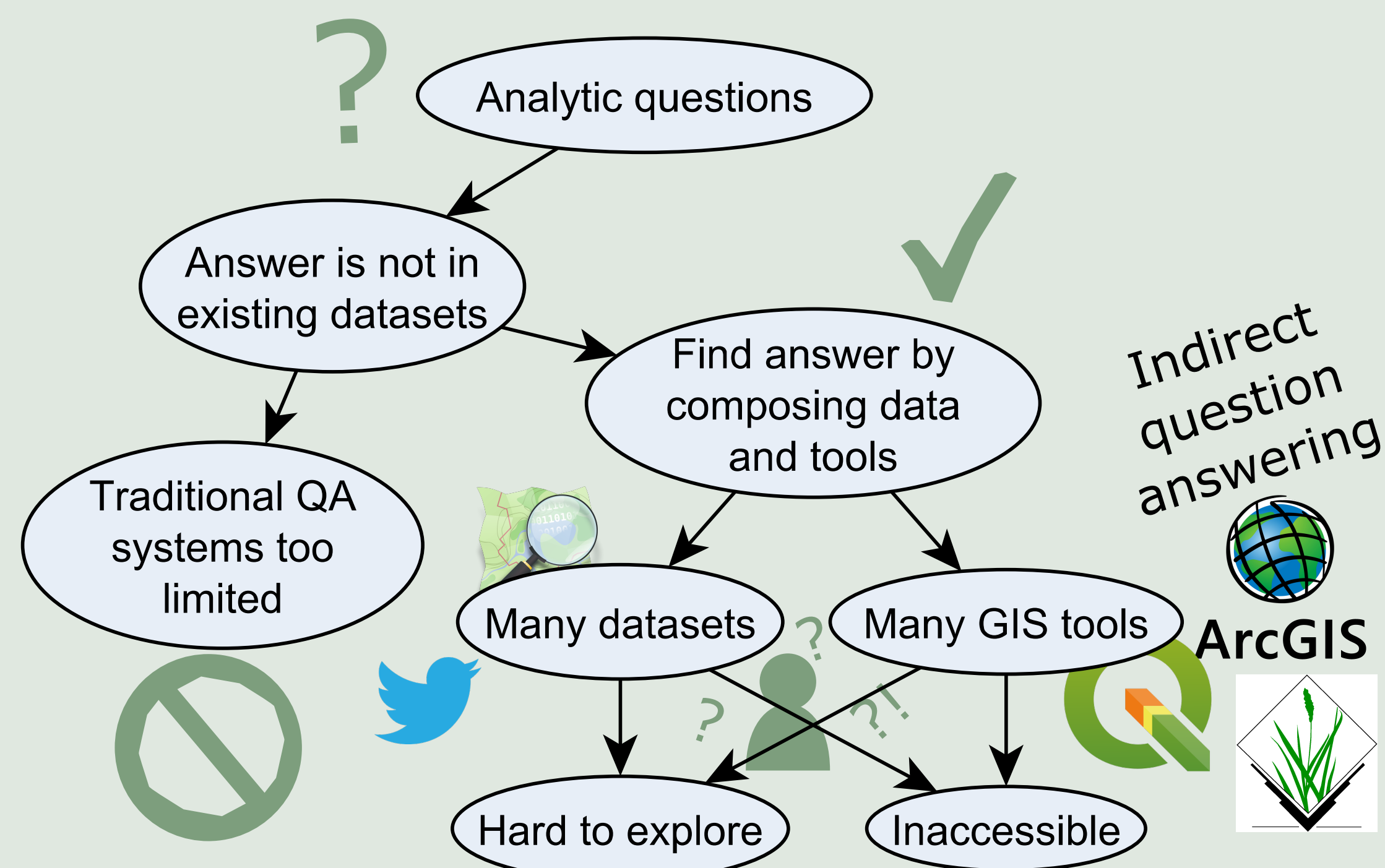


Geo-analytic Question Answering with GIS

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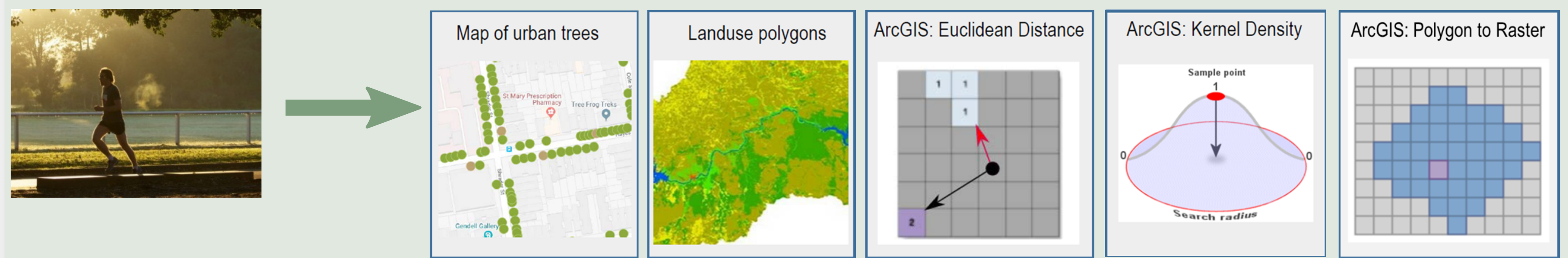
Motivation



“How can spatial resources be automatically composed to answer geo-spatial questions posed by analysts?”

Example

“How much is Tom exposed to green space?”



Core Concepts and Their Importance

Core concepts of spatial information provide a high-level conceptual view of spatial information. It clarifies the nature of spatial properties, relations, and interactions.

Core concept	Explanation	Example
Field	Spatially continuous attribute of phenomenon	Elevation
Object	Spatially bounded entity	Building
Event	Temporally bounded entity	Trajectory
Network	Quantified relations between objects	Road network

Core concepts of spatial information (Kuhn, 2012) play an important role in defining the methodology of geo-analytic QA system, due to the following reasons:

...in describing analytic potential

Geodata types like vector do not capture the underlying spatial concepts relevant for analysis. However, the core concepts influence how geodata can be analyzed. For example, *Polygon to raster* can only be done if a layer represents space-filling **field** (coverage), and not a lattice.

	land cover type	average elevation (m)
A	Forest	631
B	Urban	220
C	Water	42
+	Urban	

...in posing and interpreting spatial questions

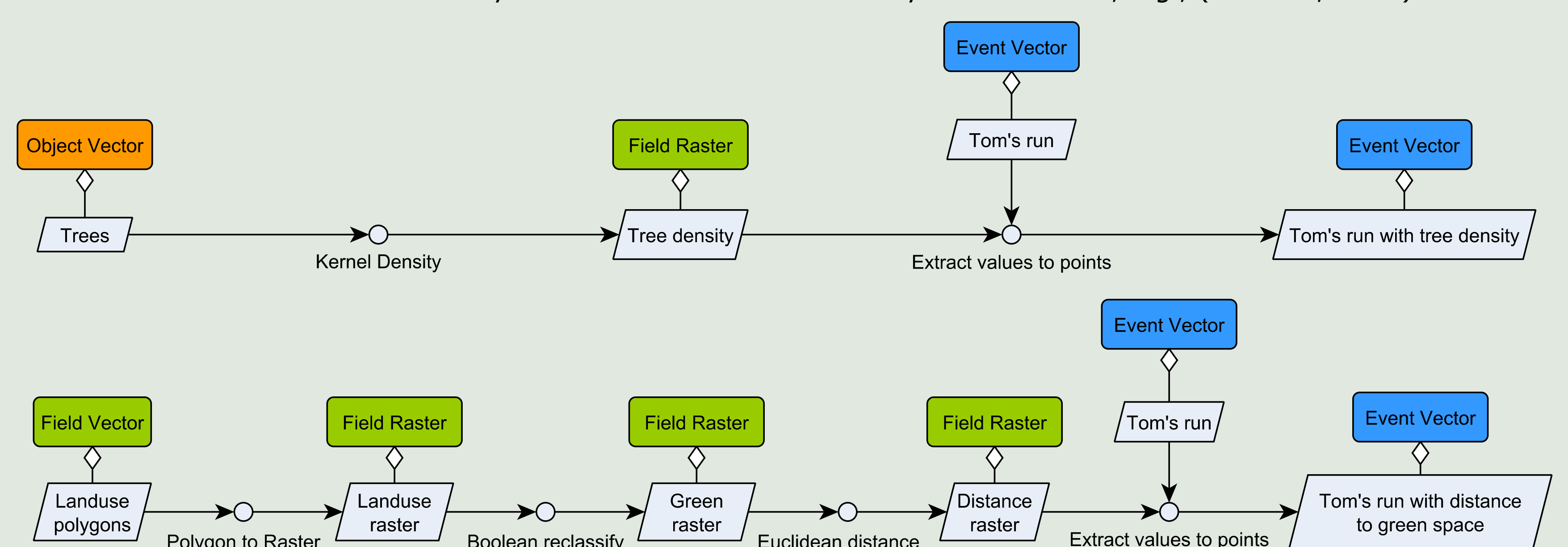
“(Field)How much exposed to parks is (Event)Tom's run?”

“How (Field)far is the next (Object)park in (Object)Amsterdam?”

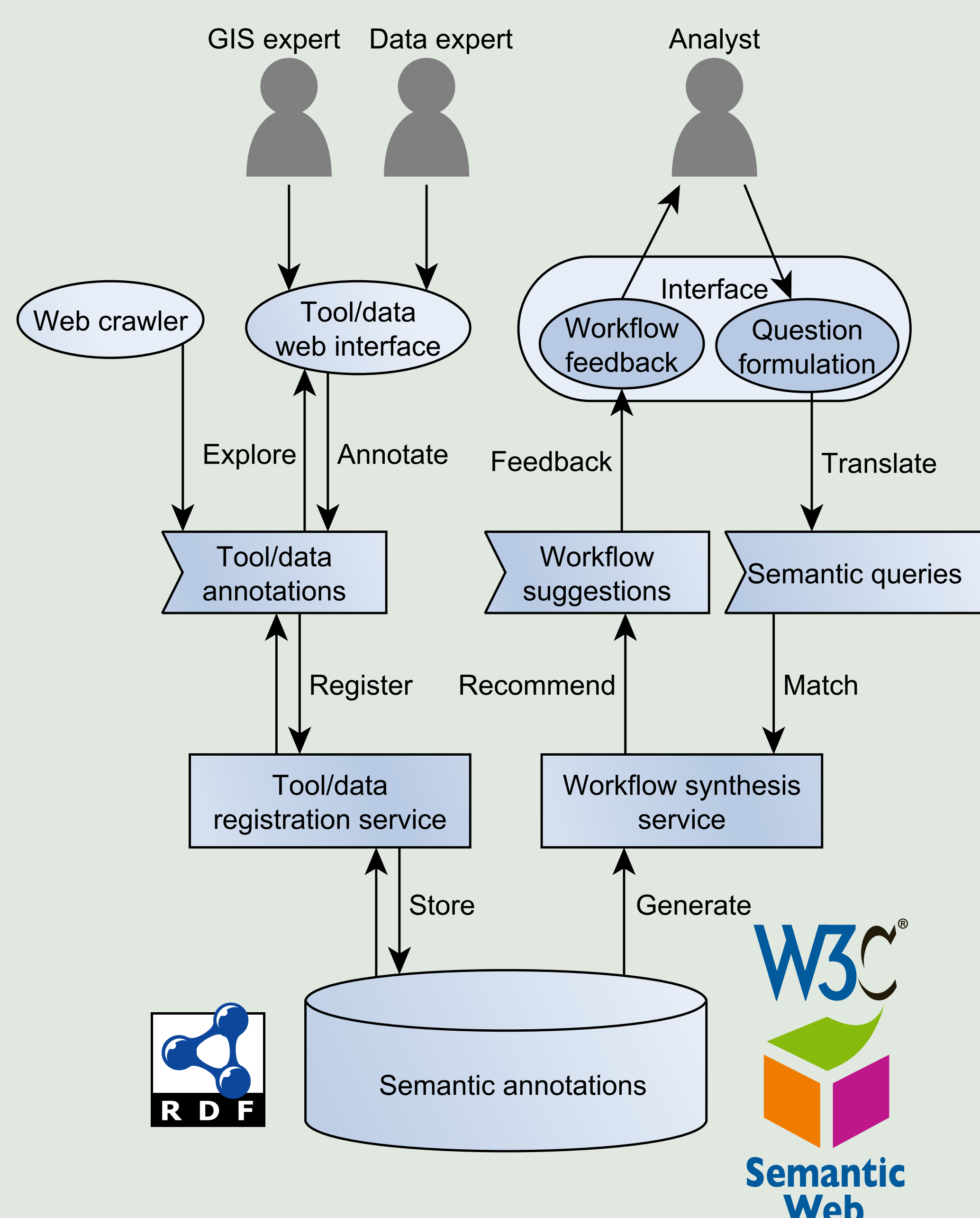
“(Network)How many runners run from (Object)University campus (Network)to (Object)downtown?”

...in finding spatial answers

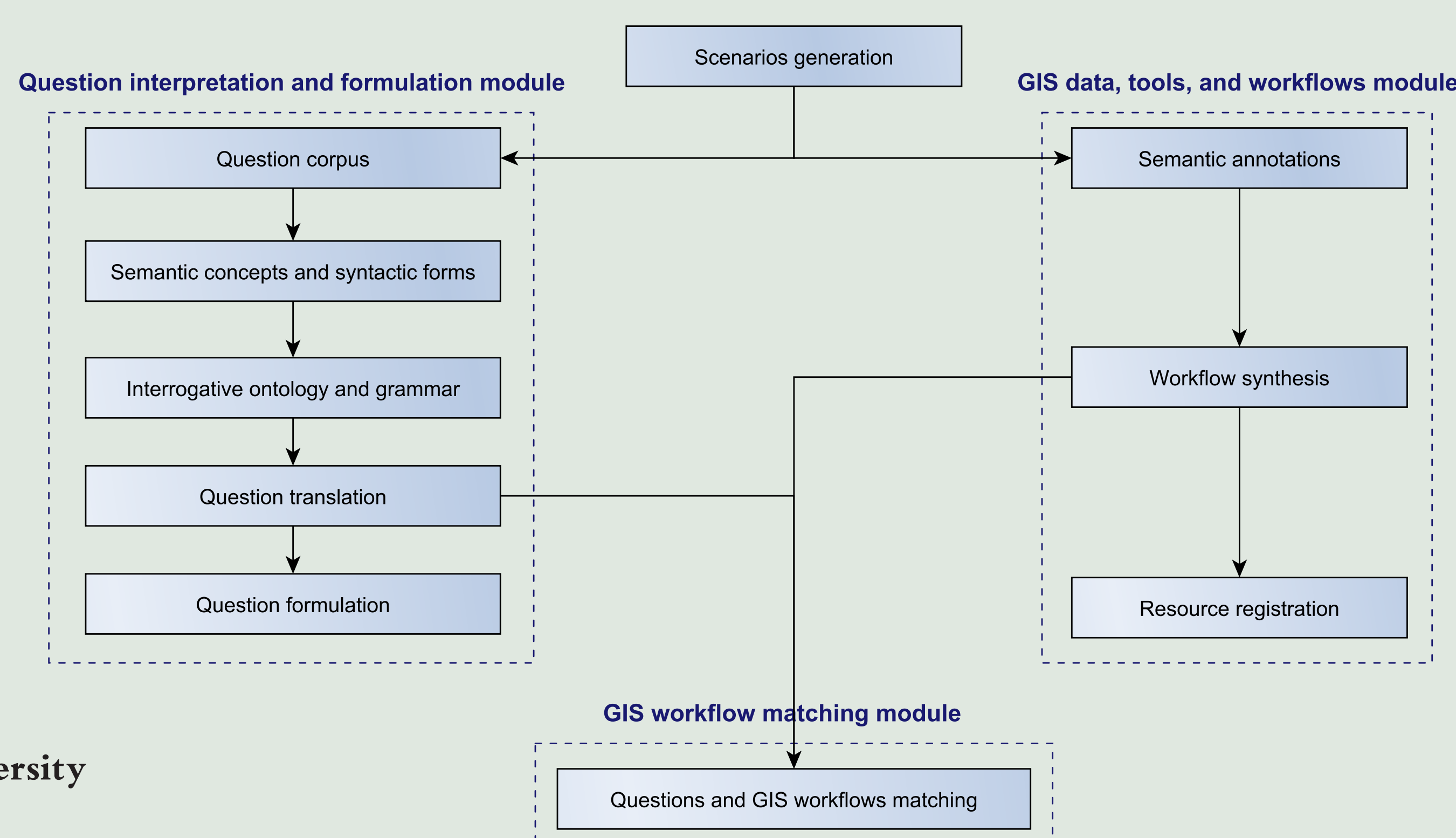
Since core concept data types describe spatial information and the applicability of functions to data, they constrain how workflows can be synthesized. Workflows can be synthesized with, e.g., (Kasalica, 2018).



Solution



Plan



References

Kasalica, Vedran, and Anna-Lena Lamprecht. “Automated Composition of Scientific Workflows: A Case Study on Geographic Data Manipulation.” In 2018 IEEE 14th International Conference on E-Science (e-Science), 362–63. Amsterdam: IEEE, 2018. <https://doi.org/10.1109/eScience.2018.00099>.

Kuhn, Werner. “Core Concepts of Spatial Information for Transdisciplinary Research.” International Journal of Geographical Information Science 26, no. 12 (December 2012): 2267–76. <https://doi.org/10.1080/13658816.2012.722637>.

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