



# ICT Conference , 2009



**Title : DEVELOPMENT OF E-CENSUS SYSTEM**

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# Introduction



- A census is the procedure of acquiring information about every member of a given population.
- Census is a process of acquiring information about every member of a given population.



# Background



- Kenya adopted the use of printed questionnaires that were filled by interviewers on a door to door activity.
- This research is focused on automating census data collection through e-census and integrating census database with birth and death registration modules.



# Case Study 1



## Australia Bureau of Statistics

- To provide and maintain an integrated, accurate and timely geographical service.
- To minimize data redundancy and duplication of effort by establishing and maintaining a central database



## Case Study 2

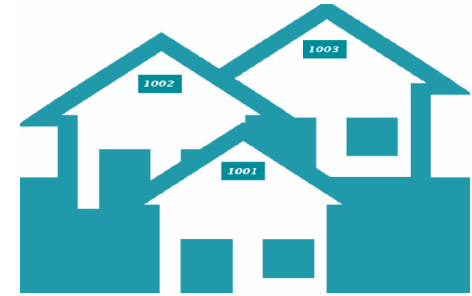


### **The Swiss Census on Internet - LOCO'2000**

- LOCO Receives data, checks them, generates the identifiers that are required for the census and in particular for E-Census, and saves them in the central database.
- Data was pre-printed onto the sent to the respondents by post.



# Case Study 3



## Use of GIS and GPS in Surveys - South Africa

- Statistics South Africa decided to implement the use of GPS technologies and hand held computers in conducting, monitoring and reporting in its surveys



# Research Problem



1. Census in Kenya is conducted after every 10 years as a result, the government lacks timely and accurate data on actual population.
2. After initial capturing of demographic data, there are no data updates .
3. Census data is not available in the public domain due poor methods of data disseminations.



# Objectives



1. Develop online data collection questionnaire
2. Integrate the e-census system with birth and death registration module
3. Disseminate census data to the public domain through map services
4. Test the overall Performance and Security of the e-census system



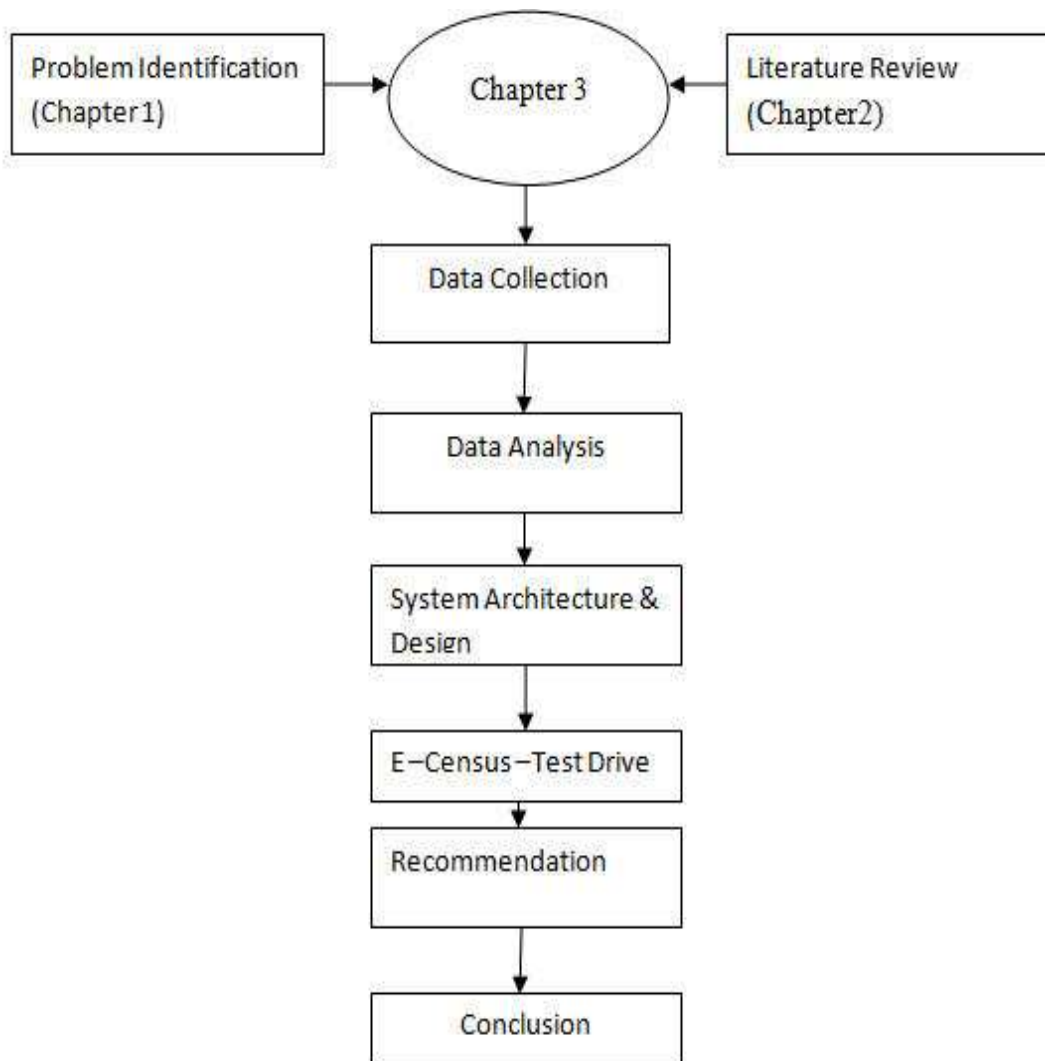
# Research Questions



1. Can e-census system replace manual hardcopy questionnaire and improve on demographic data integrity and availability?
2. Can e-census system enhance system provide accurate demographic data at any given time?
3. Can E-Census System disseminate accurate and timely census data to the public?
4. Can E-Census System meet performance and security requirement to ensure reliability availability and integrity of census data?



# Research Structure





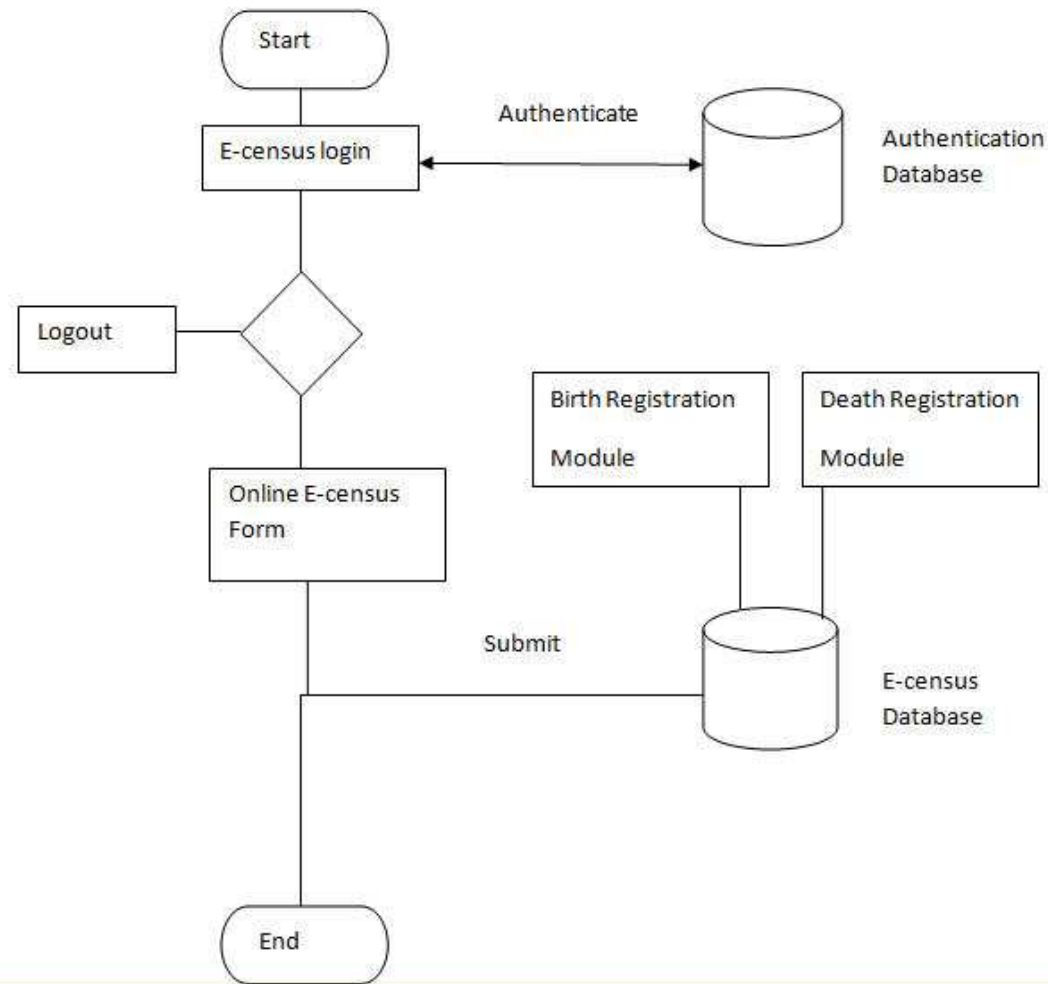
# Design Methodology



The methodology adopted in this research is qualitative - by determining how census is currently conducted in Kenya and determine how the government can use ICT to conduct national census and disseminate census data.



# Methodology





# Survey Results



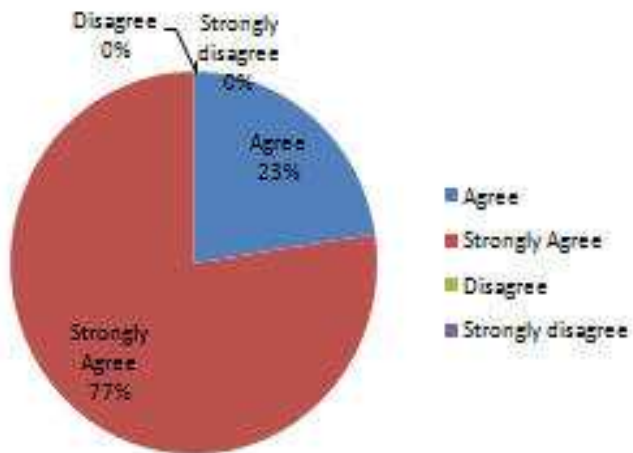
Questions	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean
E-Census replacing hardcopy questionnaire	50 %	47 %	3 %	-	3.467/ 4.0
E-Governance on service delivery	77%	23 %	-	-	3.787/4.0



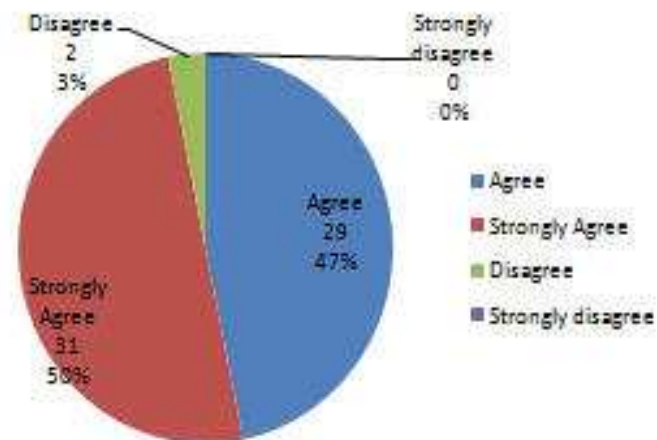
# Results



E- Governance improves on service delivery



Possibilities of E- Census Replacing hardcopy system





# Survey Results



Question	Private Sector	Government	Foreign Company
Who should develop and implement E-Census system	81 %	16 %	3 %

Question	Online	Hardcopy	Other
Preferred way of data dissemination	89 %	11 %	-



# Performance Results



System overall performance is rated to be good at an average mean scale of 4.4 out of possible 5.0.

Mean time to submit

E-Census data = **5 minutes**

Death registration data = **3 minutes**

Birth registration data = **3 minutes**



# Security Results



- Analysis showed that the probability of users hacking to the webserver is 0.1 and failing to hack are 0.9 in two attempts at duration of five minutes.
- Analysis showed that the database authentication has a mean score of 4.1 out of possible mean of 5.



# Response Time



E- census system have highest response time of 2.06 Seconds at the beginning of transaction and there after decreases up to 0.42

Response time, sec							
Name	Time	0:00:00-0:00:10	0:00:10-0:00:20	0:00:20-0:00:30	0:00:30-0:00:40	0:00:40-0:00:50	0:00:50-0:01:00
ecensus	Min	0.01	0.01	0.02	0.01	0.01	0.01
	Avg	0.53	0.21	0.2	0.22	0.19	0.19
	Avg90	1.51	0.51	0.49	0.53	0.43	0.42
	Max	2.06	0.59	0.58	0.86	0.43	0.42



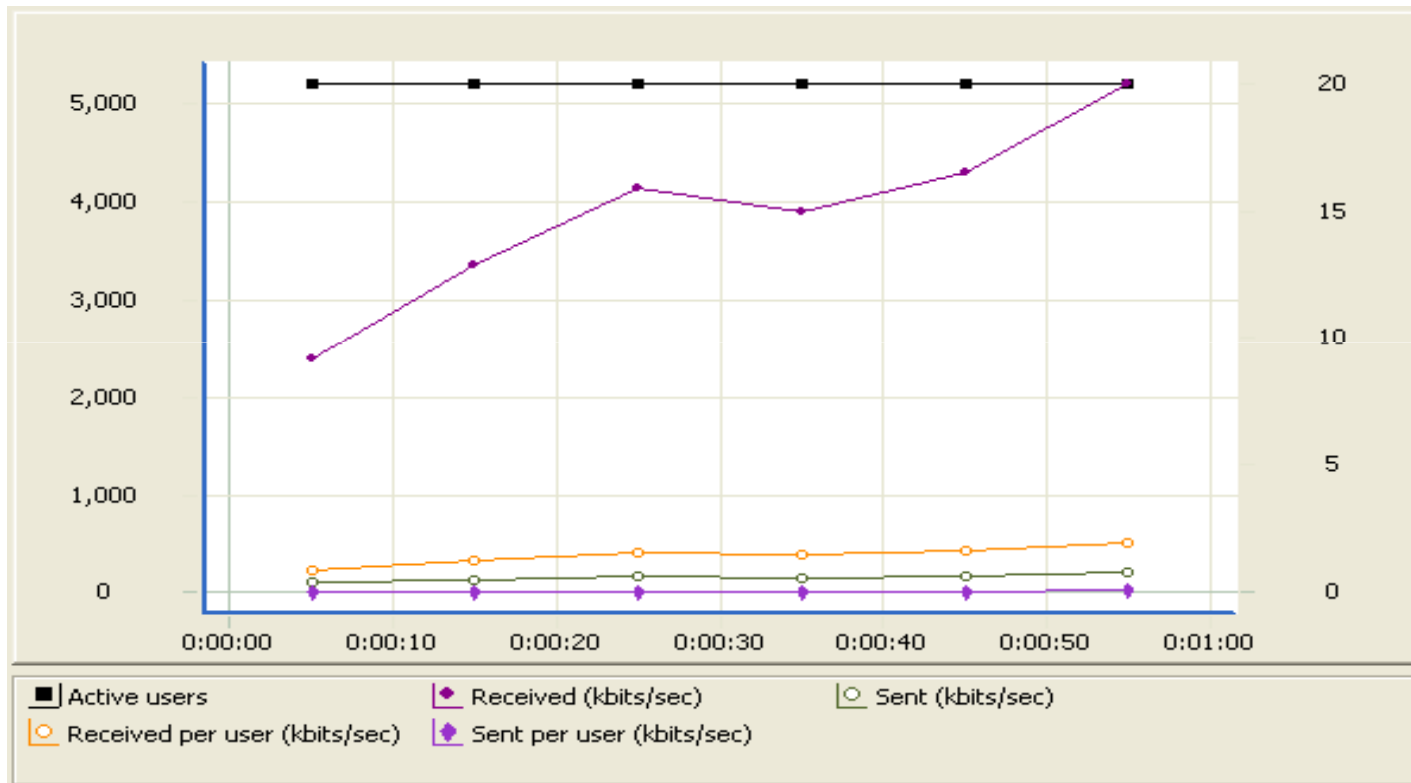
# Data Transfer



Receiving speed (kbits/sec)							
	0:00:00-0:00:10	0:00:10-0:00:20	0:00:20-0:00:30	0:00:30-0:00:40	0:00:40-0:00:50	0:00:50-0:01:00	Total
ecensus	2,393	3,371	4,141	3,905	4,305	5,209	3,887
Total	2,393	3,371	4,141	3,905	4,305	5,209	3,887
Sending speed (kbits/sec)							
	0:00:00-0:00:10	0:00:10-0:00:20	0:00:20-0:00:30	0:00:30-0:00:40	0:00:40-0:00:50	0:00:50-0:01:00	Total
ecensus	103	133	161	148	167	206	153
Total	103	133	161	148	167	206	153
Receiving per user speed (kbits/sec)							
	0:00:00-0:00:10	0:00:10-0:00:20	0:00:20-0:00:30	0:00:30-0:00:40	0:00:40-0:00:50	0:00:50-0:01:00	Total
ecensus	239	337	414	391	430	521	389
Total	239	337	414	391	430	521	389
Sending per user speed (kbits/sec)							
	0:00:00-0:00:10	0:00:10-0:00:20	0:00:20-0:00:30	0:00:30-0:00:40	0:00:40-0:00:50	0:00:50-0:01:00	Total
ecensus	10.3	13.3	16.1	14.8	16.7	20.6	15.3
Total	10.3	13.3	16.1	14.8	16.7	20.6	15.3



# Bandwith Utilization



Sent Per User: 2,500kbits/sec to 5,000 kbits/secs



# Discussion



- Integration of birth and death registration to E-Census module
- Performance testing have also proved that the setup meets its objectives on data reliability and availability of the system at the speed that the users expect .
- System Security objectives on data integrity .



# Conclusion



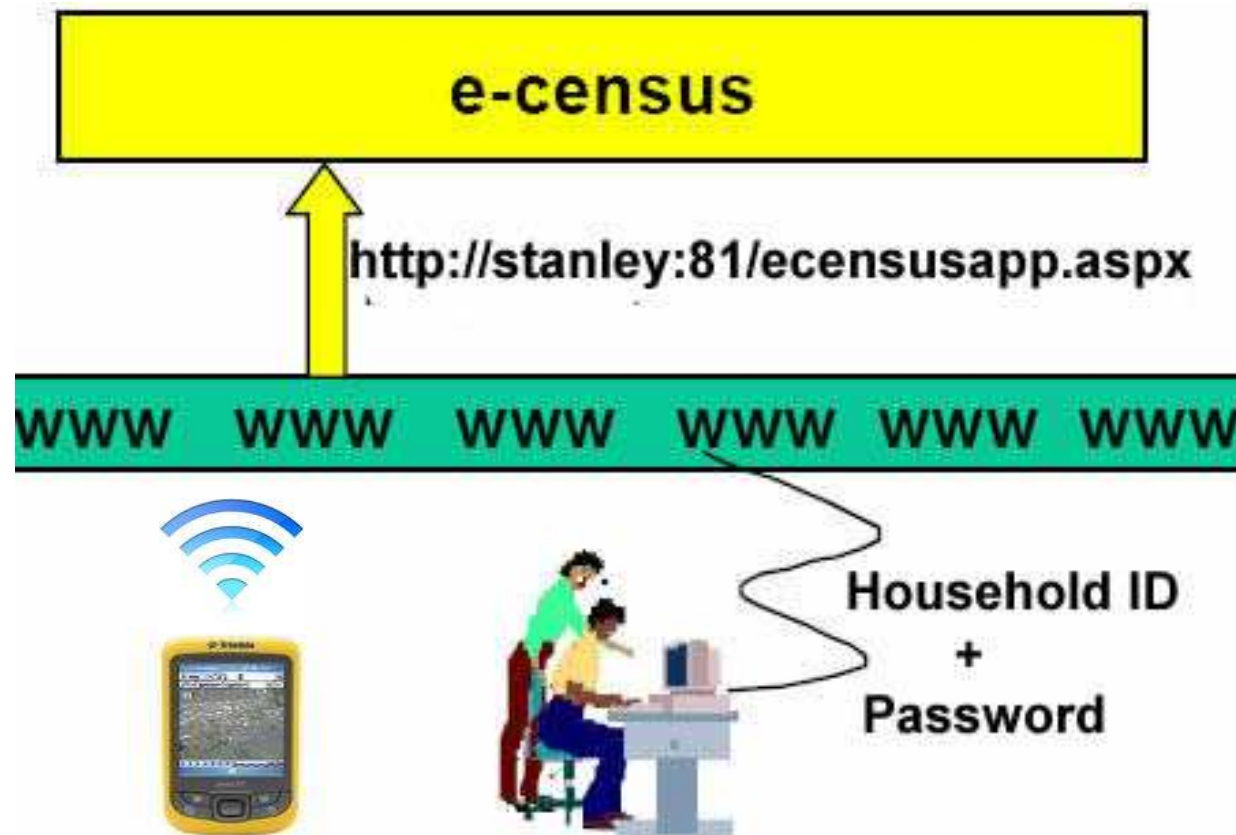
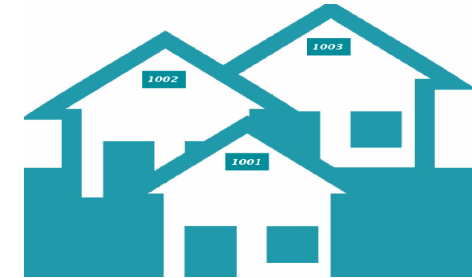
- E-census system integrated with birth and death registration module the government will be able to determine the actual population of the country at any given time
- E-census will assist on decision making and as a result speed up national economic recovery
- E-Census Prototype system



# Recommendations



1. Integration of e-census with immigration department to enable the government to account for people who are living outside the country.
2. Continuous improvement on system architecture.
3. Performance monitoring
4. Quality control of the e-census data



# Thank you