



**Presented at the FIG Congress 2018,  
May 6-11, 2018 in Istanbul, Turkey**

**6-11 May 2018  
ISTANBUL**

# XVI FIG Congress 2018



**EMBRACING OUR SMART WORLD WHERE THE CONTINENTS CONNECT:  
ENHANCING THE GEOSPATIAL MATURITY OF SOCIETIES**

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## Digital Integration of Land Records through the LADM and STDM

Glendon G. Newsome (Jamaica)

and

Charisse Griffith-Charles (Trinidad & Tobago)

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## Outline of Presentation

- Rationale
- Aim
- Methodology
- Domain Models – LADM, STDM
- Justification for a new model
- Hybrid Model – LSTDM
- DLRMS
- Database, Tables and Views
- Conclusion

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## Rationale

- Fragmented Land Records
- Disjointed computerized systems
- 750 Informal settlements i.e. 20% population
- Deeds system operating independently of Titles system, creates conflict, needs an integrated approach.
- Digital Land Records Management System in a centralized Geo-database, needed to store and provide a seamless approach to updating and retrieval of all land information

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## Aim

To improve access to land records in the land administration system by recording in one comprehensive system, the formal and informal land tenures which describe the people-land relationship, in an integrated Digital Land Records Management System (DLRMS) that can potentially provide the foundation for attaining all the sustainable development benefits of integrated land information.

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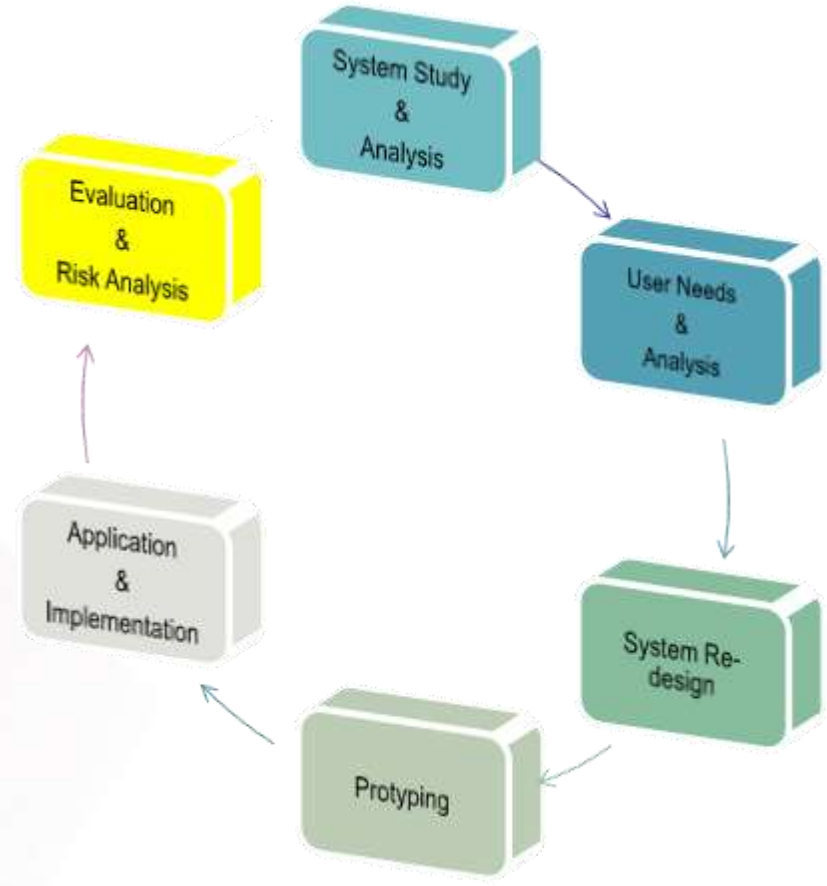
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## Methodology for Design (Waterfall-Prototyping-Spiral)



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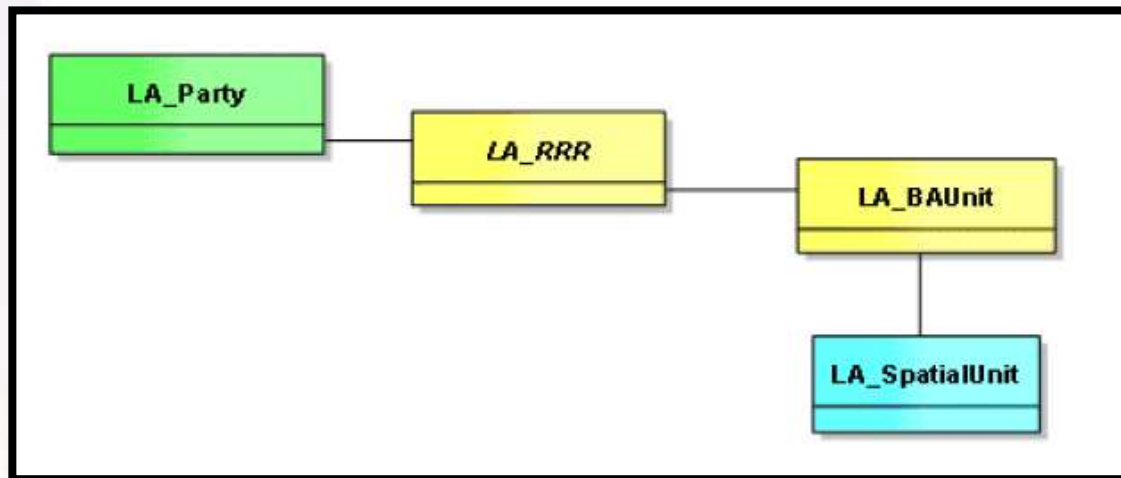
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## Land Administration Data Model (ISO 2011)

### Four Classes of Data in three packages :

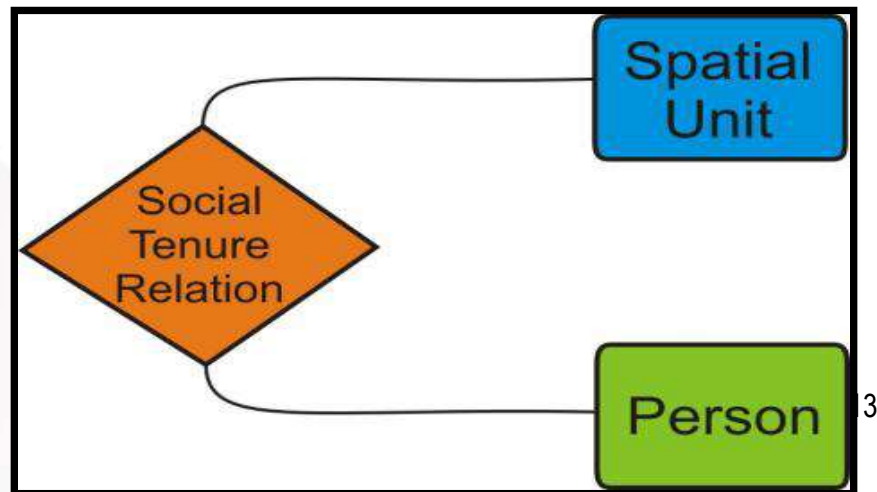
- 1) Class LA\_Party (Natural – People, Non-Natural – Organizations)
- 2) Class LA\_RRR (Rights, Restrictions and Responsibilities)
- 3) Class LA\_BAUnit (Basic Property Unit or Rights Unit e.g. Easements, Source e.g. Deed or Title)
- 4) Class LA\_Spatial Unit (Describes BAUnit) with sub-package: Surveying (Spatial Sources) and Spatial Representations (Geometry and Topology)



## Social Tenure Domain Model

Three Classes of Data in three packages :

- 1) Class Person (Individuals or Groups)
- 2) Class Social Tenure (Squatting, Land grabbing, Family Land, Tribal/Communal, Common law conveyance)
- 3) Class Spatial Unit (Overlapping Property Units , Deeds, Voice notes, Photographs, Documents)







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## Justification for a new model

- 1) Not all land rights or claims can be accommodated into a formal or conventional, parcel-based system such as the LADM, as some rights or claims are based on social tenures, such as: customary, mailo, freehold, leasehold, land use, land allocation, tribal land, land grant rights (Arora 2011)
- 2) A specialisation (Augustinus, Lemmen and van Oosterom 2006) or refinement and a more flexible version of the LADM, to be used in circumstances where the LADM is not applicable, for example, in countries whose Land Administration System has a colonial flavour, so that customary, informal and communal tenure, such as family land, are not supported (Griffith-Charles 2011, Augustinus, Lemmen and van Oosterom 2006), is required.

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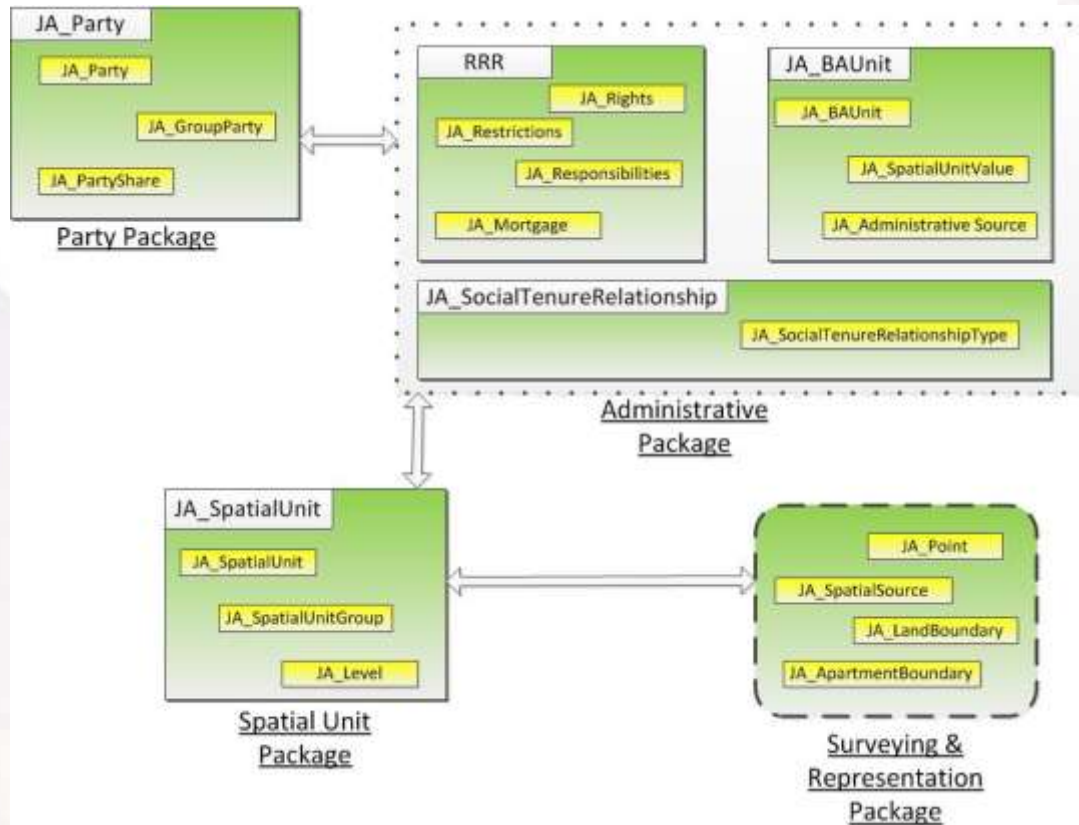
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## Hybrid - JA\_LSTDM



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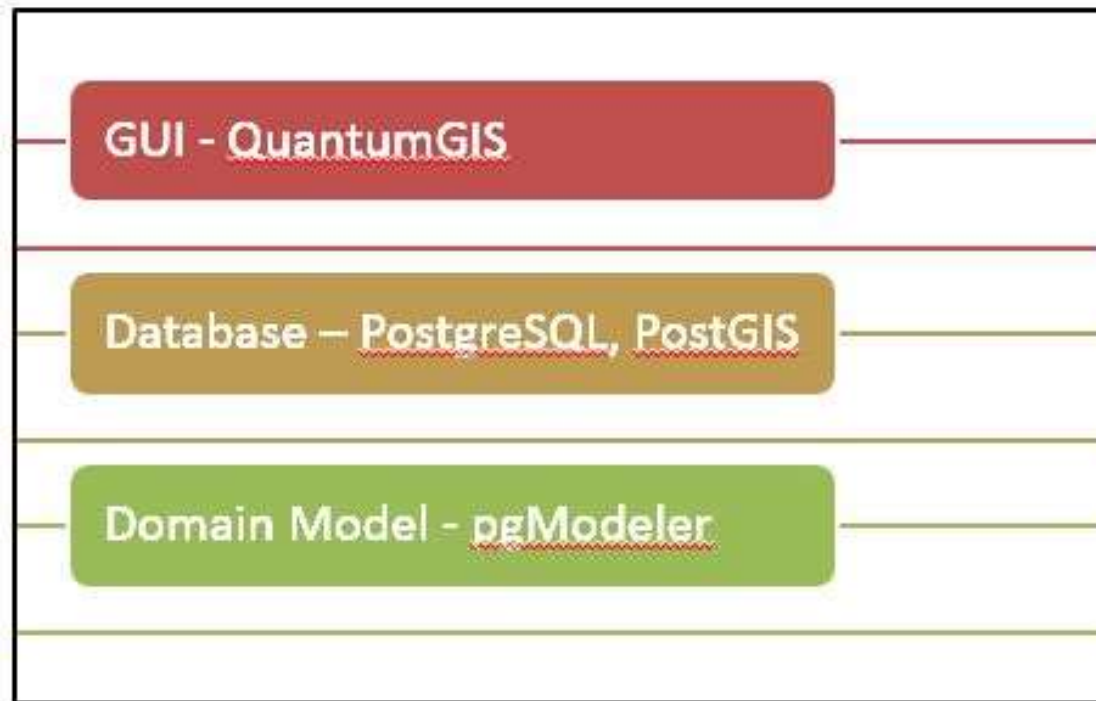
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## DLRMS (Three – tiered Architecture)



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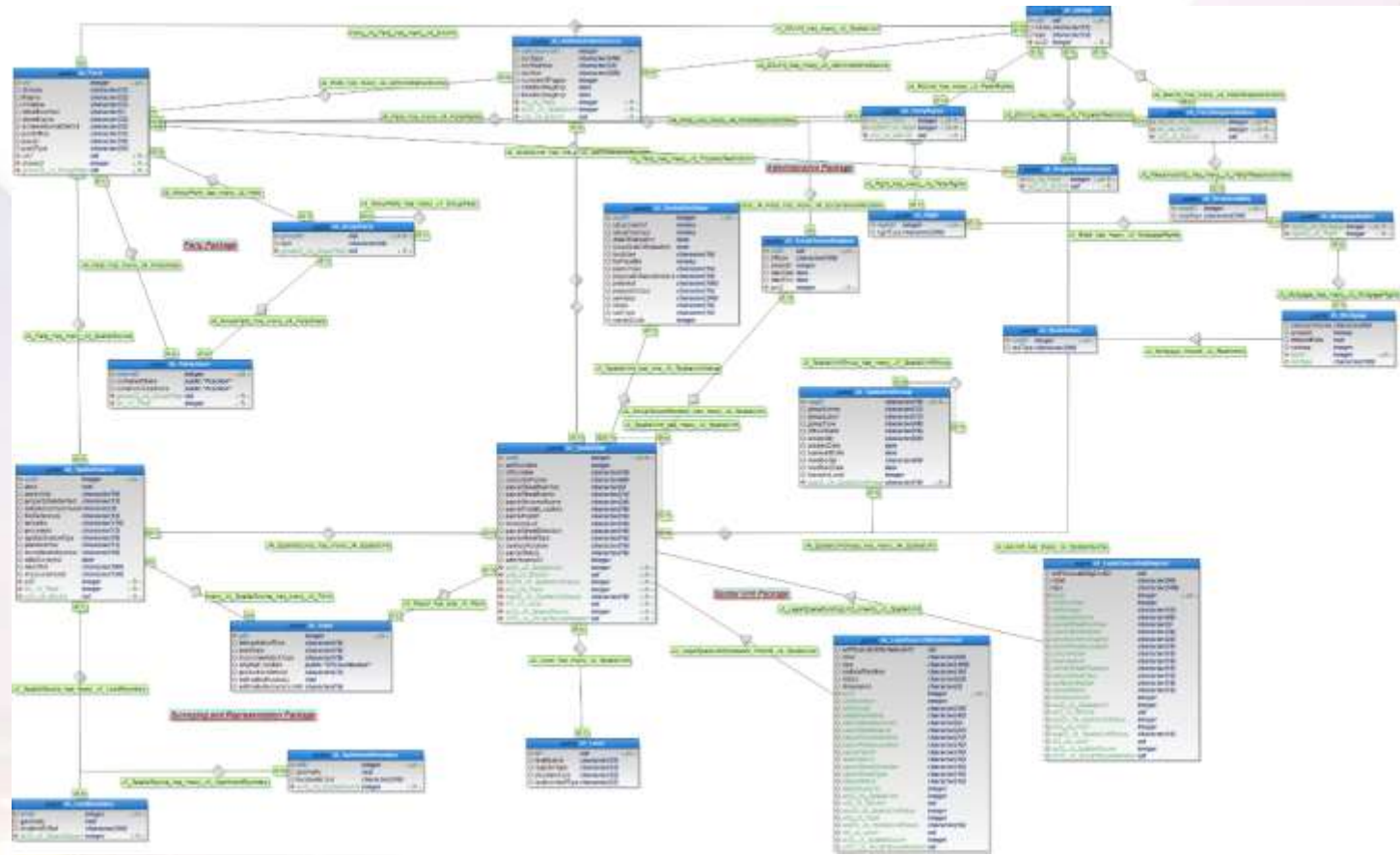




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## Legal & Social Tenure Domain Model



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## Tables

### Party

|   | trn<br>[PK] integer | sName<br>character(32) | fName<br>character(32) | mName<br>character(32) | streetNumbe<br>character(5) | streetName<br>character(32) | schemeName<br>character(32) | postOffice<br>character(32) | parish<br>character(16) | partyType<br>character(20) | uID<br>oid | shareID<br>integer | groupID_JA_<br>oid |
|---|---------------------|------------------------|------------------------|------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-------------------------|----------------------------|------------|--------------------|--------------------|
| 1 | 100786343           | Browne                 | Jacob                  | Ford                   | 18                          | William Str                 | Vineyard To                 | Kingston 21                 | St. Andrew              | Individual                 | 43267      | 102                | 1256               |
| 2 | 101027486           | Rowe                   | John                   | Tom                    | 94B                         | Monkey Park                 | Monkey Park                 | Kingston 23                 | St. Andrew              | Individual                 | 45123      | 101                | 2001               |
| 3 | 101568931           | Robinson               | Charley                | Joseph                 | 13                          | Ralston Ave                 | Vineyard To                 | St. Andrew                  | St. Andrew              | Individual                 | 43267      | 102                | 1256               |
| 4 | 101693456           | Johnson                | Trevor                 | Bert                   | 45                          | Highburn                    | Richmond Pa                 | Kingston 34                 | St. Andrew              | Individual                 | 45123      | 104                | 3001               |
| 5 | 101907654           | Johnson                | Robert                 | Ned                    | 27                          | Jones Drive                 | Waltham Par                 | Kingston 14                 | Kingston                | Individual                 | 44674      | 109                | 3001               |
| * |                     |                        |                        |                        |                             |                             |                             |                             |                         |                            |            |                    |                    |

### Responsibilities

|   | respID<br>[PK] integer | respType<br>character(200) |
|---|------------------------|----------------------------|
| 1 | 31001                  | Property Tax               |
| 2 | 31002                  | Common Area Maintenance    |
| 3 | 31003                  | Fence Maintenance          |
| 4 | 31004                  | Waterway Maintenance       |
| * |                        |                            |

### Social Tenure Relations

|   | sTID<br>[PK] oid | sType<br>character(100) | shareID<br>integer | dateStart<br>date | dateEnd<br>date | suID<br>integer |
|---|------------------|-------------------------|--------------------|-------------------|-----------------|-----------------|
| 1 | 50001            | Squatting               | 109                | 1997-03-21        | 2015-12-18      | 10014           |
| 2 | 50002            | Communal (Maroons)      | 102                | 1803-09-24        | 2015-12-18      | 10002           |
| 3 | 50003            | Communal (Family)       | 101                | 1999-05-17        | 2015-12-18      | 10002           |
| 4 | 50004            | Tenancy                 | 101                | 2004-08-09        | 2015-12-18      | 10002           |
| 5 | 50005            | Short Lease             | 101                | 2015-11-01        | 2016-07-31      | 10002           |
| 6 | 50006            | Land Grab               | 101                | 2015-11-25        | 2015-12-18      | 10002           |
| 7 | 50007            | Customary               | 101                | 2001-12-17        |                 | 10002           |
| 8 | 50008            | Mailo                   | 101                | 1995-04-13        |                 | 10002           |
| * |                  |                         |                    |                   |                 |                 |

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## QGIS

| Field Name                | Value   |
|---------------------------|---|
| gid                       | 76  |
| bfid                      | 76  |
| locationByText            | Plantation Heights  |
| geom                      | 01.80957 654456.06823,765504.03079 654463.39411,765513.396457 654463.39102111 |
| procedure                 | Total Station Traversing  |
| parfnumbr                 | EM 255813   |
| recordIndexNumber         | 6.3421  |
| dateSurveyed (yyyy-MM-dd) | 1995-05-18  |
| descText                  | Part of Lot. 13 Part of Patrick Heights being Part of Holmes Mountain         |
| measurements              | Bearings and Distances  |
| lotNumber                 | 5-15  |
| cadastrName               | Molynes Mountain  |
| unitNumber                |   |
| parcelStreetNumber        | 4   |
| parcelStreetName          | Emerald Terrace   |
| parcelSchemeName          | Patrick Heights   |
| parcelPostalLocation      | Kingston 28   |
| parcelParish              | St. Andrew  |
| reservedLot               | Yes   |
| parcelStreetDirection     | Southeast   |
| nameShowFile              | Shaded  |

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## Application of the Model (Legal & Social Tenure Domain Model)

- Tax Registration Number (TRN) – Identifier/Primary Key for Parties in **Party Table**
- Shares in Common Areas and Spatial Units in **Party Share**.
- Types of Groups in **Group Party**
- Rights, Restrictive covenants and Responsibilities – **RRR**
- Informal, Communal, Tenancy, Short Lease - **Social Tenure Relations**
- Condominiums – **Spatial Units**
- Single objects and group of objects - Spatial Unit and the Spatial Unit Group classes, respectively, of the **Spatial Unit Package**.
- Survey plans and metes and bounds descriptions - Spatial Source class in **Surveying and Representation Sub-package of the Spatial Unit Package**



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## Conclusions

- DLRMS Versatile so that any system in any Small Island Developing States (SIDS) developed on any combination of these features, can adapt the DLRMS as part of its modernization efforts.
- Most Caribbean islands do not have in place a digital cadastral database
- Scanned Cadastral Maps in ArcGIS or CAD, and Textual in MSAccess
- The model adapts existing approaches into a more fit -for-purpose architecture, which will be attractive to developing countries that have resource constraints and want to make land records storage and retrieval more efficient

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Thank You !

Questions ??

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