

ARIES

Modeling Ecosystem Services (and more) on a semantic web

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with the whole ARIES team

The ARIES vision

Science and technology to support an improved ecosystem services scientific narrative

Quantify the potential **provision** of ecosystem services, their **actual and potential use**, and the **values generated** in **nature/society transactions**, using models in flexible, scalable and intelligent ways.

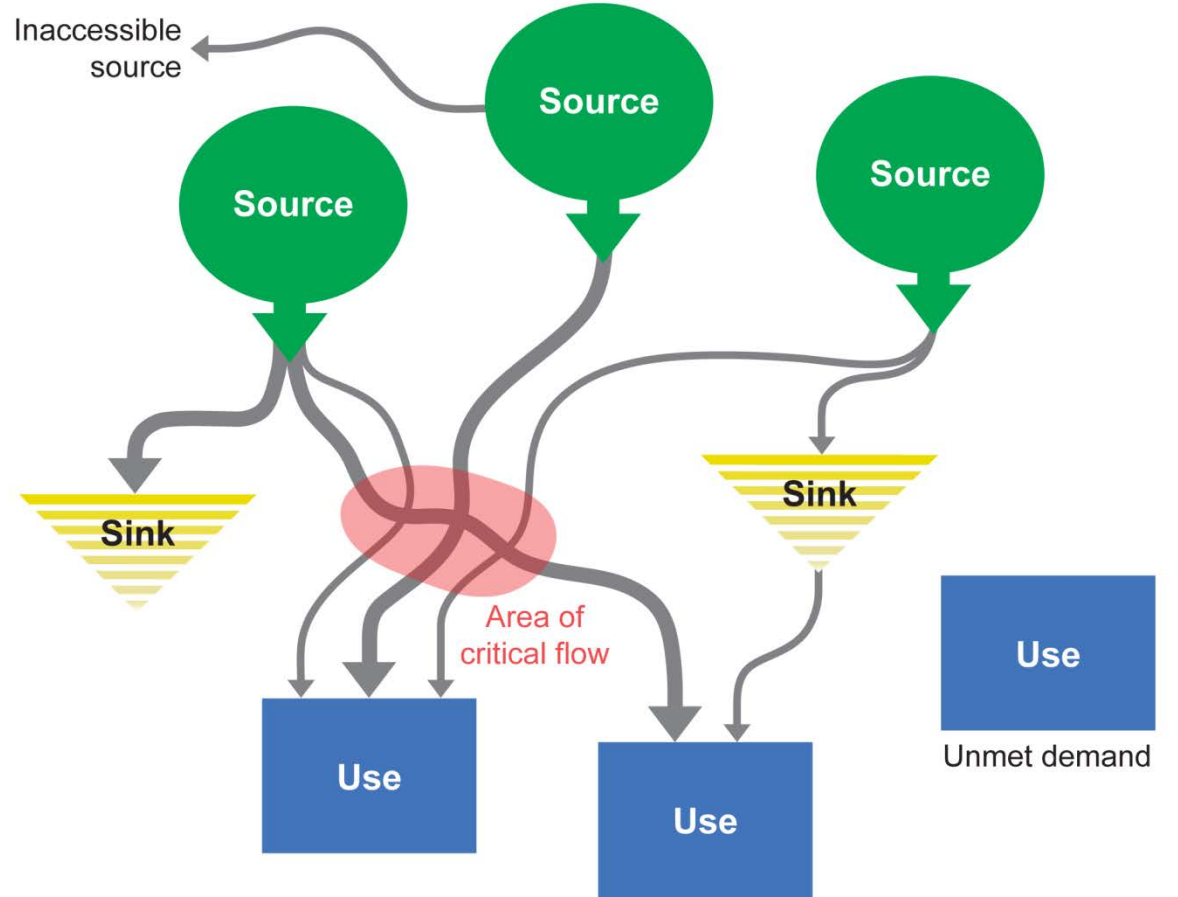
Artificial intelligence is used to:

1. find **agents** of *provision, transaction* and *use*
2. **assemble data and models** from the network to compute **flows** of value between them, in the best possible assessment for the context.

Overarching goal: pay due attention to

1. **Scale(s)** and **structural complexity** (agents);
2. **Temporal dynamics** and **functional complexity** (flows, feedbacks, tipping points);
3. **Uncertainty** and its role in decision

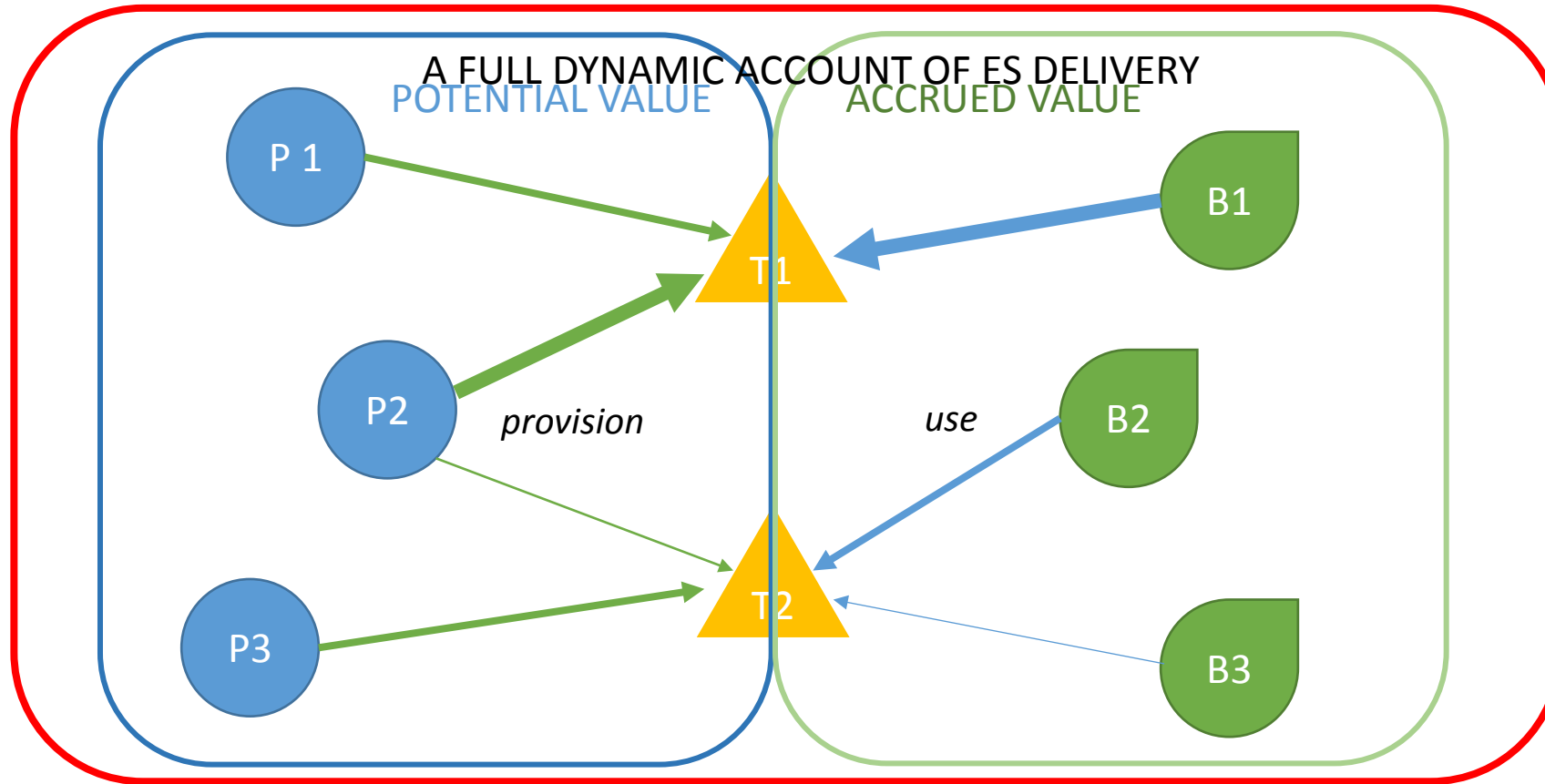
Technology allows **SIMPLE USE** of **SOPHISTICATED MODELS!**



from Villa et al. 2014, PLoS One

The ES flow network in ARIES

A generalized agent-based paradigm more accurately describes ES structure and function



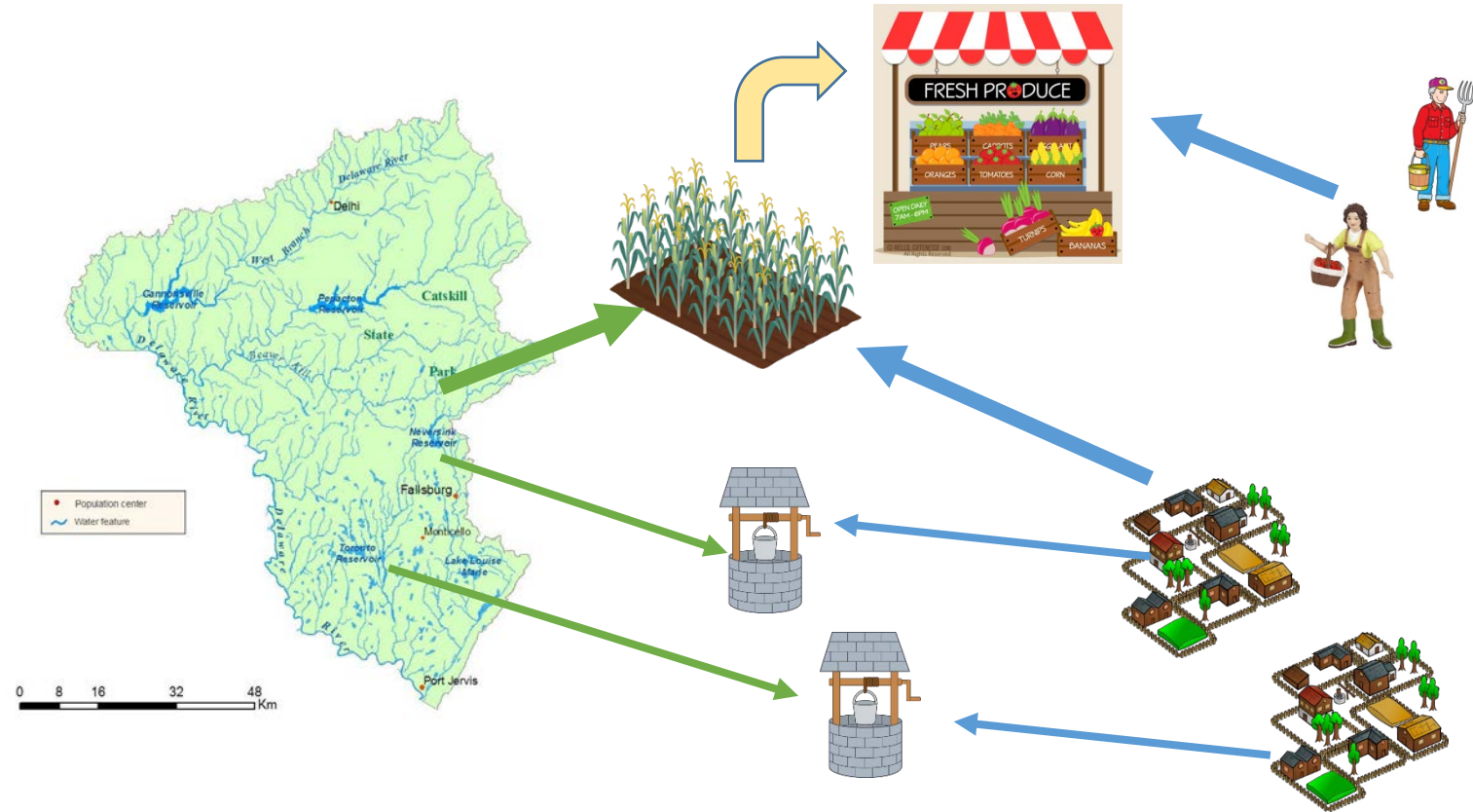
Providers (e.g. forests, watersheds): where valuable ecosystem function happens

Transactors (e.g. wells, crops, atmosphere): where ES value is generated

Beneficiaries (e.g. farmers, coastal dwellers): demand agents for ES value

How ARIES builds and run an ES flow network

based on a simple query: "observe water benefits in watershed X"



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Models and data live on an expanding semantic web

An extensible network hosts data, models and model services available to all users of ARIES

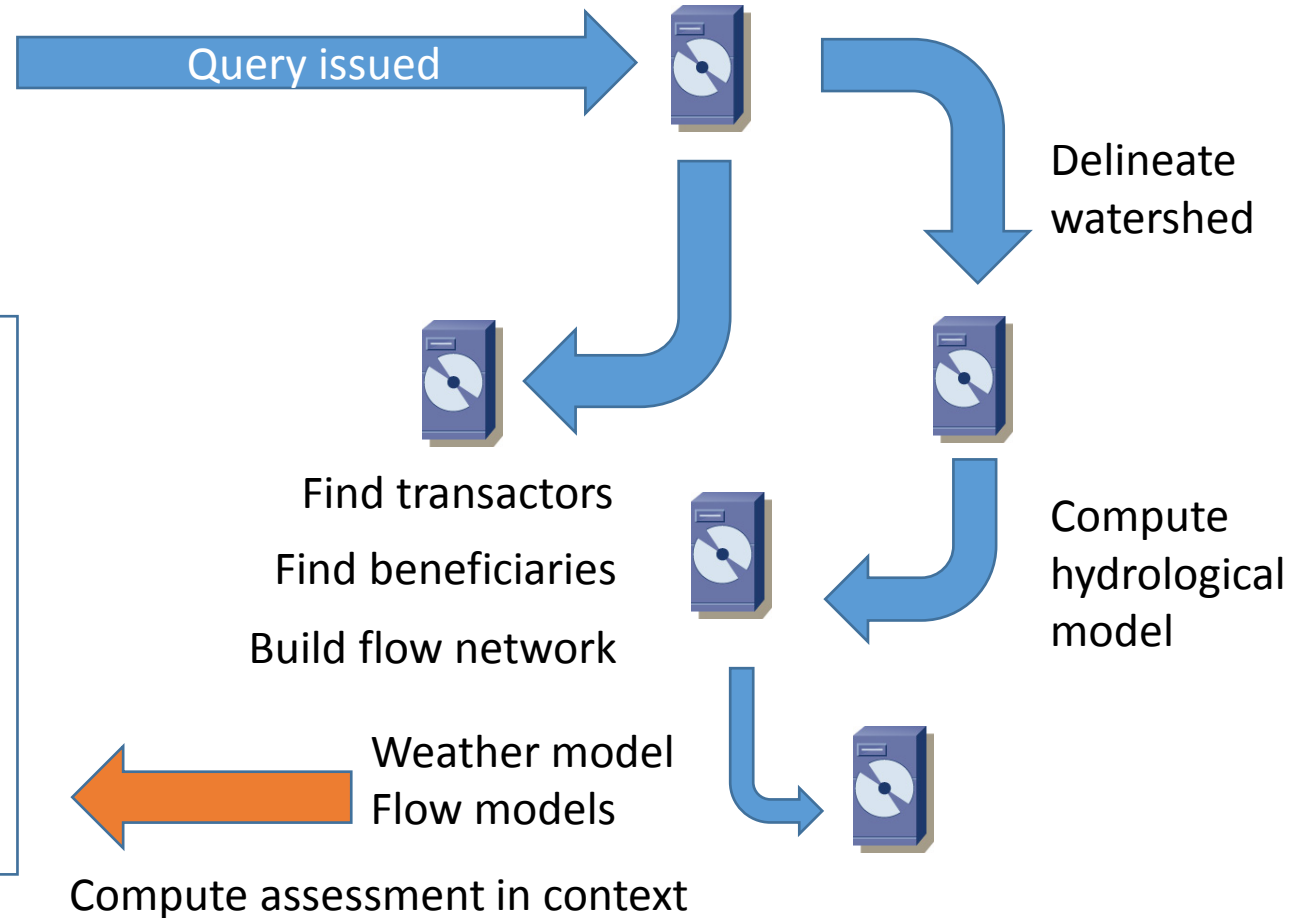
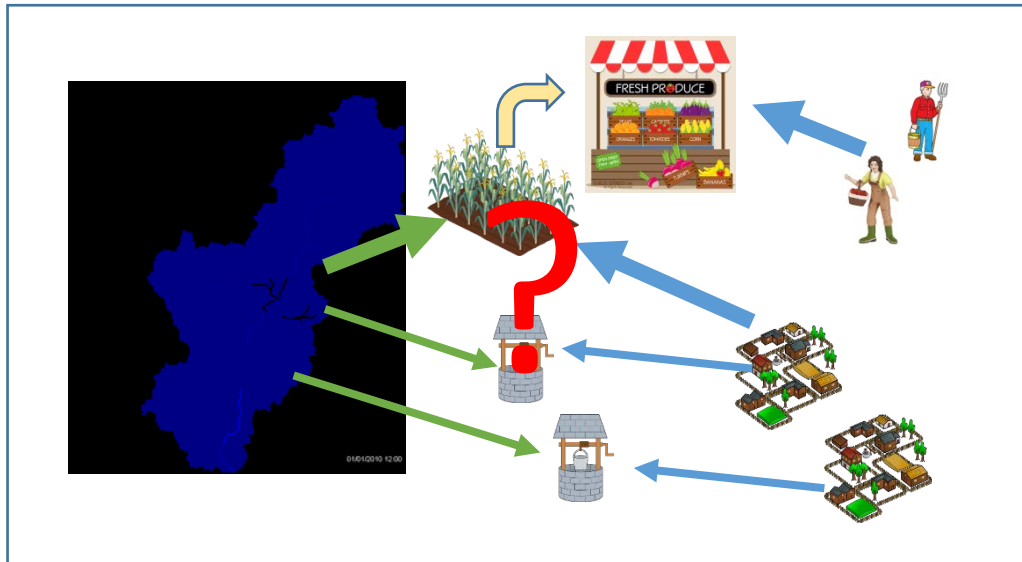


Query:

1. Set context to region X
2. Observe water ESs in it



Results!



At the user side: two-step rapid assessment

Client software (desktop & soon web-based) allow using ARIES with minimal configuration and training

...producing a complete, exportable assessment of ES flows and values.

The screenshot displays the ARIES software interface. On the left, a 'Thinklab Navigator' pane shows a tree structure of components including 'san-pedro-us [Region]', 'Measurement of elevation', 'Viewpoint [4]', and 'Relationships [8]'. The central map shows a topographic view of San Pedro with red lines indicating visual connections between viewpoints and mountain peaks. A blue arrow points to a specific location on the map. On the right, a 'Task' pane shows a notification window with a green checkmark and a list of observations. Below the notification, the 'Engine Status' section shows 'Development engine v0.9.6-SNAPSHOT' and 'Administering as ferdinando.villa'. At the bottom, a 'Quick reference' pane shows a search for 'aes' with a table of results.

Name	Namespace	Description
AestheticallyValuableFeature	im.aries.aesthetics	Any geolocated object that can be construed as worth looking at by an i...
AestheticallyDetrimental	im.aries.aesthetics	
AestheticViewEcosystemBenefit	im.aries.aesthetics	The benefit obtained by a viewer contemplating natural beauty.
AestheticallyValuable	im.aries.aesthetics	

Step 1:
Set context
(search or draw
on Google map)



Step 2:
Drag/drop the (ES) concept to observe

User is logged into ARIES
through secure certificate

- ...system
- creates agents and processes
 - builds best-case model out of component and data on the ARIES network
 - computes it...