Sep 7th, 2016

Department of Health and Human Services
Office of the National Coordinator of Health IT (ONC)
USA

Dear ONC:
Shakti Solutions is pleased to submit its solution and challenge response to MHDFC for developing its API Solution that uses the implementation specifications created by HEART WG to allow people to securely authorize the movement of their health data to destinations they choose.

This response has been prepared in accordance with the instructions provided in your Challenge for Phase 1, in regards to "Moving Health Data Forward Challenge" for CMS. We appreciate the opportunity to respond to this challenge. We believe that all information submitted in this challenge response is true and correct to the best of our knowledge.

We are excited that you have the opportunity to become more familiar with our qualifications. As you are reviewing our response, please focus on four key themes that we believe differentiates Shakti Solutions:

1) Our Commitment to Result Orientation — we look to deliver results for our clients in a strategic context & help them successfully implement their mission critical programs, Our consultants do what it takes to deliver results and not just a deliverable; To that end we will work with all stakeholders in the next phase to ensure we not only provide the deliverable expected of us but ensure that deliverable would be able to deliver the results you expect.

2) Our People and their value proposition in addressing this challenge — we bring you a team with the right balance of talent and consulting style to develop and deploy an extensible solution that not only address current needs but can support future needs specifically to address the Move Health Data Forward Challenge – API Solution, but one that can be extended for all future Health Care Data Integration programs being considered by CMS. That translates to exceptional value addition. Our technical team will be complemented with the right subject matter expertise to not just address your challenge but to meet/exceed your expectation.

3) As a prospective partner we believe, we will provide the best overall solution for your program given our proven approach and methodology that ensures continuous innovation. We are committed to collaborate with your team at a strategic & tactical level to outline an innovative next generation solution that is the state of the art as an initial strawman and continuously/incrementally improve the same through constant innovation and change based on feedback and input from all stakeholders to make your program a success & a win-win for all. We are committed to your success and have developed this proposal to meet your timeline and requirements.

4) We will treat this like a formal Consulting Engagement and not as a response to a challenge. We will bring in traditional project management tools and processes to ensure appropriate delivery to meet or exceed your expectations. We will expect you and other stakeholders that you identify to also commit time and collaborate with us to make this a successful partnership. To aid in this process, we will share with you a project plan and a clear outline of expectations from you and other stakeholders, to ensure we are tracking to achieving the program objective within the stipulated timeframe.

We are eager to assist you with your next phase of the "Move Health Data Forward Challenge" initiative, and look forward to feedback from you upon reviewing our challenge proposal. Please call me at (510) 432-1653 with any questions or additional information to evaluate our proposal & qualifications.

Respectfully,

Gapps Murugappan - VP of Professional Services – Shakti Solutions
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Move Health Data Forward Challenge API Solution

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1. BUSINESS CASE AND PROGRAM OVERVIEW

1.1 EXECUTIVE SUMMARY

The Move Health Data Forward Challenge encourages participants to create an application programming interface (API) solution that uses the implementation specifications created by the HEART Workgroup (Heart WG) to allow people to securely authorize the movement of their health data to destinations and program participants they choose.

Describe how the proposed Solution will improve the exchange and accessibility of consumer health data: ***This will initially create the infrastructure and standards for secure, authorized, private sharing of health care data in a timely manner to improve care delivery and data exchange. In future, this will help create a product and service economy to better support health outcomes and improve the overall health status of the nation while reducing the cost of delivering services and exchanging health information.*** This solution will enable a new data management and Healthcare Outcome improvement service economy where all stakeholders can securely and privately share health care related information while adhering to HIPAA guidelines.

Today hospitals and providers are not able to exchange data with other hospitals and providers due to a lack of standards/interoperability and authorization across institutions and agencies, limiting the opportunity for coordination of care. These challenges, coupled with a lack of regulatory impetus, have impeded industry wide adoption of EHR. Meaningful Use that mandates hospitals move to Stage-6 and 7 of the HIMMS EMR adoption model was not successful due to the challenges with authorization. When stage 7 is achieved, the expectation is that the industry will start reaping significant rewards and ROI collectively. Despite previous challenges, there are reasons for measured optimism and broader adoption

Broader definition and scope of EHR, including the requirements for health information exchange, is expected to improve quality and outcomes, and facilitate a wider exchange of health information among organizations. This in turn will result in improved ROI and increased EMR/EHR adoption.

In the future more products and service offerings will be possible because of this framework just as Other industries have experienced similar cycles. The banking and financial services sector, for example, transitioned to electronic service delivery in the 80s and 90s. Today the FINTECH economy and

The Target consumer population and/or the target health care providers are as follows: ***All consumers in the marketplace may choose to share their health care information with health plans, providers (hospitals, doctors, care providers, pharmacy, labs, other ancillary providers), employer groups and other consumers or family members, They may also decide to share the same with other private sector (EHR vendor, employer, life insurance companies etc.), government (CMS, State agencies etc.), and non-governmental organizations (community health partners, health support groups etc.).***

This target group will require a solution where they can securely and privately share health care related information while adhering to HIPAA guidelines. The HEART WG has attempted to advance the process of gathering representatives from this target population and has brought many

different health-related technical communities worldwide (private-sector, government and non-governmental organizations) working in areas such as patient authentication, authorization, and consent – to collaborate on developing open-source specifications.

The specific problem being solved: ***Secure, private sharing of all health related data using open standards, by empowering individuals to control the authorization of different levels of access to their health care data.*** We will leverage what the HEART WG has created - a set of privacy and security specifications (HEART implementation specifications) using the following open standards: OAUTH 2.0, OpenID Connect and User Managed Access (UMA). These specifications empower people to control the authorization of access to health-related data sharing APIs.

1.2 ANTICIPATED BENEFITS

This proposed MHDFC API Solution is expected to provide the following benefits to the consumers in accessing and sharing Vital Health details.

For General Public/EHRs/ Health Providers/Payers:

- Can access their health details recorded in different EHRs/Providers through authenticated public (Ex. Govt. Medicare) web sites.
- Can grant privilege to other users, EHRs, Health providers, Payers to have access of their Health data. The Providers/EHR systems can transfer bulk of patient Medical records to other providers. This in turn can help with the following :
  - Reduce time as the consumers don't have to wait for test results or medical data in transit.
  - Reduce costs by avoiding the repetition of taking medical tests in transit.
  - Improve quality, safety, efficiency, and reduce health disparities
  - Engage patients and families
  - Ensure adequate privacy and security protections for personal health information
  - Improve care coordination
  - Improve population and public health
- Notification to consumers in case of their delegates (grantee) access their Medical data.
- End Consumers can Grant Access to EMT and Emergency hospital users break in the glass access to their Medical data, which could save life's and result in better outcomes due to timely access to critical medical information.
- Patient vital medical conditions and status will be accessible across the country through the secured channel for registered healthcare providers/professionals should they be granted access.
- Security will prevail and a high level standard will be put forth on top of open authentication services.
- Improve better health, better care, and better value through quality improvement.

- Direct attention to new market opportunities in leveraging this for creating new value added services and products that consumers and providers may pay for.
- Go paperless with electronic form capabilities and ensure traceability and tracking
- Reduce legal risks with HIPAA compliance
- The System will need to be housed and supported 24 hours per day, 7 days per week either on the cloud or at the CMS ONI facility.

1.3 SOFTWARE OR TECHNOLOGY PRODUCTS PROPOSED

In this section, we will describe the methods and technologies used to develop the Solution: We will leverage and improve upon the HEART implementation specification for health data exchange. The solution will incorporate the HEART WG protocol specifications and this will be implemented on top of OAUTH Framework *Apache OLTU.*

To keep the maintenance and support cost low for this proposed solution, we recommend open source development using J2EE Springs Framework with MongoDB / Memcached / Redis / MySQL backend running on cloud environment for desired performance and scalability. Should ONC desire, we can also implement the same solution on Microsoft technologies .Net 5.x Framework with SQL Server back end or .Net Azure Application with SQL Database (Web and Business).

This solution will be further extended to have a Mobile EHR that synchs up with a cloud based EHR and will connect with the CMS ONI servers for maintaining registration and authorization information

1.4 FINANCIAL OVERVIEW AND METRICS FOR SUCCESS

A financial overview of the solution includes both hard and soft costs for the development outlined on a quarterly basis. We are currently internally funding this challenge effort. The projected revenue model has not been completely outlined. The key expenses are for Hardware and software development.

Back to Table of Contents	Category:	MHDF Initiative				
	Initiative:	ONC Registration and Authorization Platform				
	Description:	Creating a API based open standards secure authorized Health Integration Framework for Health plans & Providers				
Key Metric		Description				
		Budget Summary for Shakti IT build (Scenario 1)				
Quarterly Spend			2016 Q3	2016 Q4	2017 Q1	2017 Q2
Initial implementation						
Software		Mostly Opensource but single instance	$ 22,000	$ 4,200	$ 4,200	$ 4,200
Hardware		Single Production Instance	$ 25,200	$ 1,600	$ 1,600	$ 1,600
Leadership		Soft Spend				
Program Oversight			$ 5,760	$ 14,400	$ 14,400	$ 8,000
Internal Practitioner		Soft Spend				
Practitioner Staff		.	$ 19,800	$ 19,800	$ 19,800	$ 11,000
Internal IT		.	$ 18,000	$ 54,000	$ 18,000	$ 24,000
Internal		Hard Spend on Resources				
Development Staff			$ 16,200	$ 24,300	$ 24,300	$ 13,500
Testing Staff			$ 8,640	$ 12,960	$ 12,960	$ 7,200
Business Analyst			$ 9,600	$ 14,400	$ 14,400	$ 8,000
Other		Hard Spend				
Others			$ 4,000	$ 12,000	$ 12,000	$ 4,000
Contingency		3% of Hard Spend	$ 2,569	$ 2,084	$ 2,084	$ 1,155
Program Implementation Total Hard Spend No Contingency			**$ 85,640**	**$ 69,460**	**$ 69,460**	**$ 38,500**
Program Implementation Total Spend including Contingency			**$ 131,769**	**$ 159,744**	**$ 123,744**	**$ 82,655**
Initial Implementation Total Soft Spend				**$ 226,960**		
Real Total Implementation Cost				**$ 270,952**		
Book Total Implementation Cost				**$ 497,912**		

The revenue model would include revenue that we may collect from Hospitals and Providers and institutional partners that register to access this authorization information to share data in a secure manner compliant with HIPAA. For this target group, there is a great possibility for reducing operational costs, improving outcomes, reducing cost of care etc. should they have this system to collect EHR/EMR data in a secure, compliant and authorized manner. We definitely do not want to have fees for the individuals registering and authorizing the movement of their health data to improve adoption rates.in this user group. The revenue model can also be in implementation services that we can provide to Provider and EHR vendors attempting to implement solutions that leverage this Open API framework in their solutions/infrastructure to integrate/collaborate with their partners.

The Development plan and timeline describing key activities and resources required to develop and test solution are outlined in section 2.3. The plan to make the solution readily available to consumers, on existing mobile platforms or deploying on a public-facing website is for the future and not part of this plan.

The key metrics for success for such a program is outlines as follows: We believe there are many metrics for assessing success. The key among them are the number of transactions or data exchanges between consumers and providers, number of users of the solution, improved speed and reduced response time, operational cost reduction, quality improvement because of better coordination of care (quality of care, outcomes), money saved by using the solution, time saved. In future, it would also be more applications and services that will be developed that leverage this registration and authorization system for many things than just exchanging data. It could be measured by the value added services that are built on top of this authorization framework.

2 DETAILED SCOPE

2.1 REQUIREMENTS

The Move Health Data Forward Challenge encourages participants to create an application programming interface (API) solution that uses the implementation specifications created by the HEART Workgroup (Heart WG) to allow people to securely authorize the movement of their health data to destinations they choose.

2.2 API DESIGN DETAILS

Object Structures:

a. Client Info
   Members : Client IP, Client Domain name, Client Registration code and Date, Fax code, Address, Contact Person, Email id and Phone Number, KeyInfo and SecretInfo, URIEndpoints

b. KeyInfo
   Members : Algorithm , e, n ,d, key type, key id

c. SecretInfo
   Members : Client ID, Secret Code, Issued on, Expired on

d. URIEndpoints
   Members : Authorization End Point URI, Token End Point URI, Resource End Point URI List [], JSON Web Key End Point URI

e. ServiceInfo (Resource)
   Members : permission type, resource type, access type

f. JWTInfo
   Members : token code, expiry at, created at, resource type, new token request id

i. **API name** : registerClient
Purpose : To register 3rd party provider/EHR systems with ONC Authentication server
Parameters : ClientInfo
Return type : ClientInfo
Actions :
   a. Generate the JSON Web keys and fills the KeyInfo members.
   b. Convert ClientInfo to JSON String and Encrypt the JSON using the JWK pair.
   c. Makes the HTTPS REST API call ex: http://targetip/auth/registerclient with POST Model which carries encrypted JSON Client Info
   d. Get the response header and decrypt the content using JSON web key pair.
   e. Convert the JSON String to ClientInfo Object and returns it.

ii. **API name** : generateJWK(ClientInfo)
Purpose : To generate the JSON web key based the client Info
Parameters : ClientInfo

Return type : KeyInfo
Actions :

a. Generate the JSON web keys using client details.
b. Create the KeyInfo Object and store JSON web keys.
c. returns KeyInfo Object.

iii. **API name** : encryptSign(jsonstring,KeyInfo)
Purpose : To encrypt the JSON string using JSON web keys in the KeyInfo object.
Parameters : jsonstring,KeyInfo
Return type : string (encrypted UTF-8)
Actions :

a. Encrypt the JSON string based on the algorithm and asymmetric key details given in KeyInfo object
b. Return the encrypted string

iv. **API name** : registerJWKeys(KeyInfo)
Purpose : To register the newly generated JWK set in the KeyInfo object.
Parameters : KeyInfo
Return type : boolean
Actions :

a. Request for registering newly generated JWKeys set in the KeyInfo object with ONC Authentication server.
b. Update the newly generated JWKeys for requested client onto the Authentication server's repository
c. Return the registration status as Boolean value.

v. **API name** : getRedirectAuthenticateURI(EHR/Provider code)
Purpose : To retrieve appropriate URI based of registered EHR/Provider with ONC Auth Server.
Parameters : EHR/Provider code - String
Return type : URI String
Actions :

a. Request for Athentication URI of registered EHR/Provider.
b. Return the authentication URI or null If fails.

vi. **API name** : getEHRServicesList(consumer id, EHR/provider Code)
Purpose : To retrieve EHR/Provider services list for the authenticated consumer id.
Parameters : consumer id (specific to Provider/EHR System) ,EHR/Provider Code
Return type : ServiceInfo[]
Actions :

a. Request for EHR/Provider services list for the specific consumer.
b. Return all assigned resources along with its permission type and access type (read, write, delete).

vii. **API name** : requestAuthorizationCode(resource type ,EHR/Provider Code)
Purpose : To request the temporary authorization code prior for acquiring authorization token.
Parameters : resource type string (medical info) ,EHR/Provider Code - String
Return type : Authorization String
Actions :

a. Request for temporary authorization code for selected resource/service . this authorization code will be used for generating transaction tokens for exchanging/access medical records
b. Return authorization string if given resource is valid. Else returns null.

viii. **API name** : requestAuthorizationToken(Authorization code, Resource type, EHR/Provider Code)
Purpose : To request the authorization token details for exchanging/access medical records.
Parameters : Authorization code - String, Resource type –String, EHR/Provider Code - String
Return type : JSON Web Tokens (JWTInfo)
Actions :
a. Request for authorization token for selected resource/service using the temporarily shared authorization code.
b. Return authorization Token if given resource and code is valid. Else returns null.

ix. **API name** : requestResource (JWTInfo, Resource type, EHR/Provider Code)
Purpose : To request the resource (medical record) details for exchanging/access medical records.
Parameters : JWTInfo, Resource type, EHR/Provider Code - String
Return type : JSON string
Actions :
a. Request for resource details for selected resource/service using the shared authorization token.
b. Return string (medical details) if token and resource are valid.

x. **API name** : requestNewAuthorizationToken(Old JWTInfo, Resource type, EHR/Provider Code)
Purpose : To request the new authorization token details for exchanging/access medical records.
Parameters : Old JWTInfo, Resource type –String, EHR/Provider Code - String
Return type : JSON Web Tokens (JWTInfo)
Actions :
a. Request for new authorization token for selected resource/service .
b. Check the old token validity for the given resource and generate new token info
c. Return new authorization Token if given details are valid. Else returns null.

xi. **API name** : registerAuthorizationEndPoint(URI String, EHR/Provider Code)
Purpose : To request for registering new authorization endpoint URI to share authorization code by the authentication server.
Parameters : URI String
Return type : boolean
Actions :
a. Request for registering authorization end point URL. So that the authentication server will this as call back URI as to share temporary authorization code.
b. Return true if registered successfully.

xii. **API name** : registerAuthorizationTokenEndPoint(URI String, EHR/Provider Code)
Purpose : To request for registering new authorization endpoint URI to share authorization token by the authentication server.
Parameters : URI String, EHR/Provider Code - String
Return type : boolean

Actions :
a. Request for registering authorization token end point URL. So that the authentication server will this as call back URI as to share authorization token. This token will allows the consumer to access/exchange medical records.
b. Return true if registered successfully.

xiii. **API name** : registerResourceEndPoint(URI String, EHR/Provider Code)

Purpose : To request for registering resource server endpoint URI to share resource details (Medical) by the Authentication server.
Parameters : URI String, EHR/Provider Code - String
Return type : boolean
Actions :

a. Request for registering resource server end point URL. So that the authentication server will this as call back URI as to share resource details (Medical).
b. Return true if registered successfully.

xiv. **API name** : grantResource (ServiceInfo , EHR/Provider Code)
Purpose : To grant/permit the EHR/provider to view/access the given Service/Resource .
Parameters : ServiceInfo , EHR/Provider Code
Return type : boolean
Actions :

a. Request for granting /permitting the target EHR/Provider to access the consumer medical records. ServiceInfo holds resource details and its scope.
b. Return true if granted successfully.

xv. **API name** : revokeResource (ServiceInfo , EHR/Provider Code)
Purpose : To revoke/cancel the view/access privileges of Service/Resource already given to EHR/provider.
Parameters : ServiceInfo , EHR/Provider Code
Return type : boolean
Actions :

c. Request for revoke/cancel the view/access privileges of Service/Resource already given to EHR/provider.
d. Return true if revoked successfully.

xvi. **API name** : unRegisterAuthorizationEndPoint(URI String, EHR/Provider Code)
Purpose : To request for unregistering authorization endpoint URI.
Parameters : URI String, EHR/Provider Code - String
Return type : boolean
Actions :

a. Request for unregistering authorization end point URL.
b. Return true if unregistered successfully.

xvii. **API name** : unRegisterAuthorizationTokenEndPoint(URI String, EHR/Provider Code)
Purpose : To request for unregistering authorization token endpoint URI.
Parameters : URI String, EHR/Provider Code - String
Return type : boolean
Actions :

a. Request for unregistering authorization token end point URL which had been registered already.
b. Return true if unregistered successfully.

xviii. **API name** : unRegisterResourceEndPoint(URI String, EHR/Provider Code)
Purpose : To request for unregistering resource endpoint URI.
Parameters : URI String, EHR/Provider Code - String
Return type : boolean
Actions :

a. Request for unregistering resource end point URL which had been registered already.
b. Return true if unregistered successfully.

xix. **API name** : unRegisterClient(ClientInfo)
Purpose : To request for unregistering client with the ONC Authentication server.
Parameters : ClientInfo
Return type : boolean
Actions :
a. Request for unregistering client which had been registered already.
b. Return true if unregistered successfully.

xx. **API name** : unRegisterJWKeys(KeyInfo)
Purpose : To unregister the JWK set in the KeyInfo object which had been registered already.
Parameters : KeyInfo
Return type : boolean
Actions :
a. Request for unregistering JWK key set which had been registered already.
b. Return true if unregistered successfully.

******** *Scenarios implicitly presume that each provider/ EHR has their own HEART OAUTH Client and Authentication Server is at ONC (IT) wherein the API implementation resides and adhered to HEART WG specifications to access/exchange medical records with consumer mediation.*

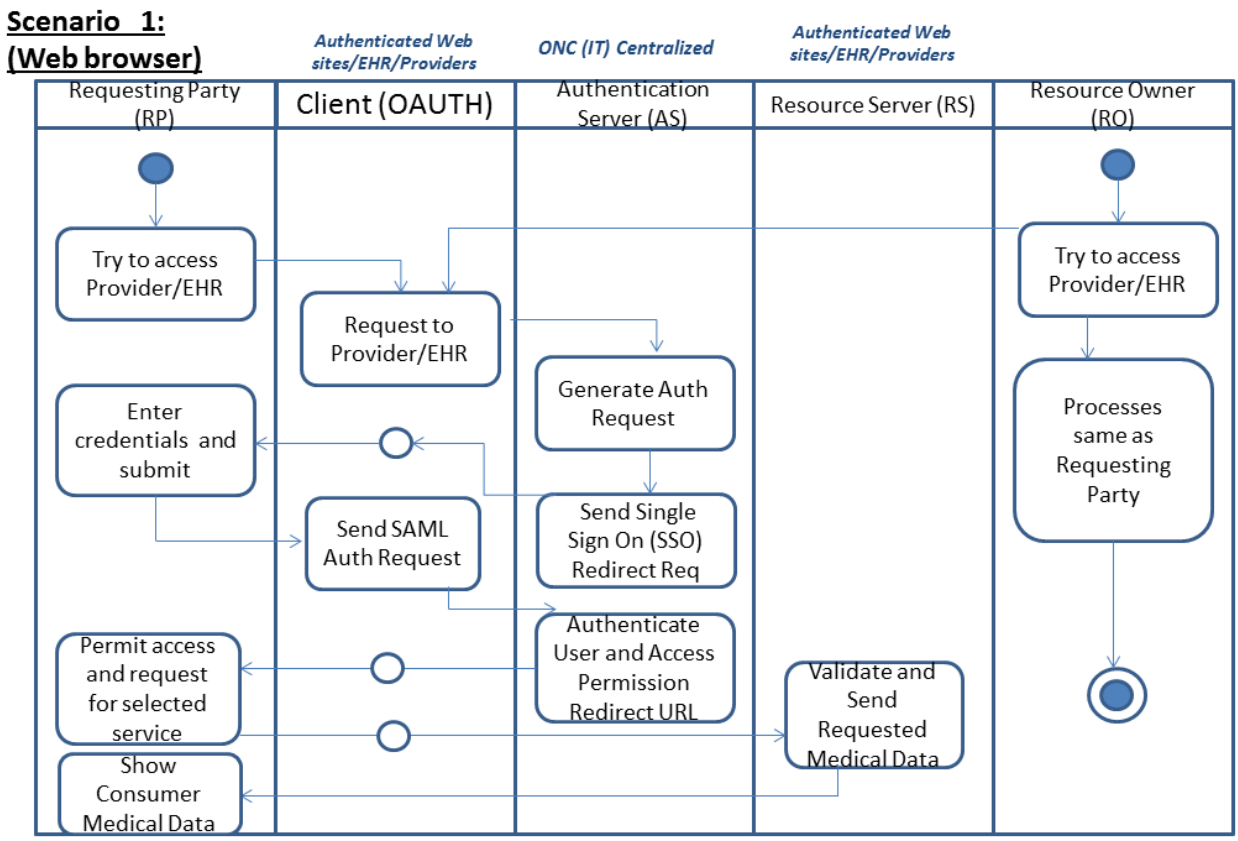
Scenario 1: (Web browser)

The users access their health records from relevant EHR/Provider System using the public authorized web sites.

Steps:

a. The user opens website in browser and select relevant EHR vendor that keeps his/her health records. (Assuming that the site is registered with ONC Authentication server)
b. Redirect to EHR vendor's authentication page and oblige to enter credentials of user.
c. The vendor site asks the user to confirm /denial permission for accessing the user's health records through the public web site.
d. if confirmed , The user is asked to select types of services provided from vendor's aspect for the registered website.
e. Based on the health service selection, the relevant details will be fetched from EHR system and shown.

Activity Interaction diagram :



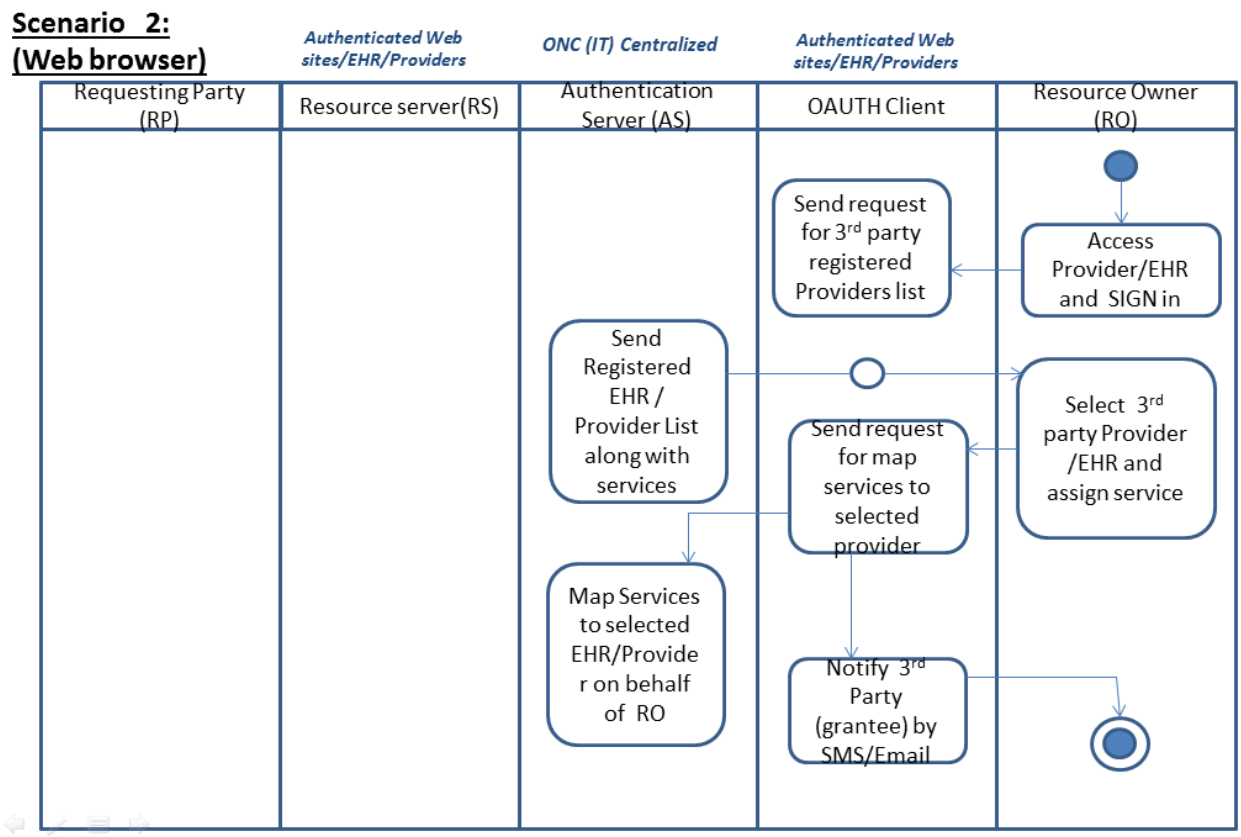
Scenario 2: (Web browser)

The users gives permission of access to another provider/EHR system to retrieve their health records from relevant Provider/EHR System.

Steps:

a. The user opens the relevant provider/EHR website.
b. The user will select the target provider/EHR (Assuming that provider is registered with ONC Authentication Server).
c. The user will select multiple medical records from the list and assigned to selected target provider and confirm the data exchange.

Activity Interaction diagram :



Scenario 3: (Web browser/Desktop client)

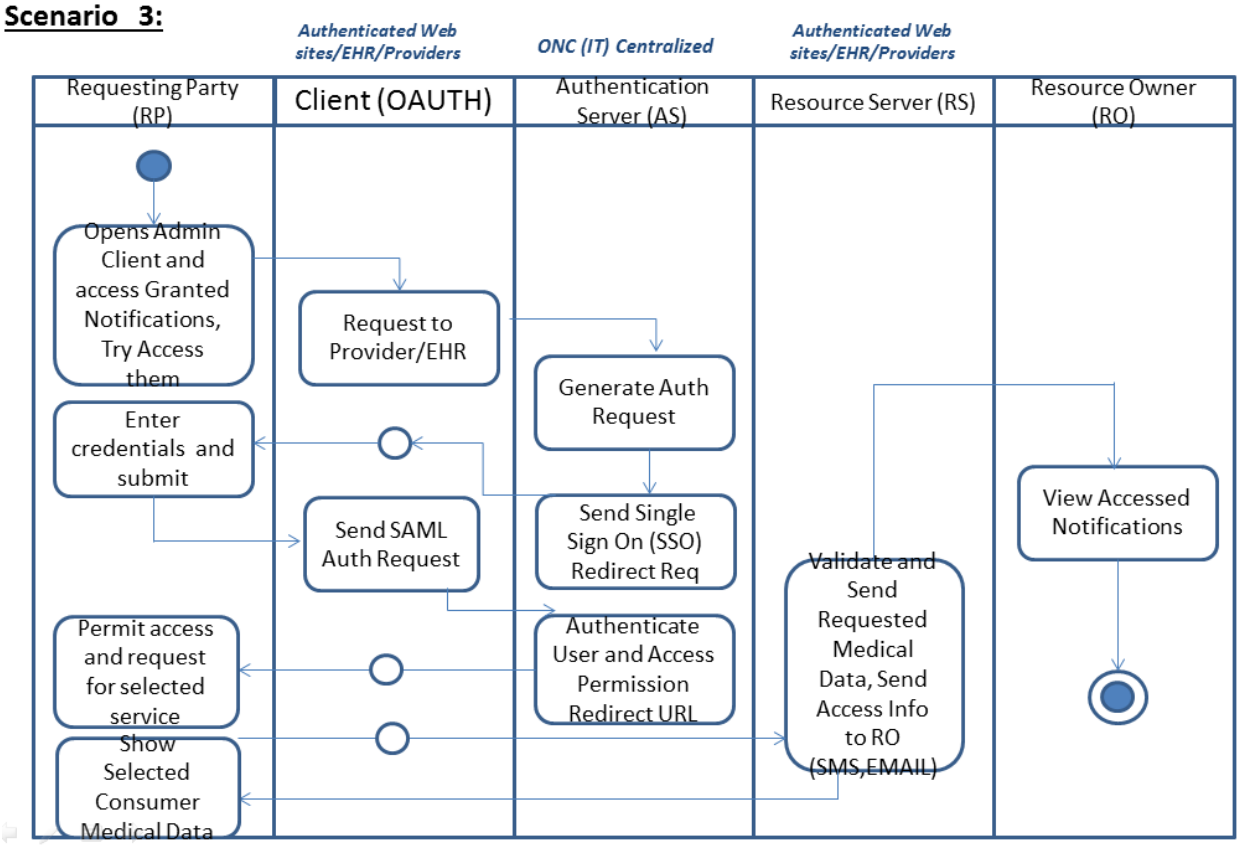
The provider/EHR which are given access permissions can retrieve medical records of patients of other provider/ EHR.

Steps:

a. The provider/EHR opens admin web client application.
b. In the dashboard message panel, the count of access grants of medical records will be shown, the admin has to select that which shows all permission access list and ask for confirming the access grant.
c. On confirmation, the admin can able to access all relevant granted medical records and download into their systems.
d. The concerned granters will be informed through SMS and Email of theirs.

Activity Interaction diagram:

Scenario 3:



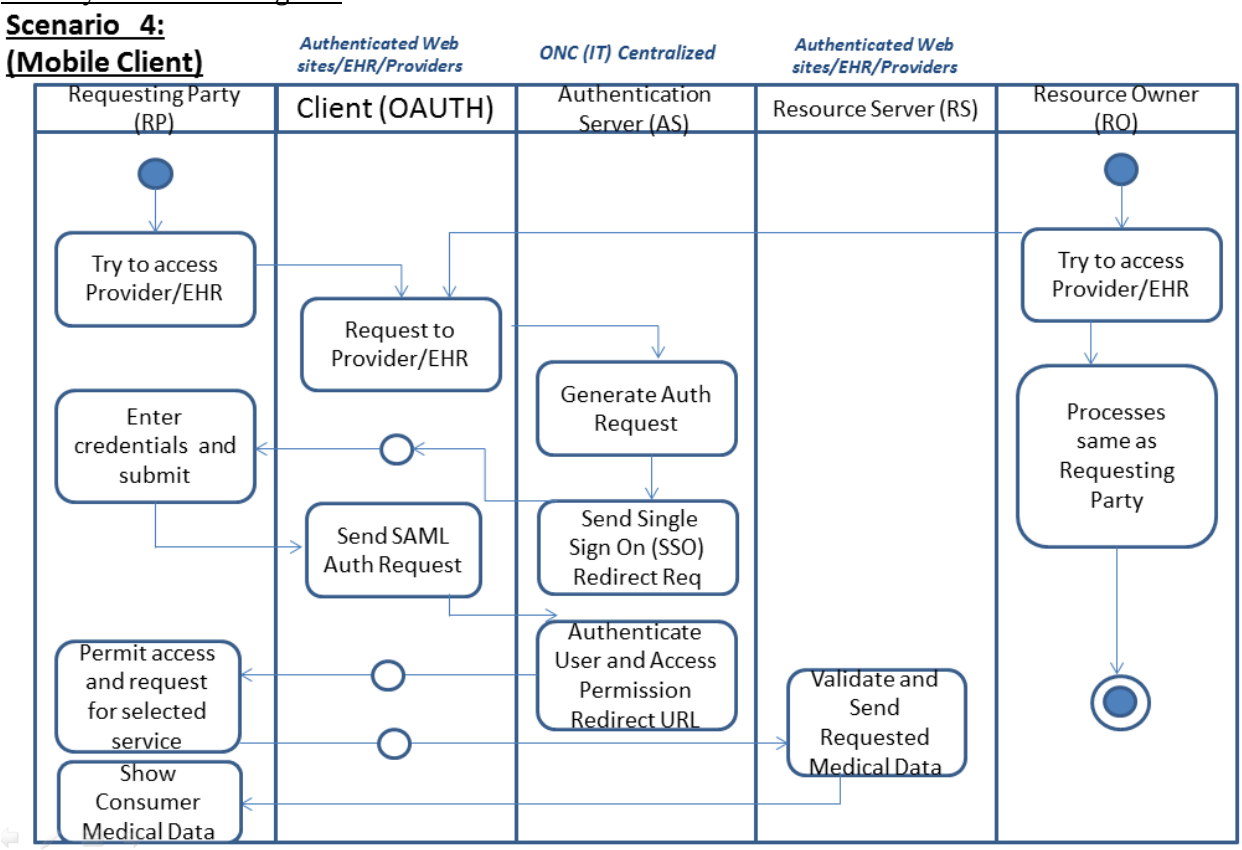
Scenario 4: (Mobile Client)

The users access their health records from relevant EHR System using Authorized Mobile application (Hybrid/Native) which integrates many EHR systems.

Steps:

a. The user opens application and select relevant EHR vendor that keeps his/her health records. (Assuming that the site is registered with ONC Authentication Server)
b. Redirect to EHR vendor's authentication page and oblige to enter credentials of user.
c. The vendor site asks the user to confirm /denial permission for accessing the user's health records through the public web site.
d. if confirmed , The user is asked to select types of services provided from vendor's aspect for the registered website.
e. Based on the health service selection, the relevant details will be fetched from EHR system and shown.

Activity Interaction diagram :



Scenario 5: (Mobile Client)

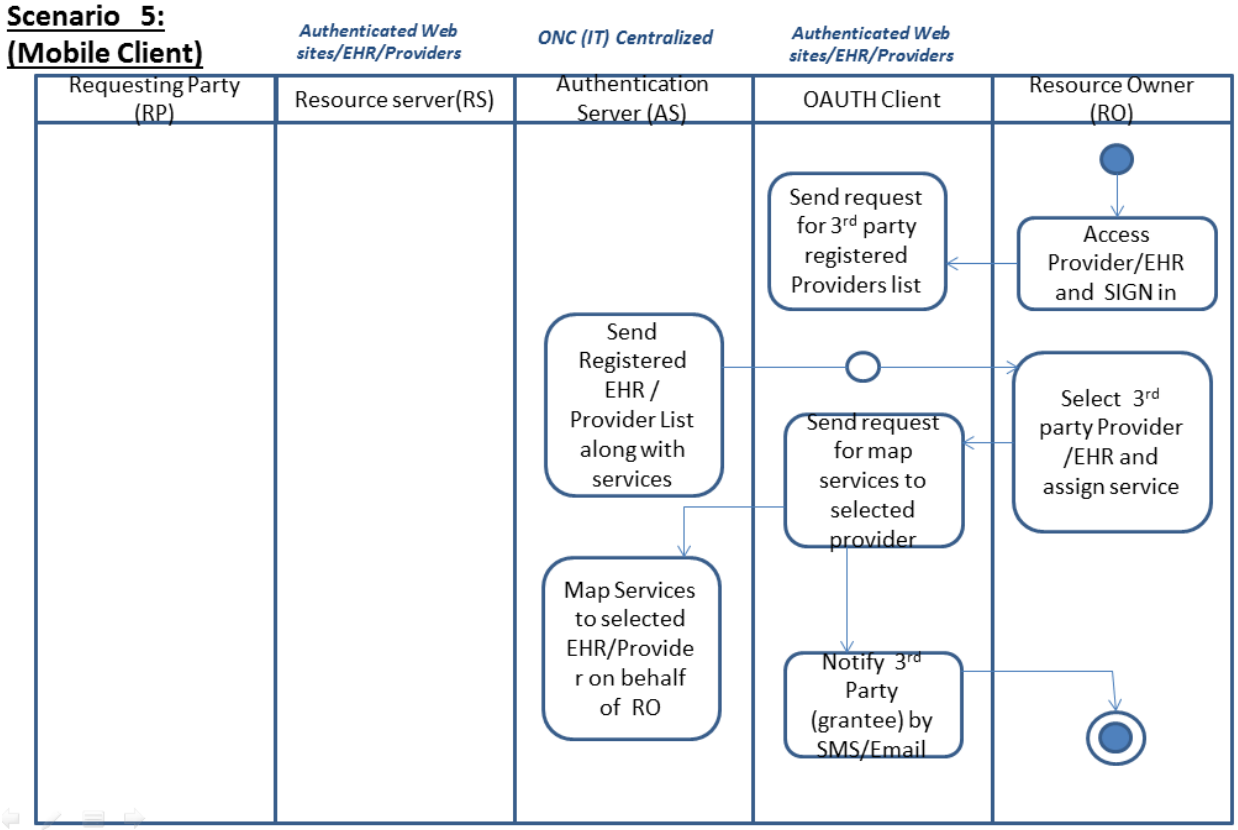
The users gives permission of access to another provider/EHR system to retrieve their health records from relevant Provider/EHR System using provider/EHR's authorized Mobile application (Hybrid/Native) which integrates many other Provider/EHR systems.

Steps:

a. The user opens the relevant provider/EHR's Mobile application.
b. The user will select the target provider/EHR from the registered providers list with ONC Authentication Server.
c. The user will select multiple medical records from the list and assigned to selected target provider and confirm the data exchange.

Activity Interaction diagram :

Scenario 5: (Mobile Client)



Scenario 6: (Web browser)

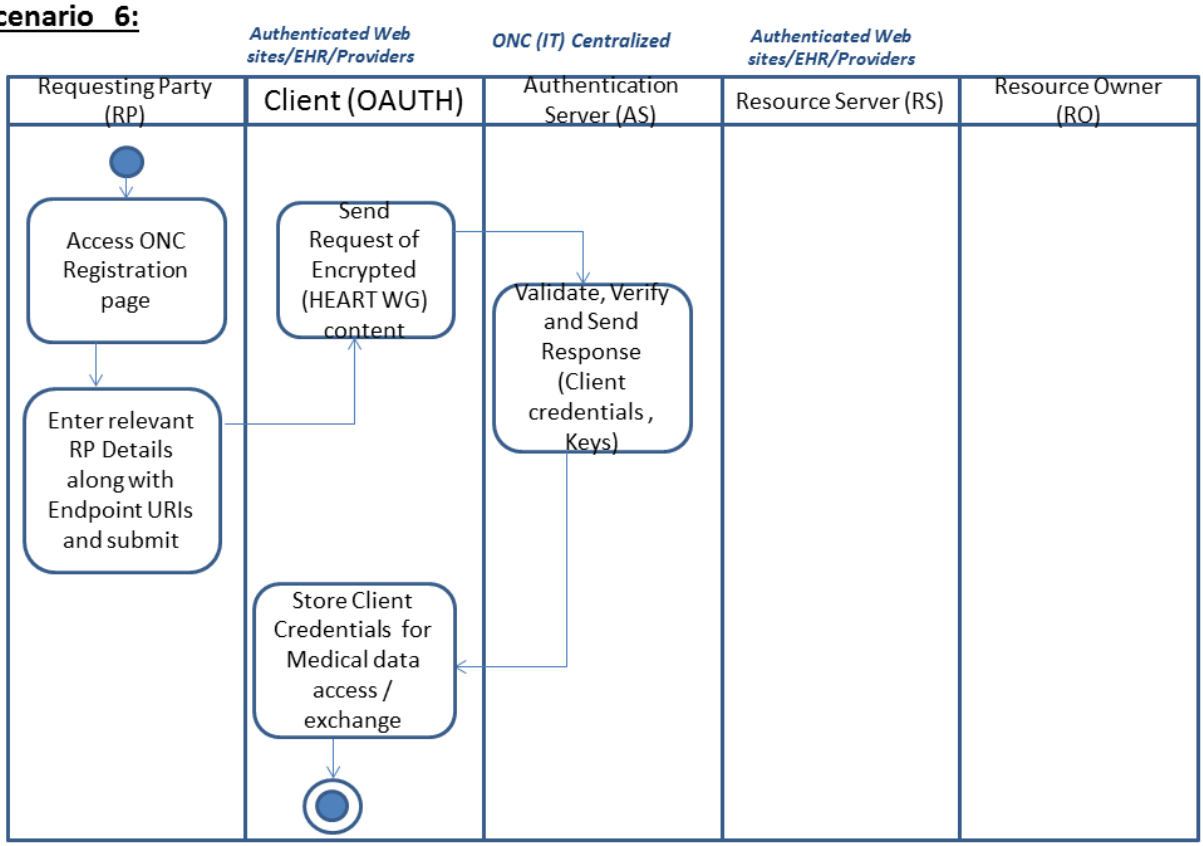
The provider/EHR system can register with ONC Authentication Server by providing registration details along with end point URIs for proper call backs. So that they can able to securely exchange/access the medical records of patients with consumer mediation.

Steps:

a. The provider/EHR admin user opens the secured ONC's registration page.
b. The admin user enters the relevant details along with Call back URIs and submits the page.
c. The ONC authentication server validate the input details sends back some secured information such as client id, secret code, asymmetric keys (RSA private and public) which will be kept in the database as encrypted.
d. The shared keys and codes will be used for every access/data exchange request made for target provider/EHR Systems through ONC Authentication server.

Activity Interaction diagram:

Scenario 6:



2.3 PROJECT ACTIVITIES AND DELIVERABLES

Activity	Deliverable	Ownership
1.Project Planning and Management • Collect relevant details on design API as prescribed by HEART WG. • Work with ONC to create initial project plan. This document will be reviewed and updated with ONC (IT) • Work with ONC to create the project charter. • Attend and present project kickoff. • Define the Firm's project team structure. • Facilitate Solution Roadmap and Project Planning Workshop. • Create weekly project status reports including prior week accomplishments and planned future activities. • Maintain the project plan. • Manage Firm resources, budgets, and schedules. • Create any scope change documentation. • Monitor progress against the defined project plan. • Assist in coordinating and conducting project team meetings. • Participate in project team meetings. • Attend monthly steering committee meetings.	• Solution Roadmap and Scope by phase • Work breakdown structure (WBS) for Phase 2 • Project schedule to include tasks ,duration, resource , critical path, risk assessment, contingency plan for Phase 2 • Meeting and reporting • Change control methodology	**Project Manager**
2.Design • Pre-Requisite Implementation Setup • Review of HEART WG protocol spec on Authentication API prototypes. • Project Team Training • Application Exploration • Business Procedure Review	• Hosted Environment Setup procedures with pre-upgrade tasks and optional License costs involved • Training Manuals and Plan • Gap analysis with Enhancement identification • Database Design Document • Software Bill of materials • System Architecture with Naming conventions and definitions	**Project Manager/ Solution Architect/Tech Lead**

	• Data Flow/UML Diagrams • Detailed Test Plans	
3.Construction • Application Data Upgrade • Preliminary Application Setup • Finalize Application Setup • Interface and Modification Re-Deployment • Testing • Business Strategy Session • Security Design Desktop/Mobile/Tablets Standards Backup and Recovery	• Data Integration Framework confirmation and Sign-off • Setup changes Document • Finalized Setup Document • ONC (IT) interfaces compliance • Acceptance Test Plans for Unit, Integration, Stress and System acceptance testing • Test Scripts with Results • Process and setup changes Document • Final Design Acceptance • Security Plans with Diagrams and reference documents • Desktop/Mobile/Tablets standards and procedures • Backup and Recovery Plan	**Project Manager/ Solution Architect/Tech Lead**
4.Activation End-User Training Readiness Assessment Perform Cut-Over Production Support Production Support Annual Operational Maintenance and Support Warranty	• Training Plan ,Schedule and Classes • Custom manuals • Readiness assessment Report • Final Design Acceptance Sign-off	**Project Manager/ Solution Architect/Tech Lead**

3. PROJECT SCHEDULE

3.1 WEEKLY SCHEDULE

MILESTONE	TASKS TO BE COMPLETED
WEEK 1,2 (Assessment & Confirmation of Solution Scope and Roadmap)	• System study to validate understanding document and all additional documents on all server application components • Confirm our Solution Architecture and Roadmap and what is within scope for Phase 2 and Phase 3. • Confirm Project Tools and Deliverable Templates for Agile Development • Build Use cases and finalize WBS(work breakdown structure) • Finalize Requirements and Screen shots for identified requirements • Finalize the Functional Design Document • Finalize the Technology components • Finalize the Project plan • Identify and Document project risk • Finalize network components
WEEK 3,4	• API Prototypes designs • Generate use cases that describes order of API functions invoked • Weekly status meeting (Review progress, resolve issues, manage/mitigate risks) • Weekly Product/Design Review meeting (Review and Approve)
WEEK 5 to 10	• Develop Data Models , Service Layers and Controllers Patterns on writing wrapper on top of Apache OLTU (OAUTH) • Authentication services, End point services and Restful web services • Create weekly build • Freeze Requirements for Final Build • Test Application Build • Weekly status meeting (Review progress, resolve issues, manage/mitigate risks, change control) • Weekly Product/Design Review meeting (Review and Approve)
WEEK 11	• Continue Integration testing Iterations • Review the test results • Freeze changes

WEEK 12	• Plan for application deployment • Create Final Build for deployment based on final user review (freeze code) • Support Deployment and testing of the application in the production environment • Support User Acceptance Testing post deployment • Project Close Out (Documentation Handover, Code Handover, Next Steps & Ongoing Support definition)

3.2 ENHANCEMENT /TECHNICAL INNOVATION

a. API enhancement can be done as it goes through multiple level opportunities in the market. New algorithms on encryption and signing content can be added with high bits of entropy. Scope of different roles and privileges can be added based on the needs in future.

b. In future, level of securities can be extended in terms of biometric kind of techniques to enable the user interaction more effectively and secured manner.

4. EXCEPTIONS/DEVIATIONS/ASSUMPTIONS

We want to be on the same page when it comes to what is in scope of the solution. We would like to create a clear solution roadmap with elements of the solution within scope of Phase 2 and Phase 3. We obviously may have further elements of the road map that are incomplete that may be future consideration.

- We are also adding some functionality that is alluded to in the specification thinking they may be necessary, However we can finalize these during the initial assessment and confirmation phase (first 2 weeks)
- All requirements within scope and those that are out of scope and or possible extensions can be identified during the project planning workshop and dealt with by the project change control process.

5. PROGRAM PROCESSES & ASSUMPTIONS

5.1 CHANGE CONTROL MECHANISM

The schedule proposed in this document is based on the statement of work documentation and information provided in the challenge. Any change to the requirements that might impact the scope and/or schedule proposed by Shakti in this document will go through change control mechanism as defined in this section.
Shakti will review the efforts and schedule and raise a change request to cover for the additional efforts after due consultation with ONC (IT) PM.
Proposed change control procedure for the Project is as follows:

- The identified change will be estimated for their effort, cost content and schedule implications. The delta estimates, costs and schedule changes will be submitted to ONC (IT) PM for approval.
- If the efforts are considerable as to affect the schedule, formal ONC approval will be obtained for a revision of the delivery schedule for the release
- Work on the new/changed software requirements will be taken up only after ONC formally approves effort, cost and schedule changes

5.2 ASSUMPTIONS

Cost Related Assumptions

- The efforts mentioned in this proposal are based on our understanding of the scope defined in this document. This will be validated during the initial facilitated workshops with the ONC user group.
- All the change controls associated with changes in functionality, business processes, compliance issues are not covered in cost mentioned in this proposal and will be charged separately on mutually agreed terms.
- Any delay in schedule because of change in plans on part of ONC or any extension of project end date beyond Shakti's control, would result in a change in cost unless otherwise agreed by Shakti in writing
- Should the indicative schedule as outlined in this proposal change based on requirements identified for the program because of a changed expectation in scope, level and detail of any of the deliverables assumed or due to a lack of approval or decision on implementation recommendations and/or the recommended project approach & program roadmap. This change will need to be dealt with as a change request.

Scope/Schedule Related Assumptions

- ONC will ensure timely availability of source system and any Web Service or flat file access
- ONC will review all the functional/technical work that is carried out by us and signoff the same in a timely manner 1-2 business days.

- ONC will provide timely turnaround for approvals/sign-off, acceptances, reviews and clarifications as required. Unforeseen delays in obtaining these may affect schedule and effort. In such a situation Shakti would work with ONC for revising the efforts/schedule. All such changes will be addressed using change control.
- If Shakti delivers on the agreed schedule and ONC user acceptance group does not respond for over a week, then Shakti will assume that the said deliverable is deemed accepted

Environment Related Assumptions

- ONC will provide necessary access privileges and connectivity to the existing source systems/UAT environment for us to deploy to and for ONC users to test and approve from.
- ONC IT to provide access to UAT environment, unit test data & prepare the test environment and appropriate test data.
- Extensive Performance tuning or load testing of the application are not in the scope for this phase of the engagement.

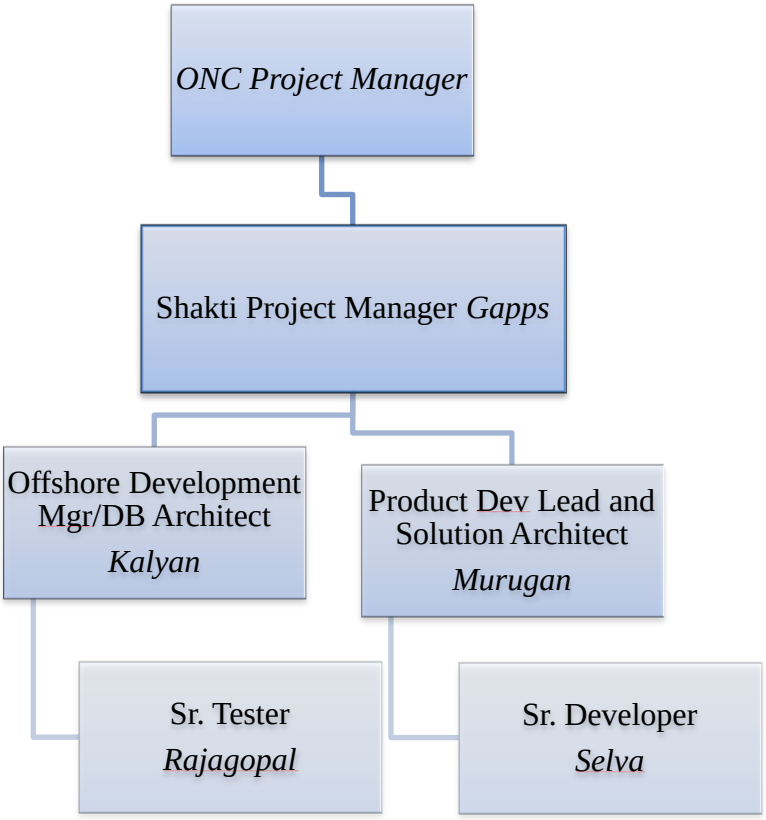
5.3 PROJECT RISK MANAGEMENT

- Timely review and approval given the short timeframe (Weekly or as needed tracking, single point of contact identified for resolving issues on the ONC end)
- Integration testing in the UAT environment using stubs for the various service objects or flat files (may face issues when moved to deployment environment)
- Deployment and target environment set up, ongoing maintenance (can support and provide assistance in deployment and stress testing)
- Though we intend to design for performance and scalability, the lack of clear response time requirements or performance expectations does not provide a benchmark
- Changes in requirements (intend to have change control to manage and mitigate the same, created screen shots of what we intend to build, intend to have weekly reviews of design and product as required).

6. PROJECT RESOURCES

6.1 RESOURCES

PROJECT ROLE	NAME	ROLE	LOCATION
Onsite PM	Gapps Murugappan	Sr. Account Manager/PM	Bay Area
Offshore Tech Manager	Kalyan Kumar. M	Chennai Dev. mgr.	Chennai
Offshore Tester	Rajagopalan. V	Sr. Tester	Chennai
Off Sr. Dot Net Developer	Selvaraj. E	Sr. .Net Developer	Chennai
Off. Architect /Product Dev. Developer	Murugan. L	Sol. Architect / Product Development Lead	Chennai



7 . COMPANY OVERVIEW

7.1 CORPORATE PROFILE

Our Mission
"To provide total customer satisfaction through powerful software solutions and services and deliver comprehensive results using proven and result-oriented approaches"

- Operations - Our US operations are based out of Austin, Texas for over 15 years and our Offshore facilities are in Chennai, India.
- Size - Our US operations is in excess of $10 million revenue in 2014. Our India Operations are in excess of $ 2 million.
- Onsite we offer a broad range of services in a broad range of technologies.
- We specifically pride our self of our Technology Consulting and Advisory services, Turnkey Custom Application Development projects (project conceptualization thru delivery), Troubled project recovery services,
- We also partner with large System Integrators on both time & material as well as fixed bid programs. We also provide Team Augmentation/Staff Augmentation services.
- With Deloitte and Accenture in particular, we also go to market together to win various state bids. The Michigan Child Support Enforcement System Project is one where we and Accenture had jointly bid/teamed up with Accenture being the prime vendor. The contract for this project with the state is valid through March 2017. Financial Strength – Have been in business for over fifteen years with a strong business model which is profitable and generates significant cash flow. We have an excellent financial track record of profit since inception. We have funded our growth and investments from internal cash flow. We are proud to be a Zero debt corporation. There are no events such as bankruptcy, pending litigation, planned office closures, impending merger that may impede our ability to complete any project we undertake. We are a very conservative firm and ensure profitable billability.
- Markets & Geography - We deliver services nationally and globally. We have delivered services in 18 US States during the course of our operations. We offer Global delivery capability for our key clients through our offshore operations.
- Industry Focus - Like the System Integration partners and Clients we serve, we focus on key industry verticals. Our specialization is in Public sector and in Healthcare. We do continue to service clients in other industries such as manufacturing, telecommunications, consumer business etc.
- Service Quality - Excellent track record in delivering projects in legacy, new and emerging technologies. We are committed to delivering a quality solution on time...every time.
- Strategic Relationships - Strong long term relationships with large SI's like Deloitte, Accenture, IBM, CG E&Y, ACS-Xerox & HP-EDS.

- Strategic Clients - Developed strategic clients such as The ODS Companies, The Regence Group, State of California, State of Michigan, State of Texas etc.
- Sourcing Services – We are a tiered vendor with Deloitte, Accenture, ACS besides others. We source contract staff & FTE's to serve our client needs.

7.2 WHY US

- **Our Past Performance**
  - Breadth and depth of our Enterprise Web Application Development experience.
  - Our proven track record on prior projects with various global leaders.
  - If past performance is any indication, we have great feedback from our clients.
  - We have been called to assist with troubled programs taken on by System Integrators, and to address key challenges or problems at their State Clients such as
    - » AOC (Association of Courts) of California.
    - » State of California (CADDIS).
    - » CDC (e-HARS, PEMS).
    - » District of Columbia (FACES.NET).
    - » Commonwealth of Pennsylvania (CCMIS).
    - » Texas workforce commission.
- **Our Enterprise Web Solution Delivery experience**
  - We have been there and done that with many clients.
  - Proven Breadth and depth of our Delivery capability.
  - Proven track record with our direct clients and major System Integrators.
- **Our commitment to delivering exceptional value to you**
  - Value - Focus on delivering value through end-to-end solutions based on your specific business process by providing cost-competitive, high-quality technology services.
  - Quality – Invest in project methodology, templates, tools and standards for delivering quality. Build in processes for managing and delivering quality.
  - Process Maturity – Use Agile development methodology, to enhance productivity and quality while mitigating schedule and delivery risks.
  - Delivery Capability - A proven entity with the ability to bring the right resources, whether they are deep technical resources, project management or industry experts to get the job done right.
- **Our Off shore Capability and Value Proposition**
  - Enterprise Solution Expertise.
  - Technical talent.
  - Cost competitive business model to deliver exceptional value within your budget constraints.
  - Reliable Development and Support Infrastructure.
- **Why we will be successful at ONC**
  - We look to collaborate in this mobile application development exercise.

- We look at this as a Win Win Relationship - You are a strategic client of ours & our success depends on your success.
- We are willing to commit key dedicated resources to work with you to take this relationship commitment to the next level.
- We are willing to invest in this relationship and are committing to discounting our services to meet you budget constraints.

8. APPENDIX

8.1 KEY RESUMES

Gapps Murugappan N – Sr. Account Manager/Project Manager

Present Position: **Vice President – Professional Services, Shakti Solutions**

SUMMARY: Over 25 years of experience both at management and consulting levels in leading industries including health care, telecommunications, and manufacturing. A proven leader in the Management Consulting, Information Technology Services, Mobility/Business Intelligence & Information Management services, Strategy Consulting, Solutions Design and in Practice Development space. Played Interim Technology Executive Leadership roles in Healthcare, Telecommunications and in the High Technology Manufacturing Domain. Was Global Practice Leader for top 5 Indian Software consulting firm. Was a Healthcare Partner in Waiting at one of the largest Audit and Consulting partnership firm in the world.

Specialties: Large & Complex Program Management, Troubled Program Recovery, Global Practice Development, Solution Design, Strategy Consulting Responsibilities. QA review and Program Assessment, Pre Sales Support, Merger Integration Expertise, Business Intelligence, Corporate Performance Management, Revenue Assurance, Business/Data Migration, Business Process Reengineering, Enterprise Architecture.

EMPLOYMENT HISTORY:

Shakti Solutions, TX
Vice President Professional Services, 2009 –to date

I-Gate/Patni, Milpitas, CA
Global Practice Lead, 2006 - 2009

LifeMasters, Burlingame, CA
Interim BI/Reporting Director, 2004 - 2005

Kaiser Permanente, Oakland, CA
Director, Data Management, 2002 – 2003

Deloitte Consulting, San Francisco, CA
Partner in Waiting (final Yr. Sr. manager), Health Care, 1996– 2002

University of Alberta, Edmonton, Alberta, Canada
Doctoral Student, Sessional Instructor and Research Assistant, 1992 – 96

Tata Consultancy Services, India
Senior Consultant, 1990 - 1992

International Data Management (formerly IBM, India), India
Solution Marketing Specialist, 1988 - 1989

EDUCATION HISTORY: **University of Alberta, Canada**
MBA, PhD(ABD)
Birla Institute of Technology and Science (BITS), India
Masters in Management Science (MMS)

Kalyan Kumar Manivannan – Delivery Owner

Present Position: Senior Project Manager, Shakti Infosolutions Pvt Ltd

SUMMARY: Has over 17 years work experience in delivering Enterprise Software Solutions all over the world. Played leadership roles in large, complex, enterprise technology projects and had end -to-end responsibilities at various tech divisions within technology companies both in the US and in Asia pacific region.

EMPLOYMENT HISTORY:

Senior Project Manager - Shakti Infosolutions Pvt Ltd. (Oct' 2007- till date)

Specializing in managing large scale technology projects in Child support systems, Insurance & Heath care domain.

Key Responsibilities:

Product strategy & engineering & operations
Delivery management of both product platforms and Solution Delivery/Service Delivery for clients
Team building to take the Delivery organization to the next level

Select assignments handled:

Client:	**Michigan Child Support Enforcement System (Michigan, USA)**
Tools:	Toad, Oracle Repository
Environment:	Windows NT, Oracle 9i, SQL* Plus, PL/SQL, TOAD, Oracle Repository, Oracle Forms 9i, Reports 9i (Web based application)
Team Size	15
Duration:	36 Months
Role:	Senior Developer

Synopsis: MiCSES (Michigan Child Support Enforcement System) is a complex statewide application which serves the Michigan families that need Child Support. The system comprises various functionality from the day a family submits an application for child support until the child emancipates. It has huge volumes, complex requirements and needs to integrate to courts, offices of child support services, law enforcement, federal child support network and lot of other entities to enforce the child support payment.

Client:	**DirecTV**
Tools:	Eclipse IDE
Environment:	Facebook Platform (FBML, FBJS), PHP, MySQL, AJAX, Adobe Flash, Adobe Photoshop, Adobe Dreamweaver, Eclipse
Team Size	5
Duration:	36 Months
Role:	Database Architect

Synopsis: DIRECTV delivers satellite-based television services to U.S. customers in homes and businesses. Operations include some of the world's most advanced technologies in the delivery of a seamless viewing experience. DIRECTV U.S., is the largest provider of DTH digital television services and the second largest provider in the multi-channel video programming distribution, or MVPD, industry in the United States. DIRECTV makes local channels available to 94% of U.S. households. DIRECTV as a part of its overall competitive strategy is looking to leverage new technologies especially web 2.0 for better

servicing their existing and prospective customer needs.

The goal of this project is to provide access to the DIRECTV guide application to existing and prospective DIRECTV customers who are a part of the broader Facebook community.

Client: **Moda Health (formerly known as ODS)**
Environment: Facets 5.01, Sybase 15.0, Crystal Reports, UNIX and TIDAL Scheduler, Asp .Net, VB scripts
Team Size 25
Duration: 7 Years
Role: Senior Project Manager.
Synopsis: Moda originated in 1955 and has ever since remained a pioneer in affordable health plans. With innovative, evidence-based health plans, diverse networks and member programs, and superb customer service, MODA continues to be the health leader throughout the Pacific Northwest.

The project is focused on developing interfaces to send extracts and to accept and process the files received from various vendors of Moda and on generating Premium and AFA bills for Moda.

Prior to Shakti Infosolutions held Sr. Project leader positions at
Interpro Inc in the U.S,
GAVS Information Services in India and U.S.,
Kumaran Systems Inc in India, Canada , South Korea and U.S.

EDUCATION HISTORY:

B.E (Computer Science), Madras University Tamil Nadu, India

Rajagopalan Venkataramanan – Senior Tester

Present Position: Senior Tester, Shakti Infosolutions Pvt Ltd

PROFESSIONAL SUMMARY: Over 13 years of experience in software testing on various technologies.

- Efficient in Manual testing, preparation and execution of test cases, bug management and reporting.
- Experience in Web testing and Client/server applications.
- Experience in automation testing using QTP, Rational robot.

TECHNICAL SUMMARY

Developing Tools:	Crystal Report, Hyperion IR.
Operating Systems:	UNIX, Windows 98/XP/Vista/Win 7/Mac
Databases:	Sybase, SQL, Teradata 12.0, DB2
Testing Tools:	Testlink 9.2, Bugzilla 6.3, HP Mercury Quality Center 9.2, QTP, Rational Robot.

EMPLOYMENT HISTORY

Aug'13 - to Date: Shakti Info solutions Pvt Ltd. Chennai as Test Lead

Aug'09 - Aug'13: HCL Technologies Limited Chennai as Test Lead

May'03 to June'09: Tata Consultancy Services Limited. Bangalore as IT analyst

Nov'99 to April'03: Phoenix Global Solutions Bangalore as System Engineer

Projects

Client:	**Vicroads, Australia**
Tools:	Testlink, Bugzilla
Environment:	Datastage, Putty, Java, Cognos
Team Size	12
Duration:	16 Months
Role:	Test Lead
Title:	TRAFIC INFORMATION SYSTEM

Synopsis: Traffic related information are processed and reported for client business analysis purpose. This is a data warehousing project for which I played the role of test lead. All the traffic related information was processed into staging and once validated moved to a target database that was used for reporting purpose for Vicroads. I was working in Australia.

Client:	**CBA Bank, Australia**
Tools:	Mercury Quality Center 9.2 Environment:
Team Size:	08
Duration:	8 Months

Role: Test lead

Title: AML TTR 2011

Synopsis: Under the Financial Transaction Reports Act 1988, the Bank currently reports Significant Cash Transactions to the regulator of the financial sector, the Australian Transaction Reports and Analysis Centre (AUSTRAC). All the threshold transactions are reported to Australian Transaction Reports and Analysis Centre (AUSTRAC). This an Anti money laundering project related to Data warehousing project.

Client: **Xoserve, UK**

Tools: Mantis, Mysql

Environment: Web based with Orcle database

Team Size 2

Duration: 6 Months

Role: Test Lead

Title: XO serve data warehousing project

Synopsis: In order to overcome the inaccurate and poor performance of the legacy systems; TCS was tasked to come up with a new system. This project involved the implementation of a data warehouse. Data from the source systems were extracted and loaded via ETL and staging databases to the data warehouse. The reports are generated in business objects. I supported the design of the data model. I lead the testing team in the creation of the Test plan, the test scenarios and the test cases working with the subject matter experts.

Client: **USAA Bank, San Antonio, Texas**

Tools: Test Director 8.3, Crystal Report

Environment: Web based with Orcle database

Team Size 2

Duration: 22 Months

Role: Test Lead

Title: XO serve data warehousing project

Synopsis: In order to overcome the inaccurate and poor performance of the legacy systems; TCS was tasked to come up with a new system. This project involved the implementation of a data warehouse. Data from the source systems were extracted and loaded via ETL and staging databases to the data warehouse. The reports are generated in business objects. I supported the design of the data model. I lead the testing team in the creation of the Test plan, the test scenarios and the test cases working with the subject matter experts.

EDUCATION HISTORY: **Masters in Software Application (MSc) from Bharathiyar University, Chennai.**

Selvaraj Easwaran – Senior .Net Developer

Present Position: Senior .Net Developer, Shakti Infosolutions Pvt Ltd

PROFESSIONAL SUMMARY:

Over 8 years of experience in managing large scale technology projects in Health care, Retails, Banking Domain including a number of Mobility Projects and Products.

1. A results-driven, customer-focused, articulate, and analytical Software Engineer with JAVA development experience who can think "out of the box
2. Comprehensive experience in designing, developing, maintenance & review of Mobility Applications.
3. Adept in developing a framework of quality standards and overseeing smooth roll-out of the various releases including customer packs and maintenance releases.
4. Strong in design and integration problem solving skills.
5. **Expert in .Net**

TECHNICAL SUMMARY

Operating System	:	Windows , Mac OS
IDE	:	Visual Studio , Eclipse
Microsoft Technologies	:	ASP.Net ,C#,VB.net, MVC3, Entity Framework, Razor, WCF
Web Scripts	:	HTML, Java Script, JQuery
Application Servers	:	IIS , Tomcat
RDBMS	:	MSSQL Server, Oracle

EMPLOYMENT HISTORY

May'2007 - to Date: Shakti Infosolutions Pvt Ltd. Chennai as *Senior .Net Developer*

Select assignments handled:

Client:	**DirecTv**
Tools:	Eclipse IDE
Environment:	Facebook Platform (FBML, FBJS), PHP, MySQL, AJAX, Adobe Flash, Adobe Photoshop, Adobe Dreamweaver, Eclipse
Team Size	5
Duration:	36 Months
Role:	Senior Developer
Synopsis:	DIRECTV delivers satellite-based television services to U.S. customers in homes and businesses. Operations include some of the world's most advanced technologies in the delivery of a seamless viewing experience. DIRECTV U.S., is the largest provider of DTH digital television services and the second largest provider in the multi-channel video programming distribution, or MVPD, industry in the United States. DIRECTV makes local channels available to 94% of U.S. households. DIRECTV as a part of its overall competitive strategy is looking to leverage new technologies especially web 2.0 for better servicing their existing and prospective customer needs.

The goal of this project is to provide access to the DIRECTV guide application to existing and prospective DIRECTV customers who are a part of the broader Facebook community.

Client: **Moda Health (formerly known as ODS)**
Environment: Facets 5.01, Sybase 15.0, Crystal Reports, UNIX and TIDAL Scheduler, ASP .Net.
Team Size 6
Duration: 7 Years
Role: Senior Developer.
Synopsis: Moda originated in 1955 and has ever since remained a pioneer in affordable health plans. With innovative, evidence-based health plans, diverse networks and member programs, and superb customer service, MODA continues to be the health leader throughout the Pacific Northwest.

The project is focused on developing interfaces to send extracts and to accept and process the files received from various vendors of Moda and on generating Premium and AFA bills for Moda.

EDUCATION HISTORY: Masters in Computer Application (MCA) from Anna University, Tamil Nadu, India.

Murugan Lakshmanan – Solution Architect/Tech Lead/Senior Developer (.Net/J2EE)

Present Position: Senior Tech Lead, Shakti Consulting

PROFESSIONAL SUMMARY: Over 10+ years of experience in design and developing Enterprise projects and products in Health care, Insurance, Pharmaceutical and Retails SFA domains based Web and Mobility Solutions.

1. A Results-driven, Customer-focused, Problem solving and Analytical in .Net and J2EE based Web and Mobile Application development.
2. Having experience in all the phases of SDLC including Analysis, Design, Coding, Testing and Maintenance.
3. Hands on in design and development of standard frameworks and prototypes for Web and Mobile Applications.
4. Extensive knowledge in Design patterns and applied in all in-house frameworks for developing Applications.
5. Being versatile in learning new technologies and innovative.
6. Expert in .Net, J2EE and Mobility platforms.

TECHNICAL SUMMARY

Operating System	: Windows , Mac OS
Languages	: C, C++, Java, J2EE , C#
IDE	: Visual Studio , Eclipse
Mobile Platforms	: Windows – PDA : WP8 : Surface RT : Surface Pro ,Symbian-J2ME , RIM - Blackberry, Dalvik - Android ,Hybrid : Phonegap (JQM)
Microsoft Technologies	: ASP.Net ,C#,VB.net, MVC3, Entity Framework, Razor, WCF
Java Technologies	: Java, RMI, JNI,JMS , Servlets, JSP, Servlets, Struts, Springs, Hibernate ,Axis WS, Apache MQ, Fiarano MQ .
SAP Technologies	: SUP , SAP ByD Cloud
Web Scripts	: HTML, Java Script, JQuery
Application Servers	: IIS , Tomcat , J2EE Server, BES Server
RDBMS	: MSSQL Server, Oracle

EMPLOYMENT HISTORY

Working as Product Development Lead (Mobility) in Shakti Info Solutions, Chennai. (Nov 2014 – Till Date)

Worked as a R&D Innovation Head & Solutions Architect (Mobile COE) in HTC Global IT Services, Chennai. (Dec 2013 – Aug 2014)

Worked as a Web and Mobile Application Architect in Ivy Mobility Pvt Ltd (Prior Name is Envision) , Chennai. (Sep 2007 – Dec 2013)

Worked as a Software Engineer in Moonsoft Technologies, Tirunelveli. (June 2001 – August 2007)

Selective Projects Summary

Project	::	SmartRep
Client	::	Pharma Companies
Role Played	::	Application Architect
Team Size	::	10
Duration	::	Oct 2011 – Dec 2012
Environment	::	Visual Studio 2010, SQL Server 2008 R2
Technologies	::	C#, MVC3 Framework, LINQ ,HTML5, JQuery , Razor ,Repository & Abstract factory Pattern, DI & IOC , Resource Bundles, Report Service, Integration Service

PROJECT ABSTRACT :

SmartRep is an Web Application developed for Pharma Companies using this solution in SAAS Model. Each pharma company has its own organizational and Workflow structure. Based on the workflow structure , the workforce should plan the MTP to get the approval at their higher authority. Everyday activities planned in the Tour plan are submitted and reports populated accordingly. The Mobile sync has been deployed in this solution to integrate various Mobile Based Reporting by the Workforce. Some of the modules of this solution are Tenant & Business unit configuration , User management , Planning, Workflow, Data management and Reporting.

Project	::	Ivy Products Migration to Android and iOS
Role Played	::	Application Architect
Team Size	::	10
Duration	::	Jan 2010 – Dec 2013
Environment	::	Eclipse ADT , XCode
Technologies	::	Java, Objective C ,Android SDK , iOS SDK

PROJECT ABSTRACT :

All Ivy Products developed for Pharma , FMCG and Insurance industries were migrated to Smart Phones and Tablet versions of Android and iOS Devices . Pharma and FMCG application are based on Sales force Automation.

EDUCATION HISTORY:

2003 Post Graduation Degree (MCA), Master of Computer Application Madurai Kamaraj University

1999 Under Graduation Degree (BBA) , Bachelor of Business Administration, Annamalai University

1994 Professional Diploma (DCT), Diploma in Computer Technology, Sankar Institute of Polytechnic

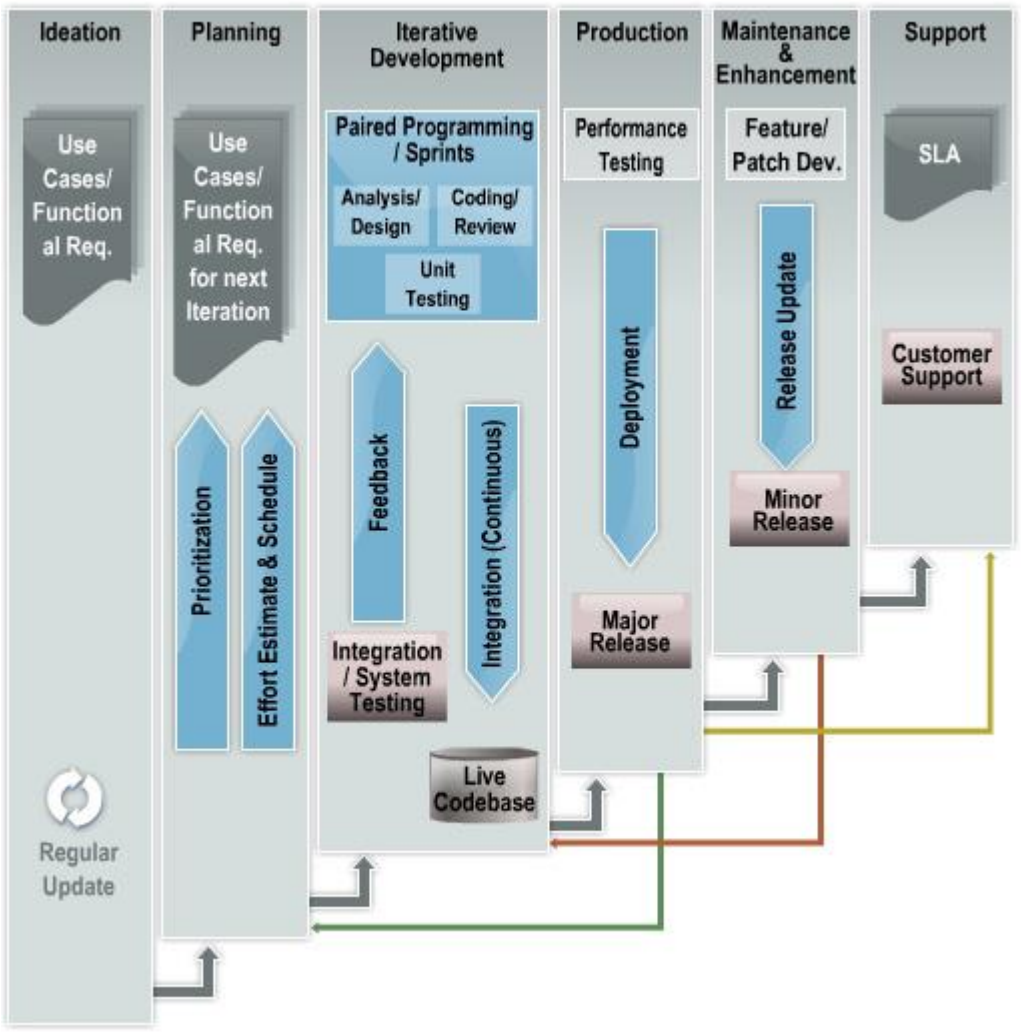
8.2 AGILE/SCRUM BASED DELIVERY METHODOLOGY @SHAKTI

A few challenges need to be addressed to become a leader in the product offerings. The following high level challenges have been put together for Agile Development Process and Quality Assurance Process to address the same.

- Managing costs while being in a feature race, adopting to the growing demand and needs
- Improving user experience continuously
- Releasing a product frequently thus keeping the product robust
- Maintaining, implementing, and supporting issues
- Adopting, Integrating with industry standards and regulatory requirements

Key Objective includes:

- Accommodates changes in requirements during the project based on agile practice.
- Project costs are reduced dramatically by defining detail based on business priority.
- Rapid construction cycles and regular demonstrations improve end user adoption.



Our Agile development process is a proven, seamless on-site/offshore framework designed for accelerating project cycles, improving quality, and maximizing the ROI. This also makes sure that the best optimized Total Cost of Ownership (TCO) is achieved for the specific project/ product.

Our methodology is designed to support multi-location engagement in order to maximize quality, flexibility while avoiding timeline delays and cost overruns. This will ensure the following:

- Transparent communication
- Incorporating and providing best user experience
- Rapid and Incremental Development to support Small releases.
- Managing Changes
- Driving Prototypes
- Quality Assurance
- Refactoring and Integration with other internal/ external application systems
- Suite of Testing Activities

The Phases:

Prototyping:
Collaborate to come out with the list of use cases for the first release and subsequently for next releases. Build the necessary prototypes while evaluating platforms/ tools/technologies.

Planning:
Deciding the priorities of the use cases, estimating the effort, deriving the schedule for the first release and subsequent releases.

Iterative Development:
Number of iterations is carried out, smaller activities taken up as Sprints with small teams to carry out the activities. This ensures the problem areas are analysed in smaller packets for a faster and better resolution. The unit testing is carried out for each iteration and followed by the integration to the complete codebase/ package. The integration and system testing is carried out for the iterations before releasing it for the production.

Production:
In the Production phase, the performance testing of the system is carried out before the final deployment. Based on the results and feedback, the inclusion of the specific features is decided for the production release. This is carried out by an independent team to ensure stringent validation and verification practice.

Maintenance & Enhancement:
After the first release is deployed for production, the project team ensures that the production environment is maintained for a healthy run. It also starts the next iteration process for the next set of use cases. Any production related issues or patch is also managed through this phase.

Support Phase:
Once the development cycle is complete and the production environment is up and running with all desired functionality, this team ensures that the customer support is provided as per the Service Level Agreement for various levels of support. The knowledge base and extensive documentation is prepared to help future support activities and to increase the number of support cases manageability with better response time.

Status Reporting & Metrics:
Project success depends on the best practices being followed for the project management and the highest level of transparency is maintained with the customers/ partners. This ensures that the correct status, issues, risks are visible to everybody in the same manner to help planning future activities for all stake holders and mitigating risks.

8.3 SAMPLE RISKS & MITIGATION STRATEGIES

Shakti will provide action plan for following risk factors involved while executing the project.

Risk Details	Effect Details	Mitigation	Contingency
Aggressive timelines	Schedule overrun	Change Management	Rigorous compliance to schedule by all stakeholders
Availability of right stakeholders from ONC at the right time	Improper or delayed decisions render the whole initiative futile	Effective escalation mechanism should be available	Single Point of Contact (ONC PM)
Definition of scope	Schedule / Effort overrun	Change Management	Agreement from all stakeholders on scope boundaries
Finalization of templates for all the deliverables	Delay in sign-off, Rework	Change Management	Mutual agreement between ONC and Shakti PM within a week from start of the project on the templates to be used for all the deliverables
Timely availability of data web services and access to source applications	Schedule overrun	Change Management	Effective escalation mechanism should be available to get the timely accesses
Project Team and data owners are spread across multiple locations	Gap in communication and coordination, schedule overrun	Change Management	Establish strong and effective communication and to follow a rigorous agile process to ensure the same. Use Video Conferencing and social collaboration tools to communicate as well.

8.4 KEY HIGH LEVEL SOLUTION ARCHITECTURE DIAGRAMS