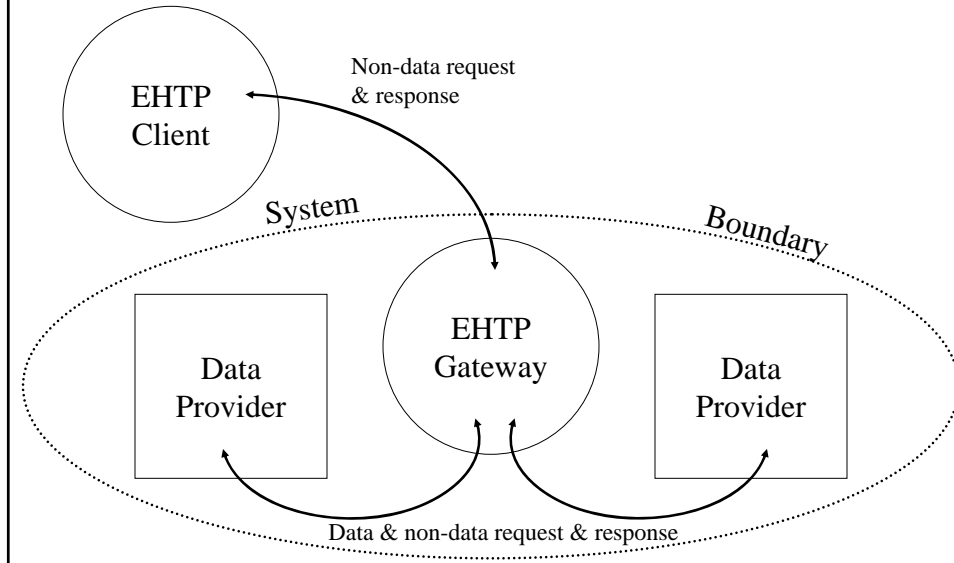
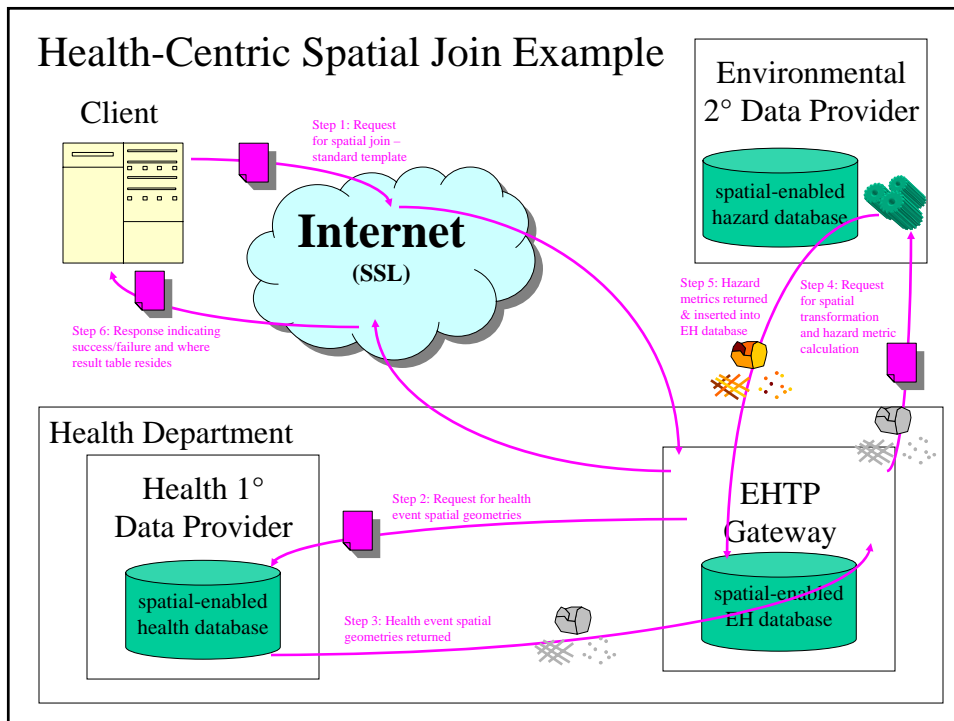


Spatial Join Architecture

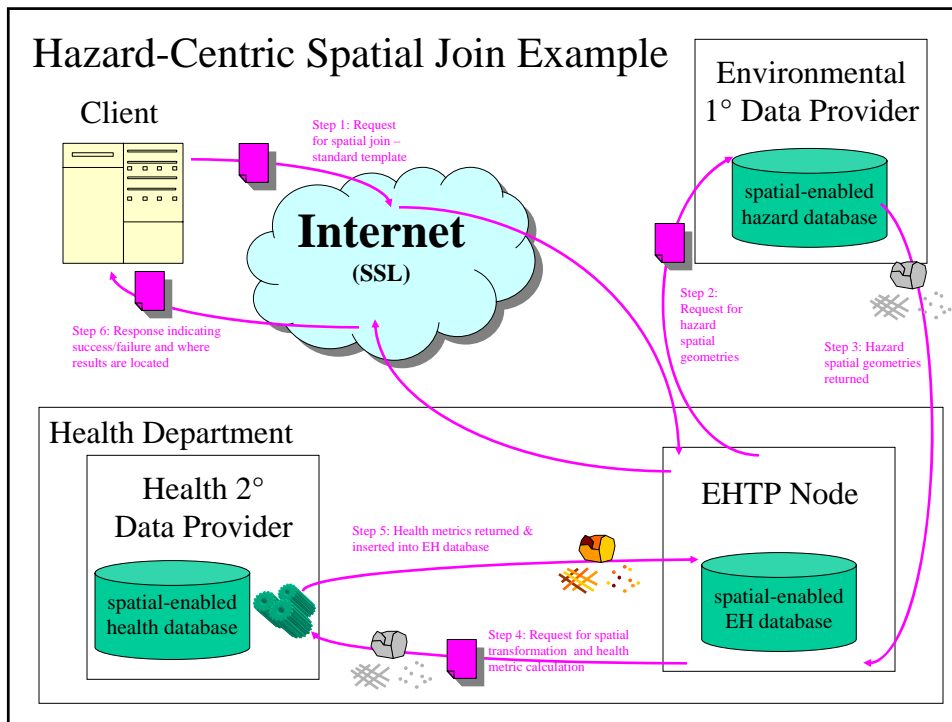
Client/System Scope/Boundary



Health-Centric Spatial Join Example

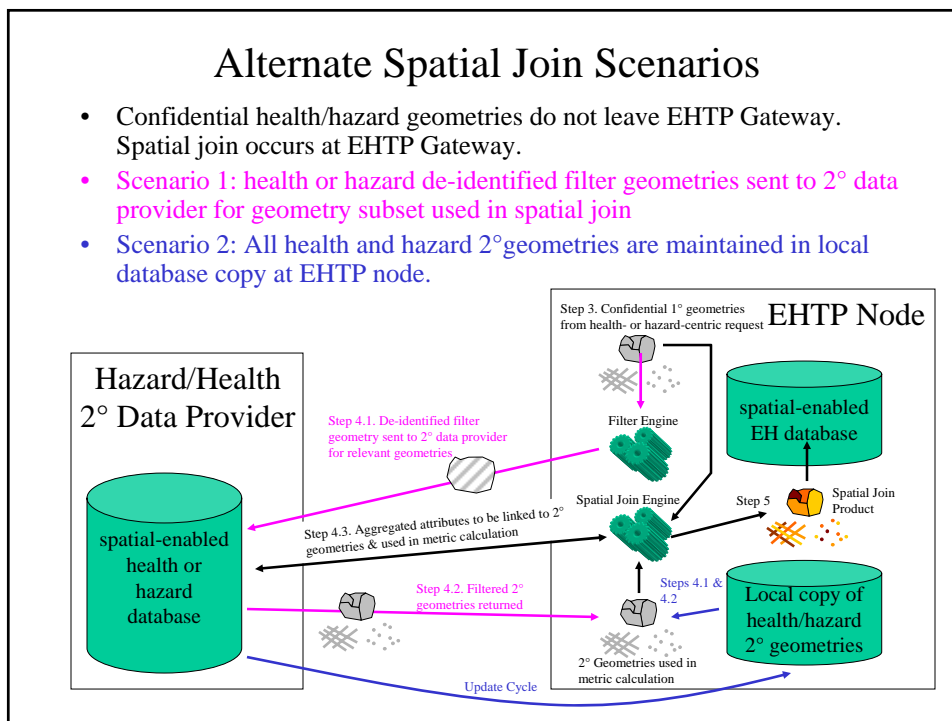


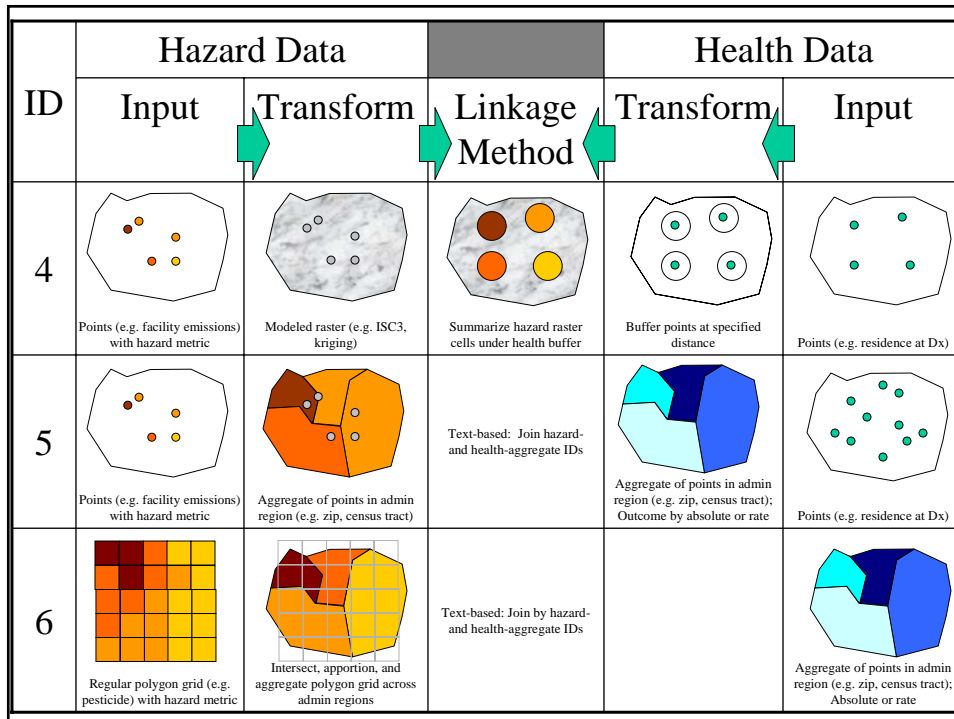
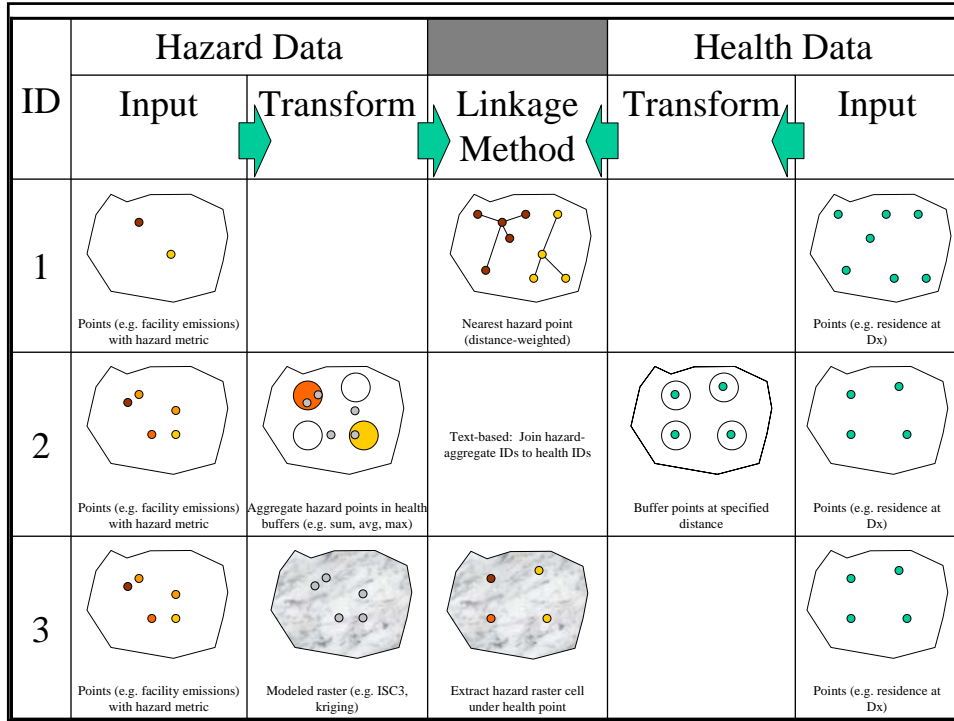
Hazard-Centric Spatial Join Example


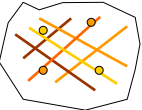
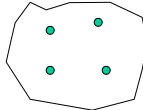


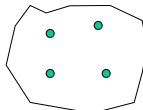

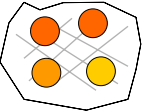
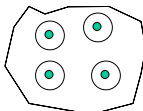
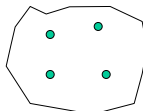



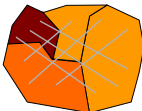
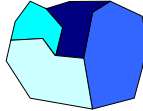

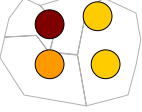
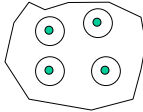
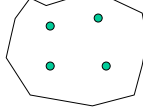
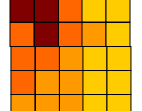
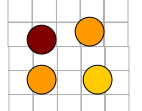
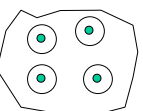
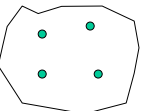
Alternate Spatial Join Scenarios

- Confidential health/hazard geometries do not leave EHTP Gateway. Spatial join occurs at EHTP Gateway.
- **Scenario 1:** health or hazard de-identified filter geometries sent to 2° data provider for geometry subset used in spatial join
- **Scenario 2:** All health and hazard 2° geometries are maintained in local database copy at EHTP node.





ID	Hazard Data		Linkage Method	Health Data	
	Input	Transform		Transform	Input
7	 lines (e.g. traffic, water) with hazard metric		 Nearest hazard segment (distance-weighted)		 Points (e.g. residence at Dx)
8	 lines (e.g. traffic) with hazard metric	 Modeled raster (e.g. ADMS, CalLine, kriging)	See methods 3 & 4 for raster and point linkage		 Points (e.g. residence at Dx)
9	 lines (e.g. traffic) with hazard metric	 Intersect, apportion, and aggregate segments within health buffer (distance-weighted)	Text-based: Join hazard-aggregate IDs to health IDs	 Buffer points at specified distance	 Points (e.g. residence at Dx)

ID	Hazard Data		Linkage Method	Health Data	
	Input	Transform		Transform	Input
10	 lines (e.g. traffic, water)	 Intersect lines with admin region, apportion and aggregate	Compare hazard- and health-aggregates in admin region		 Aggregate of points in admin region (e.g. zip, census tract); Absolute or rate
11	 Polygons (e.g. soils, airsheds, watersheds)	 Intersect, apportion, and aggregate polygons within health buffers	Text-based: Join hazard-aggregate IDs to health IDs	 Buffer points at specified distance	 Points (e.g. residence at Dx)
12	 Regular polygon grid (e.g. pesticide) with hazard metric	 Intersect, apportion, and aggregate polygons within health buffers	Text-based: Join hazard-aggregate IDs to health IDs	 Buffer points at specified distance	 Points (e.g. residence at Dx)

Transformation Attributes

ID	Input Geometry	Output Geometry	Transform Method	Parameters	De-identified?	Notes
2,4	Points	Regions	Buffer	Radius	No	Buffers can assist in summarizing multiple hazard sources that are at a greater scale than health data; What size buffer should be used?
3,4	Points	Raster	Modeling	Depends on method	Yes	Interpolating or modeling hazard points into a raster surface has a similar scaling effect as buffers; What model is appropriate for describing exposure to health events? What surfacing algorithm gives rise to an appropriate hazard scale?
5	Points	Regions	Aggregate by admin region	Aggregation method, rate method	Maybe	Aggregating hazard and health event data to administrative region is helpful for de-identifying confidential health data and for incorporating auxiliary SES data (e.g. census). Under what conditions is it appropriate to summarize a hazard within a polygon whose boundaries are based on anthropomorphic characteristics?
6	Regions	Regions	Intersect and apportion	None	Maybe, but probably not applicable	Under what conditions is it appropriate to aggregate hazards to larger regions?
8	Lines	Raster	Modeling	Depends on method	Yes	Modeling of link-based hazard data might incorporate the use of auxiliary datasets like meteorology, land-use, elevation
10	Lines	Regions	Intersect and aggregate	None	Yes	

Linkage Attributes

ID	Input Geometry 1	Input Geometry 2	Linkage Method	Parameters	Notes
1	Points	Points	Nearest Neighbor	Distance weighting, pre-selection	Under what conditions is selecting the nearest hazard event to a health event a model of reality?
2	Points	Regions	Point within region	None	
3,8	Points	Raster	Point within cell	None	Demonstrates how raster cells are actually small regions
4,8	Raster	Regions	Aggregate of rasters within region	Aggregation method (ie avg, max, mode, etc)	
5	Regions	Regions	Key relationship	None	
6	Regions	Regions	Key relationship	None	
7	Lines	Points	Nearest Neighbor	Distance weighting, pre-selection	
9	Lines	Regions	Intersection	Distance weighting, aggregation method	
10	Regions	Regions	Key relationship	None	