



**United Nations Regional Workshop on
The 2020 World Programme on Population and Housing Censuses:
International Standards and Contemporary Technologies**

**SESSION 10:
USE OF HANDHELD ELECTRONIC DEVICES FOR CENSUS DATA COLLECTION: MALAYSIA**

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Introduction

Considerations for selecting handheld devices

Data collection application and testing the systems

Use of geospatial technology during enumeration

Data transfer

Security for data collection with handheld devices

Field operation management and monitoring

Re-use/disposition of devices

INTRODUCTION

Brazil
2010

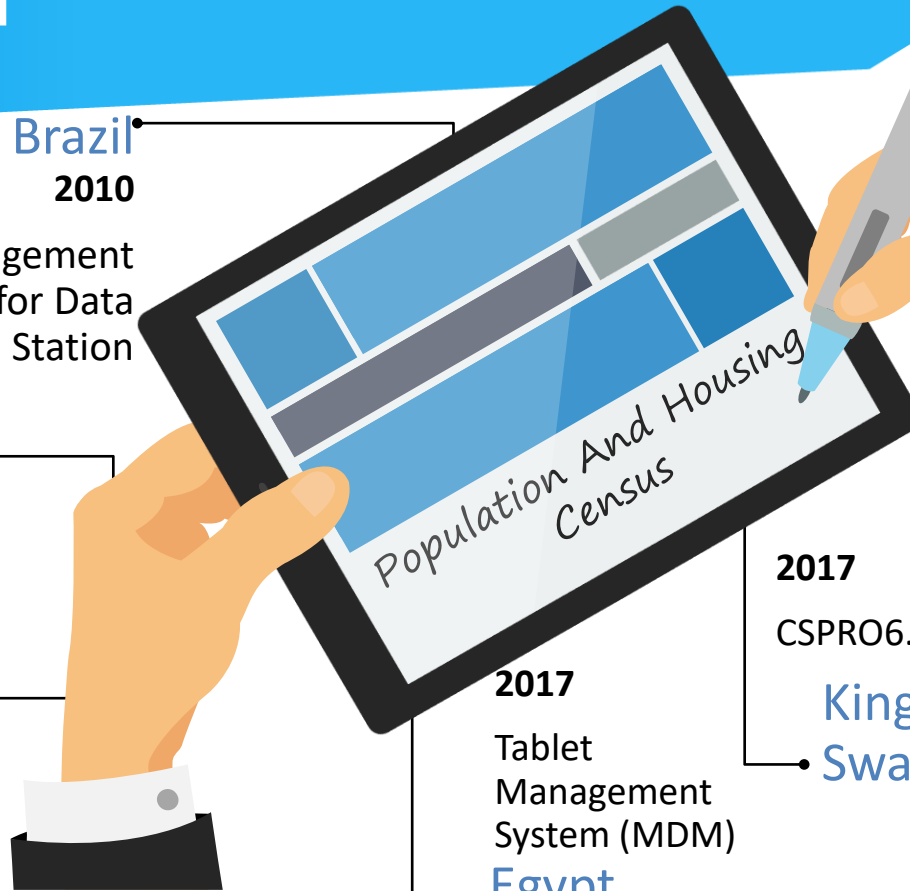
SIGPC – Management
System for Data
Collection Station

Singapore
2000, 2010

Ultra-Mobile Personal
Computer (UMPCS)

Jordan
2015

Tablet devices with
custom-developed data
collection applications



2016

Face to face
interviews by
tablet device

**Iran,
Hongkong**

2017

CSPRO6.3

**Kingdom of
Swaziland**

2017

Tablet
Management
System (MDM)

Egypt

INTRODUCTION – DATA CAPTURING

2000

Manual Data Entry

- IMPS - CENTRY
- 13 Processing Centres
- Data capture & Verification
- 762 Staff employed for data capture with 2 shifts
- (6000-8000) keystroke/hour

2010

ICR (Eyes & Hand Readsoft International)

- 6 Processing Centres
- 188 Staff employed for data capture with 2 shifts
- **Online for Urban areas (eSurvey)**
- Web server – Apache
- Database My Sql ver 5.1.26

2020

CAPI

- Tablet
- BYOD
- **CAWI – e-Census**
- Friendly interface
- **CATI**
- 6 CATI centers
- **PAPI/DOPU**
- ICR (Eyes & Hand Readsoft International)
- 11 Processing Centres

CORE COMPONENTS: PRE-CENSUS

DOSM SMART LISTING



- Field Listing
- Online Self Listing

DOSM SMART MAP



LQ

EB
UPDATE

GIS
PROCESSING

ANALYTICS

- Descriptive Analytics LQ
- Descriptive Analytics HH



CENSUS DATA MANAGEMENT



PRIOR SECONDARY



MSAR



MSPR



ADMINISTRATIVE



FROZEN
FRAME

CENSUS SUPPORTING SYSTEM: CENSUS TRACKING



PERSONNEL



INVENTORY



ASSETS

SYSTEM ADMINISTRATION & INTEGRATION



PERSONNEL



SYSTEM PERFORMANCE



INTEGRATION

CORE COMPONENTS: DURING CENSUS

CENSUS OPERATION



- Census Modes
- eDocuments
- eRKL

CENSUS PROCESSING

- ICR data
- Consolidation
- Imputation
- Manual Coding
- QC Validation



ANALYTICS



- Descriptive Analytics LQ, HH & individual
- Compare eRKL Actual vs Target

CENSUS DATA MANAGEMENT



FROZEN FRAME RAW CENSUS

CENSUS SUPPORTING SYSTEM

CENSUS TRACKING



PERSONNE



INVENTOR



ASSETS



PES

SYSTEM ADMINISTRATION & INTEGRATION



PERSONNEL



SYSTEM PERFORMANCE

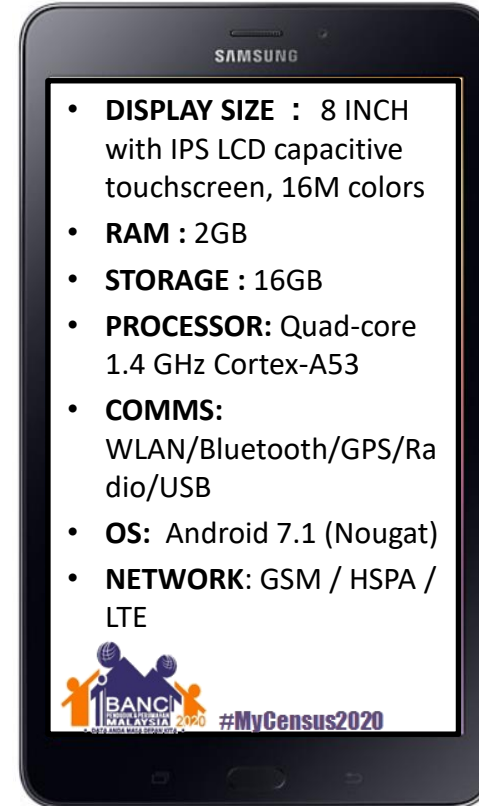


INTEGRATION



Important features

- *Processor performance*
- *Operating system*
- *Storage capacity*
- *Keyboard*
- *Screen*
- *Battery*
- *Portability and robustness*
- *Sensors and peripherals*



DATA COLLECTION APPLICATION AND TESTING THE SYSTEMS

Features of the application

- Interface for field staff
- Questionnaire navigation
- Automatic routing
- Data quality control
- Case management
- Data management
- Support and documentation
- Other features such as:
 - Precoding
 - Customising questions
 - Operational information



Evaluation of the system

- Performance in the field
- Tools for managing cases and data
- Resources
- Steps in the evaluation process
 - Checklist
 - Testing
 - Evaluation of performance
 - Comparison of software

USE OF GEOSPATIAL TECHNOLOGY DURING ENUMERATION

The application
will be
embedded with
GIS function

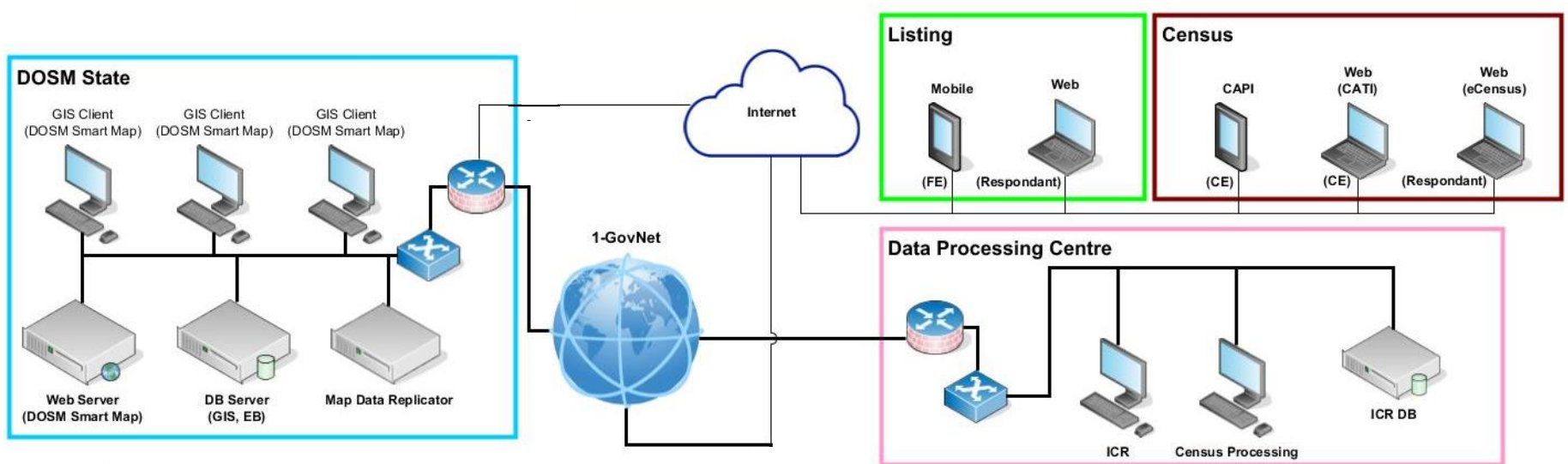


- Networking
 - WiFi
 - Cellular 2D/3D/4D
 - Bluetooth
- Synchronization options
 - Online
 - Partially online
 - Off-line
- Servers
 - Web-based
 - Cloud-based
 - FTP



- Estimating volume of data
- Challenges
 - Network performance constraints
 - Network overhead
 - Application performance

DATA TRANSFER



SECURITY FOR DATA COLLECTION WITH HANDHELD DEVICES



- **Network:** 1GovNet network (secured government network) for data transfer
- **System Authentication:** Each enumerator has username and password
- **Server:** The data server is physically secured (ISO/IEC 27001:2013 ISMS)
- **Gadget:**
 - Monitoring thru Logistics Tracking System
 - General rules policy



Major security threats

- Data stored in the device
- Data in transit
- Aggregated data on the server
- Other security-related challenges

Technology coordinator and team

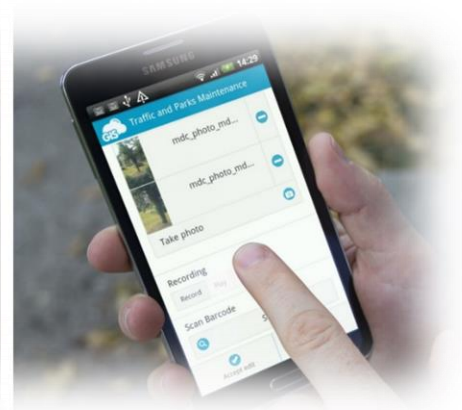
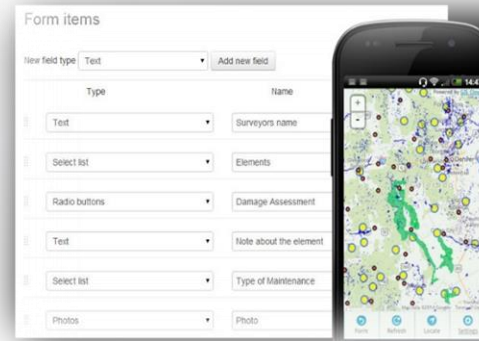
- Installation of system on device
- Checking all accessories
- Assisting in case of hardware problems
- Defining the Internet
- Ensuring that devices are synchronized

Field management tools

- Supervisor's module
- Enumerator's module
- GPS tracking system

Management information system

- Performance indicators
- Supervision alerts
- Centrally managed systems



Re-use all tablets for other field operation work such as updating MSAR, MSPR, conducting surveys and censuses

Challenges of re-use

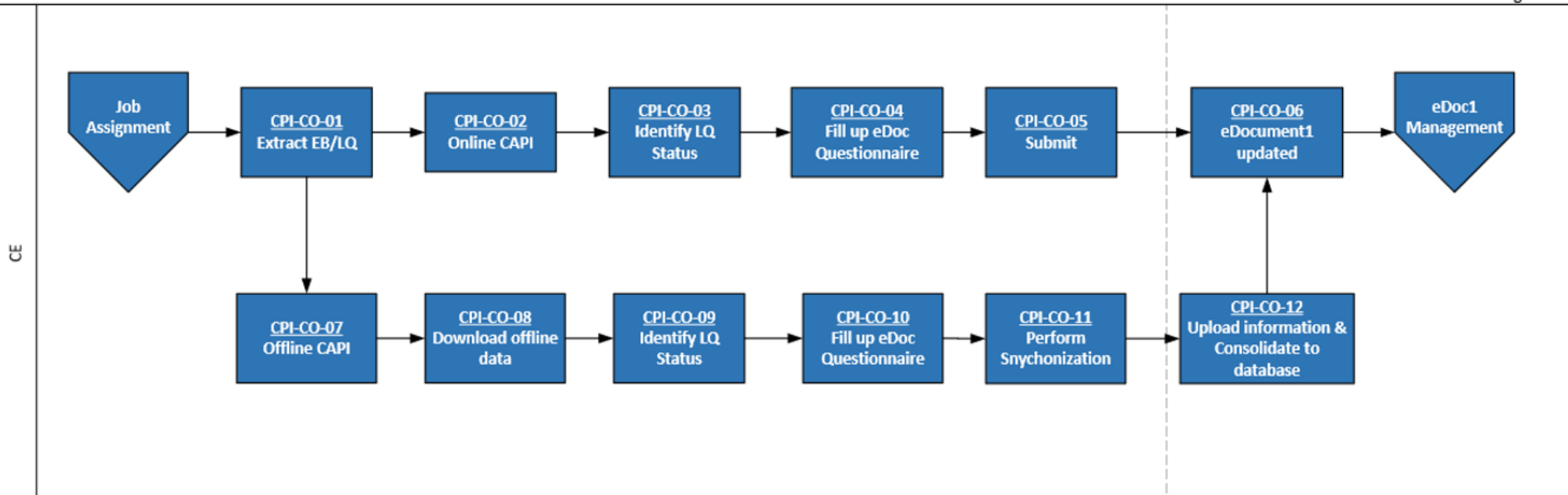
- Degradation
- Battery life
- Warranty life
- Removal of data
- Wiping software
- Restoring disabled feature
- Compatibility with IT infrastructure for re-use

Disposition

- Necessary for obsolete or damaged devices
- Scrubbing of sensitive data
- Data purging
- Early decision necessary
- Compliance with IT security requirements

CAPI SYSTEM FLOW

During Census



CHALLENGES

Security

Enforcement and monitoring on gadgets management

- Physical security
- Confidentiality

Technology

Rapid evolution of digital technology

2020: $\geq 40\%$

Capability

Hands-On Demo
Central Briefing
MySUL

Promotional

Power of publicity

Capacity

- Fast turn over FE
- Insufficient gadgets 1:120



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Thank You

