of ISBE's nSBCs. This will require deep insight into underlying scientific issues. Also, ISBE needs to keep track of the expertise of the nSBCs and identify new developments and gaps in expertise and services that need attention. To do so, one of the nSBCs will be nominated to become the coordinating SBC (cSBC) of the infrastructure. Tasks of the cSBC, beyond those of a nSBC, will be:

- keeping an up-to-date overview of the expertise and services of all nSBCs,
- coordination of nSBCs working together if required to provide specific ISBE services,
- coordination of the stewardship activities and the development of community standards,
- quality control of the services provided by ISBE.

## The Central ISBE Office

The central management, administration and governance of ISBE will be carried out by the Central ISBE Office (CIO), which will be physically linked to the coordinating SBC. It will monitor and coordinate overall operations and oversee ISBE strategy development, including:

- nomination and approval process for new nSBCs,
- links between nSBCs, including commissioning of novel services, resources and activities,
- liaison with ISBE member state funding organisations, external cooperation, such as partnerships with other Research Infrastructures, including other ESFRIs, and international organisations in or outside the EU.

## A map of physical or distributed European Institutions

A dialogue with potential nSBCs and associated national funding bodies has been initiated, aimed at identifying candidate nSBCs. A transparent and open nomination process will be started later in 2015 in the Preparatory Phase and continued during the subsequent Interim Phase. It will require candidate nSBCs to seek financial support from a national funder together with endorsement by the host institution. Delivery of existing resources and services via national institutions will be based on relevant national and EU procurement regulations.

Presently, a number of prominent systems biology institutions and research groups are being audited with respect to their expertise and willingness to become a provider as part of a nSBC of ISBE. To date (January 2015), 40 institutions across 9 countries have provided detailed information. Most of the addressed institutions recognised the value of offering their expertise and services to a broader community of users via a pan-European infrastructure, and thus manifested interest in becoming part of ISBE as a provider.