Clusters and Start-Up Location Choice

William Kerr

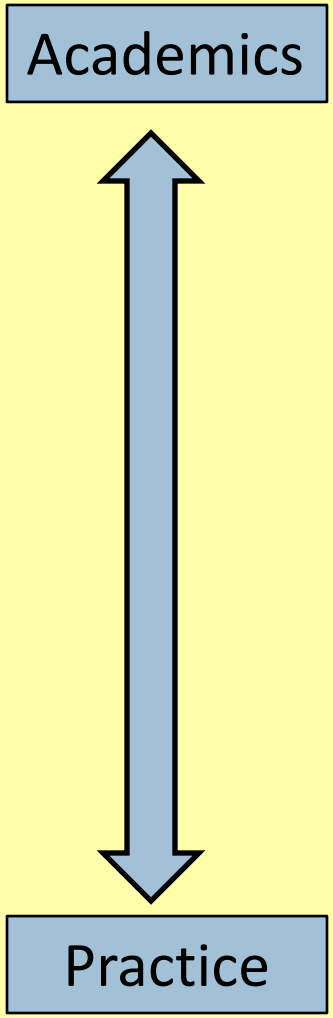

eBay
California
Sand Hill Rd


MADISON AV
treehugger
Big Apple
Silicon Alley 100
WALL ST


Boston?
San Francisco?
NYC?


MASS HIGH TECH
MHT
THE JOURNAL OF NEW ENGLAND TECHNOLOGY
VE RI TAS
HARVARD
BOSTON
RED SOX
128
MIT

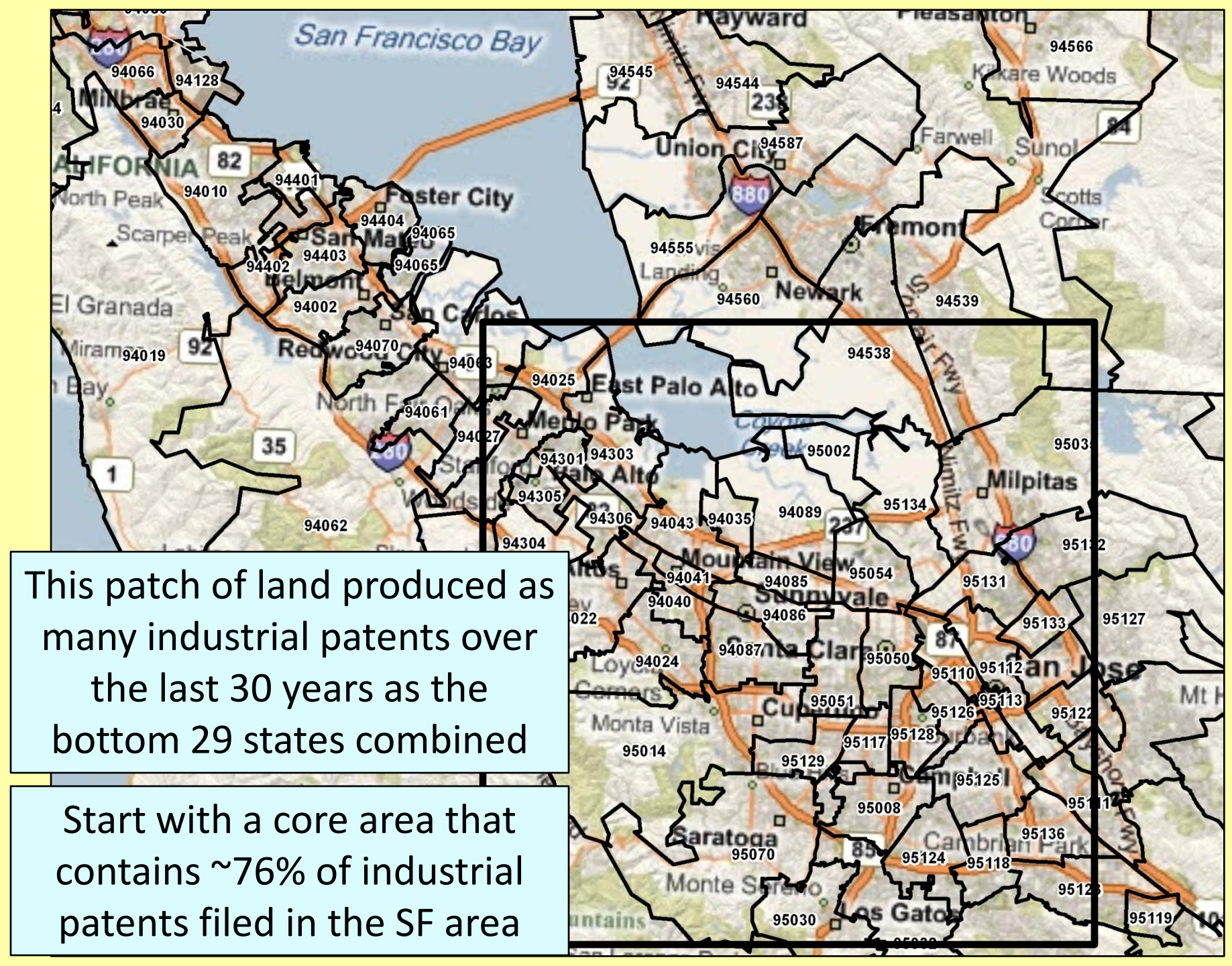
Agglomeration and Location Choice

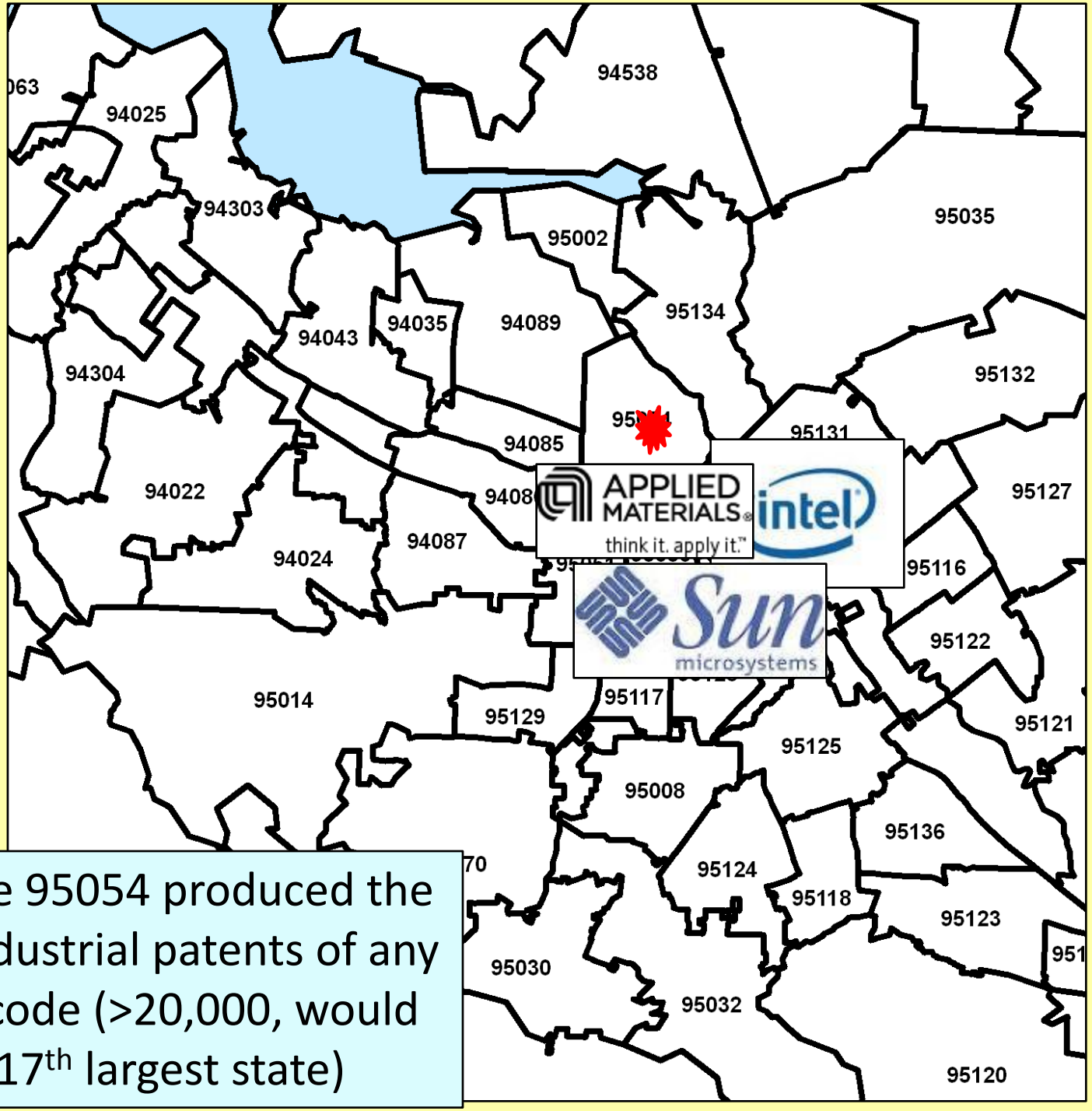


- Metrics of spatial concentration
- Rationales for why clusters forms …
- … frameworks to evaluate attributes that cities offer by industry
- Incumbent firms and start-ups
- Local economic growth and stability

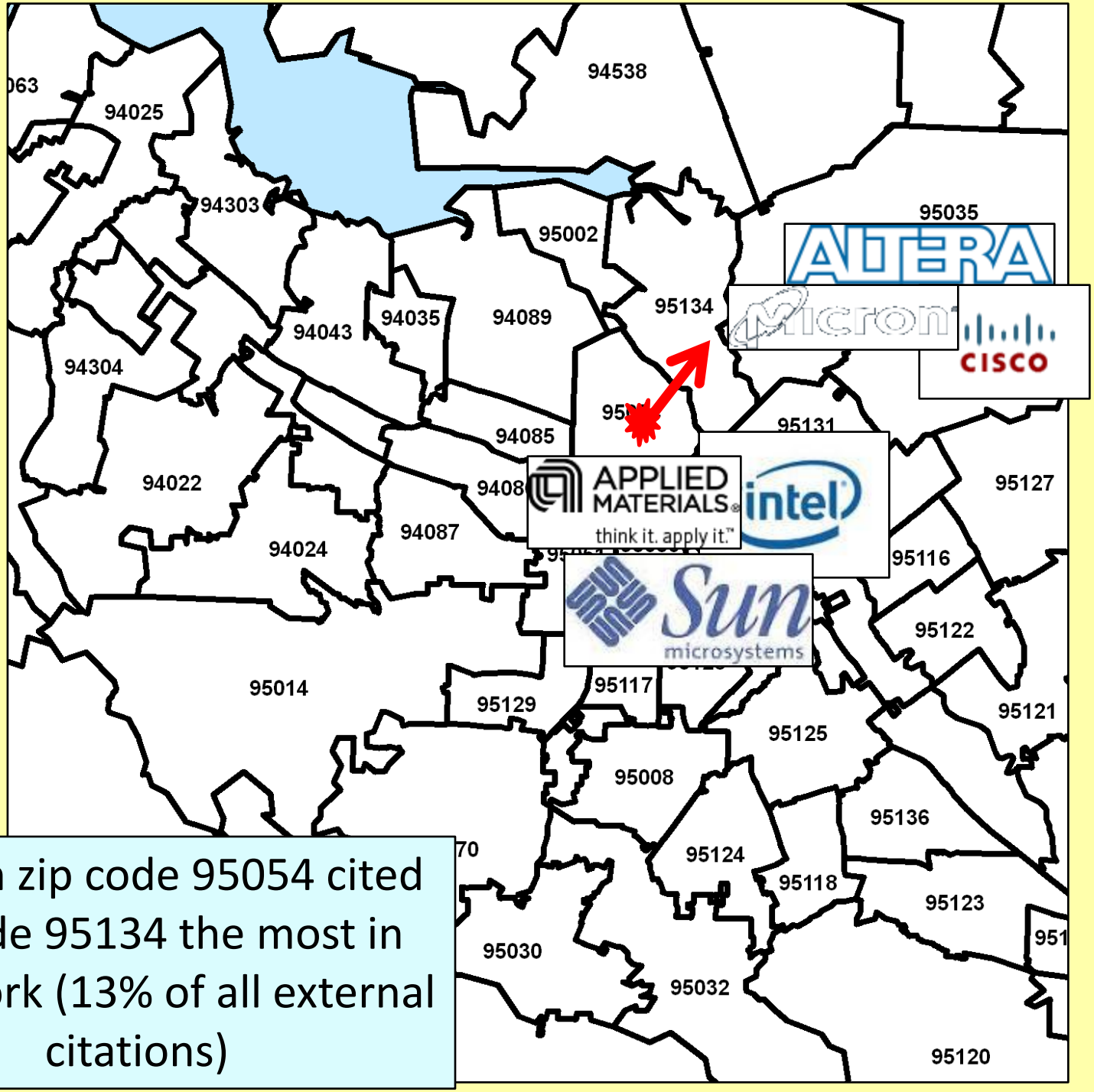

SF Rocks!
But now
where??


Tiburon
Angel Island
Berkeley
Piedmont
Oakland
Walnut Creek
Lafayette
Moraga
Mount Diablo State Park
Danville
San Ramon
San Leandro
Castro Valley
Dublin
Pleasanton
Hayward
Union City
Fremont
Newark
San Francisco Bay
Mulford Gardens
San Lorenzo
Bayshore
Millbrae
Foster City
San Mateo
Belmont
San Carlos
Redwood City
El Granada
Miramar
East Palo Alto
Menlo Park
Palo Alto
Los Altos
Mountain View
Sunnyvale
Cupertino
Monta Vista
Saratoga
Milpitas
La Honda
Pescadero
Portola State

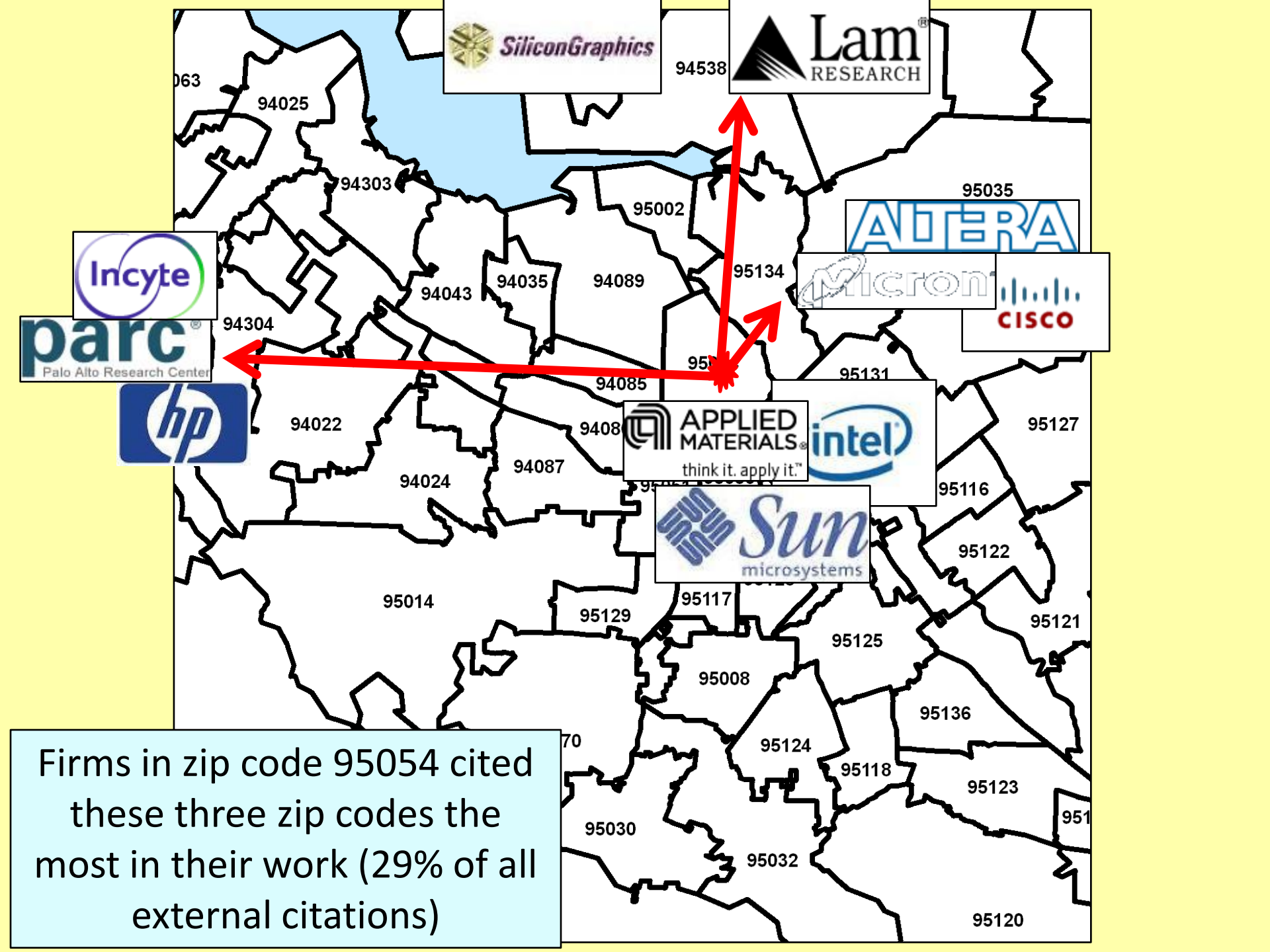

San Francisco Bay
This patch of land produced as many industrial patents over the last 30 years as the bottom 29 states combined
Start with a core area that contains ~76% of industrial patents filed in the SF area



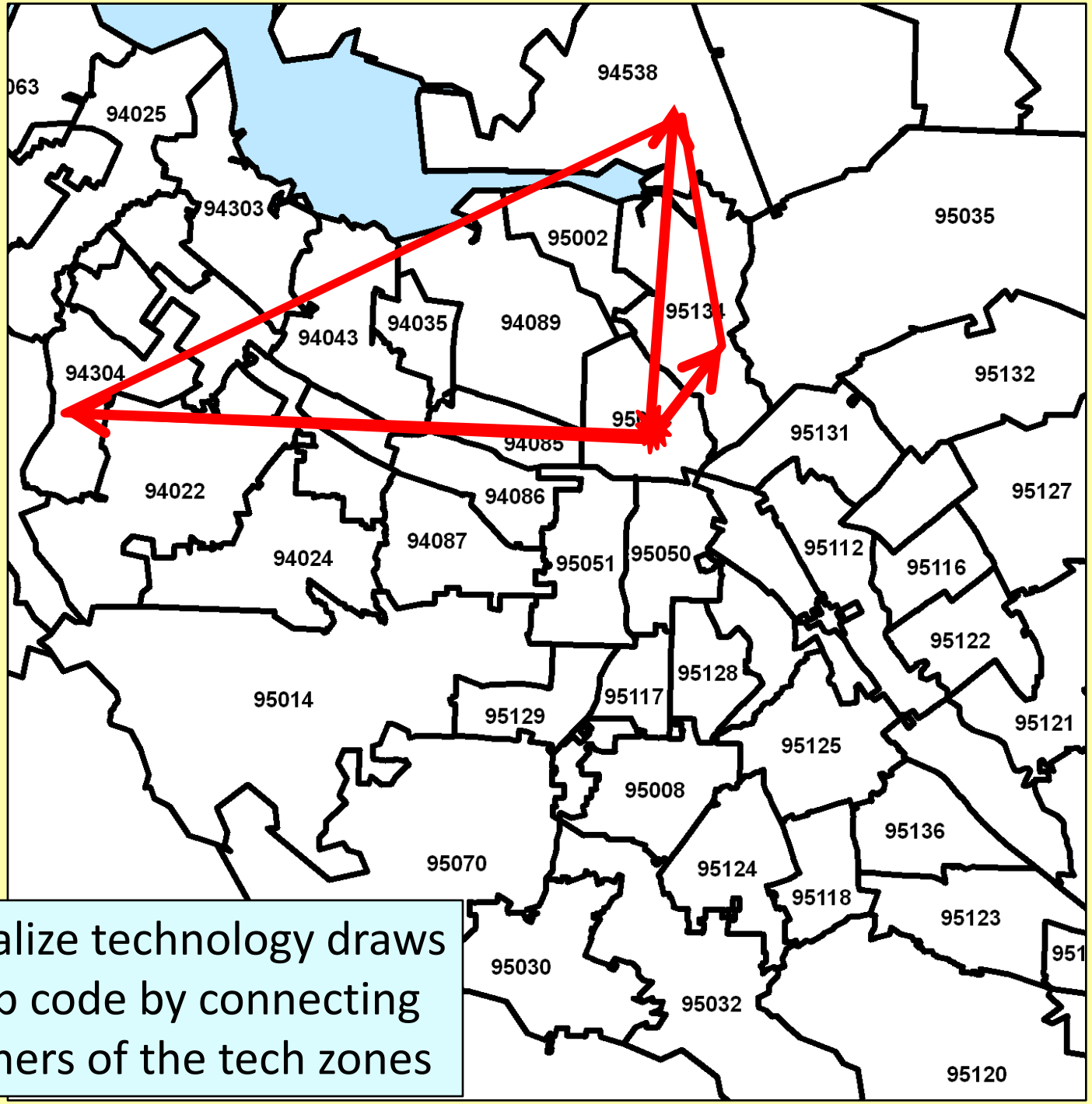
Zip code 95054 produced the most industrial patents of any SF zip code (>20,000, would be 17th largest state)



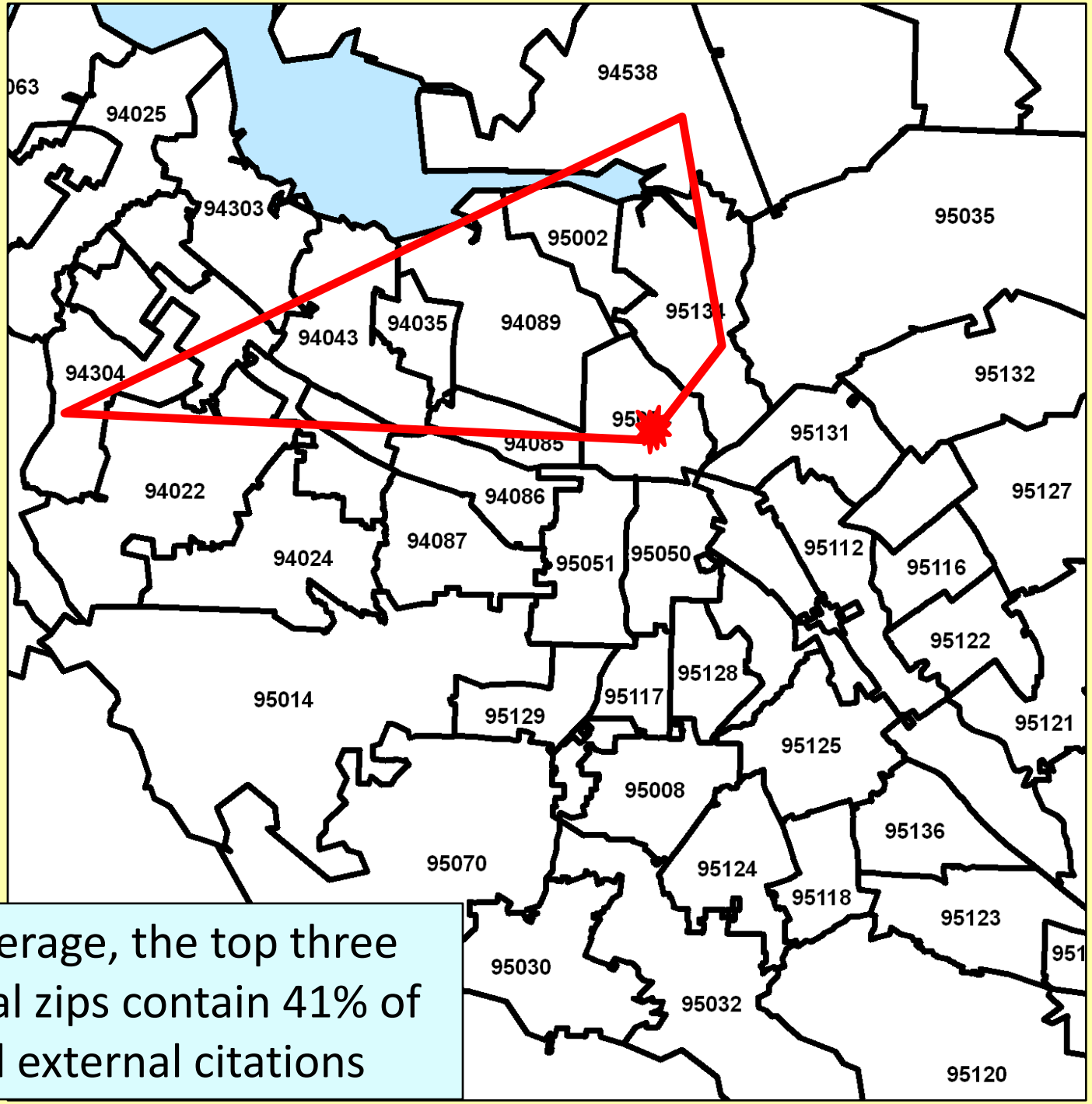
Firms in zip code 95054 cited zip code 95134 the most in their work (13% of all external citations)



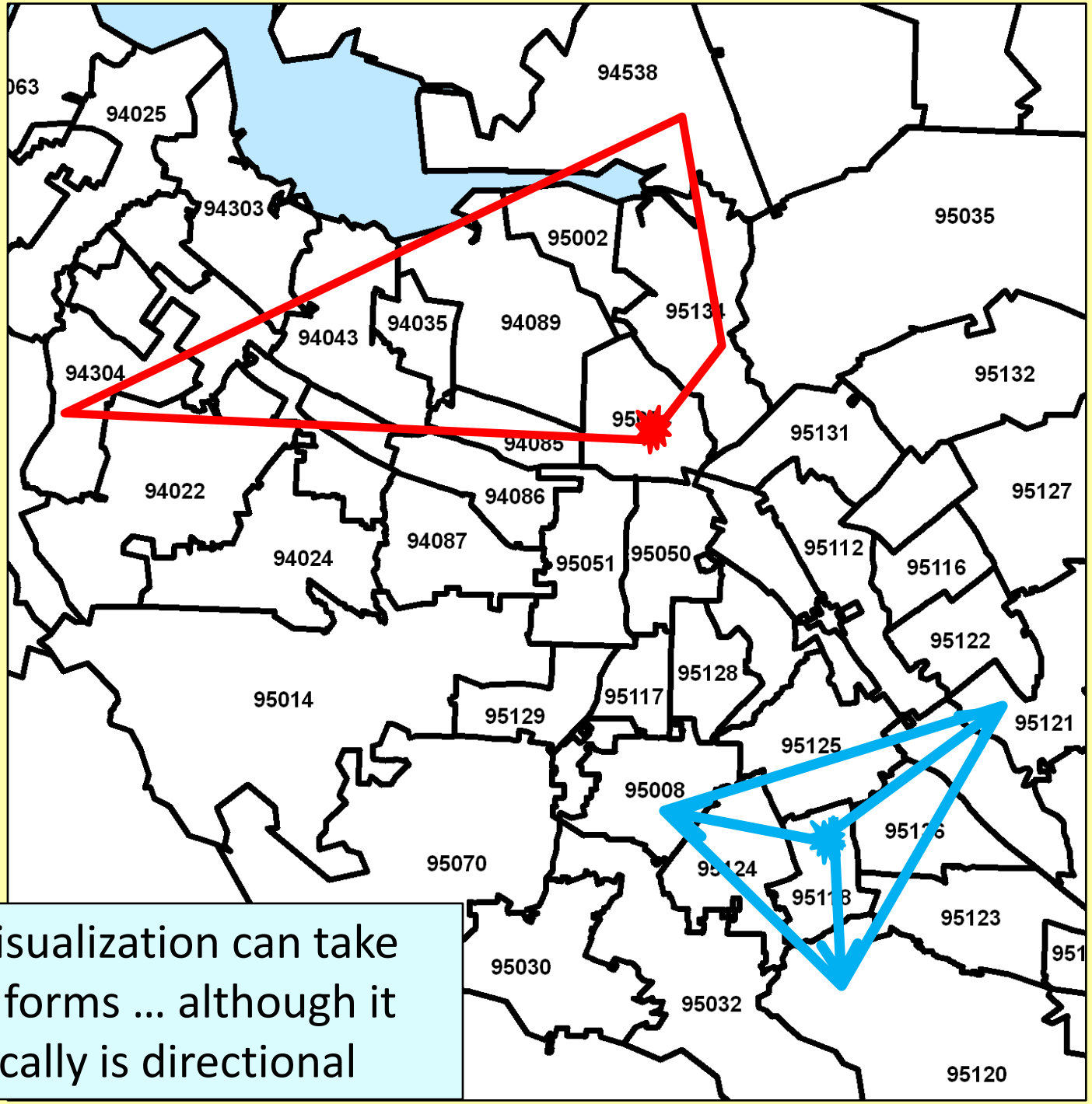
Firms in zip code 95054 cited these three zip codes the most in their work (29% of all external citations)



We visualize technology draws for a zip code by connecting the corners of the tech zones



On average, the top three external zips contain 41% of local external citations



This visualization can take many forms … although it typically is directional


063
94025
94538
94303
95002
95035
94043
94035
94089
95134
94304
95132
95131
94085
94022
94086
95127
94087
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95051
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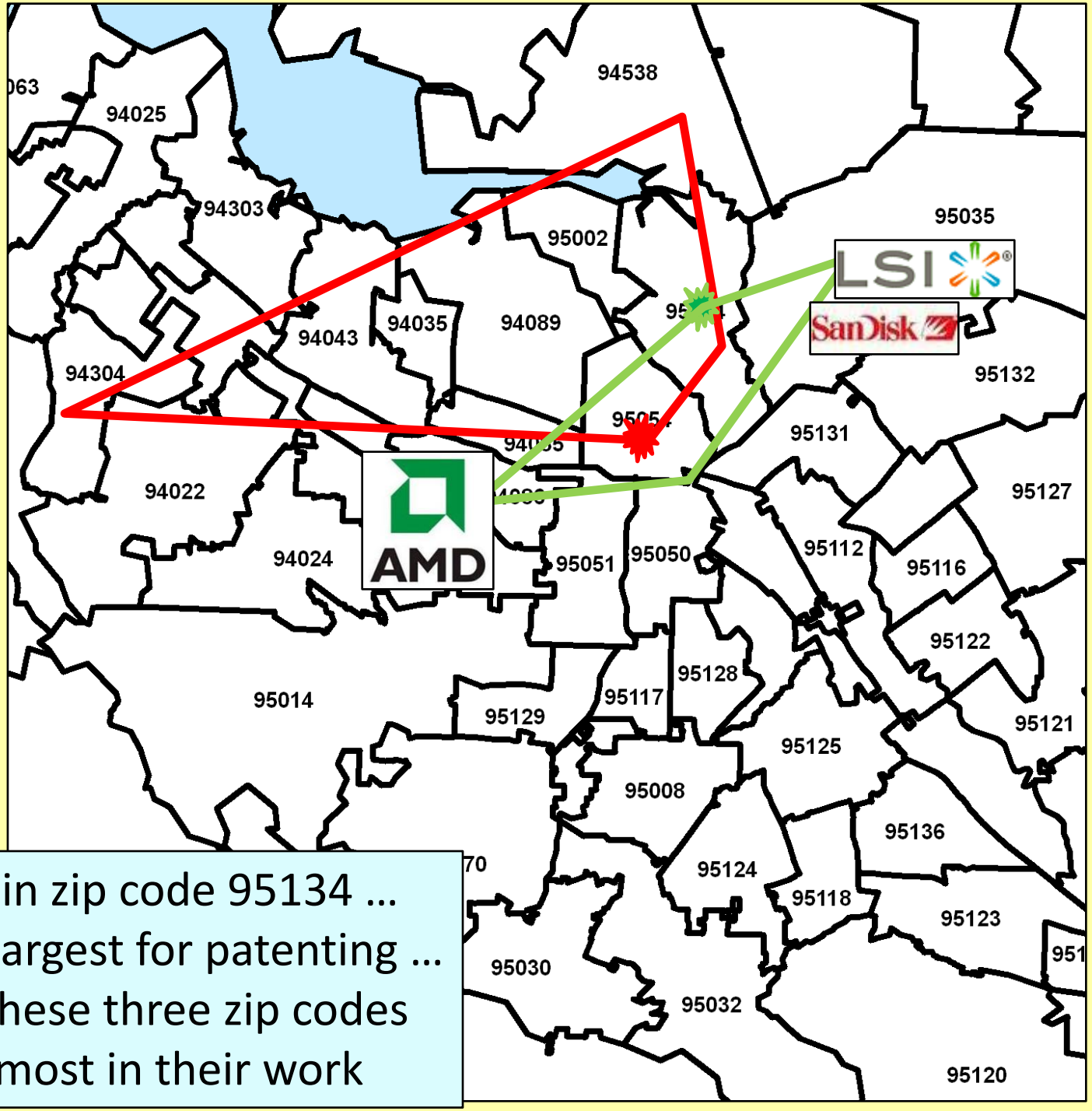
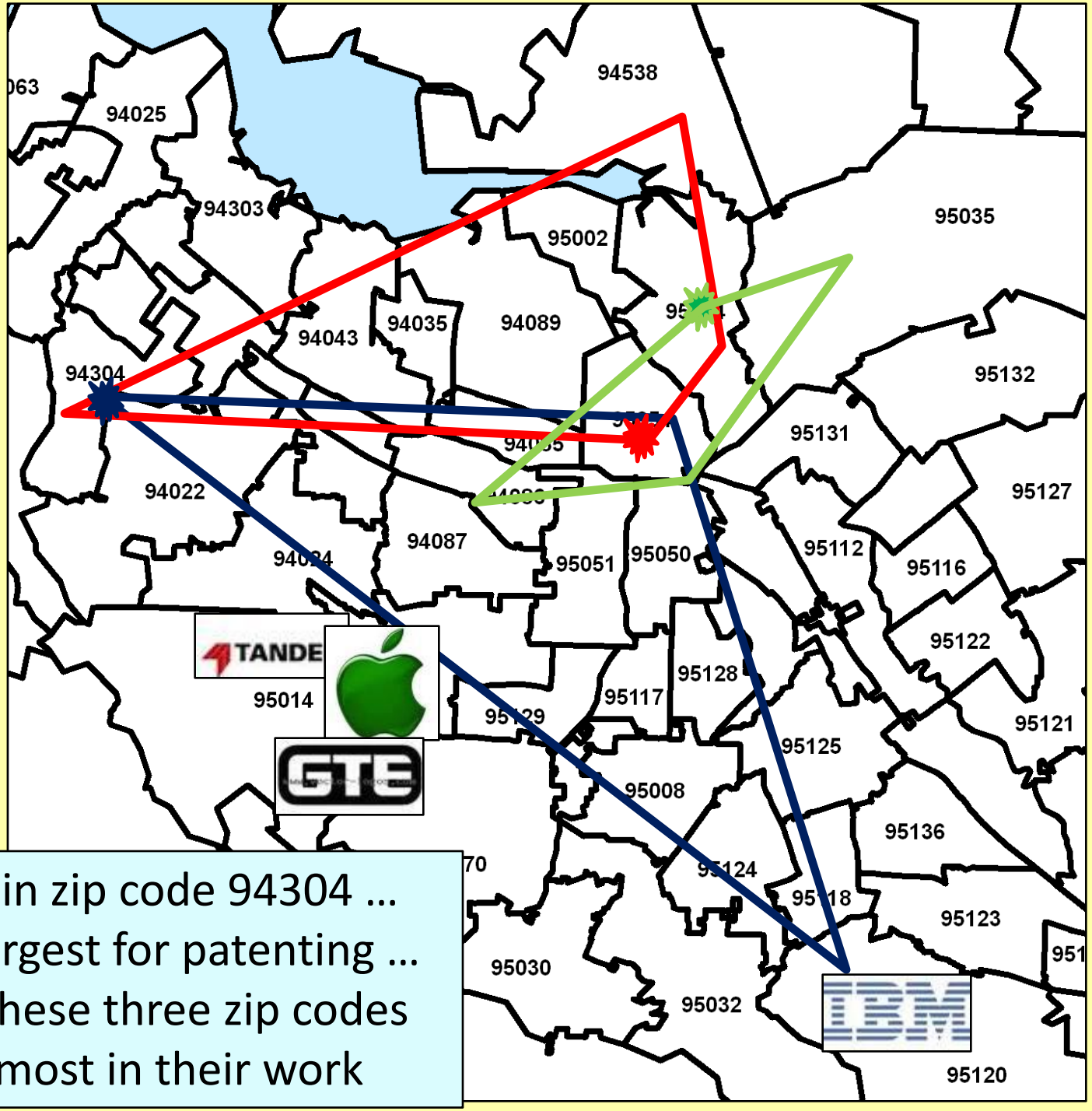
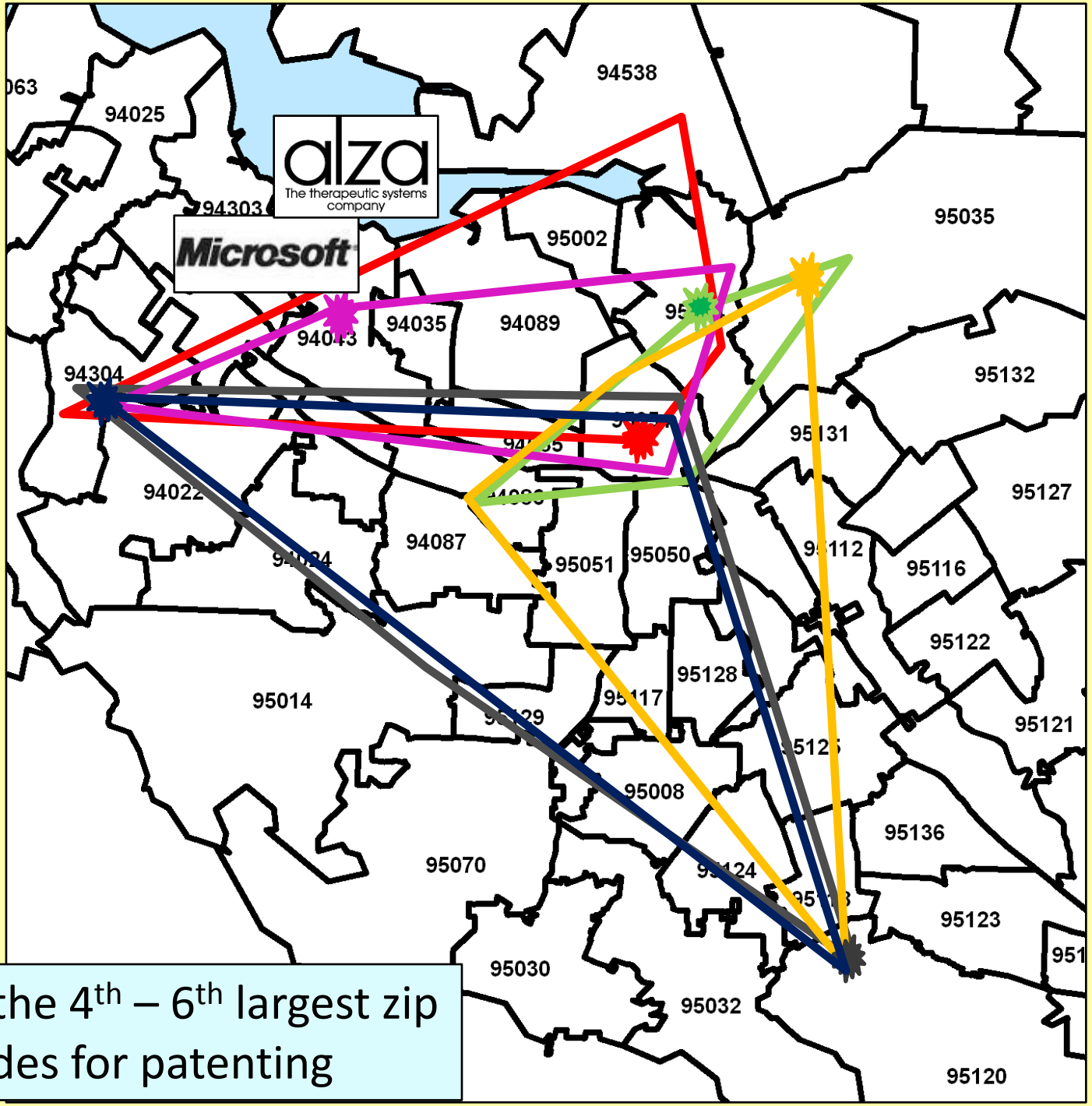


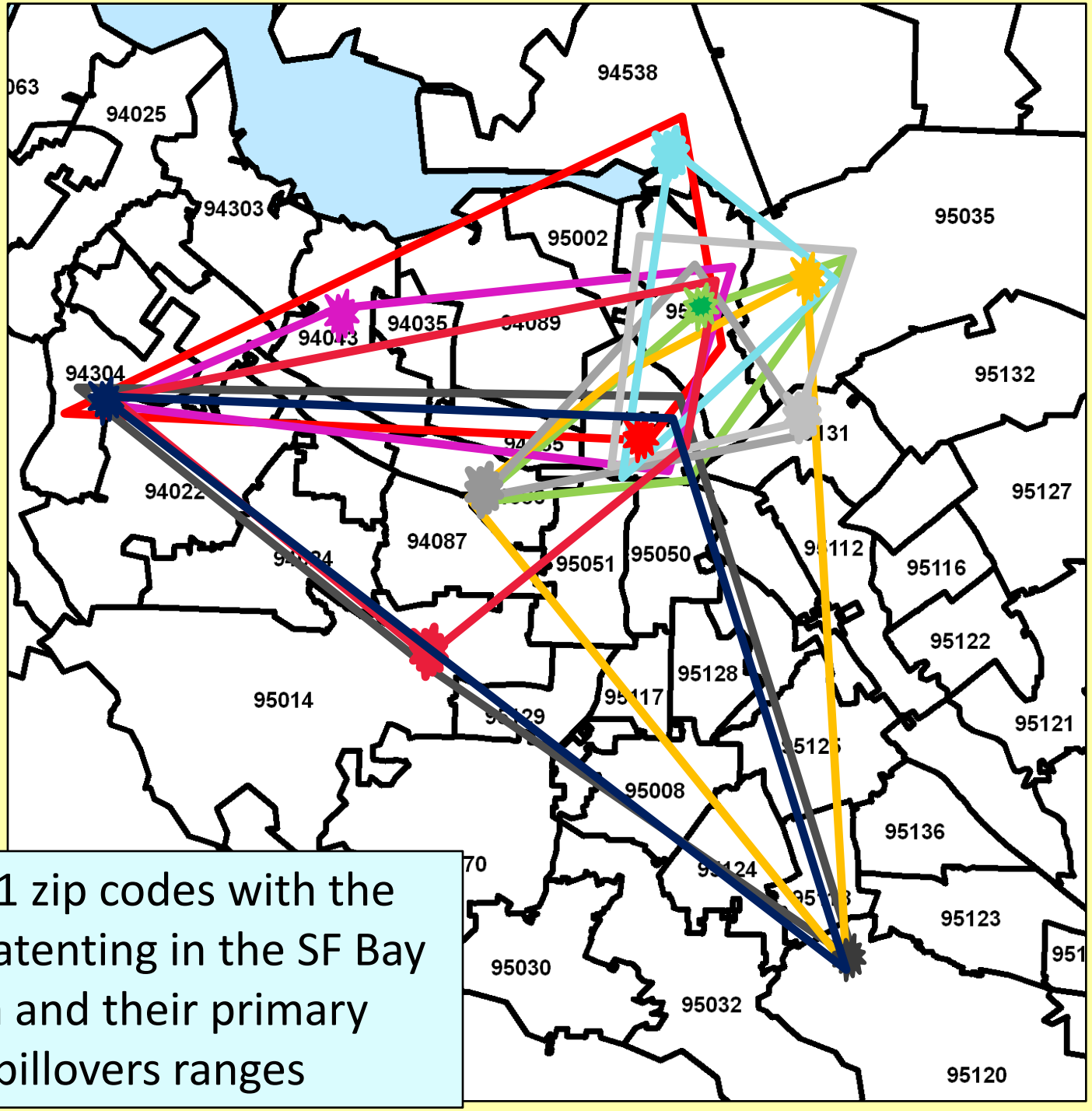
Firms in zip code 95134 …
second largest for patenting …
cited these three zip codes
the most in their work



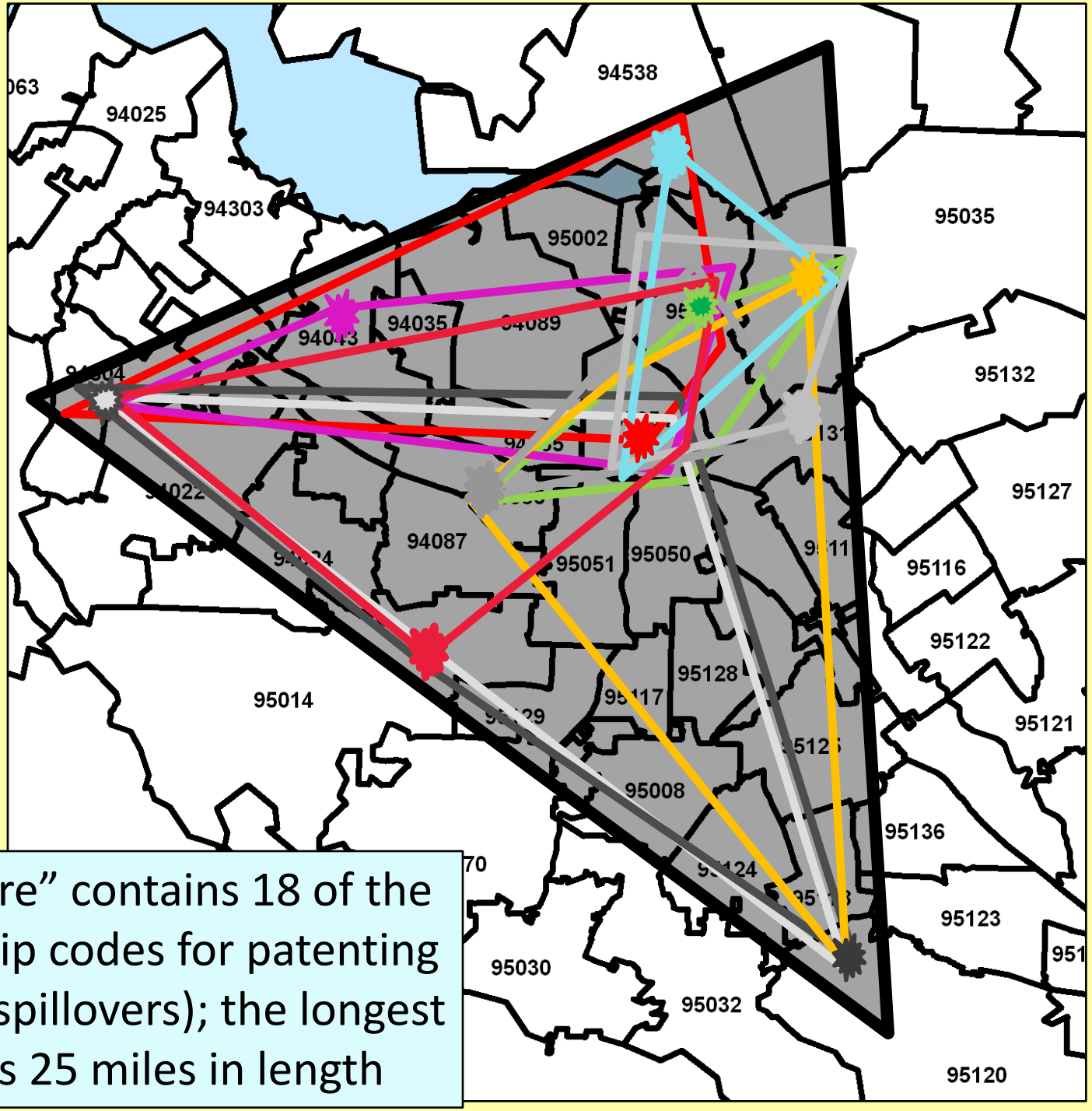
Firms in zip code 94304 …
third largest for patenting …
cited these three zip codes
the most in their work



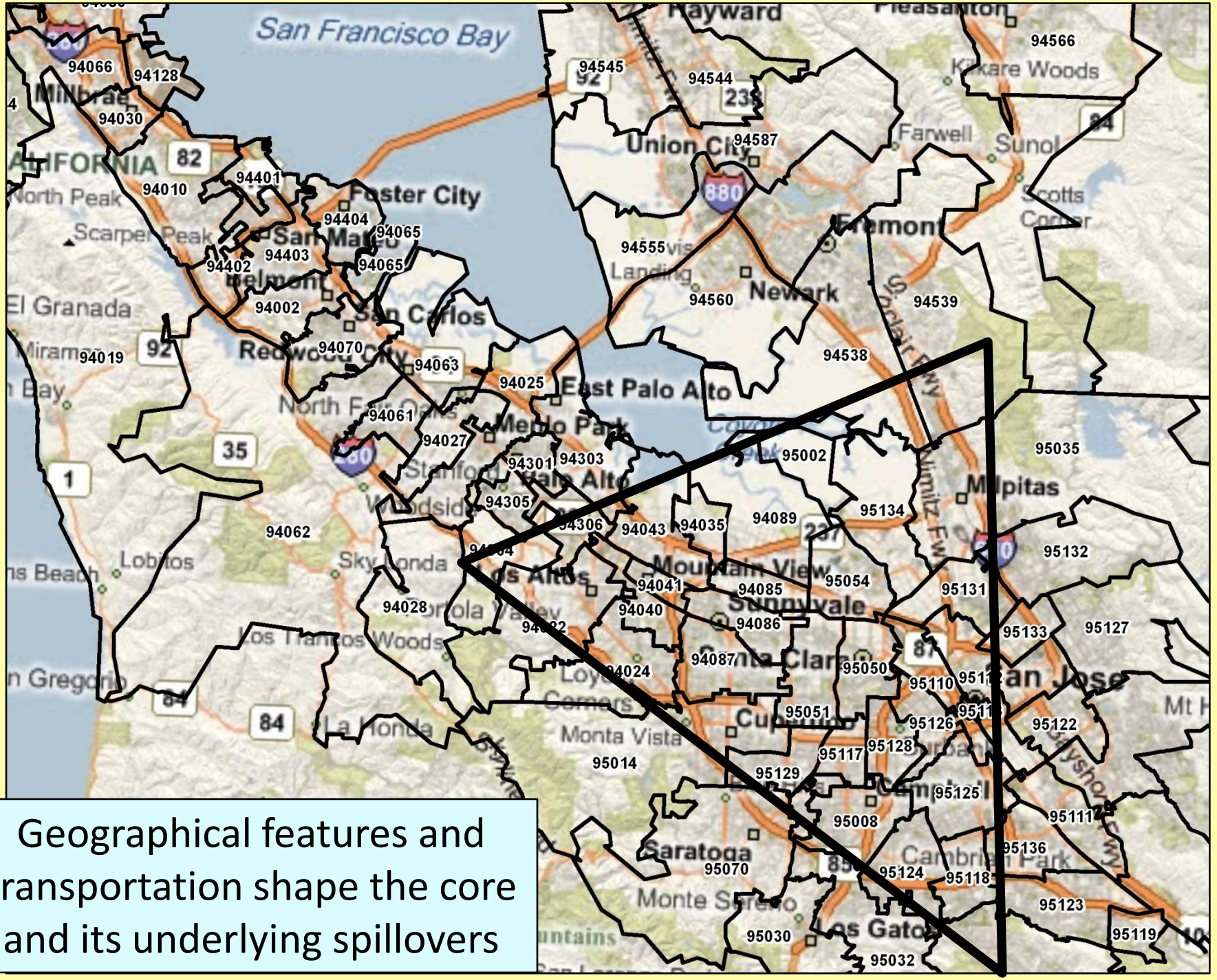
Adding the 4th – 6th largest zip codes for patenting



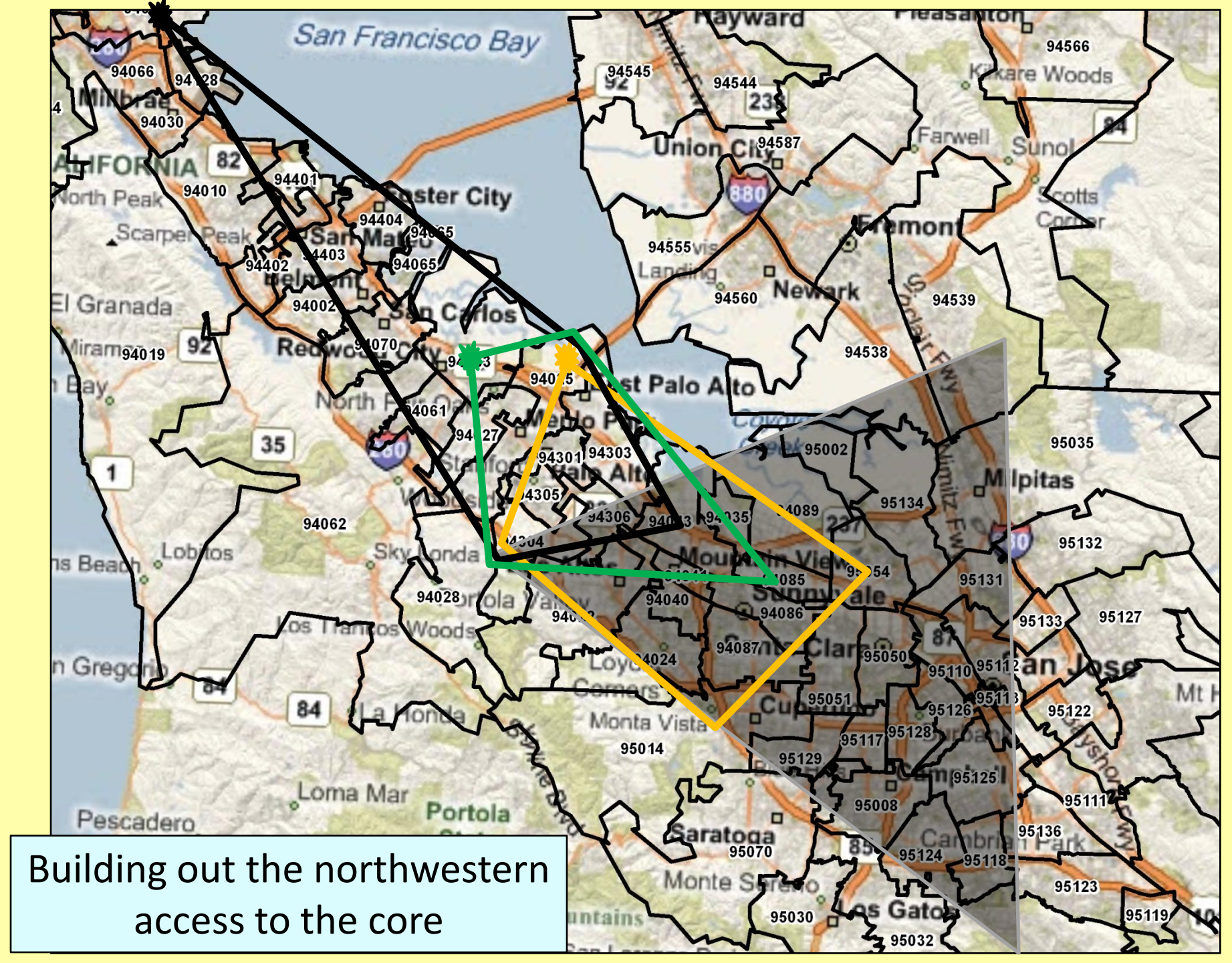
The 11 zip codes with the most patenting in the SF Bay Area and their primary spillovers ranges



The “core” contains 18 of the top 25 zip codes for patenting (and all spillovers); the longest side is 25 miles in length



Geographical features and transportation shape the core and its underlying spillovers


San Francisco Bay
Hayward
Pleasanton
Union City
Fremont
Newark
Milpitas
Sunnyvale
Mountain View
Palo Alto
San Carlos
Redwood City
San Mateo
Foster City
Millbrae
Burlingame
El Granada
Half Moon Bay
Pescadero
Loma Mar
Portola
La Honda
Los Trancos Woods
Monta Vista
Saratoga
Los Gatos
Monte Sereno
Cupertino
Santa Clara
San Jose
Farwell
Sunol
Scotts Corner
Kirkare Woods
Cambrian Park
Lobitos
Sky Londa
94066
94030
94010
94401
94404
94403
94402
94065
94002
94070
94019
94061
94062
94028
94301
94303
94305
94306
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94014
94545
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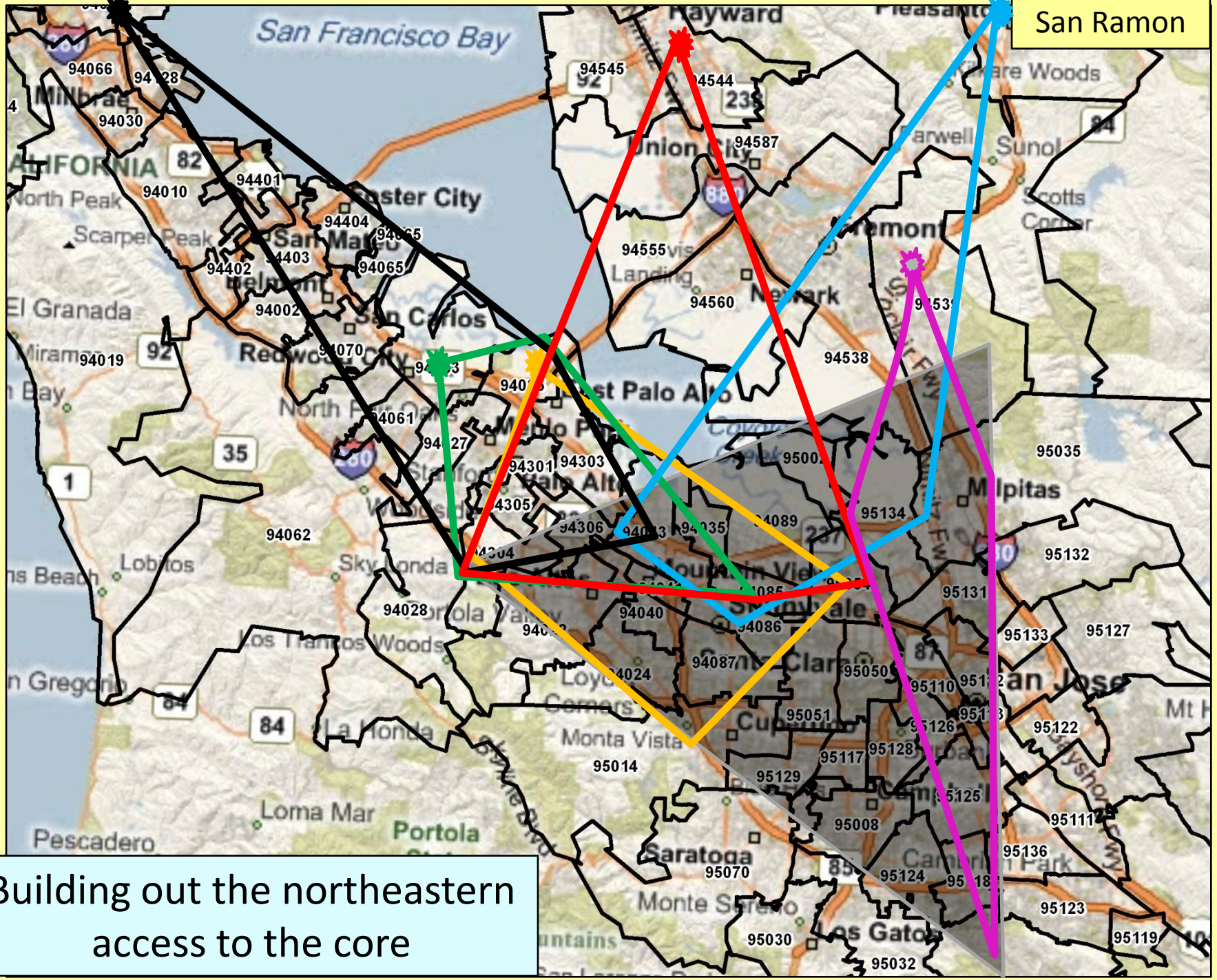
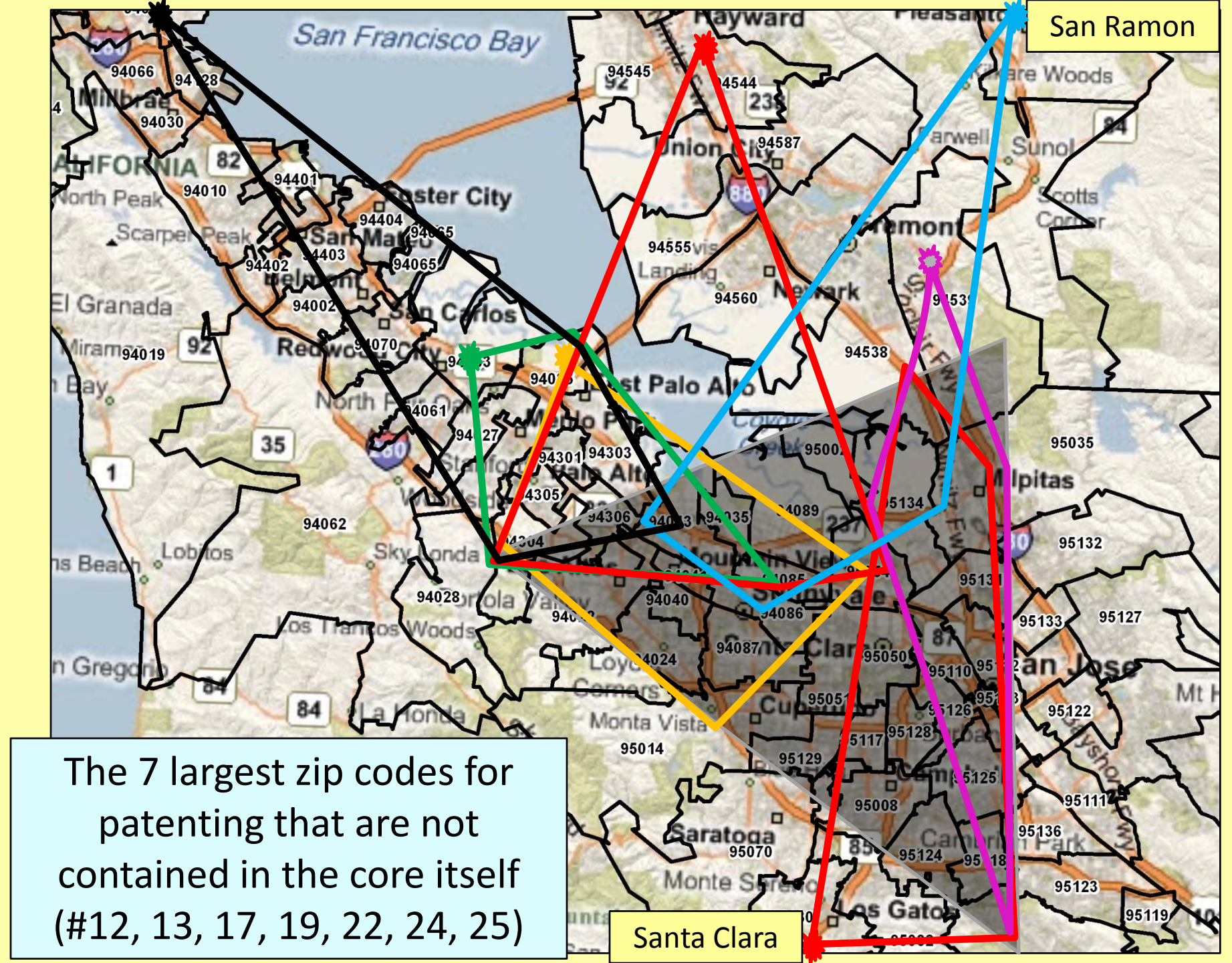
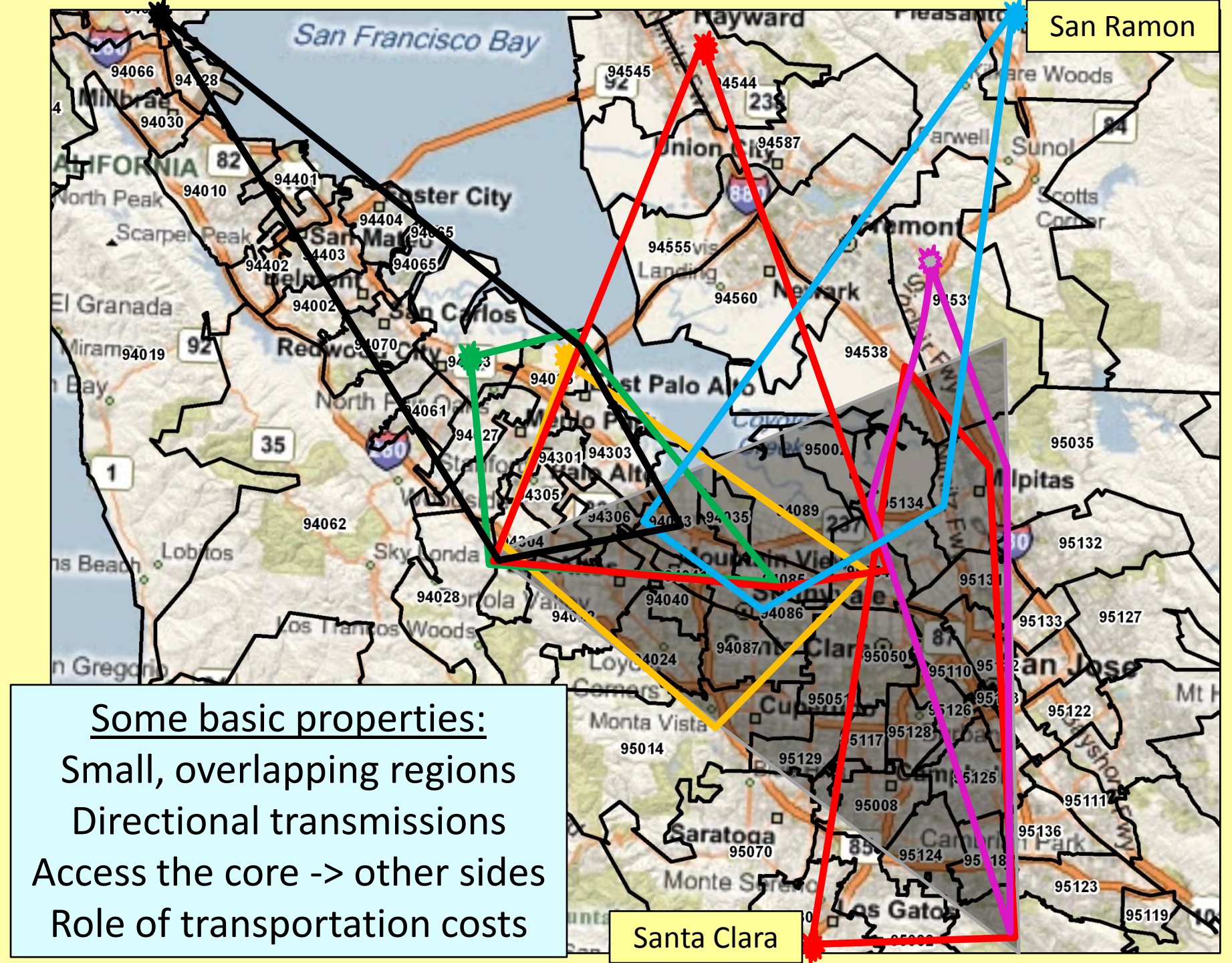
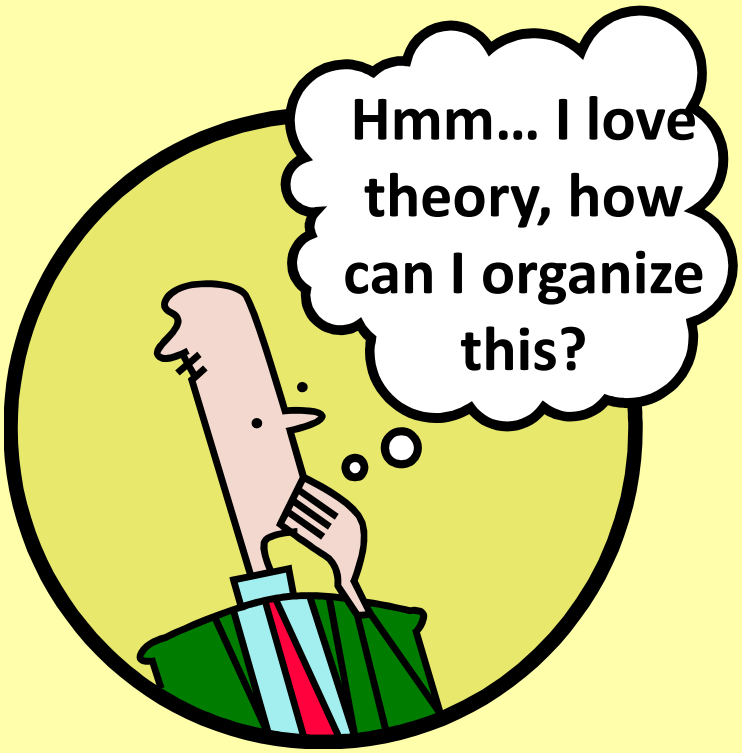
95051
95126
95128
95117
95129
95125
95008
95070
95124
95118
95136
95111
95123
95119
95030
95032
94566
82
92
35
1
84
85
880
237
680
87
Building out the northwestern access to the core

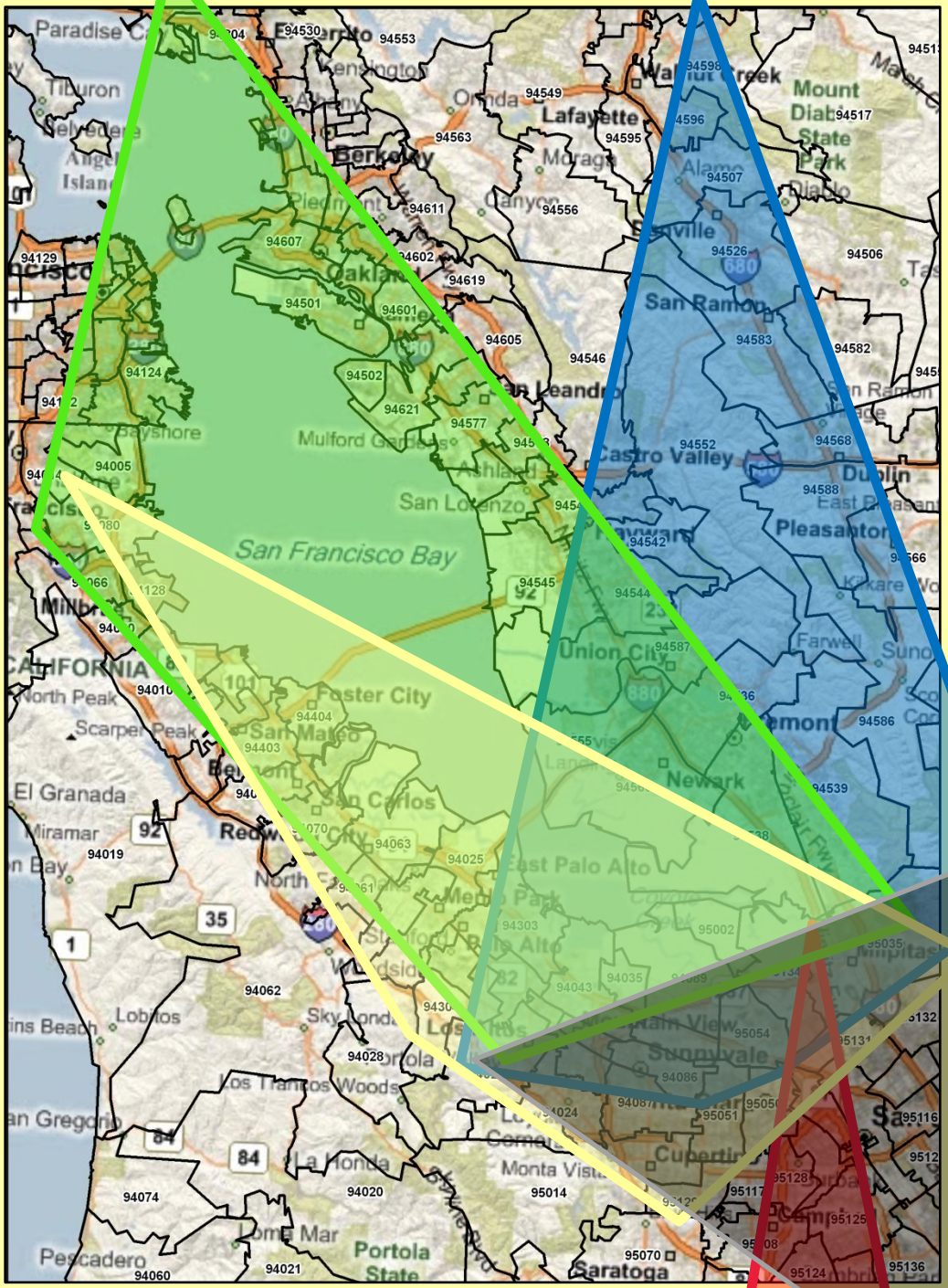

San Ramon
Building out the northeastern access to the core


San Ramon
Santa Clara
San Francisco Bay
The 7 largest zip codes for patenting that are not contained in the core itself (#12, 13, 17, 19, 22, 24, 25)

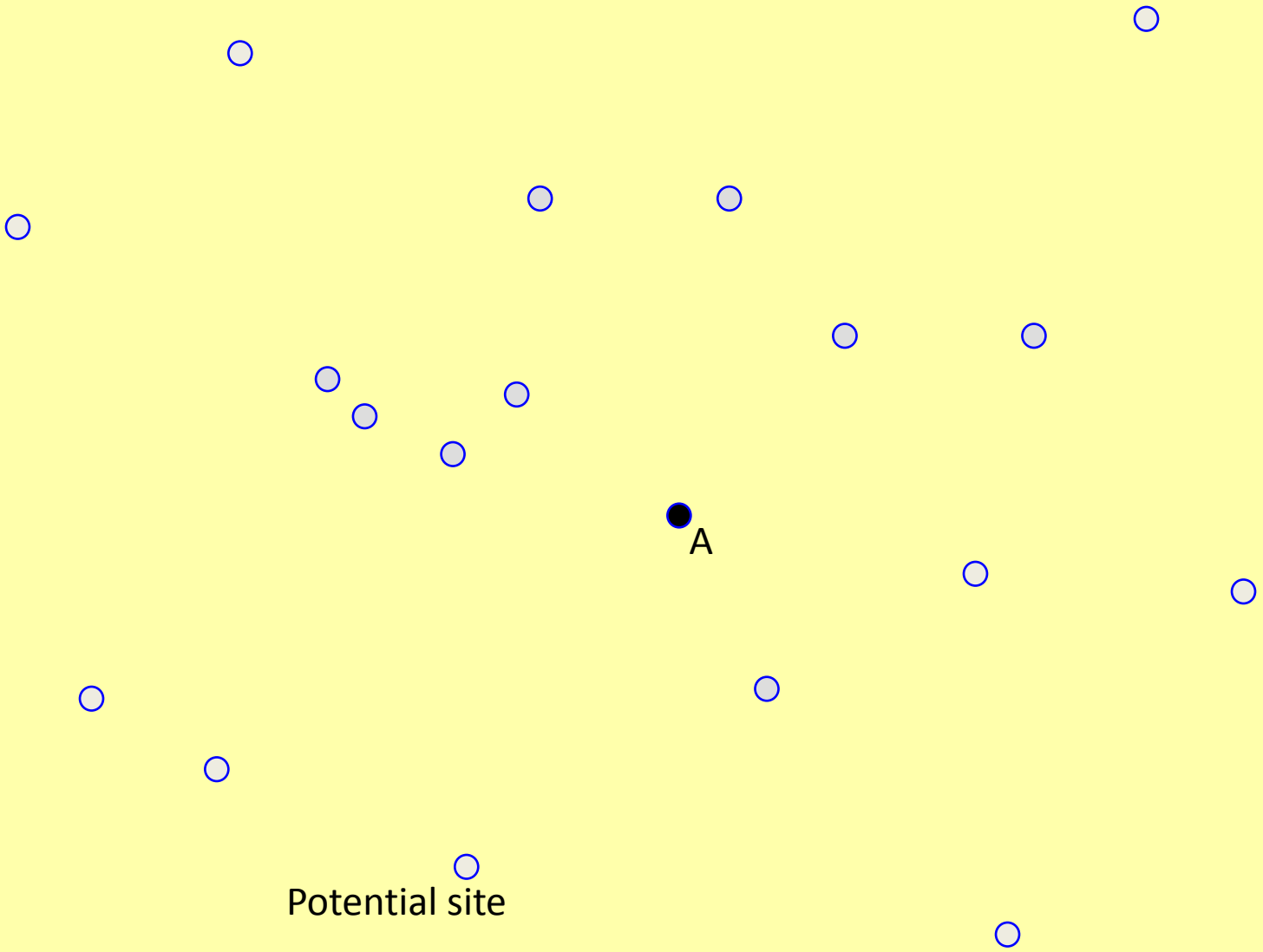

San Ramon
Santa Clara
San Francisco Bay
Some basic properties:
Small, overlapping regions
Directional transmissions
Access the core -> other sides
Role of transportation costs



Further grouping and organizing the technology flows … multiple, overlapping spillover zones … none transverses the whole span

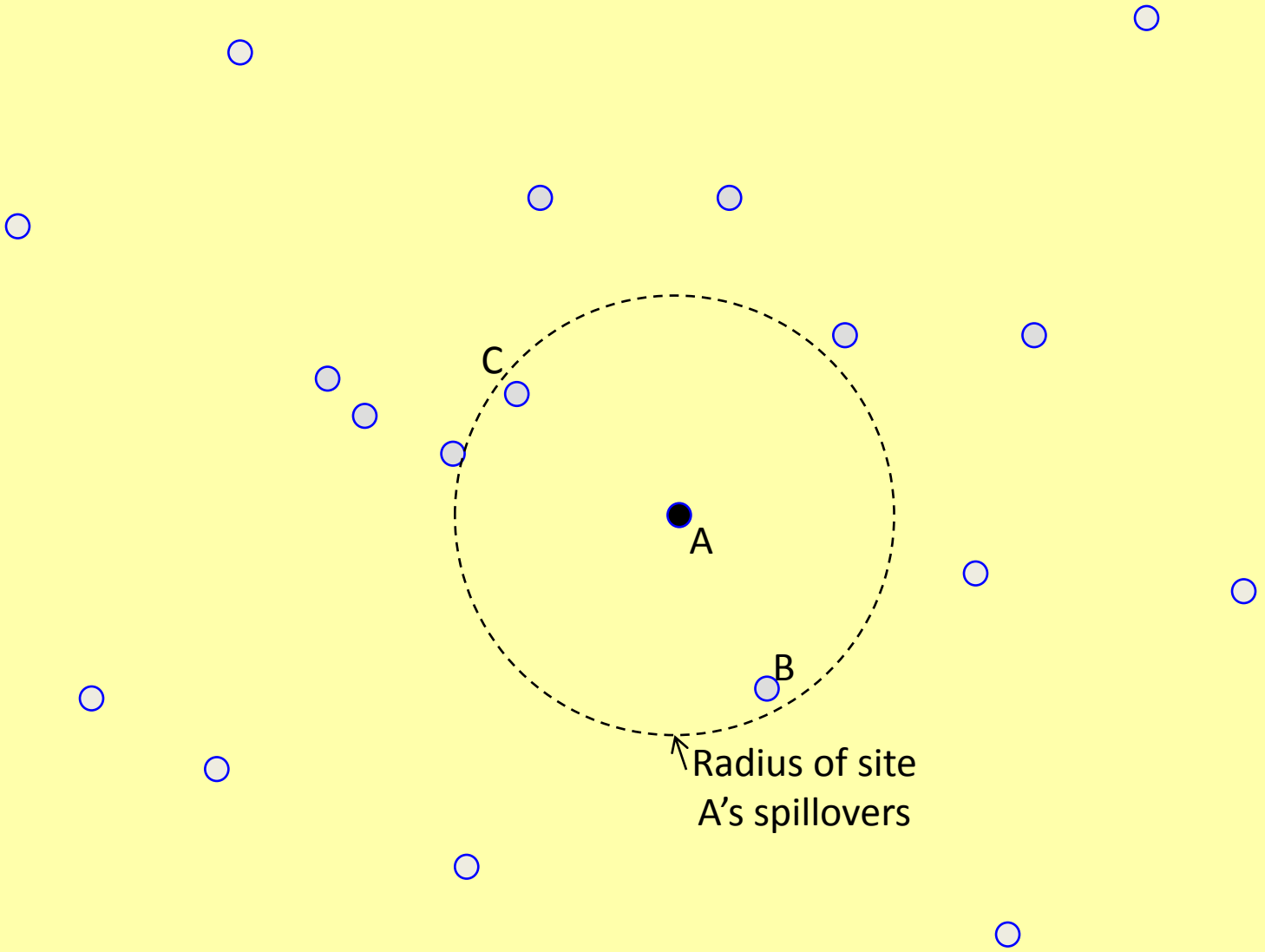


Theory: The formation of an agglomeration bubble …

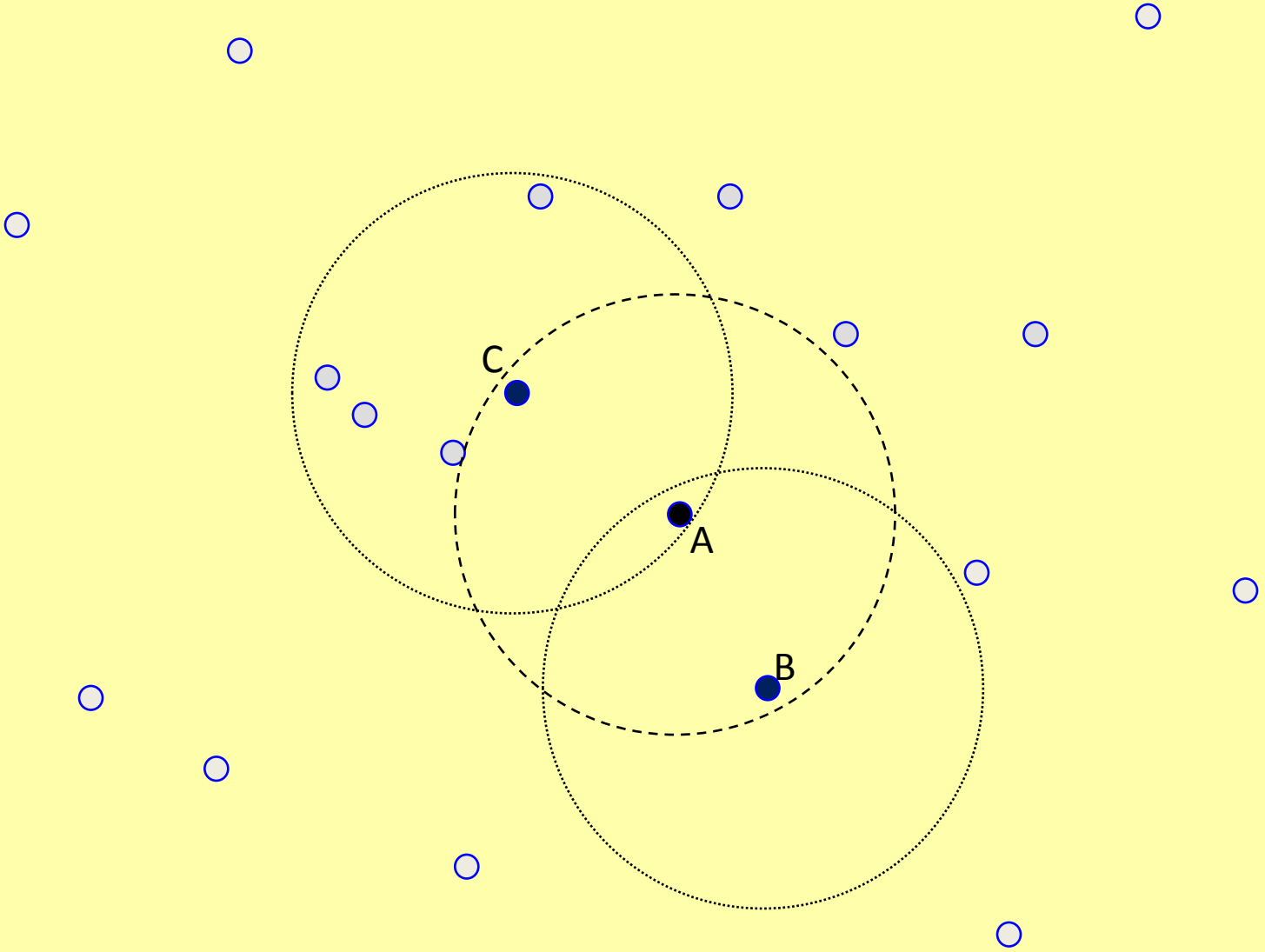


Sequential entry, no foresight, & potential sites fixed

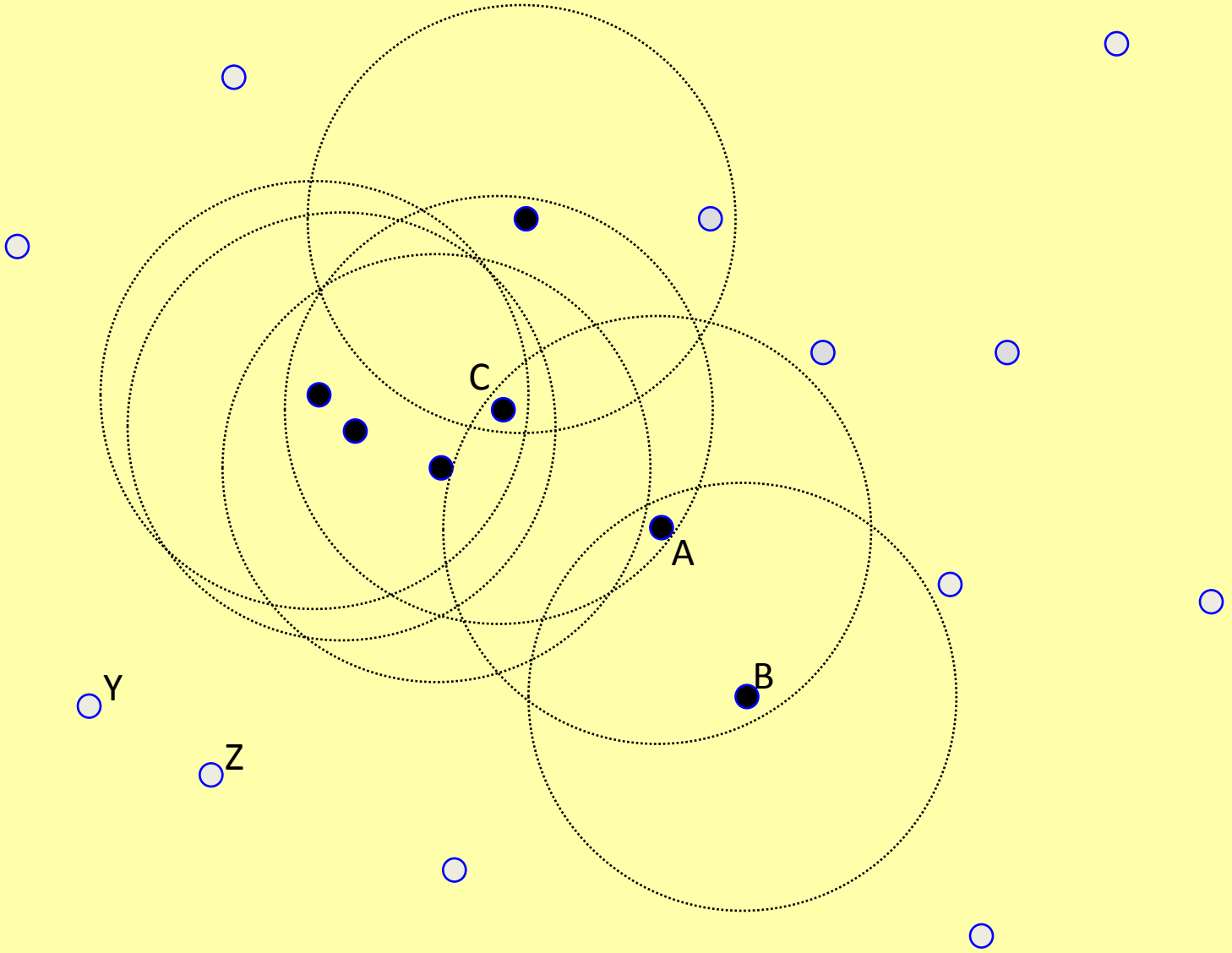
Theory: The formation of an agglomeration bubble …



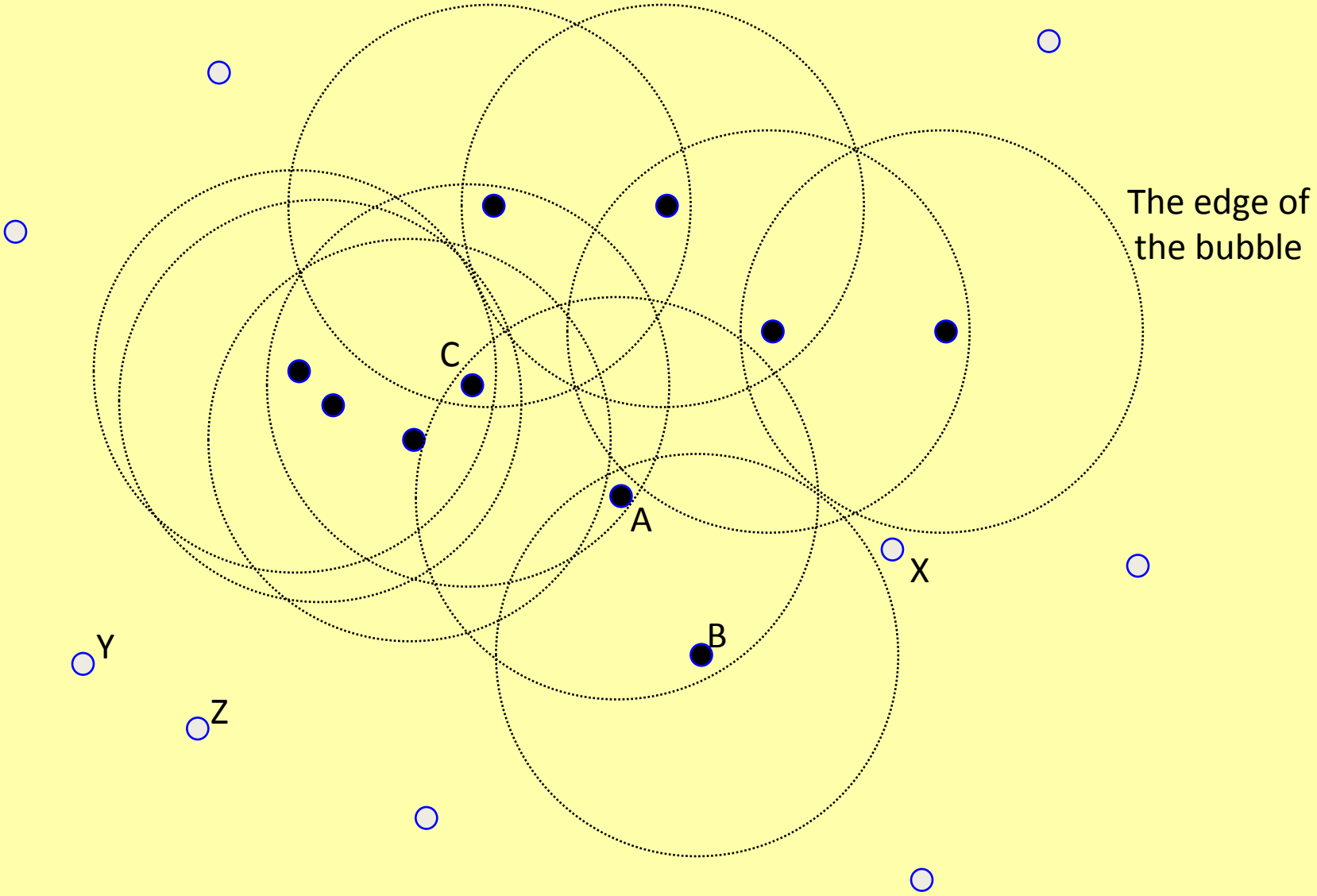
Theory: The formation of an agglomeration bubble …



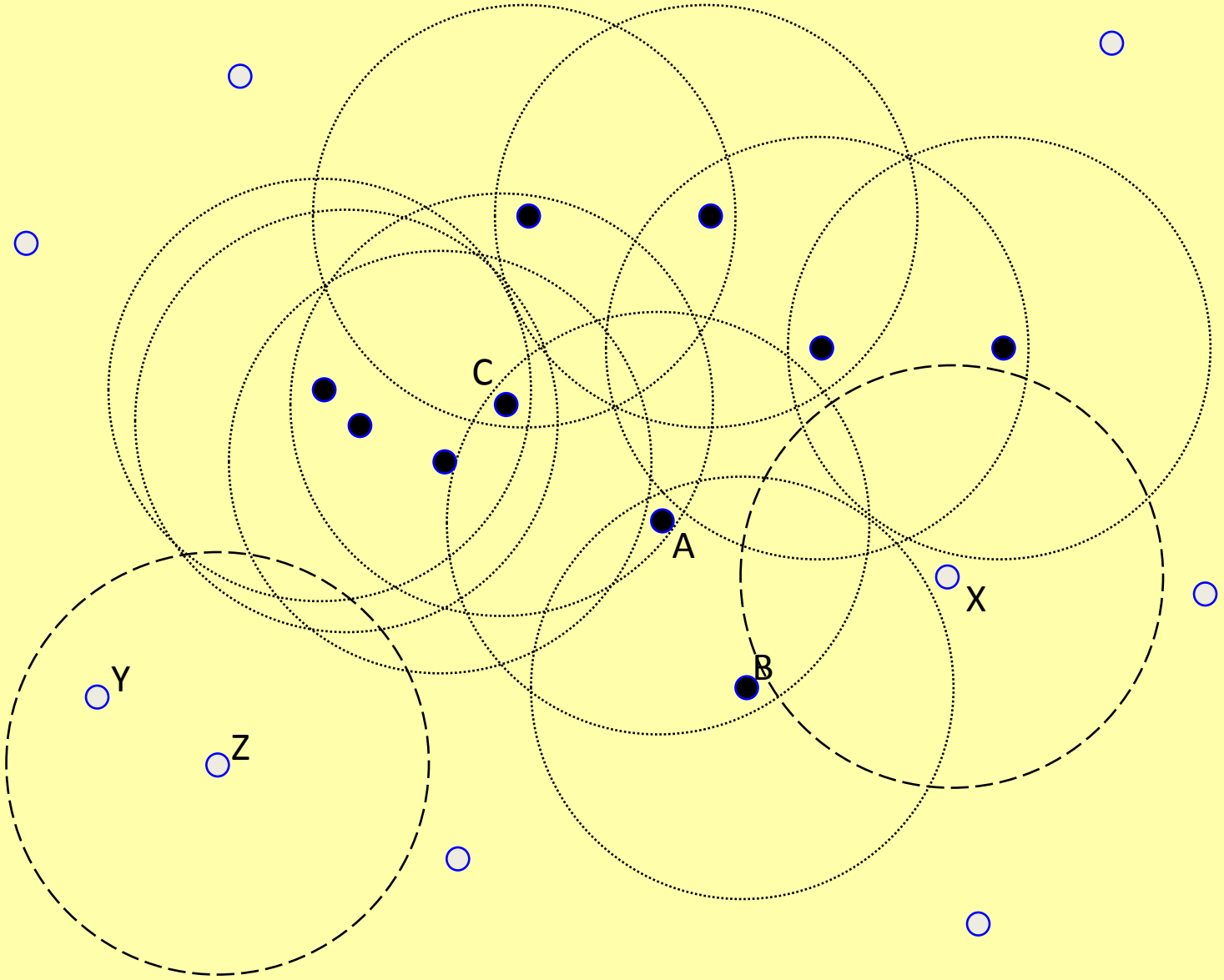
Theory: The formation of an agglomeration bubble …



Theory: The formation of an agglomeration bubble …

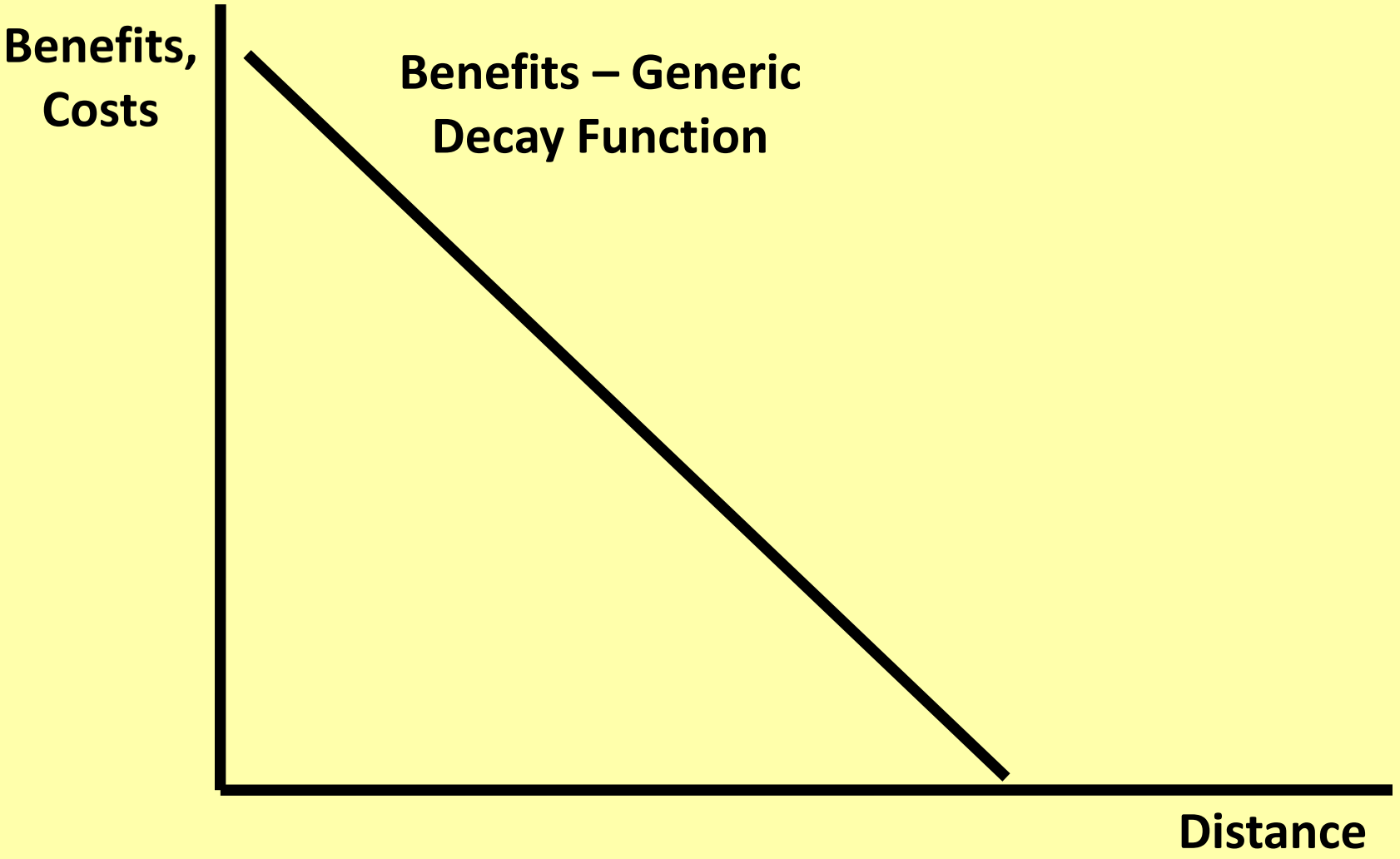


Marginal entrant indifferent over open sites …

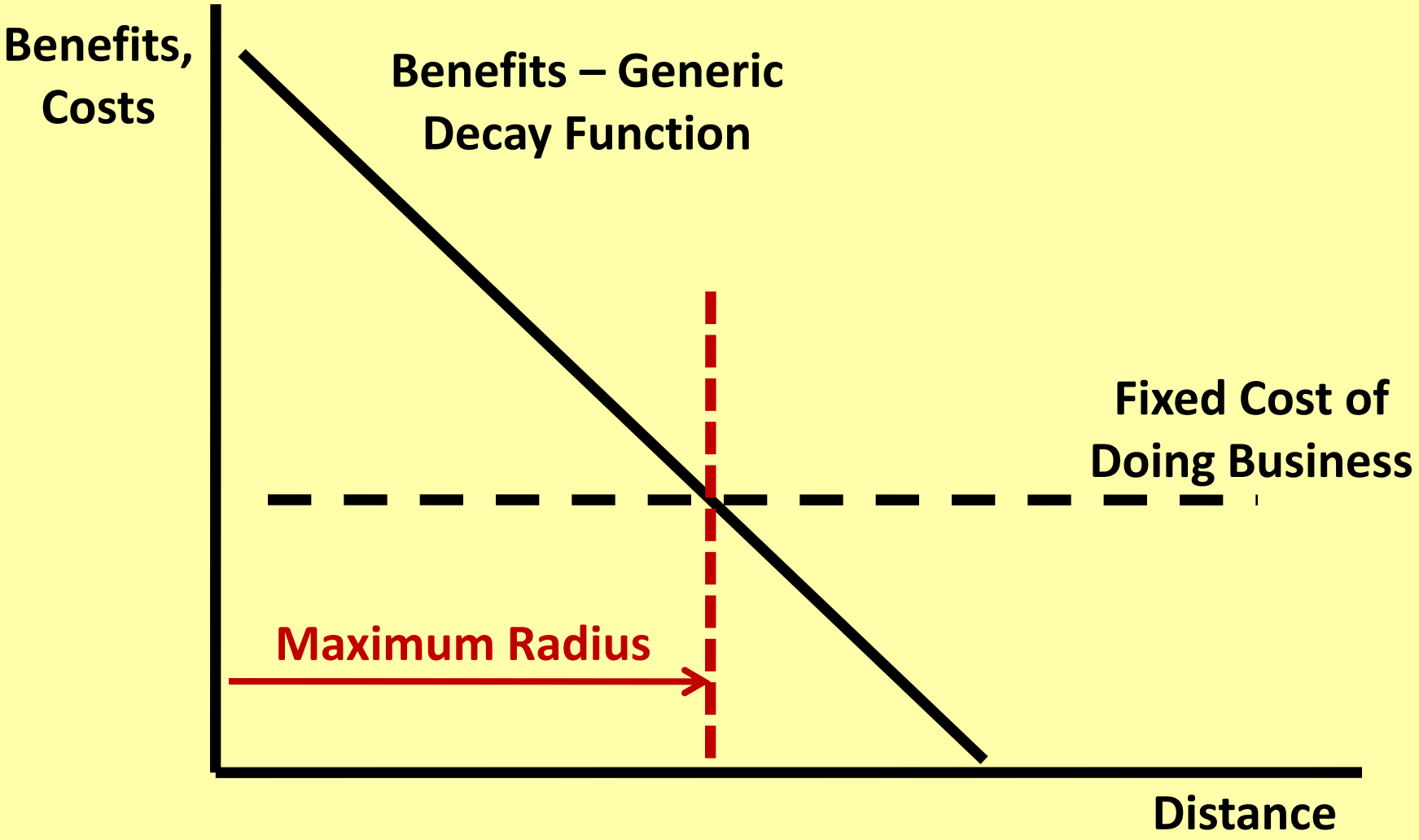


No previously populated sites are within spillover range

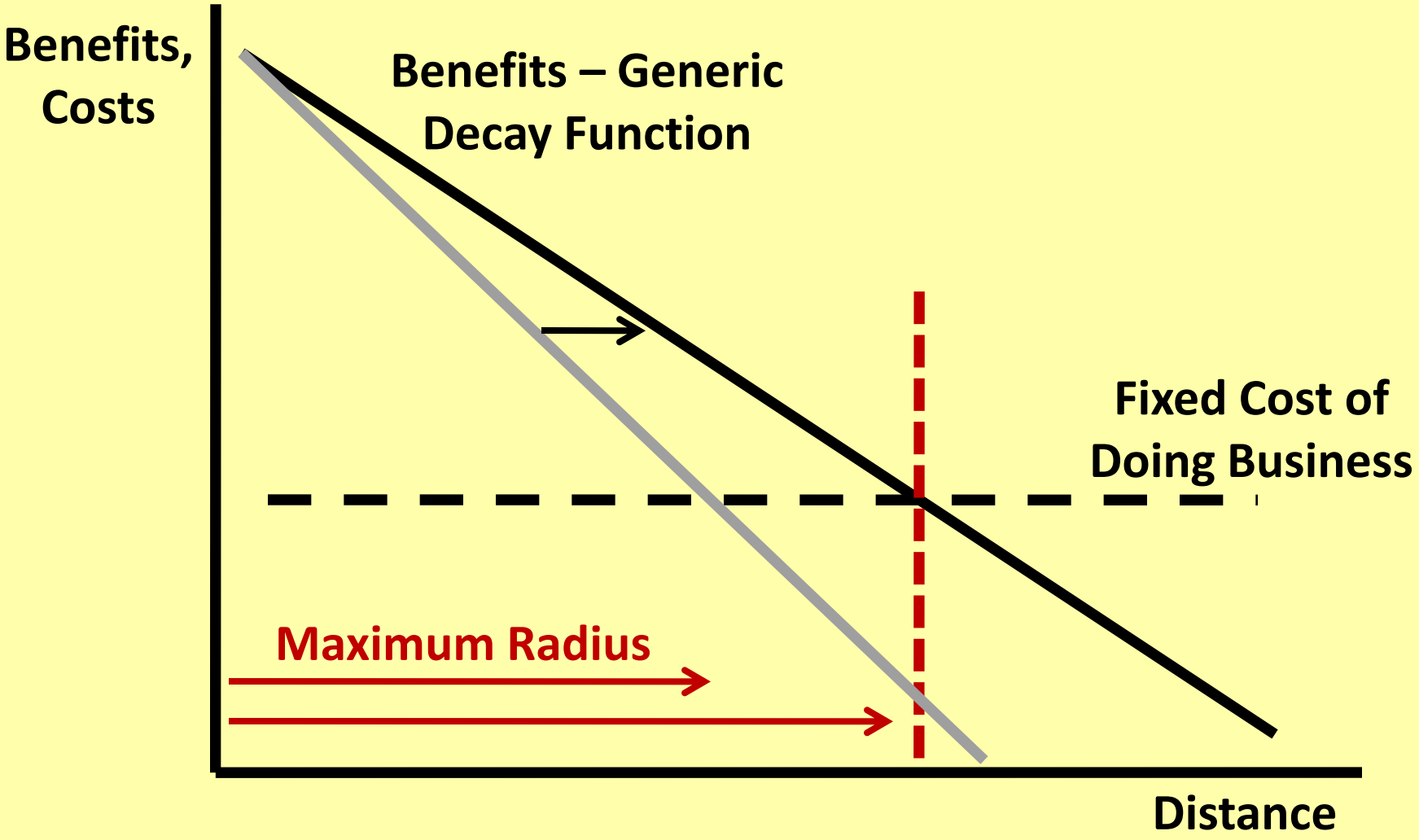
Simple backbone for the maximum radius…



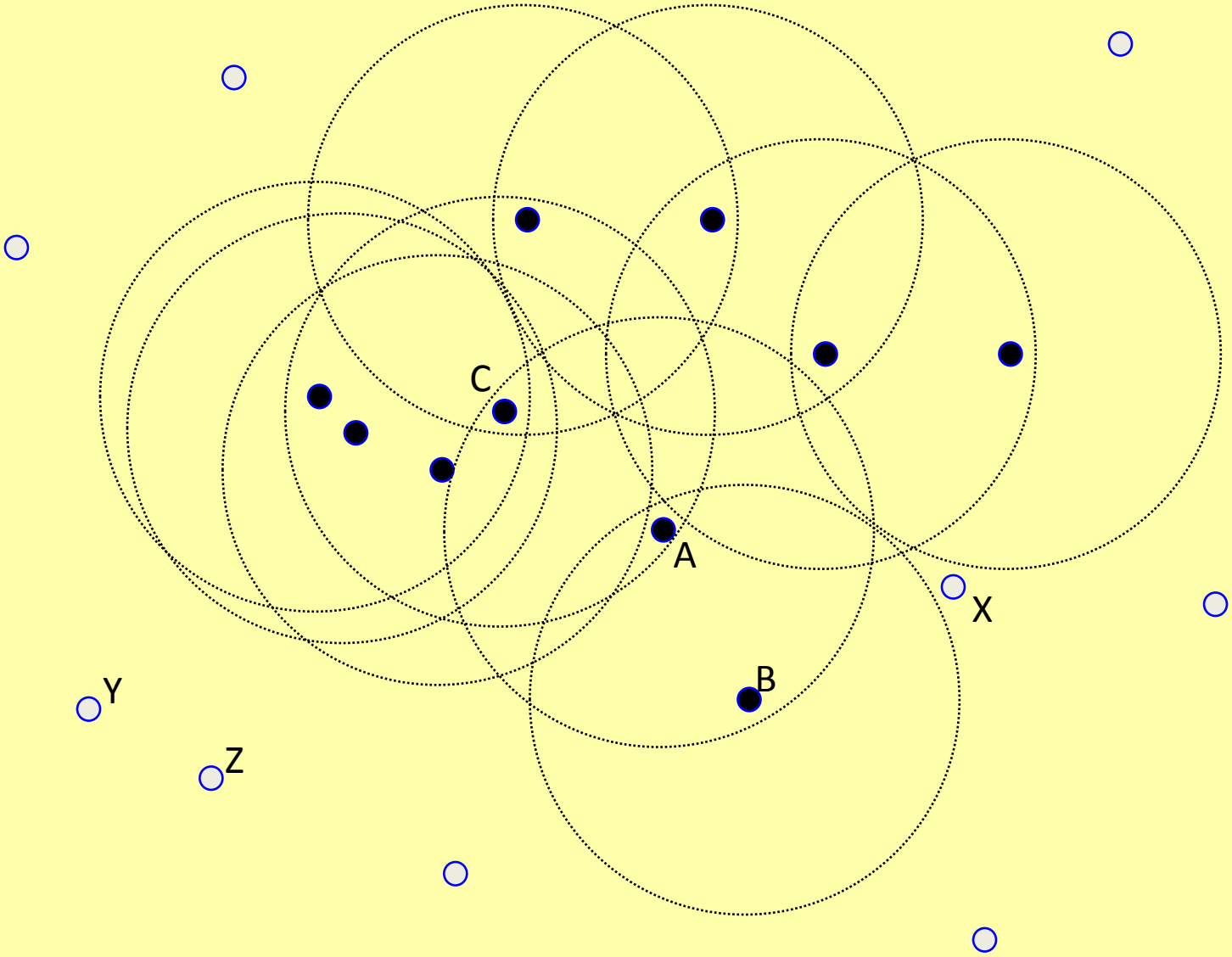
Simple backbone for the maximum radius…



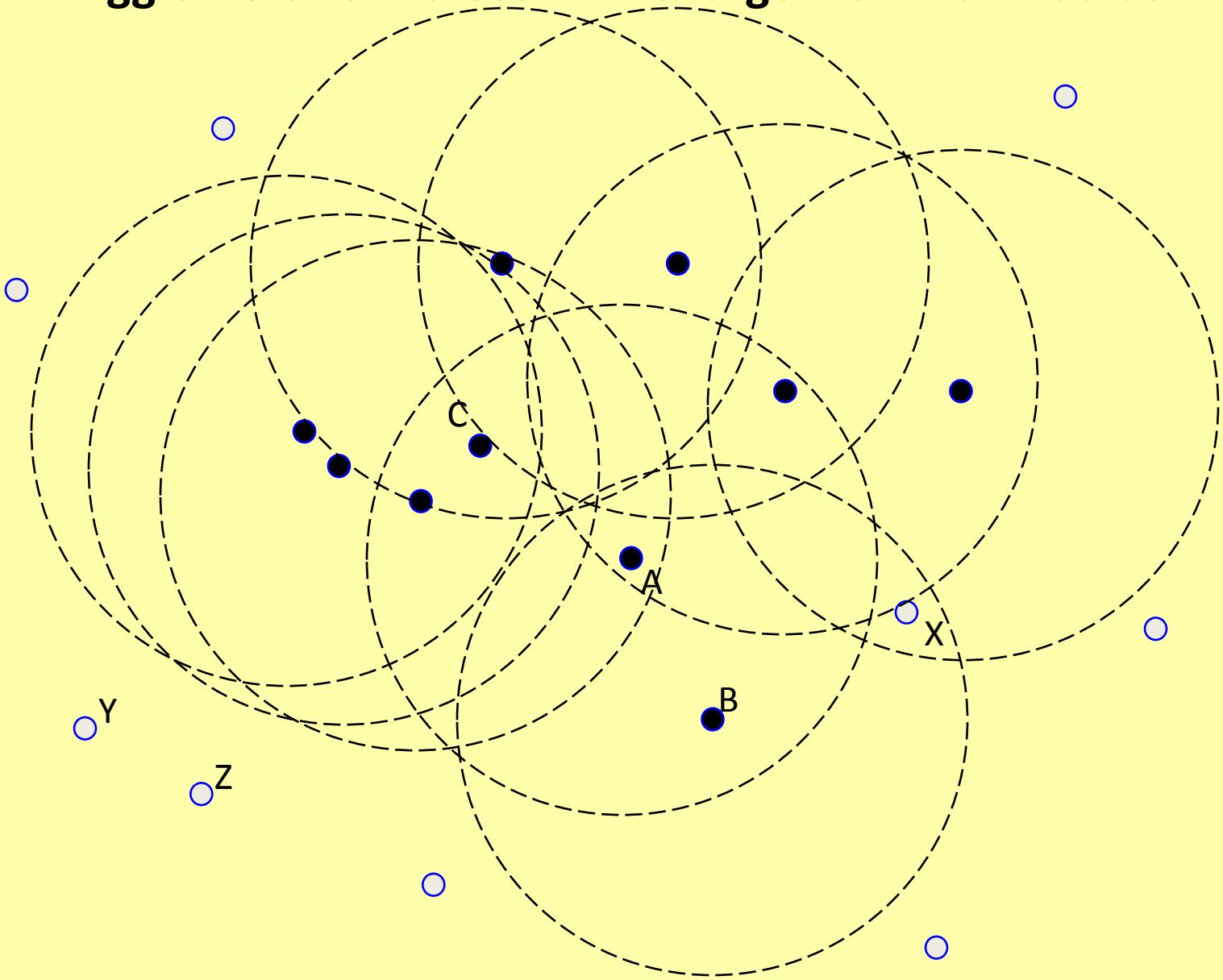
A slower decay yields a longer maximum radius



The marginal entrant is currently indifferent…

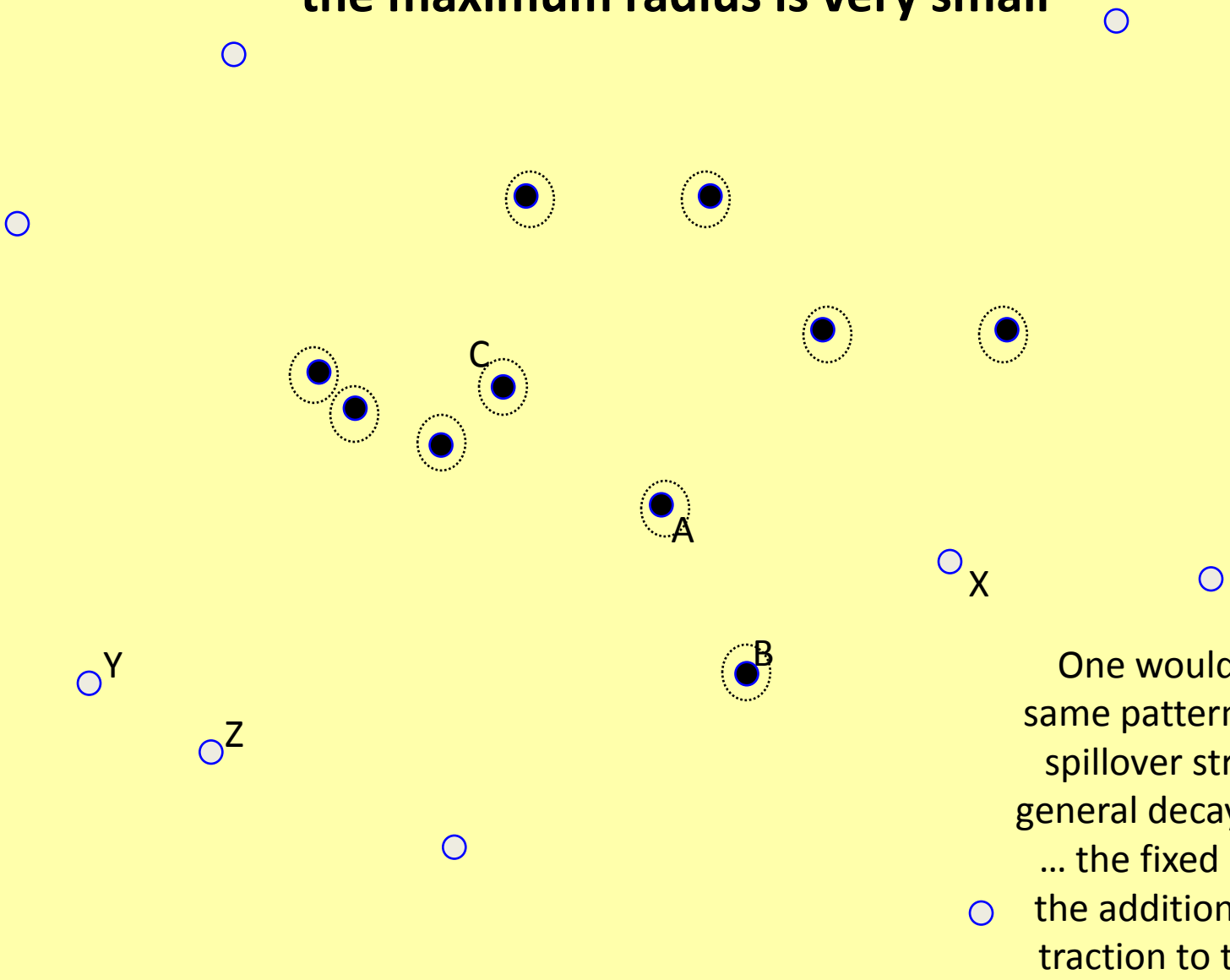


Agglomeration forces with a large maximum radius …



… produce <u>fewer, larger, and less dense clusters</u>

On the other hand, all sites are chosen at random if the maximum radius is very small

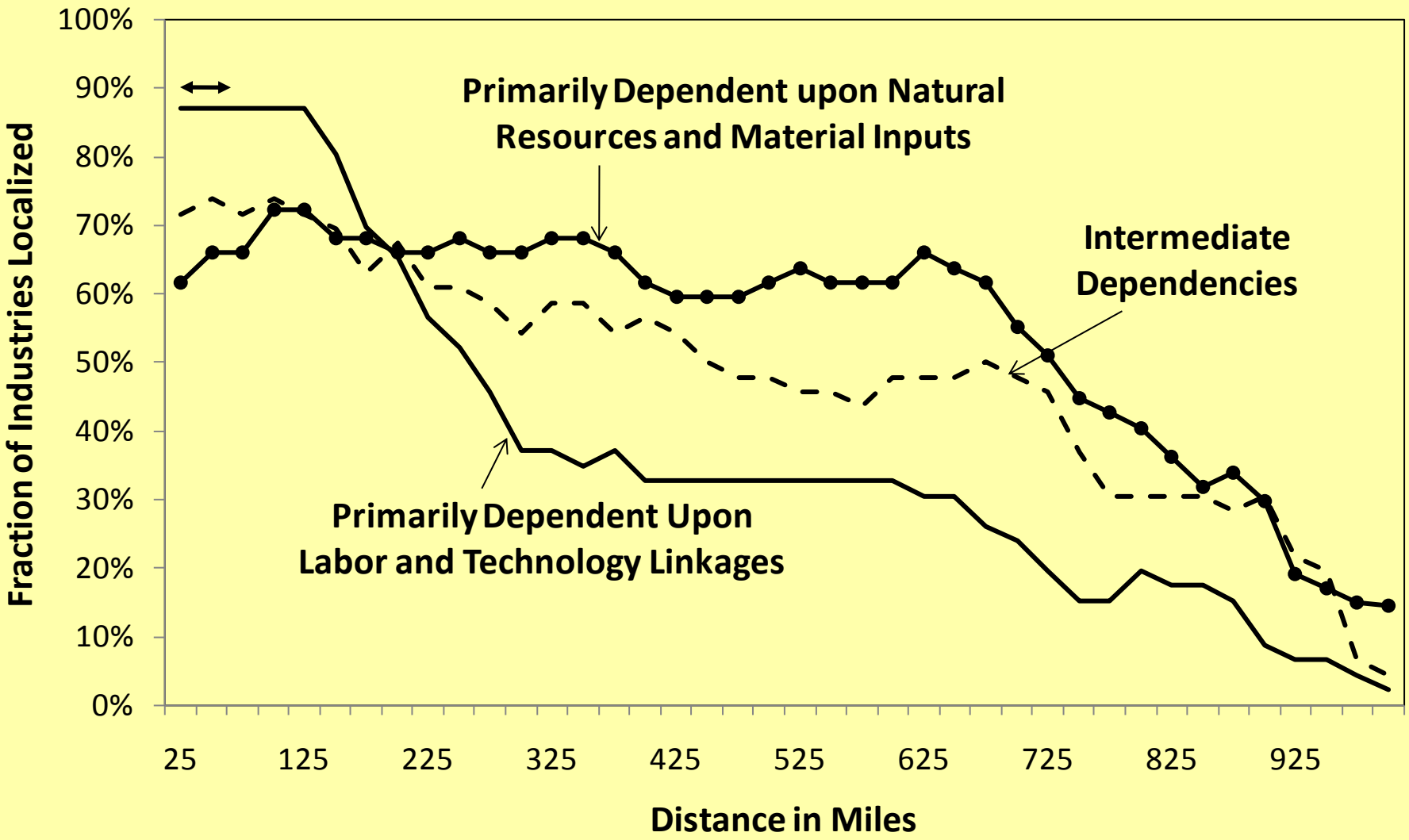


One would choose the same pattern regardless of spillover strength with a general decay function only … the fixed costs provide the additional theoretical traction to test with data

Further Theory Notes

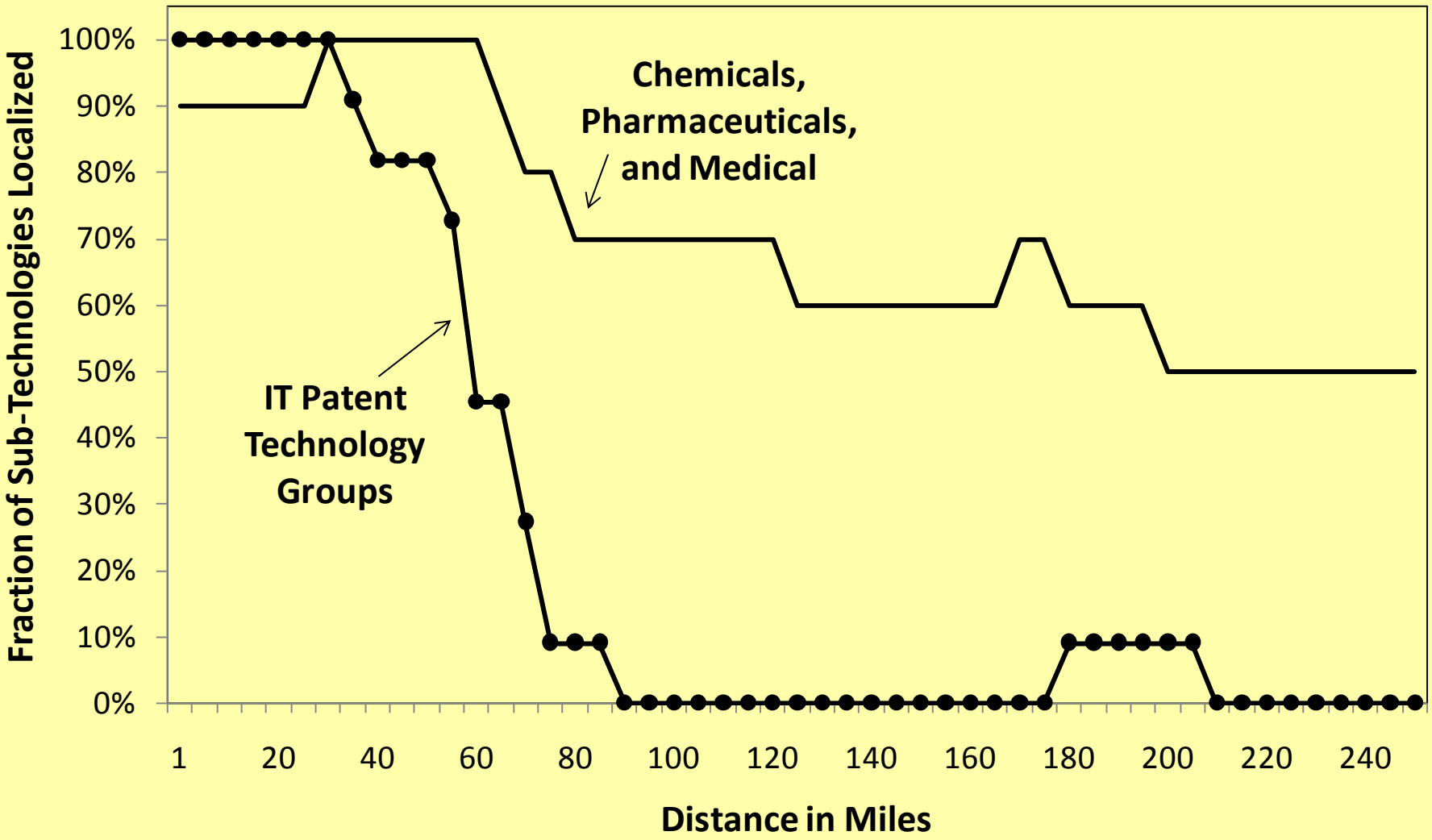
- First micro-foundation for continuous metrics of local agglomeration
- Very tractable foundation for extensions
  - Natural advantages (e.g., mines, state capitals)
  - Dynamically moving clusters
  - Industry evolution and cluster access
  - Structures on how flows happen through the core
- Estimate patterns using continuous densities
  - Patent data: technology spillovers
  - Census data: Labor pooling v. natural advantages

Ranges of Localization by Industry Traits



Longer spillover radius -> fewer, larger, and less dense clusters

Ranges of Localization by Technology Type



Longer spillover radius -> fewer, larger, and less dense clusters

Some Implications

- Not just a question of SF, NYC or Boston… exceptional heterogeneity in direction of resource flows locally
- Evidence that an attribute (e.g., labor flows) spans a geographical region does NOT indicate that the individual interactions do so
- Entrepreneurs need to be aware of the "fault lines" of a cluster and choose their locations and entry strategies accordingly

Open Questions

- How well are locations priced?
  - Real estate and wage markets price well overall
  - Hypothesis of opportunities when looking for an individual start-up in a specific industry…
- When should locations be changed?
  - Firm needs change with growth and maturity
  - Switching sites, however, brings disruption costs
  - Models of optimal transitions
- How to evaluate jointly with city choice?

Clusters and Start-Up Location Choice

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