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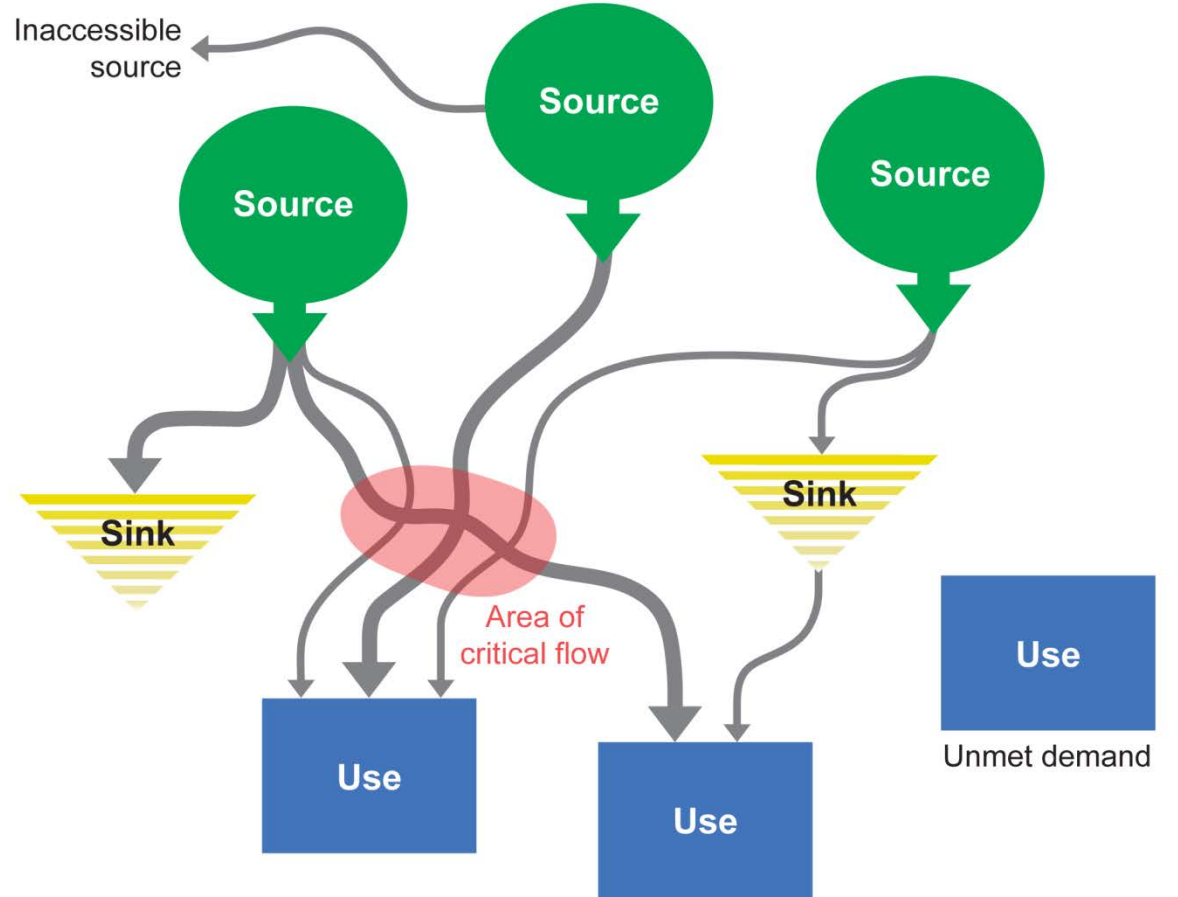
Artificial intelligence is used to:
1. find **agents** of *provision*, *transaction* and *use*
2. **assemble data and models** from the network to compute **flows** of value between them, in the best possible assessment for the context.

Overarching goal: pay due attention to
1. **Scale(s)** and **structural complexity** (agents);
2. **Temporal dynamics** and **functional complexity** (flows, feedbacks, tipping points);
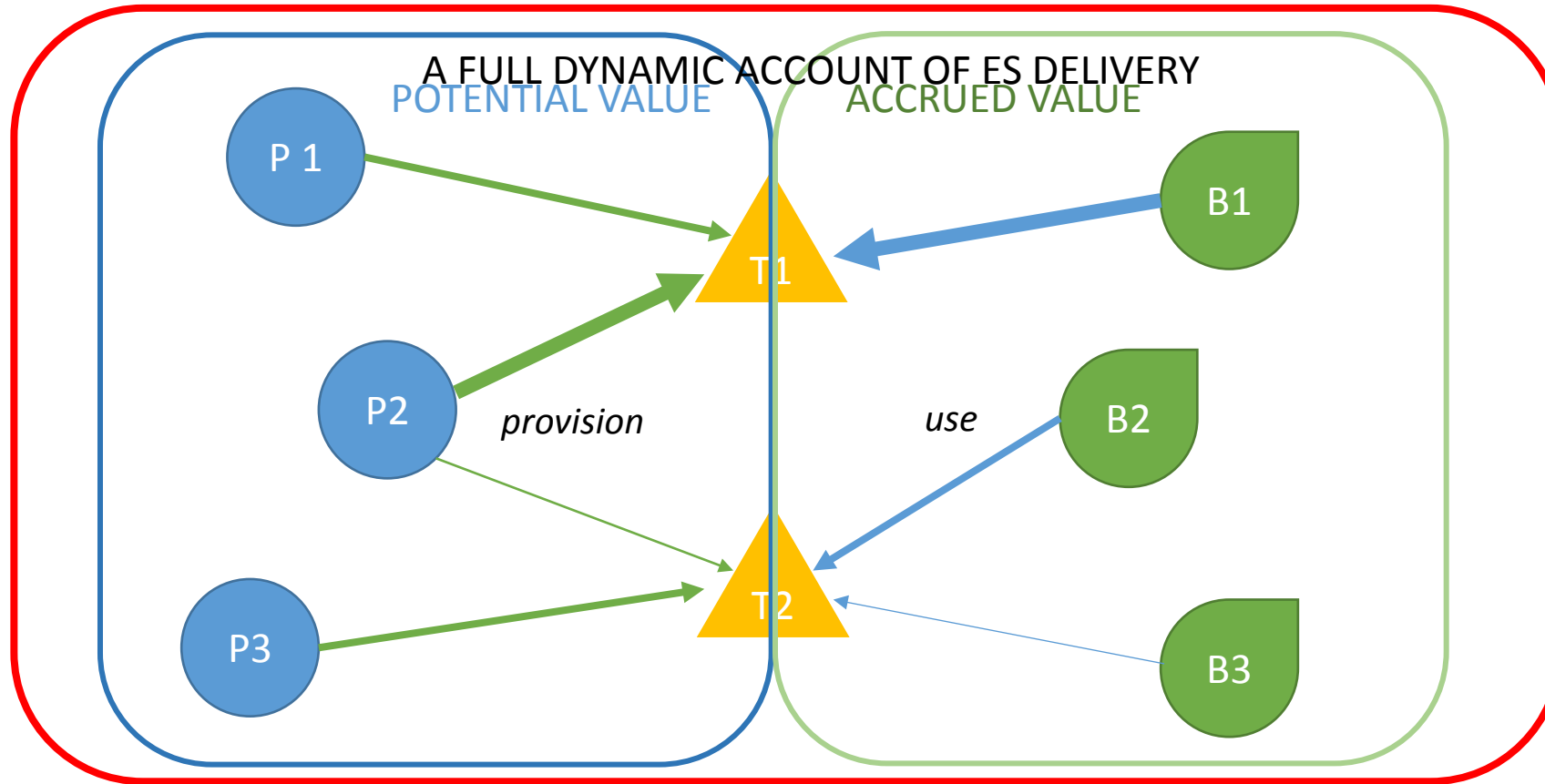3. **Uncertainty** and its role in decision

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

A FULL DYNAMIC ACCOUNT OF ES DELIVERY

POTENTIAL VALUE

ACCRUED VALUE

P 1

P2

P3

provision
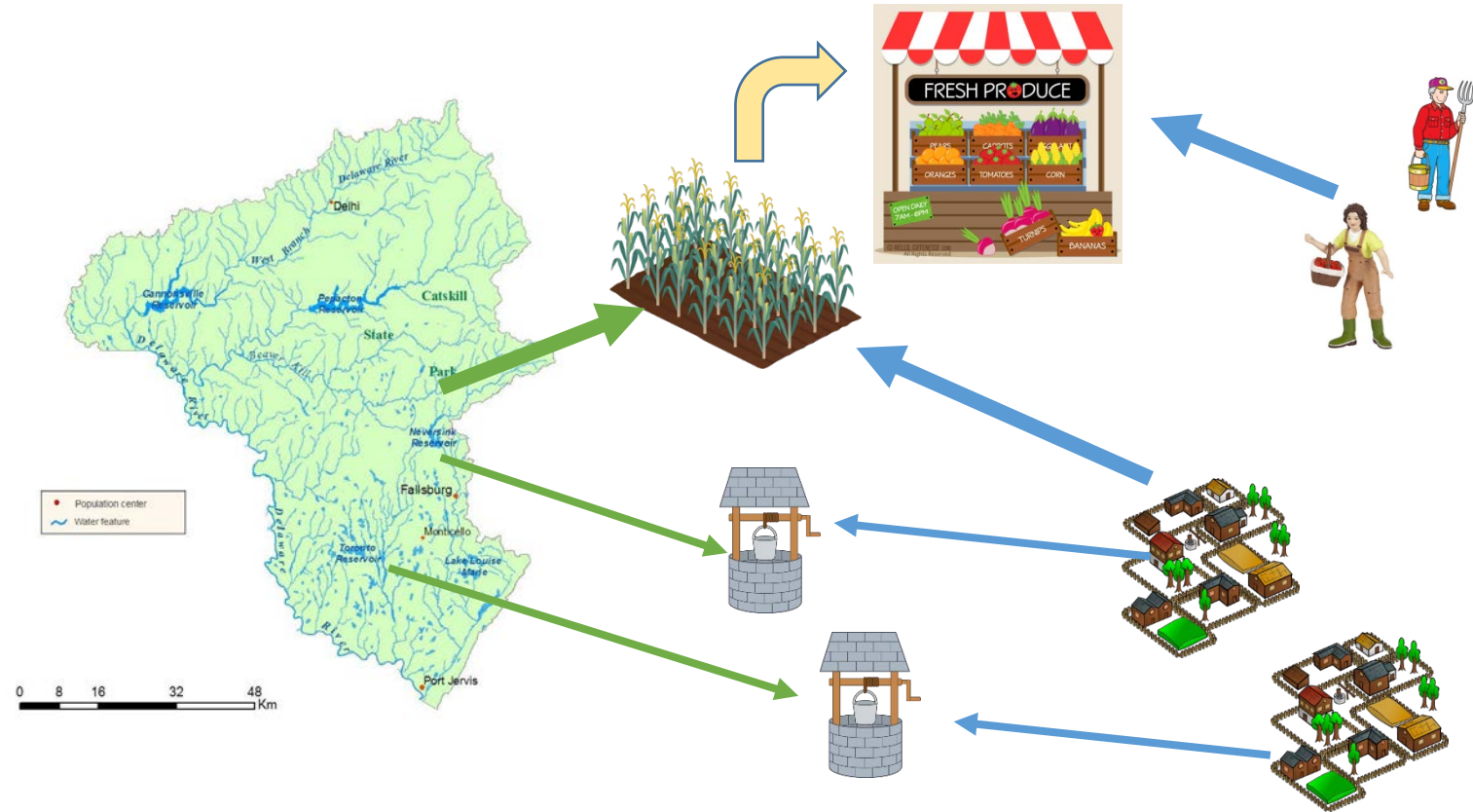
T1

T2

use

B1

B2

B3

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

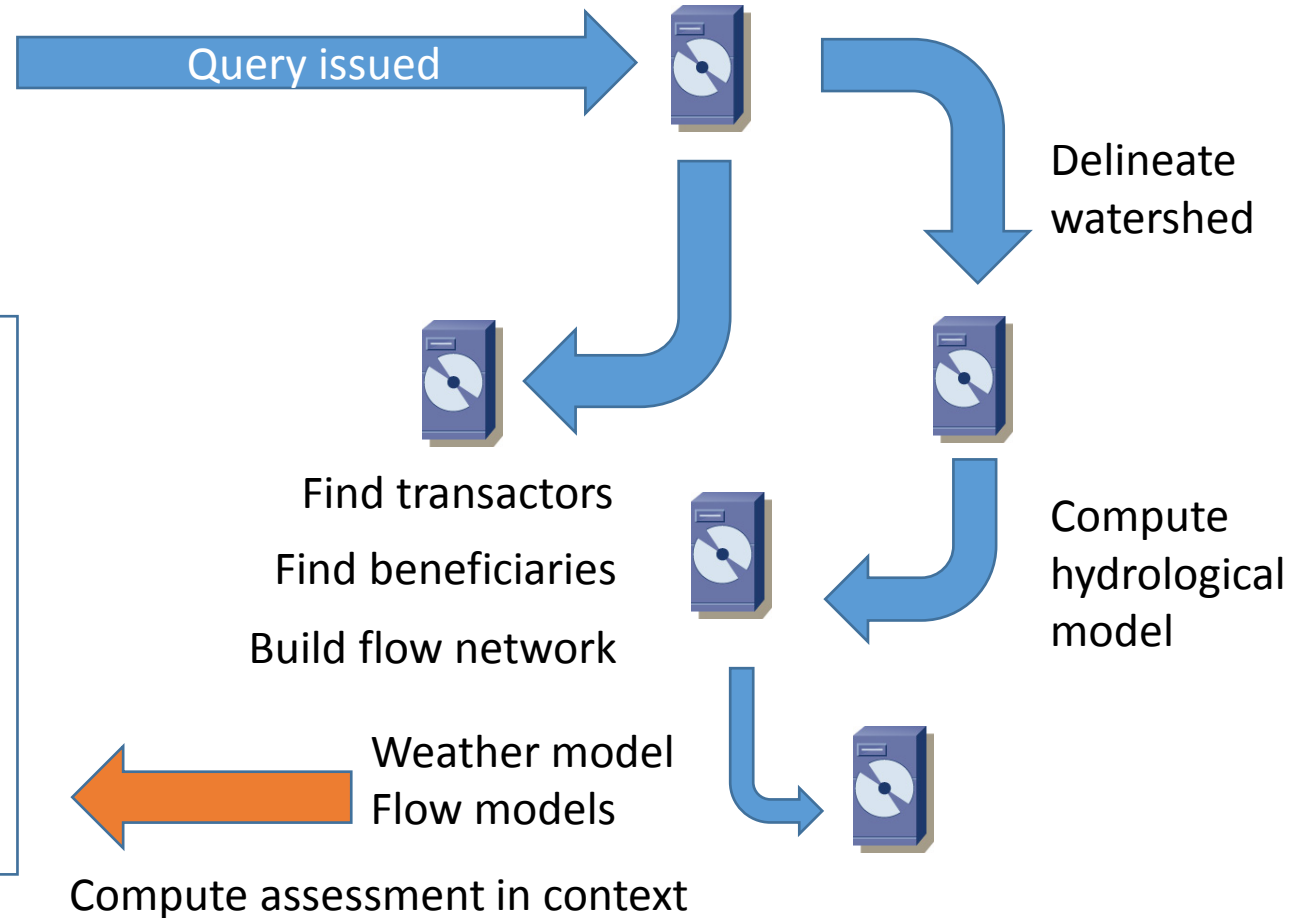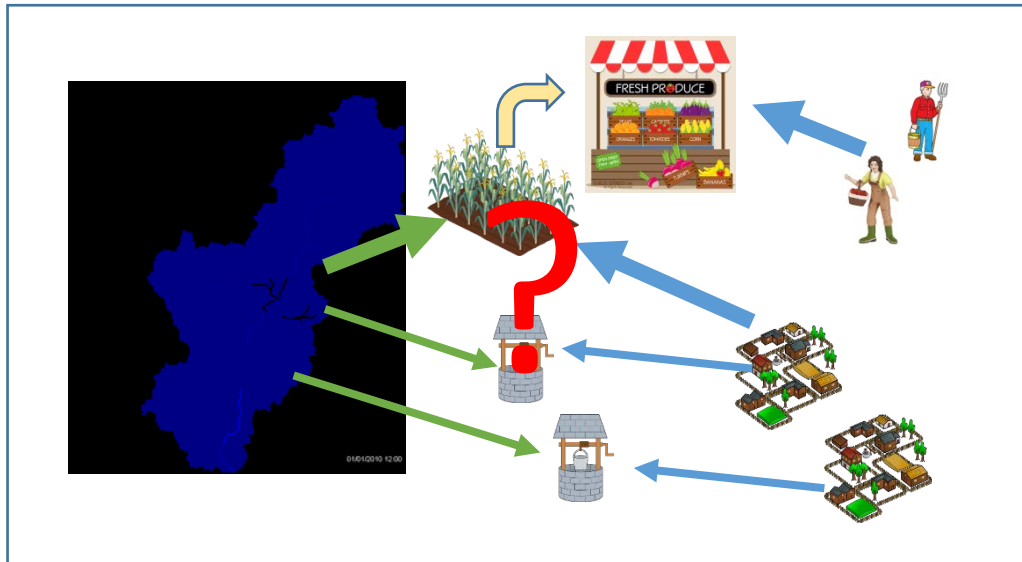An extensible network hosts data, models and model services available to all users of ARIES

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

Query issued

Delineate watershed

Results!

Find transactors
Find beneficiaries
Build flow network

Compute hydrological model

Weather model
Flow models

Compute assessment in context

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.

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

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