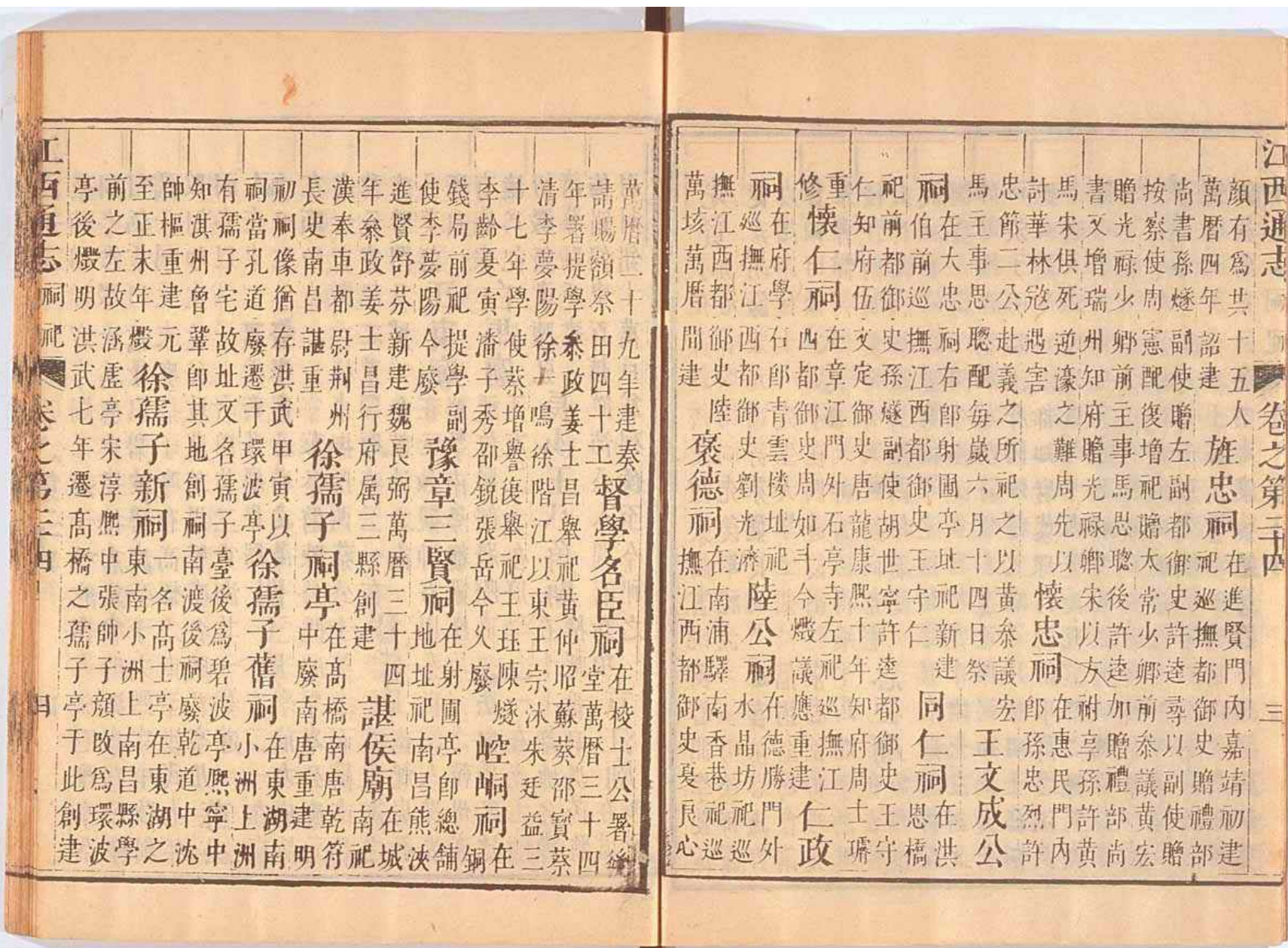


Origins and development of the China Historical GIS

**Pelagios Gazetteer Meeting
NYC, Sep 12th 2013**

**Merrick Lex Berman
CGA, Harvard University**

Local gazetteers to “Dynastic geography”



顏有為共十五人
 萬曆四年詔建
 尚書孫燧副使贈左副都御史許遠尋以副使贈
 按察使周憲配後增祀贈太常少卿前參議黃宏
 贈光祿少卿前主事馬思聰後許遠加贈禮部尚
 書文增瑞州知府贈光祿卿宋以友附享孫許黃
 馬宋俱死逆濠之難周先以懷忠祠在惠民門內
 討華林寇遇害之所祀之以黃參議宏
 忠節二公赴義每歲六月十四日祭
 馬王事思聰配每歲六月十四日祭
 祠在都御史孫燧副使胡世寧許遠都御史王守
 祀前都御史文定御史唐龍康熙十年知府周士璠
 仁知府伍文定御史唐龍康熙十年知府周士璠
 重修懷仁祠在都御史孫燧副使胡世寧許遠都御史王守
 祠在府學右都御史劉光濟陸公祠在德勝門外
 撫江西都御史陸
 萬垓萬曆間建

黃曆二十九年建奏
 請賜額祭田四十一督學名臣祠在棧士公署
 年署提學徐政姜士昌舉祀黃仲昭蘇葵邵寶蔡
 清李夢陽徐士昌舉祀黃仲昭蘇葵邵寶蔡
 十七年學使蔡增譽復舉祀王珏陳燧崆峒祠在
 李齡夏寅潘子秀邵銳張岳今久廢
 錢局前祀提學副
 使李夢陽今廢
 進賢舒芬新建魏良弼萬曆三十四地祀南昌熊浹
 年參政姜士昌行府屬三縣創建
 漢奉車都尉荆州徐孺子祠亭在高橋南唐乾符
 長史南昌謹重州
 祠當孔道廢遷于環波亭徐孺子舊祠在東湖南
 有孺子宅故址又名孺子臺後為碧波亭熙寧中
 知淇州曾鞏即其地創祠南渡後祠廢乾道中沈
 帥樞重建元
 至正末年徐孺子新祠一名高士亭在東湖之
 前之左故涵虛亭宋淳熙中張帥子顏改為環波
 亭後燬明洪武七年遷高橋之孺子亭于此創建

Edited and Revised over centuries, at all scales

朝代	公元	隶 属	支塘地区当时名称	备 注
中华民国	1912.1-1937.11	常熟县	支塘乡	1912—1929.8乡董制
		常熟县 正修区 序号第十一	支塘乡	1928.8县实行区乡制
		常熟县 支塘区 序号第五区	支塘镇、窑镇乡、枫塘乡、梅苑乡、贺舍乡、盐铁乡、黄浦乡	1934年全县分8个区，以百户以上村为一乡，计260个小乡镇
	日伪时期： 1938.3—40.7	常熟县	支塘乡	伪江苏省维新政府时期
	1940.7—40.12	常熟县	支塘区	改乡名为区名
	1941.1—45.8	常熟县 第五区	支塘镇及窑镇、枫塘、贺舍、梅苑、黄浦、盐铁等乡	1941年1月，恢复1934年划分的区乡名，1941年7月，日伪清乡再次改区乡名
	1940.8—41.7 (抗日民主政权)	苏州县 李白区	支塘镇西南境	李白区(李市、白茆、支塘一带)，与何市、项桥相邻的地区归属太仓县
	1945.11—48.4	常熟县 支塘区	支塘镇、窑项乡	支塘镇，梅苑乡、黄浦乡、盐铁乡贺舍乡(一半)建支塘镇。项桥乡窑镇乡、贺舍乡(一半)建窑项乡
1948.5—49.4	常熟县 支塘区、徐市区	支塘镇	1948年5月支塘镇与窑项乡合并建支塘镇，1949年2月设徐市区	

Resulting in the 8 volume “Historical Atlas of China” (published 1980s)



Center for Historical Geography - Fudan University

Editor, Tan Qixiang



CHGIS Research Team & Advisors



Robert M. Hartwell (1932-1996)

Chinese Historical Software, Ltd



Biographies Database

20,000 entries

GIS Database

Years 742, 1080, 1200, 1280, 1391

Time Slices for Tang, Yuan, Song, Ming

GIS = co-locations of 1990 county areas

Functional Requirements for the CHGIS Data Model (2001)

- find all the admin units in existence at a **particular time**
- search by **placename** and find the correct record among ambiguous results
- filter the results by **admin status** (feature type)
- determine the **administrative hierarchy** for a particular place instance
- show how a particular place (admin unit) **changes over time**

Basic Rules for adding new records to the CHGIS Database(2001)

- change in placename
- change in administrative status
- change in location, seat, or boundary

Proposed Data Model with hierarchical codes (Larry Crissman)

<i>pinyin</i>	<i>admin_type</i>	<i>sup_prov</i>	<i>province</i>	<i>circuit</i>	<i>prefect</i>	<i>dep_pref</i>
Xincheng	Xian	Ming dynasty	Jingshi		Baoding	
Xincheng	Xian	Ming dynasty	Shandong		Ji'nan	
Xincheng	Xian	Ming dynasty	Zhejiang		Hangzhou	
Xincheng	Xian	Ming dynasty	Jiangxi		Jianchang	
Xincheng	Xian	Ming dynasty	Guangxi		Qingyuan	
Xincheng	Suo	Ming dynasty	Guizhou			Annanwei
Xincheng	Wei	Ming dynasty	Jingshi			Beiping
<i>Code</i>		<i>Level1_h</i>	<i>Level2_h</i>	<i>Level3_h</i>	<i>Level4_h</i>	<i>Level5_h</i>
M001100220025		0	11	0	22	0
M002500210026		0	25	0	21	0
M004100210027		0	41	0	21	0
M004500260022		0	45	0	26	0
M008500230032		0	85	0	23	0
M009500003722		0	95	0	0	37
M001100002422		0	11	0	0	24

Normalized Data Model with PrecededBy and PartOf relationships

Historical Instances Table



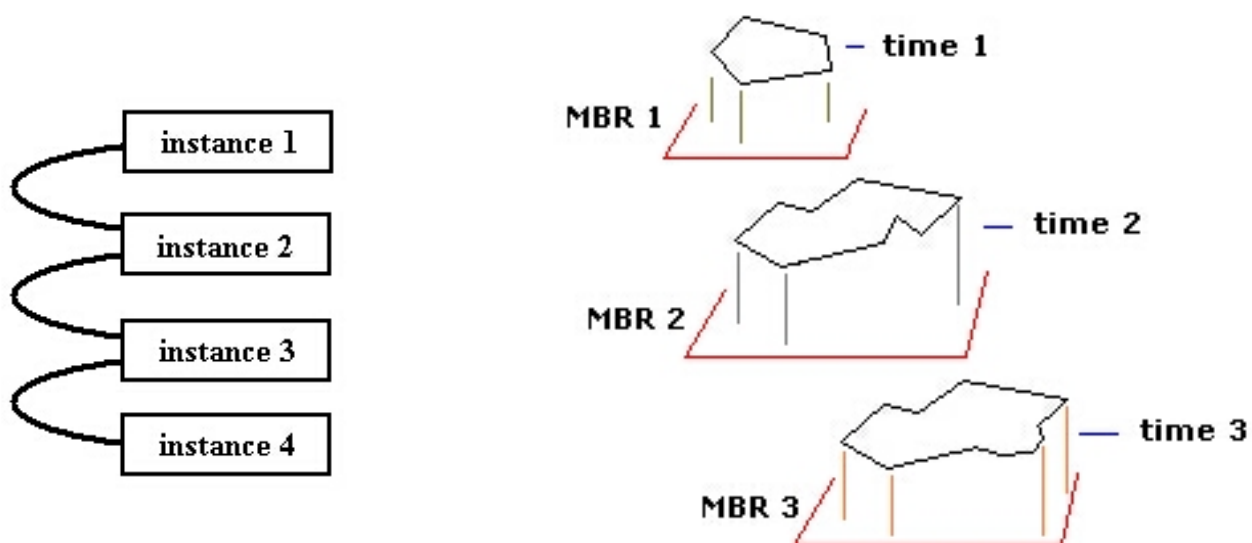
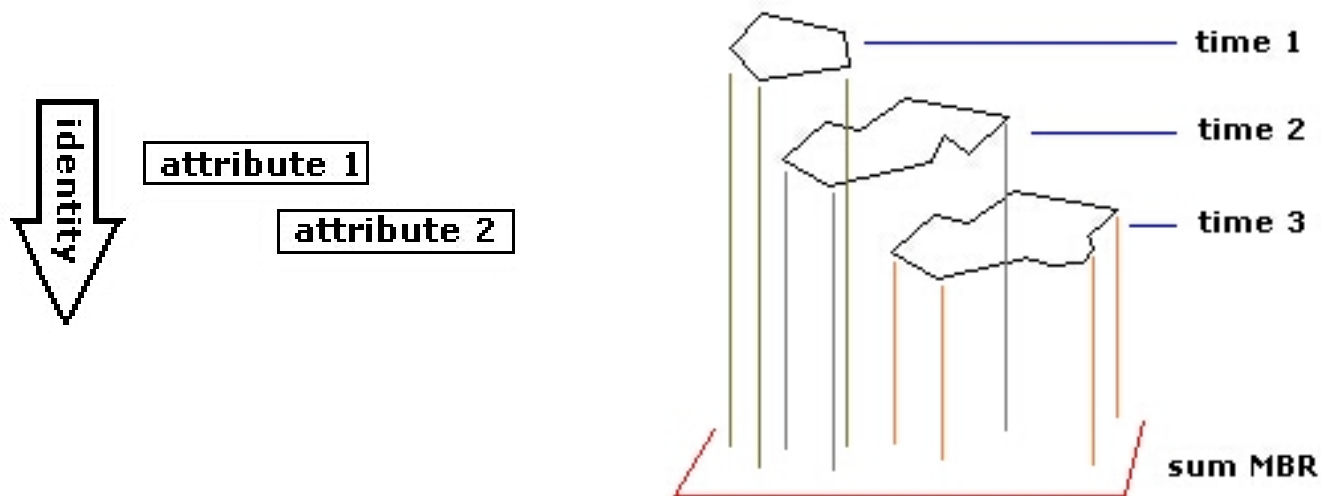
Temporal Sequence Table

sys-id	place-name	prec-by	prec-by-name
335	Prefecture B	334	Prefecture A
339	County Z	338	County Y

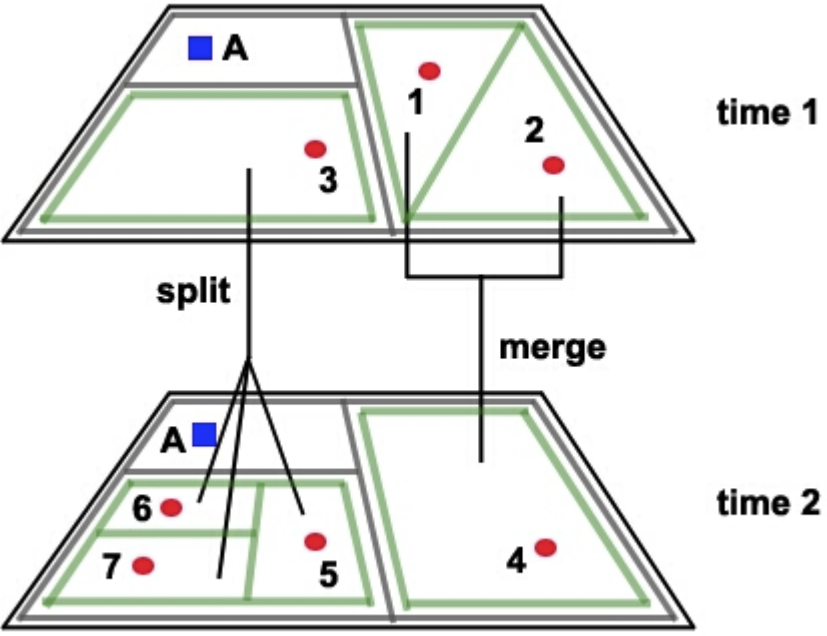
Part-Of Table

sys-id	place-name	part-of	part-of-name	begin	end
334	Prefecture A	333	Province T	1200	1249
335	Prefecture B	333	Province T	1250	1350
336	Prefecture C	333	Province T	1200	1350
337	County X	334	Prefecture A	1200	1249
337	County X	335	Prefecture B	1250	1350
338	County Y	336	Prefecture C	1200	1350
339	County Z	336	Prefecture C	1200	1350
340	Town 1	337	County X	1200	1350
341	Town 2	338	County Y	1300	1320
341	Town 2	339	County Z	1321	1340

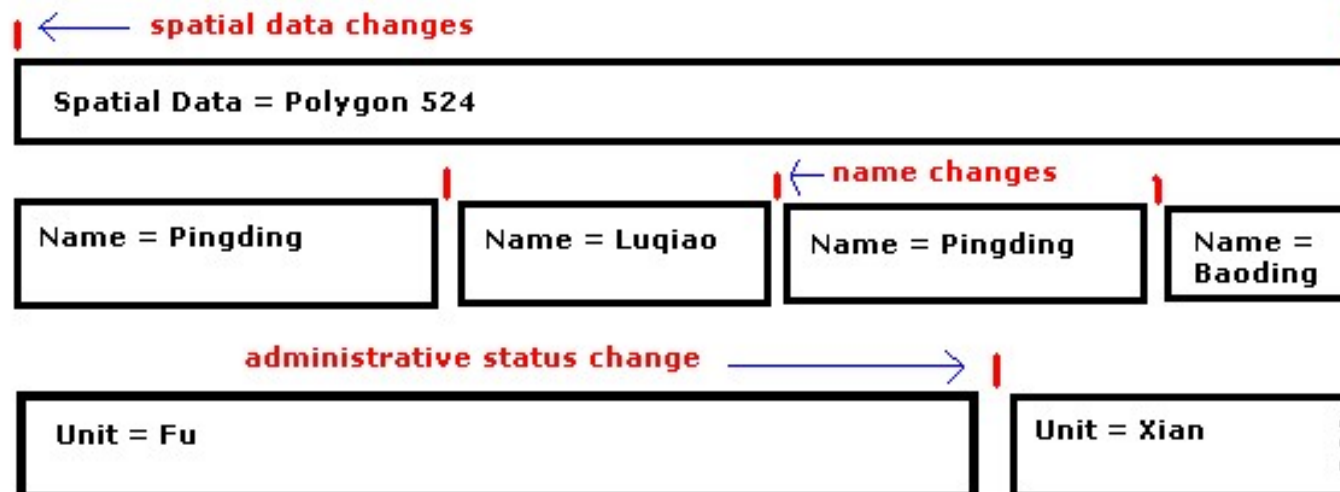
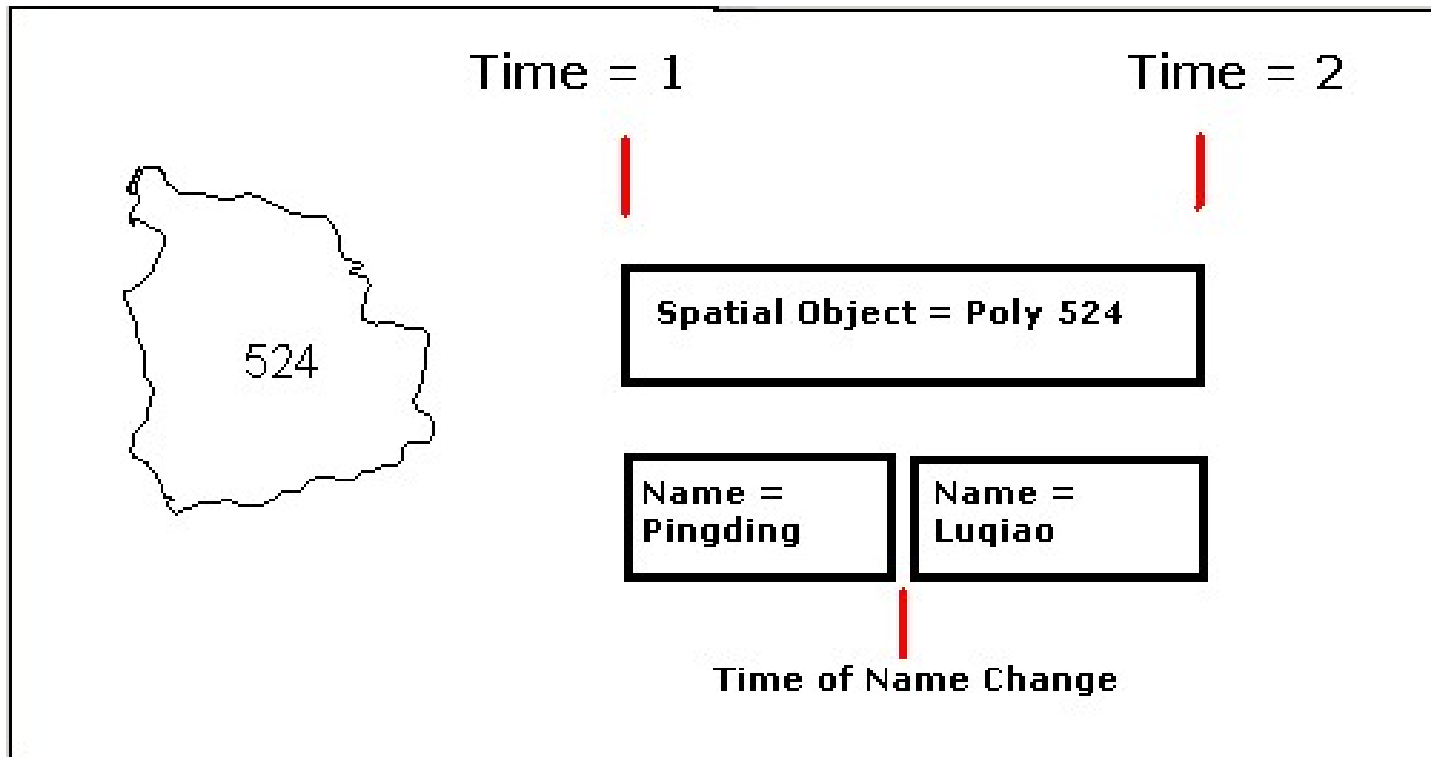
Entity modeling: *a priori* entity definition vs. sequence of instances?

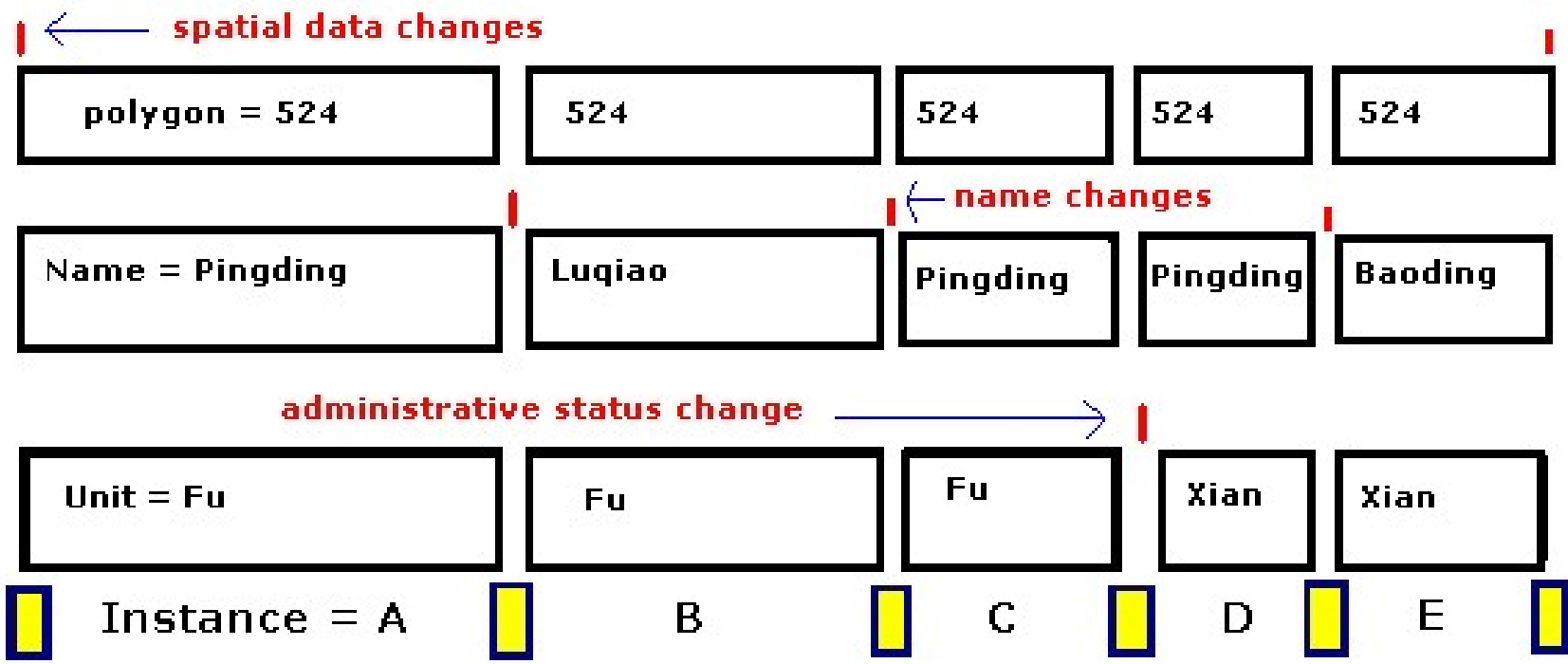


Entity modeling: splits and merges defy the continuity of “entity”



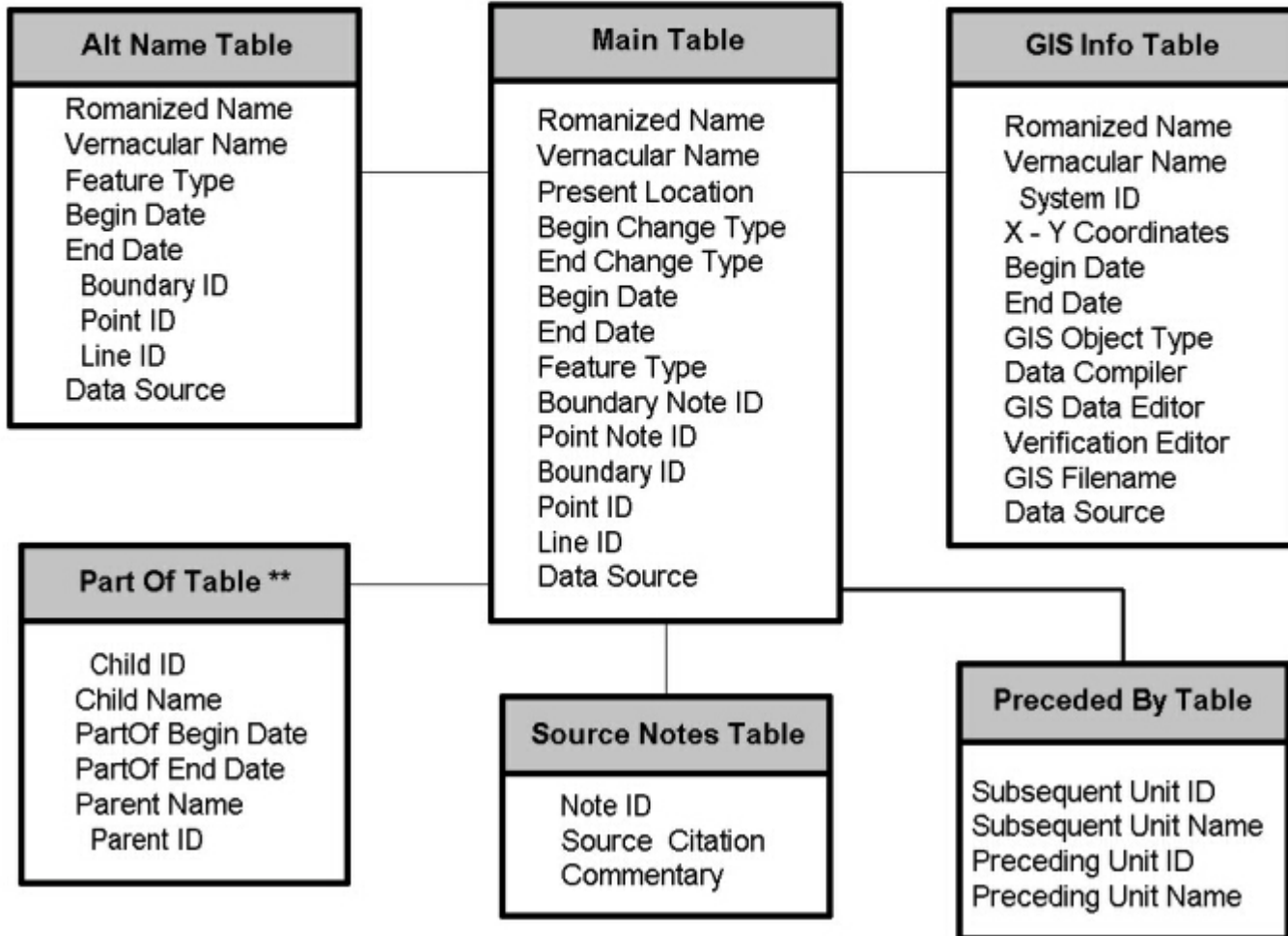
Asynchronous changes forced us to disaggregate the instances



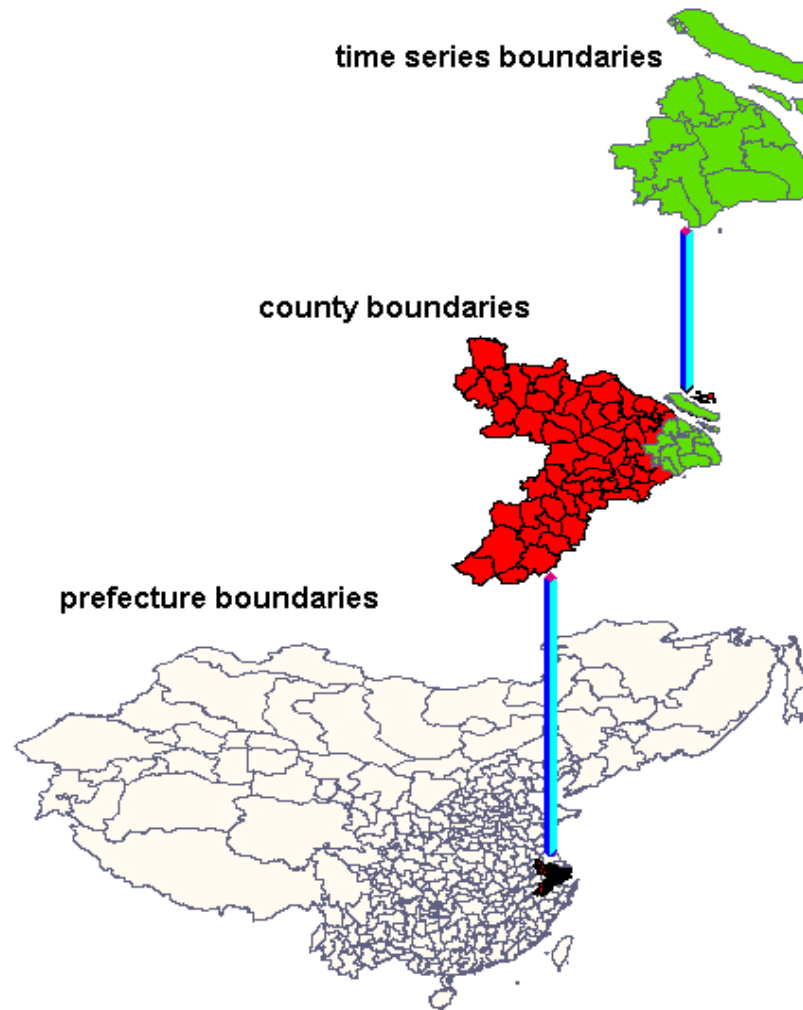


	name	begin	end	preceded by
	A	time1	time2	
	B	time2	time3	A
	C	time3	time4	B
	D	time4	time5	C
	E	time5	time6	D

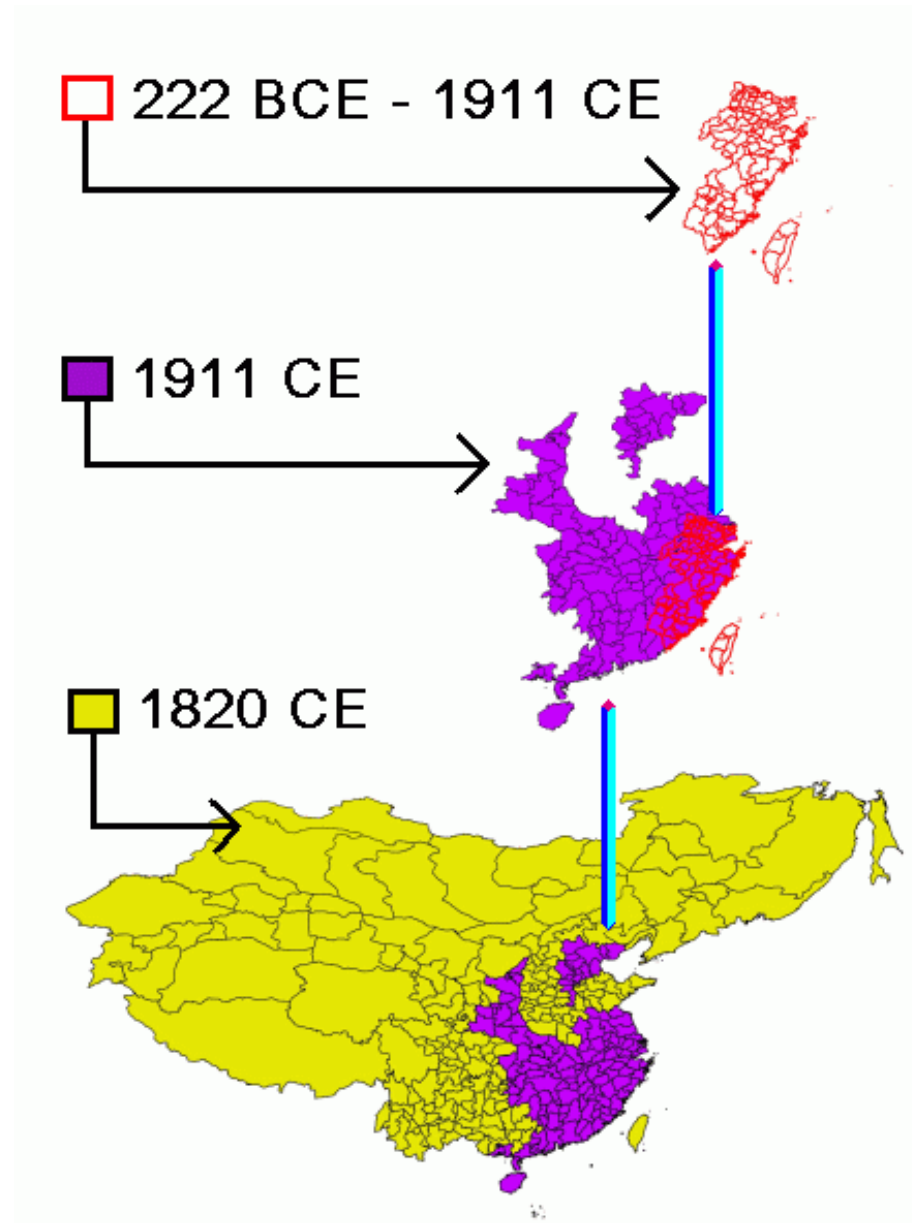
CHGIS Data Model - Version 3 - Overview Diagram



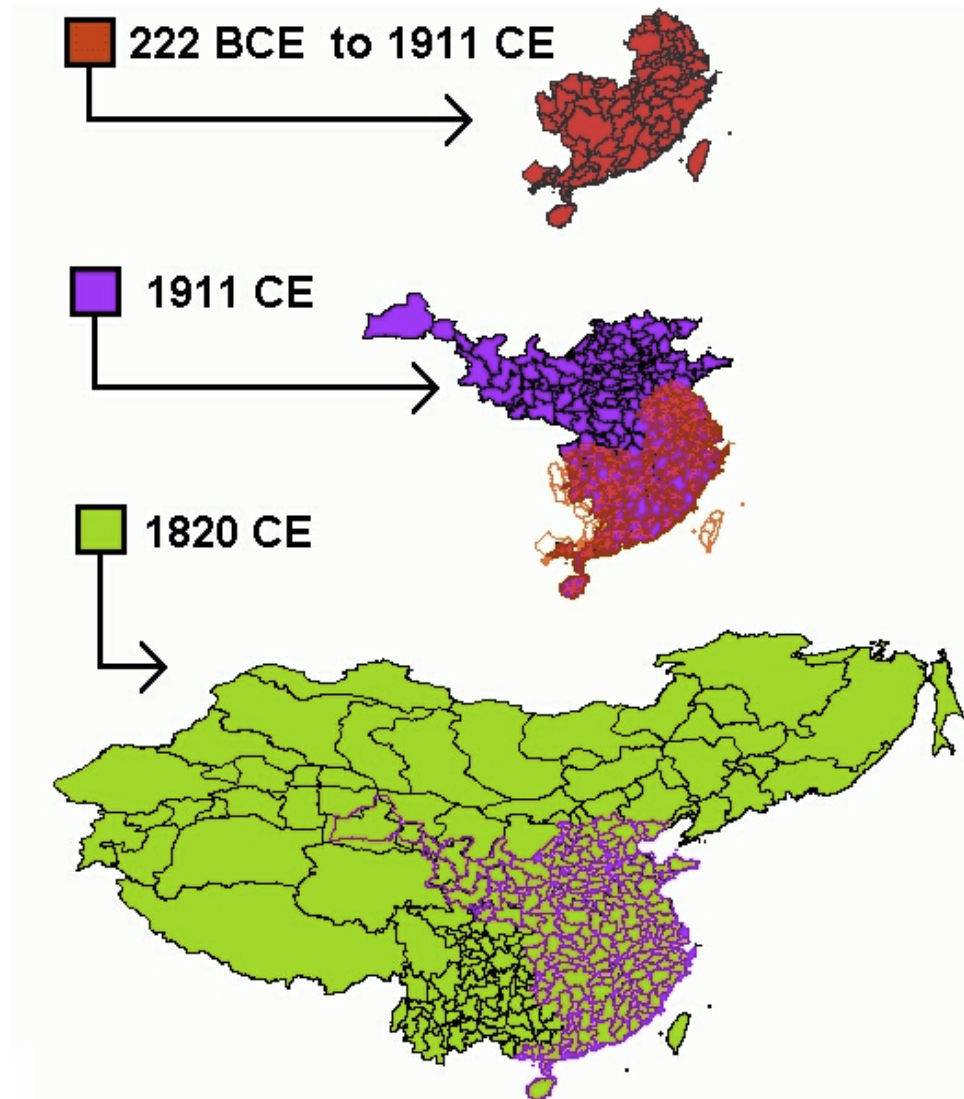
GIS boundaries digitized for CHGIS Version 1 (2002)



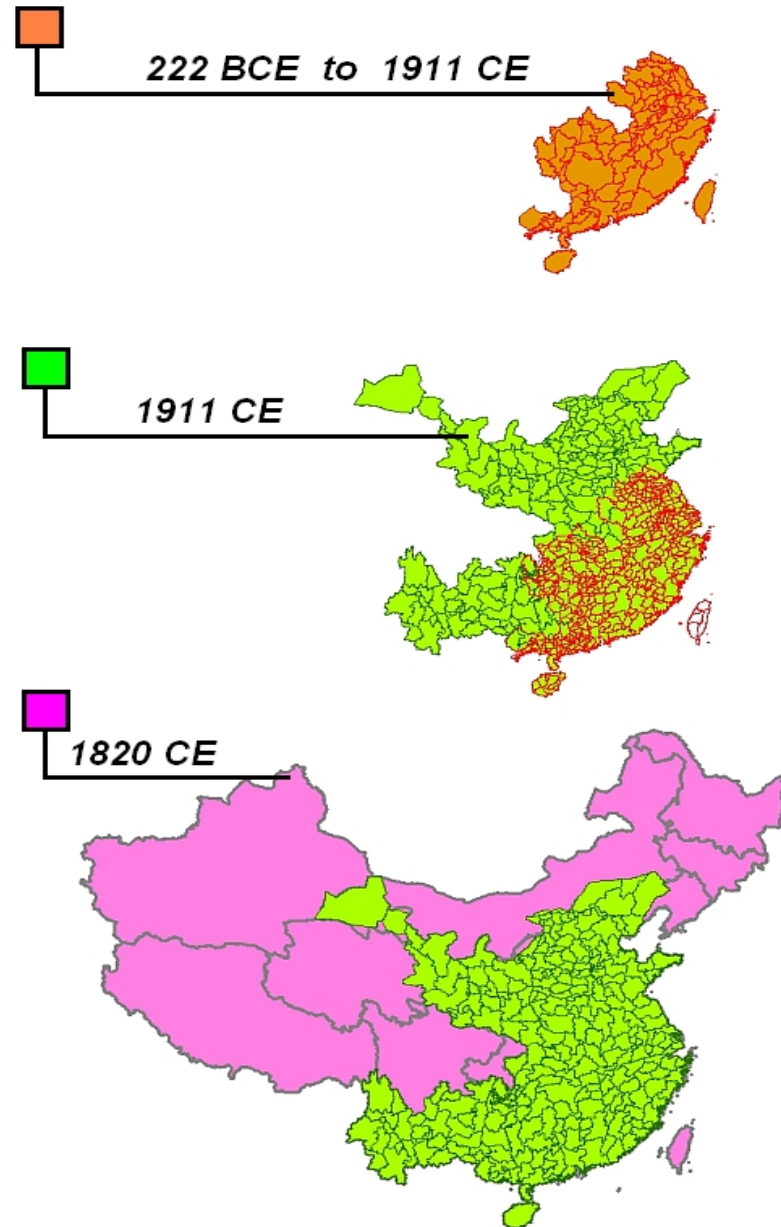
GIS boundaries digitized for CHGIS Version 2 (2003)



GIS boundaries digitized for CHGIS Version 3 (2005)



GIS boundaries digitized for CHGIS Version 4 (2007)

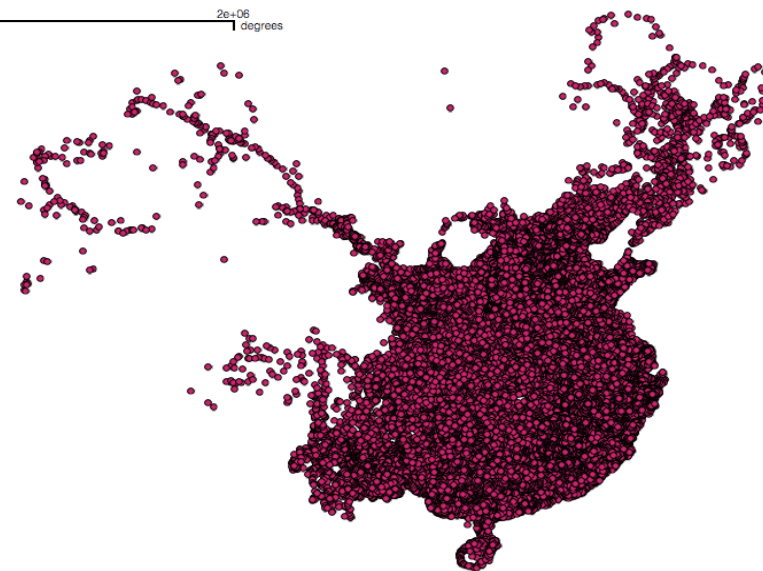


1911 boundaries and seats digitized for CHGIS Version 5 (2012)

~ 4,000 county and higher units

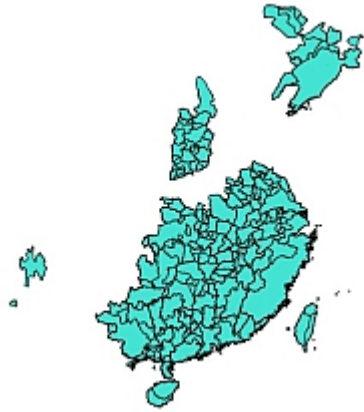


2e+06 degrees



~40,000 towns & villages

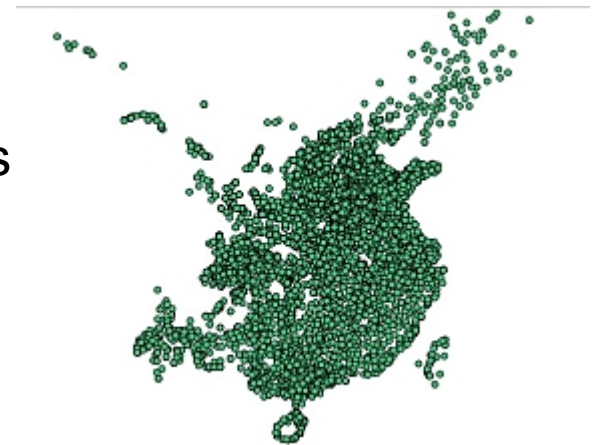
Time Series boundaries and seats digitized for CHGIS Version 5 (2012)



~3,000 prefecture polygons



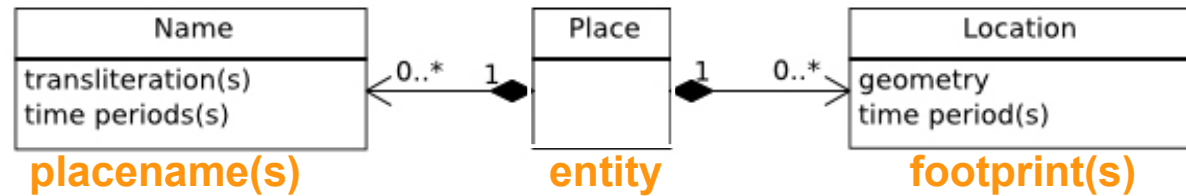
~3,500 prefecture capitals



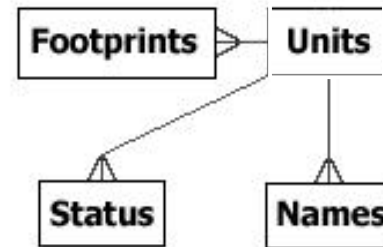
~10,000 county seats

Generic Gazetteer Entity Model

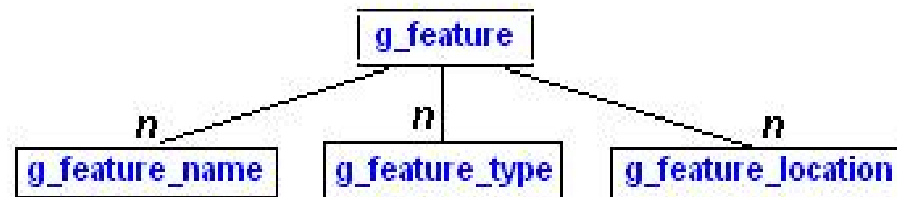
Gillies - Pleiades



Southall - GBHGIS - AUO

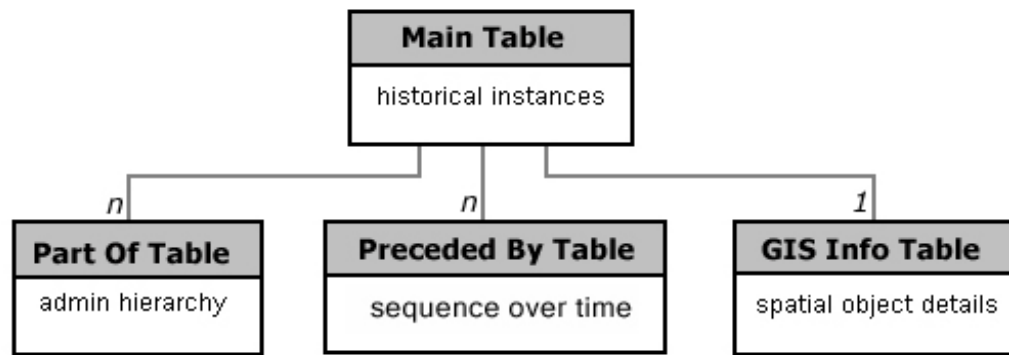


Hill - ADL

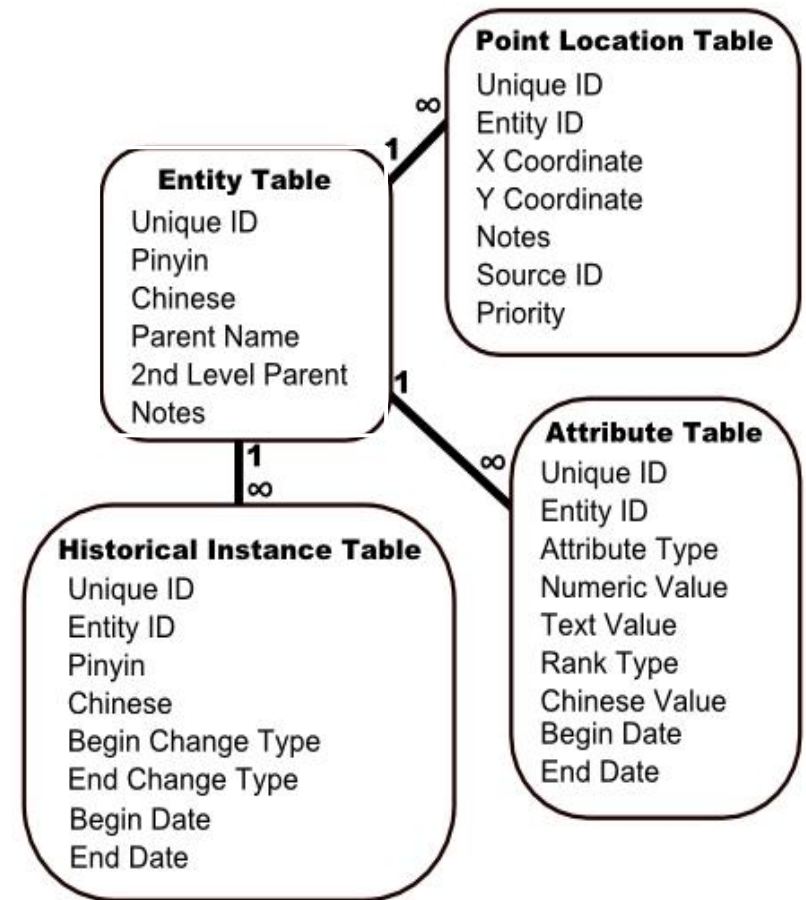


Gazetteer Entity Model - CHGIS & Song Gazetteer

CHGIS



Mostern & Meeks - Song Gaz



CHGIS - Sample Webservice Result

```
<item id="9536">
  <placename>
    <name_romanized>Lanzhou Fu</name_romanized>
    <name_vernacular>兰州府</name_vernacular>
    <name_alterate>蘭州府</name_alterate>
  </placename>
  <feature_type>
    <type_english>prefecture</type_english>
    <type_romanized>Fu</type_romanized>
    <type_vernacular>府</type_vernacular>
    <type_id>84</type_id>
  </feature_type>
  <temporal>
    <begin_year>1820</begin_year>
    <begin_year_rule>9</begin_year_rule>
    <end_year>1820</end_year>
    <end_year_rule>9</end_year_rule>
  </temporal>
  <spatial>
    <object_type>point</object_type>
    <coordinate_type>point location</coordinate_type>
    <degrees_latitude>36.047031</degrees_latitude>
    <latitude_direction>N</latitude_direction>
    <degrees_longitude>103.847137</degrees_longitude>
    <longitude_direction>E</longitude_direction>
    <present_location>甘□□州市</present_location>
  </spatial>
  <evidenced_by>
    <source_note>
      <note_type>administrative seat</note_type>
      <note_id>25000</note_id>
    </source_note>
  </evidenced_by>
  <links>
    <webpage source="CHGIS">http://chgis.hmdc.harvard.edu/query_details.php?ptid=9536</webpage>
    <webpage source="google_map">http://maps.google.com/maps?
q=36.047031,103.847137(lanzhou)&amp;spn=0.1,0.1&amp;t=m&amp;hl=e&amp;z=9</webpage>
  </links>
</item>
```


Linked Data - geo / chrono

**moving toward ontologies of spatial features
stored as triples (RDF), or deliverable via APIs**

**lacking in ontologies of temporal features (named
time periods)**

**how will the spatial and temporal instances
interact?**

**if you were to develop your own schema for
handling the temporal element, how would do it?**

Publication – Resources

<http://fas.harvard.edu/~chgis/gazetteer>

we welcome your ideas and critiques on:

- How to establish entities for CHGIS instances
- Building a global historical gazetteer

Extending Gazetteers with Time and Entity Relationships

Next Generation Gazetteer

Place Names - Footprints

- Name Authorities
- Historical GIS
- Aggregators (geonames)

Chronologies

- Administration Periods
- Timelines (of events)
- Named Time Period Index

Entity Definitions

- GBHGIS - AUO
- Pleiades - Hist Place
- CHGIS - Hist Instance
- EDGIS - STP

Placenames
Footprints

Time
Periods

Schema to model
Change Over Time