

Oakland County Department of Information Technology Project Scope and Approach

Project Name: Project Green Field

Project ID: T61186PG

Leadership Group: Information Technology Steering Committee					
Department: Information Technology			Division: Technical Systems and Networking		
Project Sponsor: EJ Widun		Date Requested: 10/1/2020		PM Customer No. 186	
Request Type: <i>New Development</i>					
IT Team Name: Server Administration			IT Team No: 6		
Project Manager/Leader: Heidi Flack					
Account Number:	17030	Account Description:	Technical Systems and Networking	Customer Name:	Information Technology
Grant Funded? No			Mandate? No		

Project Goal

To deploy new infrastructure (next to the current RAP environment), which will conform to modern data center standards and “split” the data centers into two availability zones, and to complete a proof of concept to prove out the replacement of infrastructure for network, compute/hypervisor and storage with open-source alternatives to VMware and DELL storage arrays, so that migrations can be planned for 2023-24 Master Plan.

Business Objective

The current (“RAP”) network, compute, and storage equipment has reached the end of its 7-year life. With the intention of moving the county forward towards a 'cloud' strategy, Project Green Field will deploy a local cloud to be functionally the same as primary AWS services. This allows for easier transition and migration of workloads between AWS and on-premise.

Major Deliverables

Phase: PLANNING

- **Program Kick Off**
 - Develop Kick Off Presentation (EA, NS, SA, InfoSec, ALL IT)
 - Conduct Strategic Scope & Approach Presentation (EA, NS, SA, InfoSec, CLEMIS)
 - Determine High-Level Estimates (ALL IT)
- **Data Center (Optimization)** (SA, NS, Tabor/Ops)
 - Conduct DC Data Gathering & Analysis (SA, NS, Tabor/Ops)
 - Define DC Optimization Requirements
 - Develop DC FM&O Design & Estimate of work (Tabor/Ops)
 - Conduct DC Budget Analysis (SA, NS, Tabor/Ops)
 - Present & Obtain Budget Approval (Tabor, Timm)
- **Network** (NS, EA, InfoSec, SA, Tabor/Ops)
 - Conduct Networking Data Gathering & Analysis (NS, InfoSec)
 - Define Networking Requirements (NS, InfoSec, SA, EA)
 - Develop Networking architecture: Strategic Approach and Concept Design (NS, CISCO)
 - Conduct Tech Review
 - Amend Contracts (NS)

Oakland County Department of Information Technology Project Scope and Approach

Project Name: Project Green Field

Project ID: T61186PG

- **Storage**
 - Conduct Storage Data Gathering & Analysis (SA, EA, DBA)
 - Define Storage Requirements (SA, InfoSec, DBA, EA)
 - Execute Storage RFP (SA, EA)
 - Execute Storage Contract (SA, EA)
- **Compute**
 - Conduct Data Gathering & Analysis (SA)
 - Define Requirements (SA, InfoSec)
 - Identify Compute POC Solution(s) (SA)
- **Budget Planning**
 - Develop Capital Expense Plan
 - Present for Board Approval
 - Update ROI

Phase: DESIGN

- **Data Center (Optimization)** (SA, NS, Tabor/Ops)
 - Develop Detail Design (NS, SA, EA, InfoSec)
 - Conduct Tech Review
- **Network** (NS, EA, InfoSec, SA, Tabor/Ops)
 - Develop Detail Design (NS, SA, EA, InfoSec)
 - Conduct Tech Review
 - Procure HW/SW
- **Storage**
 - Develop Detail Design (SA, NS)
 - Conduct Tech Review
- **Compute**
 - Meet with POCs Application Stakeholders (SA, InfoSec, Gosine, Carroll)
 - Develop Detail POC Design (SA, InfoSec, Apps/CLEMIS)
 - Conduct POCs Tech Review

Phase: DEPLOY

- **Data Center** (SA, NS, Tabor/Ops)
 - Procure Equipment
 - Install Equipment
- **Network**
 - Develop Test Plans
 - Install Network Equipment
 - Deploy & Test Networking (NS, SA, EA, InfoSec)
- **Storage**
 - Procure Storage Hardware/Software (SA)
 - Install Storage Solution (SA, NS)
 - Deploy & Test Storage Solution (SA, NS)
- **Compute POC**
 - Develop Use Cases & Test Plan (ALL IT)
 - Build, Deploy & Test POC (ALL IT)
 - Modify Design (SA, NS)
 - Conduct Tech Review
 - Procure Hardware/Software (SA)

Oakland County Department of Information Technology Project Scope and Approach

Project Name: Project Green Field

Project ID: T61186PG

- Deploy & Test Compute Solution (SA, NS)

Phase: IMPLEMENTATION

- **Data Center** (SA, NS, Tabor/Ops)
 - Develop Implementation Plans
 - Implement upgrades
 - Burn in State (2-4wks)
 - Decommission Equipment
- **Network**
 - Develop Implementation Plan
 - Update DR Toolkits & Documentation
 - Implement and Validate (ALL IT)
 - Transition to operational
- **Storage**
 - Develop Implementation Plan
 - Update DR Toolkits & Documentation
 - Implement and Validate (SA, NS, DBA)
 - Transition to operational
- **Compute POC**
 - Develop Migration Plan
 - Coordinate Migrations
 - Migrate (Rebuild) and Validate
 - Transition to operational

Approach

- Conduct research and analysis and gather data of the current infrastructure and environments.
- Work with FMO to develop DC upgrade plans and estimates.
- Develop requirements for each major deliverable/component.
- Execute the RFP process to select a storage array.
- Design, diagram and define strategic approach and Roadmap for solution.
- Develop Budget (Capital) Plans and obtain Board approval for funding.
- Procure services and infrastructure as required.
- Define POC approach and plan for deployment.
- Develop implementation plans.
- Deploy new network, compute, and storage infrastructure next to the current RAP environment.
- Conduct a proof of concept with select applications to test deployments to determine which hypervisor will be used with the preference to move to an open-source alternative to VMware.
- Transition to operations with documented Lessons Learned and updated DR Toolkits.

Research & Analysis

Gartner Research Recommendation:

- Start With These Three Best Practices to Maximize Open-Source Software Value
<https://www.gartner.com/document/3956330?ref=solrAll&refval=251729158>
- Magic Quadrant for Data Center Networking:
<https://www.gartner.com/document/3947431?ref=solrAll&refval=251788935>
- Data Center Infrastructure Primer for 2020

Oakland County Department of Information Technology Project Scope and Approach

Project Name: Project Green Field

Project ID: T61186PG

<https://www.gartner.com/document/3980031?ref=solrAll&refval=251788883>

- Magic Quadrant for Primary Storage

<https://www.gartner.com/document/3962309?ref=solrAll&refval=251789843>

- Market Guide for Server Virtualization

<https://www.gartner.com/document/3907165?ref=solrAll&refval=251729700>

Benefits

See *Return on Investment (ROI) Analysis Document*

Impact

Number of Users	All
Divisions	IT
Leadership Groups	IT Steering Committee

Risk

Business Environment	Med = Project requires some changes to existing business processes.
Technical Environment	High = New or non-standard technology.

Assumptions

Staffing IT Staffing: resources will be available for the hours indicated per the attached project plan.
Other Staffing: additional staffing will be available as follows:

<u>Role:</u>	<u>Name</u>
Sponsor/ TSN/EA Stakeholder:	EJ Widun
IT Stakeholder:	Mike Timm
Security Stakeholder:	TJ Fields
NS Stakeholder	Guy Compton
CLEMIS Stakeholder:	Jeff Nesmith
Internal Services Stakeholder:	Janette McKenna
Apps Stakeholder:	Tammi Shepherd
Data Center Stakeholder:	Joe Tabor

Facilities

- Joe Tabor/Operations will manage work to be conducted with FM&O, supporting estimates, modifications and any costs back to IT.

Oakland County Department of Information Technology Project Scope and Approach

Project Name: Project Green Field

Project ID: T61186PG

Technical

- The new network architecture will conform to modern data center standards and “split” the data centers into two availability zones.
- Technical debt and equipment EOL will drive the attrition of process for updating infrastructure.
- Deployments into the new Green Field environment will begin in the 2023-24 Master Plan.

Funding

- Information Technology
- Funding will be available for this effort and future phases and purchases.
- Implementation of selected solutions will be approved and budgeted.

Other

-

Priority

-

Constraints

- Equipment replacement will be dependent upon EOL terms.
- Data Center capacity limitations to physically run current and new equipment. Secondary site is at full capacity.

Exclusions

- Application migrations to the new environment except for the POC.

**Oakland County
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Project Scope and Approach**

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PROJECT PHASE AUTHORIZATION

Phase(s): Project Management, Project Greenfield Program	
Total Estimated Application Services	Hours: 205
Total Estimated Technical Systems	Hours: 2,585
Total Estimated CLEMIS	Hours: 200
Total Estimated Internal Services	Hours:
IT Application Services Division Manager Approval:	Date:
IT Technical Systems Division Manager Approval:	Date:
IT CLEMIS Division Manager Approval:	Date:
IT Internal Services Division Manager Approval:	Date:
IT Management Approval:	
Approved:	Date:
Reason:	
Project Sponsor Approval:	
Title:	Date:

PROJECT SUMMARY

Authorized Development (see above)	Hours: 2,990	
Previously Approved Phases	Hours:	
Grand Total Estimated Development	Hours: 2,990	Cost: \$493,350

Oakland County Department of Information Technology Project Scope and Approach

Project Name: Project Green Field

Project ID: T61186PG

PROJECT COMPLETION AUTHORIZATION

Customer Acceptance of Product:	
Title:	Date:
Project Office Review:	Date:

Project Green Field - Size Estimate (+/- 10% to 50%) ✕					
	Type	ID	Task Name	Estimated Hours	Estimate Notes
1	Phase	000000	PROJECT MANAGEMENT	282	
2	Phase	100000	PROJECT GREEN FIELD - PLANNING	540	
3	Phase	200000	PROJECT GREEN FIELD - DESIGN	539	
4	Phase	300000	PROJECT GREEN FIELD - DEPLOY	901	
5	Phase	400000	PROJECT GREEN FIELD - IMPLEMENTATION	728	
6					
1				2,990	

Oakland County -- Project Green Field Program

Return on Investment Analysis

Project Summary

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Benefits/Savings:							
Tangible Benefits Subtotal:	0	0	0	0	0	0	0
Cost Avoidance Subtotal:	11,500	60,500	98,000	98,000	348,000	348,000	964,000
Costs:							
Development Services Subtotal:	493,350	0	0	0	0	0	493,350
Hardware Subtotal:	880,000	1,650,000	0	0	0	0	2,530,000
Software Subtotal:	9,996	69,972	69,972	69,972	69,972	69,972	359,856
Infrastructure Subtotal	135,000	135,500	135,500	135,500	120,000	120,000	781,500
Training Subtotal:	0	0	0	0	0	0	0
Other Subtotal:	0	0	0	0	0	0	0
Annual Statistics:							
Annual Total Savings	11,500	60,500	98,000	98,000	348,000	348,000	964,000
Annual Total Costs	1,518,346	1,855,472	205,472	205,472	189,972	189,972	4,164,706
Annual Return on Investment	(1,506,846)	(1,794,972)	(107,472)	(107,472)	158,028	158,028	(3,200,706)
Annual Costs/Savings Ratio	13203.01%	3066.90%	209.67%	209.67%	54.59%	54.59%	
Project Cumulative Statistics:							
Cumulative Total Savings	11,500	72,000	170,000	268,000	616,000	964,000	964,000
Cumulative Total Costs	1,518,346	3,373,818	3,579,290	3,784,762	3,974,734	4,164,706	4,164,706
Cumulative Return on Investment	(1,506,846)	(3,301,818)	(3,409,290)	(3,516,762)	(3,358,734)	(3,200,706)	(3,200,706)
Cumulative Cost/Savings Ratio	13203.01%	4685.86%	2105.46%	1412.22%	645.25%	432.02%	432.02%
Year Positive Payback Achieved							NO PAYBACK
State or Federal Mandate?							
Signatures:							
Benefits Reviewed By Project Sponsor	_____			Date:	_____		
Costs (including IT Resources) Reviewed By Information Technology Project Manager	_____			Date:	_____		

Oakland County -- Project Green Field Program

Return on Investment Analysis

Savings Detail

Benefit/Savings Description	Project Savings Category	Budget Category/Funding Source	Unit Desc	Units	Rate per Unit	Total Savings	Annual Multiplier
VMWare Licensing and Support after ELA expiration would be an estimated \$250,000 per year starting in 2025	Cost Avoidance	17030 - Technical Systems & Networking	EA			0	
Compellent Storage Array Support Costs	Cost Avoidance	17030 - Technical Systems & Networking	ANN	1	75,000	75,000	
Dell Network Equipment Support Costs	Cost Avoidance	17030 - Technical Systems & Networking	ANN			0	
Increased portability of workloads between the Cloud and on-premise	Intangible Benefit	17030 - Technical Systems & Networking				0	
Improved east/west protection between applications	Intangible Benefit	17030 - Technical Systems & Networking				0	
Encrypted data at rest	Intangible Benefit	17030 - Technical Systems & Networking				0	
Faster access to data, improving application performance and user experience	Intangible Benefit	17030 - Technical Systems & Networking				0	
Increased adoption of open source technology	Intangible Benefit	17030 - Technical Systems & Networking				0	
Consistent network management platform	Intangible Benefit	17030 - Technical Systems & Networking				0	
Reduced and moved data center footprint to allow for FMO data center restructuring	Intangible Benefit	17030 - Technical Systems & Networking				0	
						0	
						0	
						0	
						0	
						0	
						0	

Oakland County -- Project Green Field Program

Return on Investment Analysis

Savings Detail

Benefit/Savings Description	Project Savings Category	Affects Project ROI?						Potential Savings Extensions					
		Y1	Y2	Y3	Y4	Y5	Y6	Y1-2021	Y2-2022	Y3-2023	Y4-2024	Y5-2025	Y6-2026
VMWare Licensing and Support after ELA expiration would be an estimated \$250,000 per year starting in 2025	Cost Avoidance							0.00	0.00	0.00	0.00	250,000.00	250,000.00
Compellent Storage Array Support Costs	Cost Avoidance		x	x	x	x	x	0.00	37,500.00	75,000.00	75,000.00	75,000.00	75,000.00
Dell Network Equipement Support Costs	Cost Avoidance	x	x	x	x	x	x	11,500.00	23,000.00	23,000.00	23,000.00	23,000.00	23,000.00
Increased portability of workloads between the Cloud and on-premise	Intangible Benefit												
Improved east/west protection between applications	Intangible Benefit												
Encrypted data at rest	Intangible Benefit												
Faster access to data, improving application performance and user experience	Intangible Benefit												
Increased adoption of open source technology	Intangible Benefit												
Consistent network management platform	Intangible Benefit												
Reduced and moved data center footprint to allow for FMO data center restructuring	Intangible Benefit												

Oakland County -- Project Green Field Program

Return on Investment Analysis

Savings Summary

Benefit/Savings Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Tangible Benefit:							
<i>Tangible Benefits Subtotal:</i>							
Cost Avoidance:							
VMWare Licensing and Support after ELA expiration would be an estimated \$250,000 per year starting in 2025					250,000	250,000	500,000
Compellent Storage Array Support Costs		37,500	75,000	75,000	75,000	75,000	337,500
Dell Network Equipment Support Costs	11,500	23,000	23,000	23,000	23,000	23,000	126,500
Cost Avoidance Subtotal:	11,500	60,500	98,000	98,000	348,000	348,000	964,000
Intangible Benefit:							
Increased portability of workloads between the Cloud and on-premise							
Improved east/west protection between applications							
Encrypted data at rest							
Faster access to data, improving application performance and user experience							
Increased adoption of open source technology							
Consistent network management platform							
Reduced and moved data center footprint to allow for FMO data center restructuring							
Savings Total:	11,500	60,500	98,000	98,000	348,000	348,000	964,000

Oakland County -- Project Green Field Program
Return on Investment Analysis

Cost Detail

Cost Description	Project Cost Category	Budget Category/Funding Source	Unit Desc	Units	Rate per Unit	Total Cost	Affects Project ROI?						Y1-2021	
							Y1	Y2	Y3	Y4	Y5	Y6		
IT Hours - New Development: MP 2021-2022	Development Svcs	Technical Services & Networking	HR	2,990	165	493,350	x							493,350.00

Oakland County -- Project Green Field Program

Return on Investment Analysis

Cost Detail

Cost Description	Project Cost Category	Potential Cost Extensions				
		Y2-2022	Y3-2023	Y4-2024	Y5-2025	Y6-2026
IT Hours - New Development: MP 2021-2022	Development Svcs					

Oakland County -- Project Green Field Program

Return on Investment Analysis

Cost Summary

Cost Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Development Services:							
IT Hours - New Development: MP 2021-2022	493,350						493,350
<i>Development Services Subtotal:</i>	493,350						493,350
Hardware:							
Data Center Core Networking Equipment, fiber, cables, etc.(7-year life)	750,000						750,000
Storage Arrays: 400 TB + 600 TB		1,200,000					1,200,000
Virtual Hosts (4)	50,000						50,000
Virtual Hosts (24)		450,000					450,000
Structured Cabling w/Installation and Cable Management	80,000						80,000
<i>Hardware Subtotal:</i>	880,000	1,650,000					2,530,000
Software:							
4x RHEL OS licenses/Support (2-socket)	9,996	9,996	9,996	9,996	9,996	9,996	59,976
24x RHEL OS Licenses/Support (2-socket)		59,976	59,976	59,976	59,976	59,976	299,880
<i>Software Subtotal:</i>	9,996	69,972	69,972	69,972	69,972	69,972	359,856
Infrastructure:							
Dell Storage Extended Support (Maintenance)		12,000	12,000	12,000			36,000
Dell Networking Extended Support (Maintenance)		3,500	3,500	3,500			10,500
Cabinets (Racks) @ Colo (Power) @ \$2k per rack x 12mths.= \$24k/yrly	120,000	120,000	120,000	120,000	120,000	120,000	720,000
Cabinets (Racks) @ OC Data Center	15,000						15,000
<i>Infrastructure Subtotal</i>	135,000	135,500	135,500	135,500	120,000	120,000	781,500
Training:							
<i>Training Subtotal:</i>							
Other:							
<i>Other Subtotal:</i>							
Costs Total:	1,518,346	1,855,472	205,472	205,472	189,972	189,972	4,164,706

