



# Technical Assistance Consultant's Report

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Project Number: 47184-003  
May 2015

## Regional: Geomapping of ADB's Projects (Financed by the Technical Assistance Special Fund)

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For Asian Development Bank

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**Asian Development Bank**

**TA-8713 REG: Geomapping of ADB's Projects (47184-003)  
Geomapping Application Requirements Gathering Mission  
2 – 8 December 2014, Manila**

**Prepared by:**

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## EXECUTIVE SUMMARY

1. The objective of **TA-8713 REG: Geomapping of ADB's Projects (47184-003)** is to enhance the Asian Development Bank's (ADB) transparency and the availability of its operational data by developing a mapping platform (hereafter referred to as the "geomapping application") that visualizes the geographic location of ADB projects in a user-friendly and easy-to-understand matter. One of the key aims behind developing this tool is to make the tool available to the public through ADB's external website (<http://www.adb.org>) so that this geocoded information can be used as a resource to better visualize and understand ADB's project portfolio in the Asia-Pacific region.

2. In addition to the development of the geomapping application, Development Gateway (through its partner the College of William and Mary) will support ADB in the geocoding of ADB-financed operations approved from April to October 2014, including TAs and non-sovereign projects. The maintenance of ADB's information technology (IT) systems for geocoding and geomapping will also be implemented under the TA. Prior to this TA, Development Gateway worked with ADB under **TA 8603 REG: Geocoding of ADB's Projects (47184-002)** to successfully integrate geocoding as part of ADB's project and portfolio management workflow. Over the course of February – December 2014, Development Gateway worked in conjunction with ADB to geocode the ongoing portfolio of ADB projects and to develop and integrate a geocoding tool within ADB's project management workflow, which is now live in ADB's eOperations system. This tool plays an integral part in sustaining geocoding as a core functionality within ADB's project management processes and ties into the overall sustainability of the geomapping application since it allows for the addition and modification of ADB project locations.

### 3. **Output Requirements**

The following lists out the expected deliverables under this TA, as well as the associated timelines for each deliverable and the current progress thus far:

1. A requirements gathering mission during 2 - 8 December 2014 to collect the necessary requirements and specifications for the geomapping application
  - a. **Completed.**
2. A requirements report to be sent to ADB after the completion of the mission, by 19 December 2014, for review and finalization of the design and requirements for the geomapping application
  - a. **Completed.**
3. ADB-financed operations approved from April to October 2014, including TAs and nonsovereign projects, will be geocoded and submitted to ADB by 31 January 2015
  - a. **Dataset is currently in the QA process and will be submitted to ADB by 8 May 2015.**
4. A test version of the geomapping application to be completed by 31 March 2015

- a. Various demo versions (on a bimonthly basis) were shared with the ADB team over the course of March and April 2015 as features were developed. Feedback from ADB was incorporated after each demo such that each demo reflected the latest development progress and requested changes from ADB.**
5. A pilot version of the geomapping application to be completed by 15 April 2015
  - a. On target for submission by 8 May 2015.**
6. A final version of the geomapping application to be completed by 30 June 2015
  - a. On target for submission by end of June 2015.**
7. Ongoing maintenance of both the geocoding widget and geomapping application, as well as the hosting of the geomapping application until 31 December 2015
  - a. Discussions on hosting of the geomapping application are currently underway and pending a decision by ADB team.**
4. Development Gateway will also work to ensure that all necessary training and documentation materials, according to ADB's standards, will be provided to the necessary fopoints during and before the end of the project.
5. The achieved deliverables under the previous TA have thus far not only helped to further support ADB's internal and technical goals in institutionalizing geocoding within the ADB, but have also helped to further the strategic importance of ADB's work in the global aid and transparency community. The geomapping application is sure to greatly contribute to the messaging, as well as practical implications, of ADB's commitment to using geospatial data and analysis as a pivotal tool in ADB's workflows and visualizations.

## I. INTRODUCTION AND BACKGROUND

6. This TA seeks to continue and expand upon the existing achievements ADB has undertaken in institutionalizing geocoding within the Bank's project management workflow. By now having the process of geocoding in place for project officers to record and modify project locations for ADB-financed operations, ADB is committed to showcasing this detailed information via its public-facing website: [www.adb.org](http://www.adb.org). Other multilateral banks and international organizations such as the World Bank, the African Development Bank, Inter-American Development Bank, UNDP, and DfID – have worked to incorporate geospatial data onto their websites; with lessons learned from these organizations regarding their experiences of “opening up” their location data, ADB is well-poised to make use of these experiences to lead the next wave of innovations for Development Partners to best show where their money is going in their target beneficiary countries.

7. As the pilot geomapping application is expected to be presented at the ADB Annual Meetings in May 2015, Development Gateway will support ADB in getting all of ADB's ongoing project geocoded so that the information in the public-facing geomapping application can be as comprehensive as possible. Starting from 2015, project officers will work to ensure that all new projects are geocoded via the geocoding widget in eOperations. For the geocoding work to be conducted under this TA, ADB identification of project locations will be based on project information either available on ADB's external website or provided, at the request of Development Gateway, by ADB's project officers. The structure of the geocoded data will be compatible with the current version of the international standard set by the International Aid Transparency Initiative (IATI). Annex 2 describes the geocoding process in detail.

## II. OBJECTIVES

8. The integration of the geomapping application with ADB's existing IT infrastructure will coincide with all technical and procedural requirements provided by ADB. The requirements gathering mission, which took place from 2 – 8 December 2014, was intended to detail: the (i) functional design of the mapping platform, (ii) technical design and requirements, including the integration of the mapping platform with ADB's existing IT infrastructure (including [adb.org](http://adb.org) website) and options for IT tools and equipment, such as the geographic information system (GIS) server, to be used for the geomapping application, and (iii) test scenarios for ADB's acceptance of the consultant's outputs.

9. The following list relays the general requirements the geomapping application needs to adhere to:

- Prototype functionalities of geomapping applications as exemplified by World Bank's Global Reach and the African Development Bank's MapAfrica, including a filters feature for customization of the information displayed on the map;

- Easy-to-use interface and acceptable performance for use in low-bandwidth environments in ADB's developing member countries (DMCs);
- Compatibility with a variety of browsers including Internet Explorer (9 and above), Google Chrome, Firefox and Safari;
- Responsive web design and ability to be displayed in mobile devices;
- Ability to export the map data and share the map;
- Ability to monitor and measure the number of visitors to the tool; and
- Flexibility to accommodate key changes via configuration in the mapping tool after launch.

10. The following list also outlines the features and functionalities that ADB has requested to be incorporated into the design of the application:

- The default view of the mapping tool is the Asia and Pacific regional map where each ADB DMC is represented by a bubble which differs in size depending on the number of projects under operation within the country. Clicking on a bubble leads to country view.
- In the country dashboard, project location points are represented by icons cartographically differentiated by sector.
- Presentation of location points includes spatial clustering or other visualization tools to ensure clear map view even when many locations exist in a small geographic area.
- Clicking on a location icon triggers a dialog box which shows summary information of the project. The dialog box also provides ability to navigate to the relevant project pages where maps of individual projects are displayed.
- Thematic maps of socioeconomic indicators and data, such as population density, may be overlaid on the base map.

11. In preparing the following report, the options that provide the best balance of application performance, ease of implementation, and maintainability have been sought. From the IT side, open-source products have been utilized (for example, Esri's web-based integration with Leaflet for the geomapping application's basemaps) as a means to ensure less internal IT infrastructure dependencies as well as to adhere to international trends regarding the increased usage of open source applications and procedures.

A subsequent TA for an internal GIS tool is potentially under consideration to further advance the functionality and features of the geocoding "roll-out" in ADB – now that a geocoding widget is in place in ADB's project management system as well as the development for a public-facing mapping platform currently underway, there is potential interest and appetite to further maximize on these initiatives via a Phase III, in which an internal GIS tool is developed/customized for ADB, so that project managers and divisions within ADB can use geospatial analysis as part of ADB's project planning and analysis processes.

Thus it will be important to highlight, outline, and discuss how any future internal GIS-centered work can be integrated with ADB's management system and processes, particularly from a resource (both technical and human) perspective. An important first step in guiding this

conversation will be discussing the potential use of ArcGIS Online with Esri, the provider of this service, for ADB's internal GIS tool. Additionally, gathering specific requirements and use cases from ADB internal stakeholders will be imperative in the selection of the best technology to meet ADB's GIS needs.

12. Upon approval of the requirements and designs set forth in this report, Development Gateway will initiate development of the geomapping platform so as to remain on schedule to submit a test version to ADB of the application by March 2015 for quality assurance and integration testing. Subsequently, the consultants will work with ADB's IT experts, in particular the ADB website team, to complete the integration of a pilot version of the application with ADB infrastructure by 15 April 2015.

### **III. KEY PERSONNEL AND DEPARTMENTS**

13. The scope of this TA spans a number of different offices and departments within ADB. The Strategy and Policy Department (SPD) and the Department for External Relations (DER) will collaborate closely to realize the goals set forth under this TA and ensure the functional operation of the geomapping application once it is live on [www.adb.org](http://www.adb.org). Furthermore, the Operations, Planning, and Coordination Division (SPOP) under SPD will work in conjunction with the Technology Division of OIST to discuss, create, and plan all internal work related to any potential future maintenance of the geomapping application, particularly from a technical standpoint.

14. Thus it will be important to highlight, outline, and discuss how any future internal GIS-centred work can be integrated with ADB's management system and processes, particularly from a resource (both technical and human) perspective. Continuing these discussions with the aforementioned stakeholders, as well as with others throughout the Bank, can only but help to ensure that any further developments in ADB's GIS capabilities are standardized, institutionalized, and sustained.

### **IV. OVERVIEW OF KEY SYSTEMS AND PROCESSES**

#### **15. ADB's quarterly IATI publication**

The Operation Data Store (ODS) serves as ADB's primary Business Intelligence (BI) tool. Developed using Oracle DB and IBM Cognos BI tools, the ODS powers the Operational, Executive, and Results Dashboards. Each dashboard displays different information for different user types, from project officers viewing activities within their divisions, to Directors and Senior Management reviewing data on ADB performance across all sectors, countries, and divisions. The ODS is updated nightly from eOperations via Congos' Extract, Transform, Load (ETL) tools, providing near-real time data for analysis and visualization.

16. The ODS also serves as the publishing point for ADB's IATI data. The IATI XML is rendered using Pentaho and is published on a quarterly basis. ADB provides individual country



files for each DMC, in addition to a comprehensive file for all ADB activities. The quarterly IATI publication will serve as the data back-end for the geomapping application, to be described in further depth below.

#### 17. **ADB's website**

The ADB website is managed and maintained by the Department of External Relations (DER). Project Data Sheet (PDS) data referenced on the website is updated nightly but there are currently plans underway to make that less frequent (bimonthly). Furthermore, the ADB website is currently undergoing a redesign, in which updates will be made to the website's overall design and functionality. In addition, the DER team is working to incorporate an Operations Tracker, which will provide dashboard-like visualizations as well summary statistics also based off of ADB's IATI data. This information will also be updated on the website on a quarterly-basis, when the IATI publications are released.

### **V. FUNCTIONALITY AND DESIGN REQUIREMENTS**

18. Annex I outlines the major meetings that took place between the Development Gateway team and ADB over the course of the requirements-gathering mission that took place in Manila from 2 December – 8 December 2014. The primary purpose was to get the necessary support throughout the Bank on the upcoming development and launch of the geomapping application, as well as to gather the all critical pieces of information from SPD, DER, and OIST on the technical development and compatibility of the geomapping application, in accordance with ADB guidelines and overarching vision.

19. The DER website team is looking forward to include the mapping feature into their upcoming website redesign. The main requirement set forth and agreed upon with SPD and DER was that the geomapping application would be a stand-alone application that can be embedded throughout the various ADB website pages by the use of iframes or similar solutions.

20. The overarching design principle concluded upon is to create a "simple map" on the new ADB Projects landing page, similar to what DfID has done for their development tracker: <http://devtracker.dfid.gov.uk/location/country/>. In sum, there will be 3 views of the map throughout the ADB website.

- 1) The Operations Tracker landing page will be a simple map that will show information by country. Each country pop-up box will show Total Commitments for that country and the Total Number of Projects that take place in that country, as well as links to the country's Country Page and Project List.
- 2) Individual Country pages will showcase the most robust view of the map. The country page map view will include the ability to apply filters, such as Type of Assistance, Sector, Status, and Approval Year. The country page map view will also show specific project

locations, displayed with sector icons. Thematic / indicator layers will be accessible as well here.

- 3) Individual Project page view will be a simple view, in which only project locations will be shown. Project locations will be shown for the specific project, with location infowindows available upon click for each location.

21. For future maintainability by ADB, the current version of the jQuery Javascript supporting library used throughout the ADB website is 1.8.2. If the application interacts with the ADB website using Javascript as is planned, it will need to either provide its own more recent version of this supporting library in a safe way or be developed with this version in mind.

22. For security requirements/documentation, OIST recommended following OWASP (<https://www.openhub.net/p/DevGuide>) requirements and suggestions to ensure the geomapping application does not expose ADB to any security vulnerabilities. DG will also share final of technologies to be used for the geomapping application with OIST, for any potential feedback.

23. For technical documentation, it was tentatively decided that DG should complete the same documents provided under Phase I, outlined below, in the case that ADB assumes hosting and maintenance of the geomapping application after the TA completion. In the case that the application hosting and maintenance continues to be outsourced, documentation requirements will be reviewed by both SPD and OIST to ensure that any and all necessary information is provided to ADB.

- i. High Level Solution Design
- ii. Transition Support and Maintenance Plan
- iii. Test Strategy
- iv. Test Plan
- v. User Guide

24. Regarding browser support, IE9+, Chrome, Safari and Firefox are the officially supported browsers of the website, which are also what the geomapping application will be built to support.

25. For server set-up and requirements, latency and bandwidth specifications for the ADB website were shared, so as to ensure the geomapping application can cover the same performance requirements.

## Google Analytics Key Performance Indicators

1 Dec 2013 - 30 Nov 2014

	Year Figure	Average per Day
Sessions	4,826,543	13,233
Users	2,856,580	7,826
Pageviews	16,623,217	45,543
Pages / Session	3.44	
Avg. Session Duration	00:04:07	
Avg. Page Load Time (sec)	11.78	
Avg. Redirection Time (sec)	0.29	
Avg. Domain Lookup Time (sec)	0.06	
Avg. Server Connection Time (sec)	0.06	
Avg. Server Response Time (sec)	2.6	
Avg. Page Download Time (sec)	0.86	

**ADB.org Bandwidth (avg): 20 TB / month**

26. It is important to note that the Website team will be procuring a CDN for the ADB website starting in January. This is a consideration for Development Gateway to ensure that the application can be potentially compliant with a CDN in the future.

27. Regarding hosting, OIST is planning to create an internal cloud service to host all ADB-related servers, including the website in the future. This would potentially be where the mapping application server would be hosted as well. No further action is currently needed, as the mapping application server will be hosted and contained within a single server, regardless of whether it is hosted at ADB or with a third party.

28. It was also proposed that the information on the map will be populated from the ADB IATI feed, which is currently updated on a quarterly basis, but may in the future be updated monthly. As a way to identify to the user where the map data is being populated from, a marker, such as “data as of x date”, will be incorporated with the map to disclose the timeliness of this data. The website team currently updates the data on the PDS daily but there are plans to move this to a bimonthly update. However, even with more frequent IATI publications, the website will still be updated more often than the map and there will be a need to ensure that there is a disclaimer for this difference. In addition, TA and NSO projects will not be included in the map, as they are currently not included in ADB’s IATI reporting. This is another difference that needs to be asserted, either on the map or within the new Operations Tracker, which will also be populated from ADB IATI data.

## **VI. PROPOSED DESIGN AND TECHNICAL ARCHITECTURE**

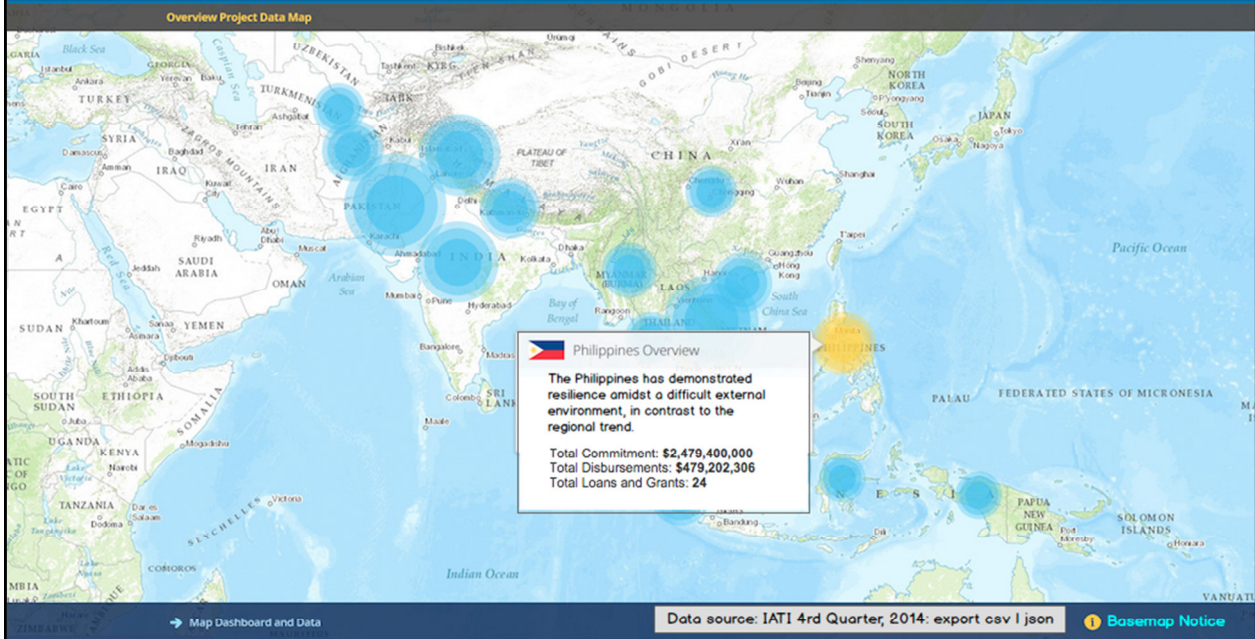
29. Given the aforementioned requirements, the following three mock-ups present the proposed UI designs for each of the various geomapping application “views” – on the map navigation page, on the various country pages, and lastly, on the each individual project page. The default basemap will be Esri Streets map, which is what the World Bank uses as well on its website. Furthermore, a legal disclaimer will appear below the map to ensure that disputed country borders are not a reflection of ADB’s views and policies. The exact wording of the disclaimer will be agreed upon with SPD.



### Project Tracker

FACEBOOK TWITTER LINKEDIN BOOKMARK

### Active Loans and Grants at a Glance



### Disbursements vs Commitment by Sector

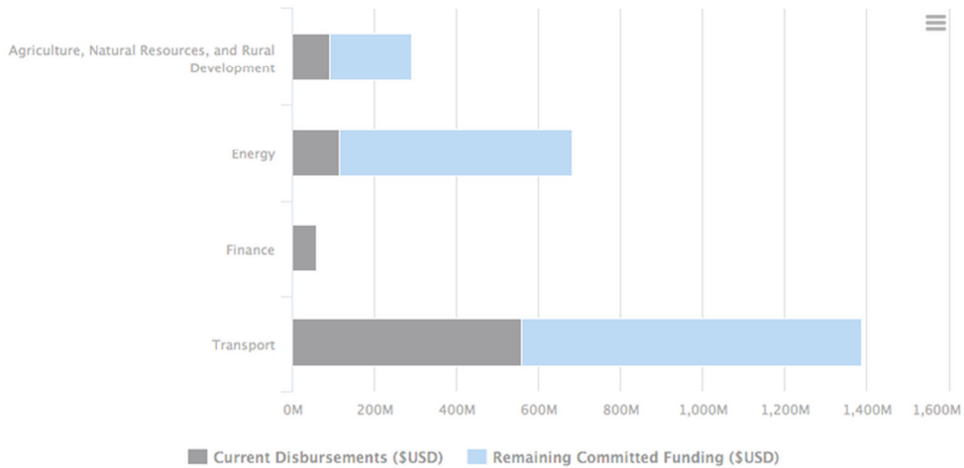
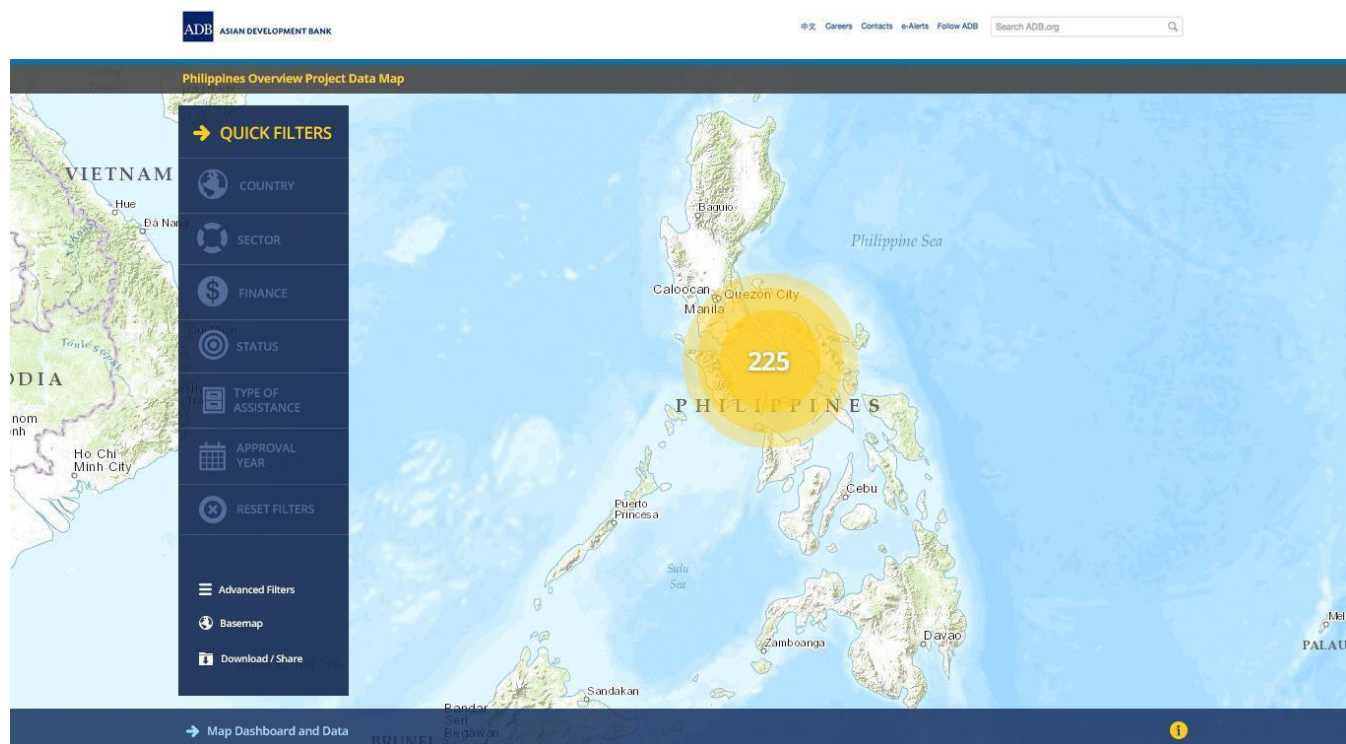


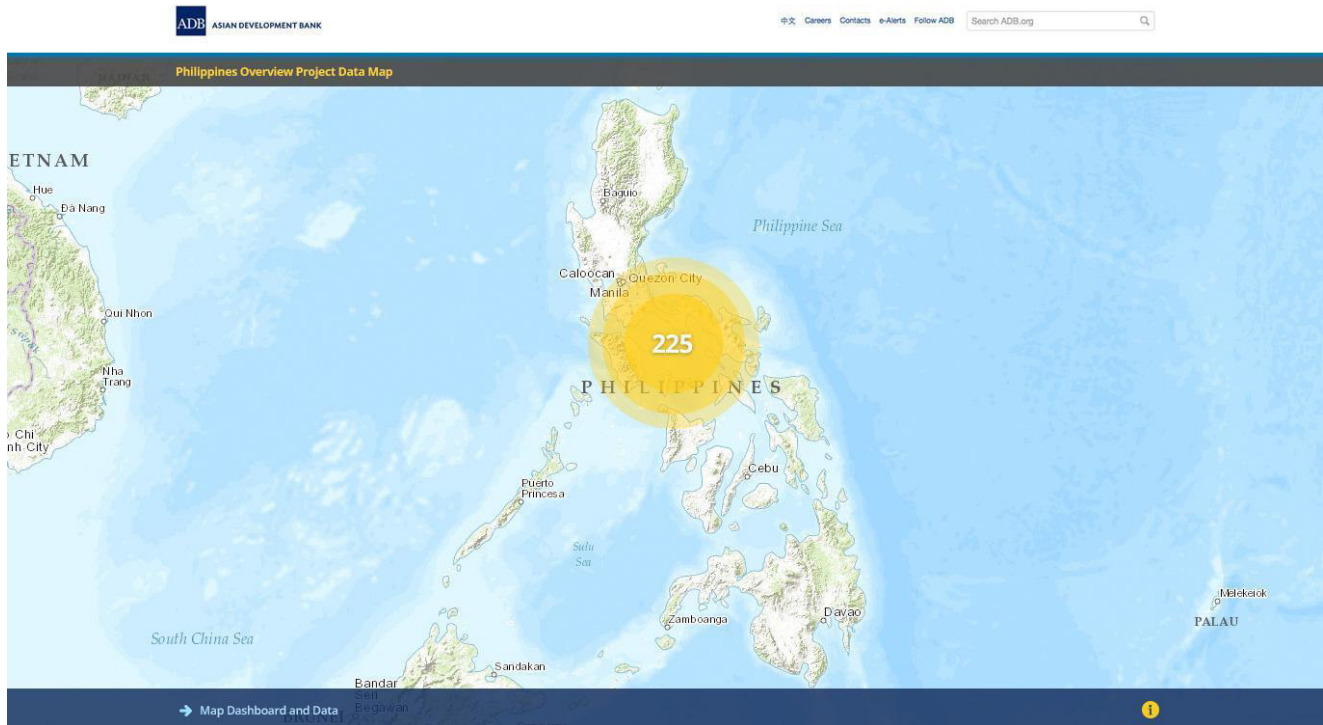
Figure 1. Design for Map Navigation Page

30. Interactive (e.g. can zoom in and out, pan, etc.) map that has bubbles overlaid on each ADB DMC. Clicking on the bubble brings up a pop-up box that shows: the country name, total actual ADB commitments to that country, the total number of ADB projects in that country, a link to the country's country page, and a link that shows the complete project list for that country.



**Figure 2. Design for Country Pages**

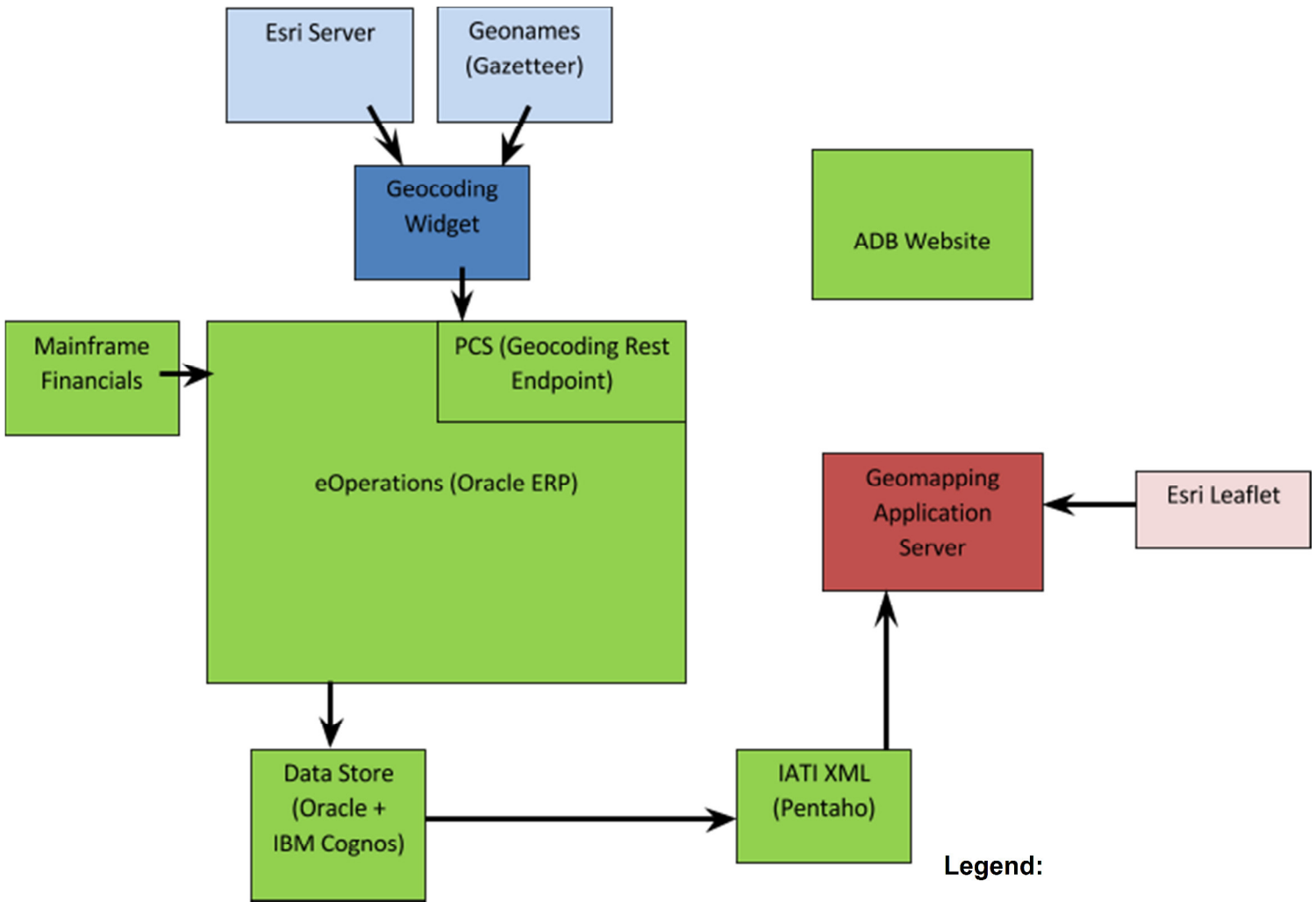
31. Interactive (e.g. can zoom in and out, pan, etc.) map that opens centred on the country of choice. User has the ability to apply filters. The list of filters, based off of what was discussed during the mission, contains the ability to filter by sector, finance type (commitments, disbursements), status, type of assistance, (grant or loan), and approval year. The user also has the ability to include more countries from the country filters. User can reset filters, as well change the base maps (topography, imagery, etc.) in addition to downloading the map data in an Excel format. There is also a share feature that allows the user to send a URL to the map, complete with all the filters/zoom levels applied, to another user. User can also choose to apply a thematic layer from a selected list for in-application analyses. Lastly, clicking on a project bubble on the map opens up a pop-up box that includes the project name, the location name, the type/sector/approval year of the project and a link to the PDS.



**Figure 3. Design for Project Page**

32. The map view on the project page will show all the locations that are associated with that project. Clicking on the project location on the map will bring up a pop-up box with the name of the location. As this feature is primarily meant as a “preview” rather than an analysis tool, it will not include other functionality in order to remain as user-friendly as possible.

Figure 4. ADB Geocoding-related technical architecture.



Legend:

**Dark blue** – developed by DG, TA Phase I

**Green** – existing processes / infrastructure within ADB

**Light blue / light red** – third party applications (non-DG and ADB)

**Dark red** – developed by DG, Phase II



33. The figure above shows the overall architecture of ADB's infrastructure, with regards to the geocoding widget and geomapping application. Two important things to note are all the green boxes are existing processes / infrastructure within ADB. The geocoding widget (dark blue) is also now an existing application within ADB's infrastructure. The lighter blue boxes associated with it (Esri server and Geonames) are an integral part to its functioning but are not applications that Development Gateway has developed. The geomapping application (dark red) will be developed under the current TA, and as seen from the diagram, has no internal dependencies on the ADB architecture. Other than the use of the IATI publications (which are publicly available on ADB's website), as well as the references to Esri's open source Leaflet, it is a stand-alone application that will be referenced by ADB's website, via its embedding in various ADB website pages.

34. The following diagrams show the Technology Stack, Components, and Deployment Processes used for the geomapping application.

**Figure 5. Geomapping Application Technology Stack**

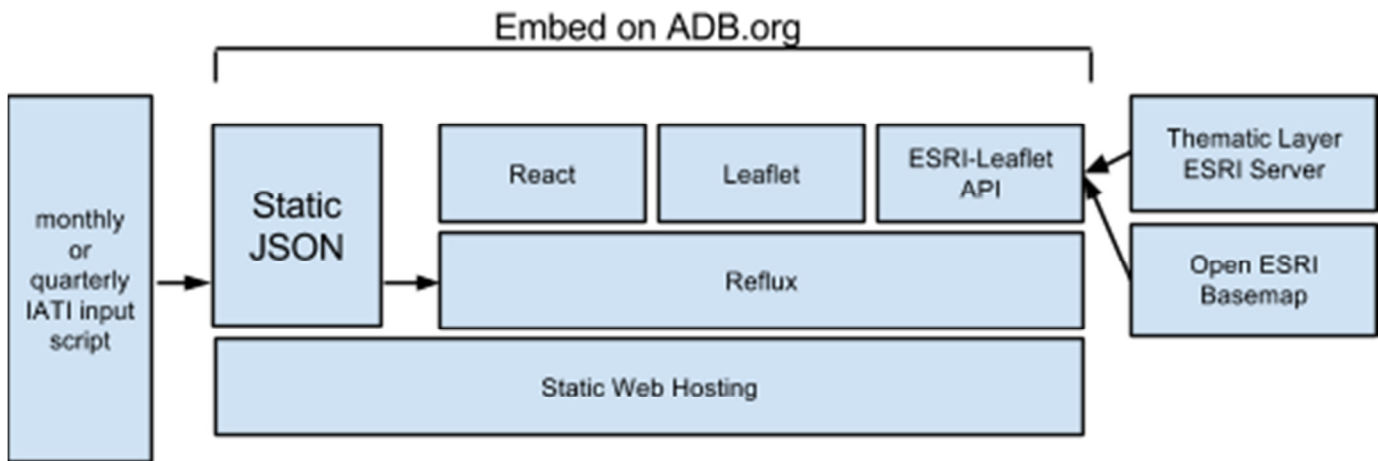


Figure 6. Component view of the geomapping application.

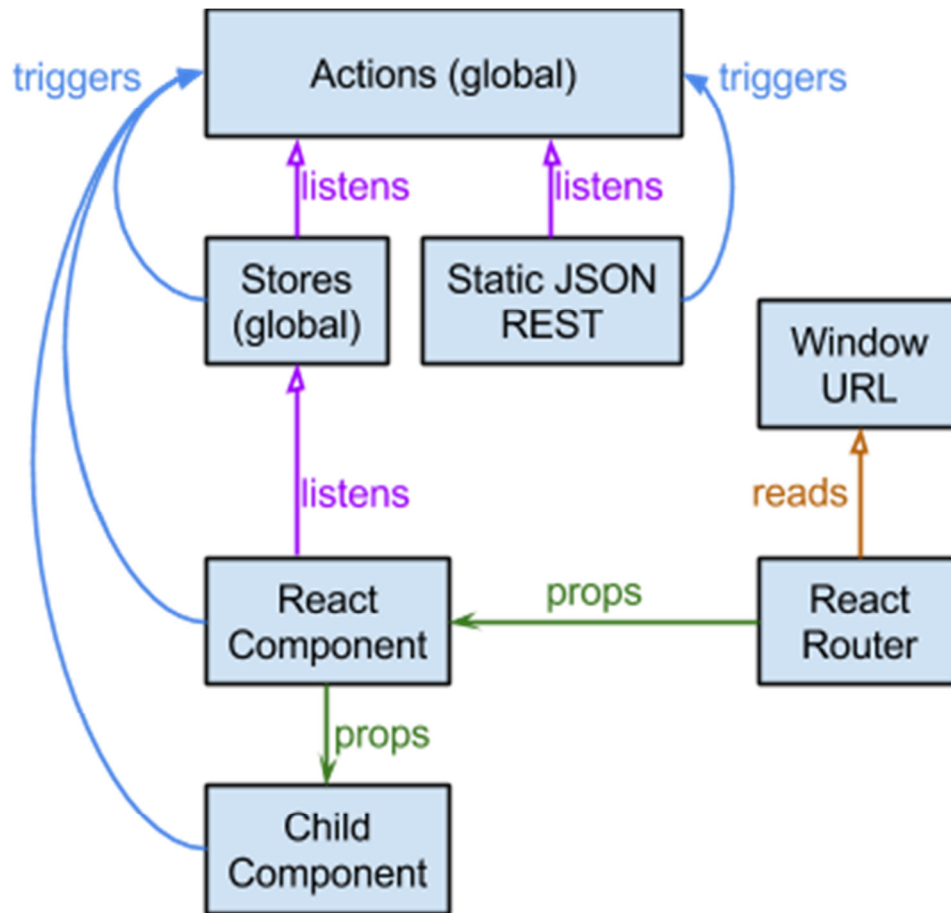
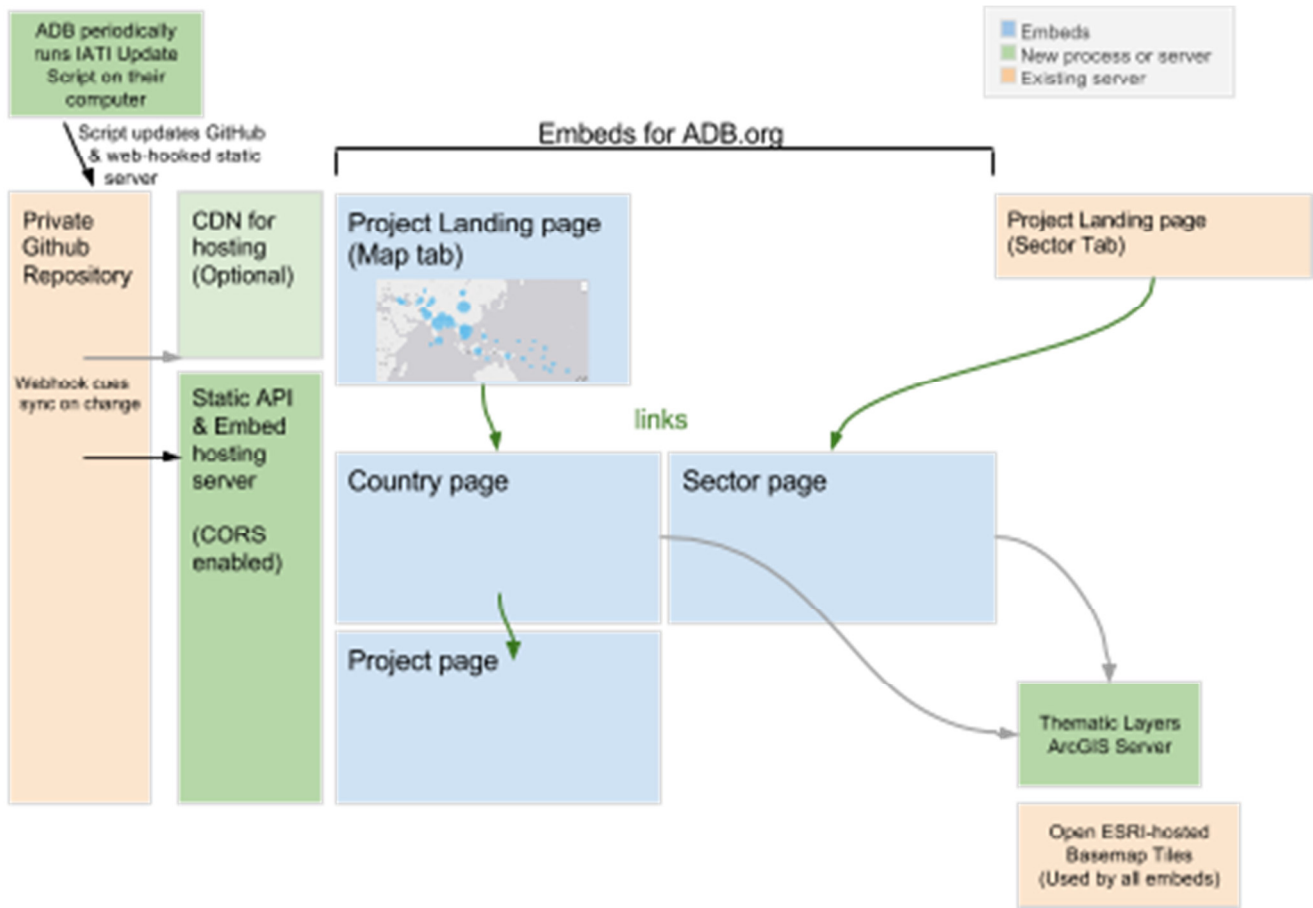


Figure 7. Deployment diagram for geomapping application.



35. The application consists of four essential embed modes: Project Landing page, Country page, Sector page, and Project Page. The input data for the embed pages is built using a script that ADB consultants or staff will run on the same schedule as IATI updates. When that script is run, it will upload its results to a private git repository hosted on GitHub.

36. The web server and/or CDN will get a webhook notification and synchronize their static contents with the git repository, either updating the data of the same script or providing a new version with embed URL, depending on the options.

37. ADB's DER will include a single embed snippet in each of the four locations on the ADB.org CMS. The snippet will detect the URL as it loads and display the appropriate map content. The "thematic layer" feature of the Country page and Sector page embeds relies on a Thematic Layer ArcGIS Server. For 2015, this will also be hosted by Development Gateway however further arrangements may be made for the future to utilize ADB's existing ArcGIS Server licenses starting in 2016.

38. The technologies and libraries used in the geomapping application are the following. It is important to note familiarity with these technologies and libraries is necessary for any potential hand-over of maintenance tasks between DG and ADB:

- a. [browserify](#) is a code build-system for including javascript code as a module rather than as many <script> tags and packaging it up into a single embeddable resource.
- b. [react](#) is the Javascript Component User Interface (UI) framework to support Javascript Expressions (JSX), created and open sourced by Facebook.
- c. JSX is a way of writing Javascript that looks and functions much like HTML but which can be easily inlaid with other Javascript.
- d. [react router](#) does some magic to map URLs to views of the app, rendering the correct components.
- e. [reflux](#) is a javascript client-side system that allows event and data flow via Actions and Stores.
- f. [leaflet](#) is a modern open-source JavaScript library for mobile-friendly interactive maps.
- g. [jest](#) is a system created by Facebook building on the open source community and is used to support unit tests.

## VII. UPDATES TO INCEPTION REPORT BASED OFF OF FEEDBACK FROM MAY 8 GEOMAPPING WORKING GROUP MEETING

39. The following points of feedback were provided during the Geomapping Working Group Meeting for DG to further delve into and clarify. DG's responses to each feedback point is in **bold** below:

40. *On geocoding, S. Jarvenpaa requested Development Gateway (DG) to specify in the inception report the scope and coverage of ADB projects to be geocoded by DG under the current TA.*

- a. During the current TA, ADB-financed operations approved from April to October 2014, including TAs and nonsovereign projects, will be geocoded
- b. During the prior TA, ADB's loan and grant operations, approved and either closed in 2013 or not closed as of April 2014, financed by the Ordinary Capital Resources (OCR) and the Special Funds, including the Asian Development Fund (ADF) were geocoded by DG. TA projects approved between January 2013 and April 2014 were also geocoded.

41. *WG members were curious about the type/source of the basemaps and socioeconomic data layers that will be used for the application. DG informed that the basemaps come from the same source as the World Bank's geomapping tool. S. Jarvenpaa requested DG to add detailed explanation about the maps and data layers, including their availability and consistency, in a revised inception report.*

- a. The basemaps used on the geomapping application are an open-source, free of charge resource provided by Esri – one of the leading global providers of geospatial information services and tools.
- b. The attached matrix shows the availability of geospatial population data by ADB DMC published by WorldPop, an online geospatial population data provider who has the most comprehensive dataset that spans across most ADB DMCs.
- c. Regarding the addition of additional thematic layers, the geomapping application can support further layers being added, as long as information is provided in a shapefile and has information by subnational ADM1 or ADM2 divisions. Precise Longitude/Latitude point information on other donor projects would also satisfy this criteria.

42. *DG explained that it will provide technical documentation about the embedding, server specs, etc. to facilitate takeover by ADB of the hosting/maintenance of the GIS applications. S. Jarvenpaa requested DG to elaborate in a revised inception report on embedding/transfer plan, and also indicate when and what kind of technical documents will be submitted to ADB.*

- a. Technical specs + process for embedding the geomapping application on the ADB website are as follows. However, please do note that, as some aspects of the embed still need to be built, some of these details may change. The current timeline to have the map successfully embedded on the ADB is end of June 2015, given that this is appropriate for ADB's planning.
  - i. Embedding the geomapping application requires a developer to add one div and one script HTML tag to the containing page.
  - ii. The div tag will hold the application
  - iii. Content may be placed inside the div to provide a notice to users with javascript disabled. If javascript is enabled and the user has a modern browser, the contents of the div will be replaced when the application loads.
  - iv. CSS may be used to set the height and width of the div. The application will fill whatever size is set.
  - v. The div must have a marker property called data-map-container so that the application can find it. For example:

```
<div data-map-container></div>
```

is sufficient for the application to work.
  - vi. The script tag loads the application. It must load the application via its src property. For example:

```
<script src="/dg-mapping-app/app.js"></script>
```

is sufficient for the application to work, if the application's javascript has been hosted at /dg-mapping-app/app.js.
  - vii. The geomapping application reads the embedding page's URL location in order to determine which map view to load: navigation view, country view (and which country), or project view.
- b. Server specifications for geomapping application hosting
  - CPU:** 2+ logical cores recommended
  - RAM:** at least 1GB, 2GB+ recommended
  - Storage:** at least 10GB, 20GB+ SSD recommended
  - Bandwidth:** 1Gb/s link can serve about 120 clients per second simultaneously; realistically, about 500 users should be able to comfortably work (if server-side & client-side caching and precompression configured properly; assuming no SSL/TLS encryption)
  - Server type:** the server can be a virtual machine. For example, in [Amazon EC2](#) the *t2.small* instance is the minimal sufficient configuration, while *m3.medium* and above are recommended.
- c. As mentioned previously, the following technical documents will be provided to ADB to facilitate the necessary transfer of technical and maintenance information regarding the geomapping application:
  - i. High Level Solution Design
  - ii. Transition Support and Maintenance Plan
  - iii. Test Strategy
  - iv. Test Plan

## v. User Guide

43. *S. Jarvenpaa asked DG to provide options for hosting/maintenance taking into account cost/resource implications based on market rates, etc.*

- a. Discussions are currently underway with OIST on server requirements as well as cloud server options such that ADB would be well-poised to take over the handover of the geomapping application after 2015.
- b. The following list gives an overview of the necessary resources and skills needed for any ADB personnel involved in the maintenance of the geomapping application.
  - i. GIS Specialist profile
    1. Ability to find, evaluate, process, and publish high-quality geospatial layers using desktop GIS software. Basic cartographic skills to ensure the publication of attractive layers that match ADB theming and design of geomapping portal. Ability to do basic administration of ArcGIS Server (e.g. publication of services, restarting services, making layers public/private). This Specialist would also support Country Offices when questions regarding geocoding or geospatial data collection are raised. Depending upon the ambitions of ADB to include statistical layers throughout its geomapping work, and the anticipated level of Country Office support, this would likely be a full-time role.
  - ii. Developer profile
    1. Ability program in JavaScript with familiarity of functional programming patterns and Single Page Applications. Basic familiarity with the Python programming language for the preprocessing script, and basic shell scripting for the download script. Familiarity with the Git version control tool.
  - iii. Systems administrator profile
    1. Work experience with any RedHat-like Linux distribution (RHEL, CentOS, Fedora, Scientific etc). Experience in configuring the following software: Nginx web server (configuring forward proxying, compression, caching, headers), SSH server, fail2ban, any backup system (e.g. Bacula, AMANDA, Duplicity), LVM, YUM. Using OpenSSL to generate public/private key pair and certificate signing request. Experience in Linux networking, understanding how HTTP and SSL/TLS layers work.

## VIII. WORKPLAN, RESPONSIBILITIES, AND NEXT STEPS

45. The following list indicates all deliverables under this TA, their status of completion, as well as any actions that need to take place:

	Description	Necessary Actions	Responsibility	Target Date	Status of Completion
<b>Kick-off trip</b>	<ul style="list-style-type: none"> <li>DG team to travel to Manila to gather requirements for the geomapping application</li> </ul>	<ul style="list-style-type: none"> <li>Meet with any and all necessary stakeholders while in Manila, to ensure both technical and user requirements are captured</li> </ul>	<ul style="list-style-type: none"> <li>SPD, DER, OIST, DG</li> </ul>	<ul style="list-style-type: none"> <li>Early December 2015</li> </ul>	Completed
<b>Inception report</b>	<ul style="list-style-type: none"> <li>DG team to provide a thorough document listing out</li> </ul>	<ul style="list-style-type: none"> <li>Provide report for ADB's review prior to development and use that as the basis for developing the geomapping application</li> </ul>	<ul style="list-style-type: none"> <li>DG, SPD</li> </ul>	<ul style="list-style-type: none"> <li>Early January 2015</li> </ul>	Completed
<b>Geocoding</b>	<ul style="list-style-type: none"> <li>Second batch of geocoded data to be provided by early January</li> </ul>	<ul style="list-style-type: none"> <li>Provide the project information necessary for geocoders to finalise dataset</li> </ul>	<ul style="list-style-type: none"> <li>Dong-Ick</li> </ul>	<ul style="list-style-type: none"> <li>Early January 2015</li> </ul>	Completed
<b>Geomapping tool development</b>	<ul style="list-style-type: none"> <li>Review and feedback on requirements</li> </ul>	<ul style="list-style-type: none"> <li>Correction by text to be made on inception report and provided back to DG</li> <li>Telco scheduled as necessary</li> </ul>	<ul style="list-style-type: none"> <li>SPD, DER, OIST, DG</li> </ul>	<ul style="list-style-type: none"> <li>Early January 2015</li> </ul>	Completed
	<ul style="list-style-type: none"> <li>Technical specs for the server to be sent to DG</li> </ul>	<ul style="list-style-type: none"> <li>Provide and confirm the specifications for the server for the geomapping application</li> </ul>	<ul style="list-style-type: none"> <li>OIST, DG</li> </ul>	<ul style="list-style-type: none"> <li>Early January 2015</li> </ul>	Completed
	<ul style="list-style-type: none"> <li>Creation of demo versions, to show progress to ADB and gather iterative feedback</li> </ul>	<ul style="list-style-type: none"> <li>Provide demo on a bimonthly basis in the lead-up to the May 8 prototype</li> </ul>	<ul style="list-style-type: none"> <li>DG</li> </ul>	<ul style="list-style-type: none"> <li>Bimonthly, starting February 2015 to May 8 2015</li> </ul>	Completed



		demonstration			
	<ul style="list-style-type: none"> <li>Creation of prototype application, to be demonstrated during May 8 meeting</li> </ul>	<ul style="list-style-type: none"> <li>Provide fully functional prototype</li> </ul>	<ul style="list-style-type: none"> <li>DG</li> </ul>	<ul style="list-style-type: none"> <li>May 8 2015</li> </ul>	<ul style="list-style-type: none"> <li>In Progress, On Target</li> </ul>
	<ul style="list-style-type: none"> <li>Embed geomapping application onto live ADB website</li> </ul>	<ul style="list-style-type: none"> <li>Work with DER to embed the geomapping application on the ADB website</li> </ul>	<ul style="list-style-type: none"> <li>DG, DER</li> </ul>	<ul style="list-style-type: none"> <li>End June 2015</li> </ul>	<ul style="list-style-type: none"> <li>Pending (to commence after May 8 2015 demo)</li> </ul>
<b>Geocoding dataset</b>	<ul style="list-style-type: none"> <li>Provide IATI compliant dataset to ADB</li> </ul>	<ul style="list-style-type: none"> <li>Provide a QA-ed, IATI-compliant, and comprehensive geocoded dataset</li> </ul>	<ul style="list-style-type: none"> <li>DG</li> </ul>	<ul style="list-style-type: none"> <li>May 8 2015</li> </ul>	<ul style="list-style-type: none"> <li>In Progress, On Target</li> </ul>
<b>Application hosting and maintenance</b>	<ul style="list-style-type: none"> <li>Sustainability + next steps: discussion on server options post-2015</li> </ul>	<ul style="list-style-type: none"> <li>DG to provide feedback on server options for a decision to be made by ADB</li> </ul>	<ul style="list-style-type: none"> <li>SPD, OIST, DG</li> </ul>	<ul style="list-style-type: none"> <li>May 2015 onward</li> </ul>	<ul style="list-style-type: none"> <li>In Progress, Pending ADB decisions</li> </ul>
<b>IATI publication</b>	<ul style="list-style-type: none"> <li>IATI publication should include all necessary fields to be included in geomapping application</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate preparation of fields addition with IATI team before Q3 IATI publication</li> </ul>	<ul style="list-style-type: none"> <li>Marvin, Chongshan</li> </ul>	<ul style="list-style-type: none"> <li>End June 2015</li> </ul>	<ul style="list-style-type: none"> <li>In Progress, Pending ADB decisions</li> </ul>
<b>Provision of documentation</b>	<ul style="list-style-type: none"> <li>Provide documentation on both the use of, and maintenance of, the geomapping application</li> </ul>	<ul style="list-style-type: none"> <li>Provide requested documentation, as indicated previously, for the successful hand-over of the geomapping application</li> </ul>	<ul style="list-style-type: none"> <li>DG</li> </ul>	<ul style="list-style-type: none"> <li>End June 2015</li> </ul>	<ul style="list-style-type: none"> <li>In Progress, On Target</li> </ul>
<b>Training trip</b>	<ul style="list-style-type: none"> <li>DG team to come to Manila to provide user training and admin training on the geomapping application</li> </ul>	<ul style="list-style-type: none"> <li>Provide all necessary training to relevant technical stakeholders (ADB IT and website team members) as well as users on the geomapping application</li> </ul>	<ul style="list-style-type: none"> <li>DG</li> </ul>	<ul style="list-style-type: none"> <li>July or August 2015</li> </ul>	<ul style="list-style-type: none"> <li>Pending ADB Approval</li> </ul>

<b>Final report</b>	<ul style="list-style-type: none"> <li>• DG to provide final report, outlining the achievements under the TA</li> </ul>	<ul style="list-style-type: none"> <li>• Provide all necessary information in the final report, based off of ADB's requirements and stipulations</li> </ul>	<ul style="list-style-type: none"> <li>• DG</li> </ul>	<ul style="list-style-type: none"> <li>• December 2015</li> </ul>	<ul style="list-style-type: none"> <li>• Pending Completion of Above Deliverables , On Target</li> </ul>
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**46. Maintenance of ADB's IT system for geocoding and geomapping**

Development Gateway will provide service for hosting, updating and maintenance of the geomapping application until the end of 2015. Also, Development Gateway will support the updating and maintenance of ADB's Geocoding Widget in eOperations during the same period.

47. Based on the technical architecture of the geomapping application specified in this inception report, DG provides several options acceptable to ADB for permanent hosting, updating and maintenance of the application, with long-term resource requirements. Annex II provides the various points for final review and consideration by ADB regarding hosting of the geomapping application.

48. A user manual for ADB's IT experts on the maintenance of the mapping platform will be submitted by end of June 2015. Also, a publishable final report, written in ADB's standard language and document format, will be submitted in December 2015.

## ANNEX I: TA KICKOFF MEETINGS SCHEDULE

Time/Venue	Group	Points to be Discussed	Attendees
<p>Wednesday, December 3 2014</p> <p>9:30am – 11:30am</p>	<p>DER: Design of the Mapping Application</p>	<ul style="list-style-type: none"> <li>- Regional view: Standalone (WB, AfDB, IDB) vs. embedded/integrated (UNDP)</li> <li>- Country/project view: to be embedded? How?</li> <li>- Scope of projects: No problem if both use IATI data. Otherwise, need to resolve possible discrepancy in the scope. Proposed projects? How to present projects not geocoded?</li> <li>- Nationwide/regional projects? TA/NSO?</li> <li>- Controls/filters: same filters as in the projects page? Controls for development indicators should be put inside the app. What about controls for operational data? Same controls in country/project view?</li> <li>- Results/success stories: Need to link with the map app?</li> <li>- Mock-ups: to be delivered within Dec for SPD/DER review</li> <li>- Timeline: test version by March, pilot by April, final by June</li> <li>- Integration of the app with the website? System architecture?</li> <li>- Security requirements?</li> <li>- Other technical constraints?</li> <li>- Update on operation tracker project</li> <li>- Permanent arrangement: any plan to move the web server to Manila?</li> </ul>	<ul style="list-style-type: none"> <li>- Andrea Stojanov (Department of External Relations)</li> <li>- Angelo Jacinto (DER Developer)</li> <li>- Hiroyuki Miyazaki (Regional and Sustainable Development Department)</li> <li>- Aekapol Chongvilaivan (Strategy and Policy Department)</li> </ul>
<p>Wednesday, December 3, 2014</p> <p>3:00pm – 4:30pm</p>	<p>Meeting with OIST</p>	<ul style="list-style-type: none"> <li>- Maintenance of the Geocoding Widget</li> <li>- ArcGIS for eOps test/dev server: options?</li> <li>- Acceptance criteria for the geomapping app</li> <li>- Documentation and user manual required</li> <li>- Sharing the current ArcGIS with the app after the TA completion</li> </ul>	<ul style="list-style-type: none"> <li>- Pamela Wyatt (Office of Information Systems and Technology)</li> <li>- Hiroyuki Miyazaki (RSDD)</li> <li>- DJ Rivera (OIST Developer)</li> </ul>

- Other requirements in case of possible take-over of the app

Thursday, December 4, 2014	Meeting with OIST/OAS/BPMS D	<ul style="list-style-type: none"> <li>- Briefing on architecture</li> <li>- Hosting and maintenance during the TA</li> <li>- Hosting, maintenance, staffing/budgeting in WB, IDB</li> <li>- Permanent arrangement: options and technical requirements for internal hosting (including CDN)</li> <li>- Permanent arrangement: options and resource requirements (ex. GIS specialist)</li> </ul>	<ul style="list-style-type: none"> <li>- Mikio Mukai (OIST)</li> <li>- Guillaume Farret (OIST)</li> <li>- David H. Miller (Office of Administrative Services)</li> <li>- Hiroyuki Miyazaki (RSDD)</li> <li>- Elton Lilly (Budget, Personnel and Management Systems Department)</li> </ul>
9:30am – 11:30am			
Friday, December 5, 2014	Meeting with RDs on internal mapping tool	<ul style="list-style-type: none"> <li>- WB's GeoWB: ArcGIS online demo</li> <li>- Expected use and output</li> <li>- Functional requirements</li> <li>- Possible source of subnational development indicators (ex. DHS etc, within ADB, from government, compilation, and estimation from existing data)</li> </ul>	<ul style="list-style-type: none"> <li>- Pinsuda Alexander (Southeast Asia Department)</li> <li>- Hiroyuki Miyazaki (RSDD)</li> <li>- Hans-Peter W. Brunner (Office of Regional Economic Integration)</li> <li>- Dalisay S. Maligalig (Economics and Research Department)</li> <li>- Abraham B. Villanueva (OAS)</li> <li>- Alexander Tarnoff (OAS)</li> </ul>
9:30am – 11:30am			
Monday, December 8, 2014	Mission re-cap with Sirpa Jarvenpaa	<ul style="list-style-type: none"> <li>- Discuss mission key findings</li> <li>- Discuss key objectives for moving forward</li> </ul>	<ul style="list-style-type: none"> <li>- Sirpa Jarvenpaa (SPD Director)</li> </ul>
9:30am – 10:30am			

## ANNEX 2: ADB GEOMAPPING POST-TA (JANUARY 2016 ONWARD) HOSTING OPTION

	<i>Pros</i>	<i>Important Points to Consider</i>	<i>Short-term Tasks</i>	<i>Long-term Tasks</i>
<b>Scenario 1:</b> ADB takes over geomapping application hosting	<ul style="list-style-type: none"> <li>• ADB can maintain the geomapping application as part of its internal maintenance practices / processes</li> <li>• Geomapping application hosting and maintenance can be worked into ADB's OIST and DER hosting and maintenance procedures</li> <li>• ADB can implement its own enhancements to the geomapping application moving forward using its internally-designated team</li> </ul>	<ul style="list-style-type: none"> <li>• ADB has to ensure there are personnel that are able to aptly and successfully maintain the geomapping application</li> <li>• Training practices need to be conducted on a consistent basis to ensure that at any given point, there are ADB staff who can address any technical needs associated with the geocoding widget</li> <li>• Costs incurred for these personnel hires or training should be taken into consideration</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure proper compatibility / transferability of the geomapping application to an ADB-hosted server</li> <li>• Ensure proper documentation, and ADB-compliant, is provided so that ADB has the proper mechanisms for a seam-less handover</li> </ul>	<ul style="list-style-type: none"> <li>• Train up / hire personnel that have both technical and GIS knowledge, so they can contribute not only to the technical maintenance of the geomapping application but also to any future internal ADB GIS systems and practices</li> </ul>