

Modelling and Simulation for e-Social Science

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NCeSS - Chronology

- First demonstrators initiated by ESRC/ DTI in 2002
- Further demonstrators in 2003/04
- National Centre commissioned in Manchester, April 2004
- Seven further research nodes from April 2005 onwards
- Latest phase of small grants currently in review



NCeSS - Rationale

- Combination of interdisciplinary research (computing and social science) with awareness raising and infrastructure development
 - Research nodes and small grants
 - Access Grid nodes
 - Agenda setting workshops
 - First International Conference on e-Social Science (June '05)



NCeSS - Examples

- An Investigation of Disclosure Issues Posed by the Grid
- Informing Business/Regional Policy: Grid Fusion of Global Data and Local Knowledge (INWA)
- FINGRID: Financial INformation GRID
- SABRE in R: An OGSA Component-Based Approach to Middleware for Statistical Modelling
- Grid-Enabled Micro-Econometric Data Analysis
- Hydra II Grid Based Spatial Planning Services
- VIDGRID: Distributed Video Analysis With Grid Technologies
- Collaborative Analysis of Offenders' Personal and Area-Based Social Exclusion
- Pilot Semantic Grid Service for Environmental Modelling
- CONVERTGRID
- Genealogies of Knowledge-Developing Anthropological Middleware to Support Fieldwork-Based Social Science



NCeSS - Scope

- Wide coverage of social science
 - Mostly quantitative rather than qualitative
- Geography and GIS well-represented
 - Demonstrators (Leeds, Sheffield, Aberdeen, Manchester)
 - FEARLUS, GeoVue, Moses



Hydra

- First generation grid-enabled spatial decision support system, using health care scenarios
- Combines virtual database access with spatial mapping, modelling and optimisation tools within a secure open grid services architecture (Globus 3)
- ESRC demonstrator project under the direction of Birkin and Peter Dew



Hydra - Example

HYDRA Health Care Planning Support System | University of Leeds, 2004

Help

Services in the County of: Buckinghamshire
Location: District of: Aylesbury Vale

Security

Seamless virtual data access

Collaboration

Modelling services & HPC

Choose Model Parameters:
(a) Select age ranges:
Minimum Female Age: 75 Maximum Female Age: 90
Minimum Male Age: 90

(b) Enter Minimum and Maximum number of surgeries:
Minimum: 3 Maximum: 6

3. Select year for model run:
 1991 2001 2011 2021

4. Enter 'run' name to save current input choices:

Here are your results.
You can see the number of surgeries for each age range.

5
6

5. Click button below to view summary info

If you would like to change past model inputs, choose a past model run from list:
test aylesbury
aylesbury future

code	x	y
3213	474100	208800
3214	473300	208500
3215	474600	216700
3216	469500	208700
3217	469500	208400
3218	463900	211500
3219	465200	213800
3220	465200	213800
3221	480390	214820
3222	483500	213900
3223	484000	213400
3224	481900	213700
3225	482500	214800
3226	482100	213400
3227	481200	212000
3228	479800	221000
3229	486800	218900
3230	488800	211700

Moses – Aims

- To create a flagship modelling and simulation node, in which the capabilities of Grid Computing are mobilised to develop tools whose power and flexibility surpasses existing and previous research outputs.
- To demonstrate the applicability of grid-enabled modelling and simulation tools within a variety of substantive research and policy environments
- To provide a generic framework through which grid-enabled modelling and simulation might be exploited within any problem domain
- To encourage the creation of a community of social scientists and policy users with a shared interest in modelling and simulation for e-social science problems.

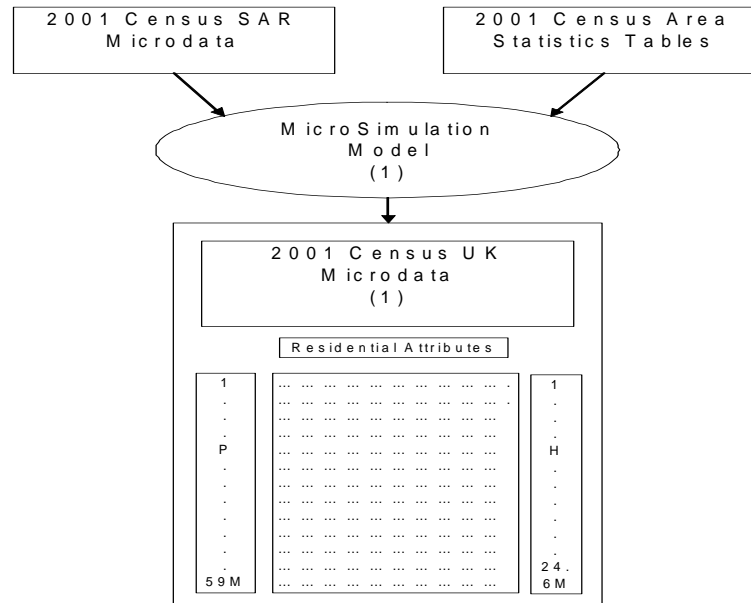


Moses - Objectives

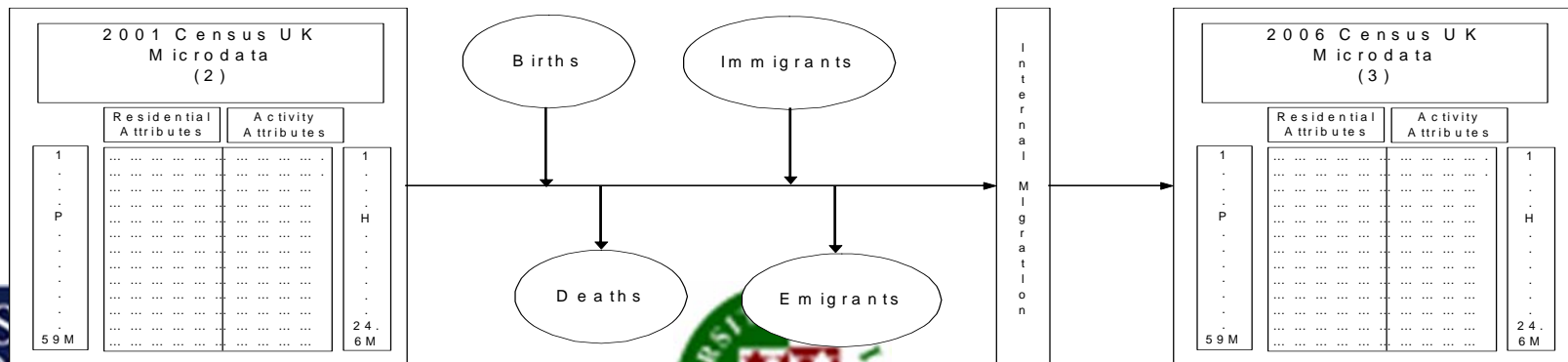
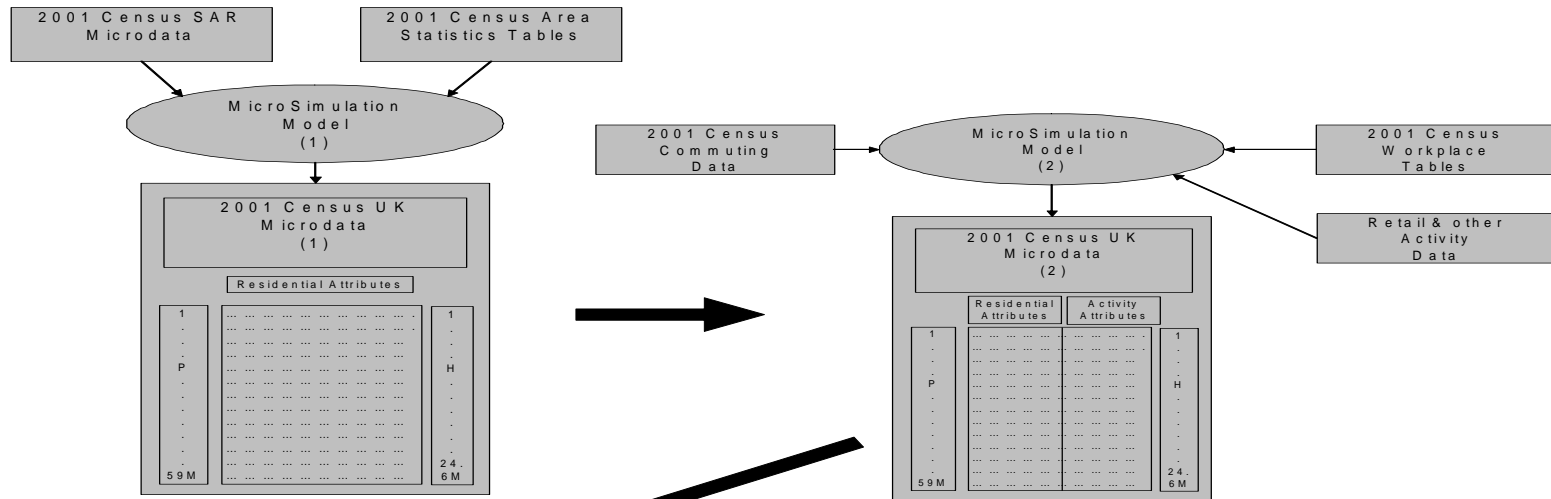
- to create a synthetic model of the whole UK population
- to demonstrate a forecasting capability for the population model
- to develop case study applications with specific reference to health, business and transport, including evaluation of wider-ranging policy scenarios
- to create a generic framework for the application of policy and simulation tools to social science problem domains.



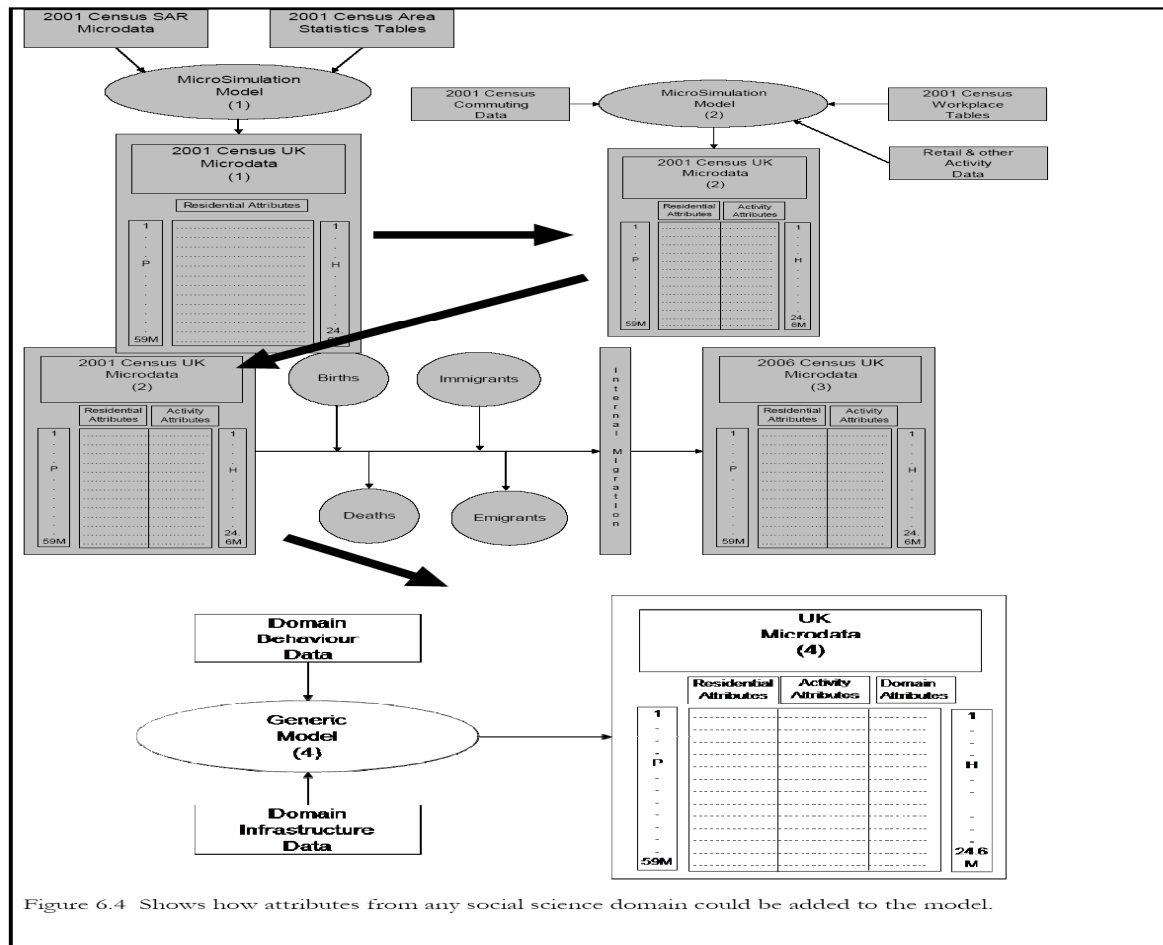
Moses - Methodology



Moses - Methodology



Moses - Methodology



Importance of e-Science & Grid

- Complex simulation
- Data sharing
- Security and confidentiality
- Collaboration
- Visualisation



Applications: Health

- Goal is to look at the balance of service provision across both the health and social care sectors
 - Important policy implications due to poor integration between these sectors
 - Increasingly problematic in particular with respect to the very elderly
 - Geographical variation as variations in use will reflect variations in provision: different demographic groups may also demand alternative service mix
 - Possible importance of ‘social networks’ – voluntary services, church, school, health clubs and centres – may have subtle and important influence
 - Problem domain of interest to geography, health economics, political science and social policy
 - Practical importance to Health Care Commission, CSCI, Local Government/ Social Services, Hospital Trusts, Primary Care Trusts
 - Important dimension of data sharing, confidentiality and security...

Applications: Transport

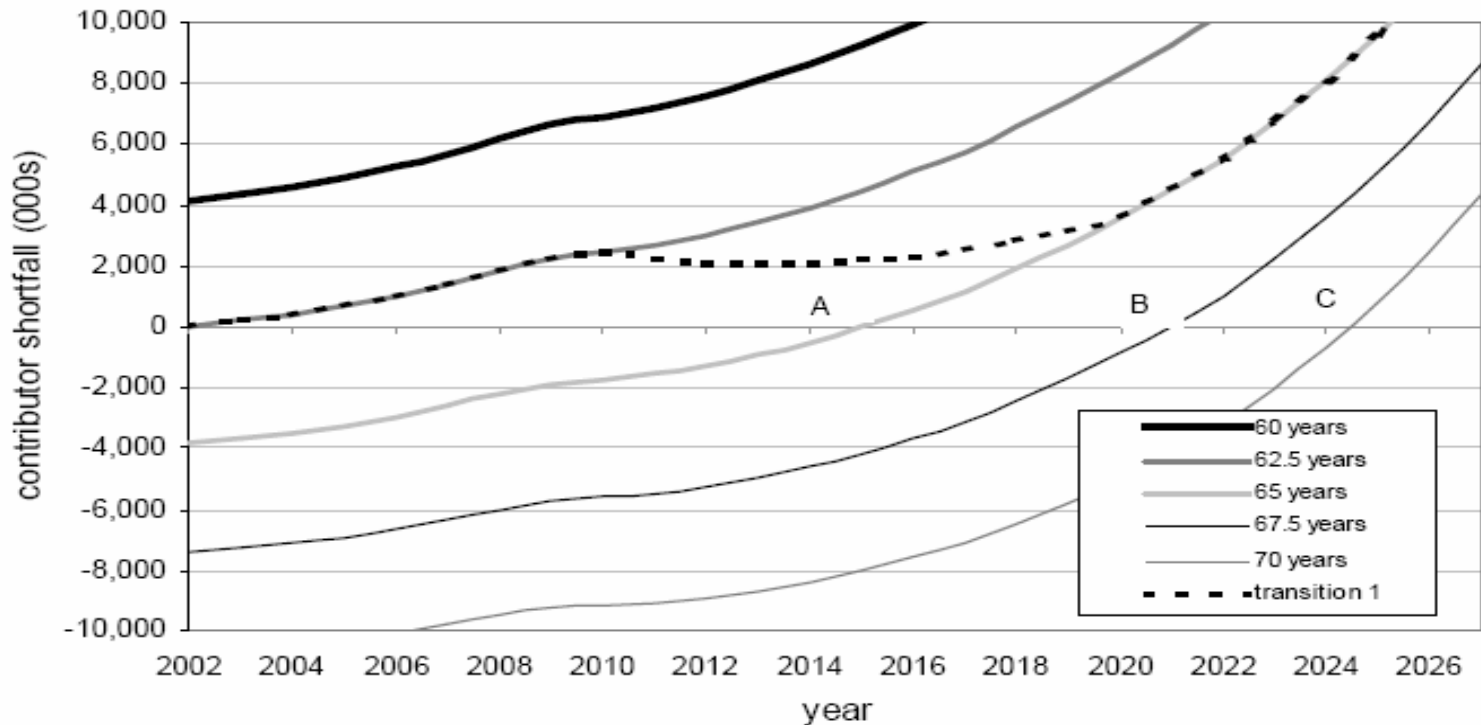
- Network and vehicle simulations are beyond the scope of this project
 - Concentration on aggregate processes of trip generation and distribution rather than assignment
 - Look at broad scale policy impacts and options: new roads versus subsidies; decentralisation; greenbelt issues?...

- This research of interest to a broad community of users – DoT, ODPM, Yorkshire Forward, ...

Applications: Business

- Increased life expectancy will create continued pressure on annuity rates
- Active elderly populations will need higher incomes in retirement
- Funding via equity release products will reduce inter- generational wealth transfer
- Increased housing supply could lead to price stagnation – or crash?

Applications - Business



Conclusions

- If successful, this research will demonstrate the value of e-social science to:
 - Geographers
 - Transport, health and business users
 - Social scientists in a range of domains (crime, politics, social policy, ...)
 - Policy makers in local and national corporations, both public and private

