Part I: Project Overview

Project Name:	SAAS Dockerization Project; GEMM
Requested By:	SAAS Development Group
Author:	Pamela Templin
Creation Date:	August 21, 2017
Status:	Pending
Approval Date:	Pending
Last Revision Date:	September 12, 2017
Document:	Project Charter
Proposed Start Date:	Mon 10/2/17
Proposed Finish Date:	Fri 6/15/18

Part II: Project Details

Purpose:	Current software delivery system is costly and lacks a tiered update system. This project will shift the current environment from running on individual AWS instances to running on Kubernetes in Docker containers.
Anticipated Project Team:	

Department	Name/Title	Role
DevOps	Sr. DevOps Engineer	Systems Architect
DevOps	Sr. DevOps Engineer	API Engineer
Development	Sr. Engineer	Environment Debugging Eng.
Development	Sr. Engineer	User Experience Testing Engineer
DevOps	DevOps Engineer	Doc. Reviewer

<table>
<tr><td>Anticipated Stakeholders:</td><td>1. DevOps Team (engineers: 2 local SF; 3 remote)
2. SAAS Development Group
3. Data Science Team
4. VP of Engineering
5. Customers</td></tr>
<tr><td>Objectives:</td><td>
<table>
<tr><th>Objectives:</th><th>Success Criteria:</th></tr>
<tr><td>1. Simplification of software delivery pipeline.</td><td>Creation of a new Docker image in response to a submitted pull request from Engineering</td></tr>
<tr><td>2. Elimination of the need for configuration mgmt through Puppet.</td><td>Successful deployment of software without utilizing Puppet or other manager.</td></tr>
<tr><td>3. Lowered monthly AWS expenditures.</td><td>Comparison with prior invoices shows a decrease in expenditure.</td></tr>
<tr><td>4. Ability to perform tiered updates (blue-green roll-outs).</td><td>Successful deployment of newer system offering to a partial client list for use comparison.</td></tr>
<tr><td>5. Increase in update speeds.</td><td>Comparison with prior roll-outs of once per month shows increase in ability to launch roll-outs multiple times per day.</td></tr>
<tr><td>6. Cluster accessed through company network must allow for easy changes to available resources.</td><td>Successful creation and clean deletion of nodes of the clustered system by engineering, incorporating the criteria determined by them.</td></tr>
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Budget:

Labor:	% of time	# of Hrs	Rate	Weekly Cost
Systems Architect	50%	20	69.71	1394.2
API Engineer	25%	10	79.33	793.3
Systems Testing Engineer	5%	2	57.69	115.38
Environment Debugging Engineer	10%	4	69.71	278.84
User Experience Testing Engineer	10%	4	69.71	278.84
Documentation Reviewer	5%	2	57.69	115.38
Other:				
AWS Instances for Development	m3.large clusters are $0.80/hr; running 24/7 not to top $600/month			
AWS Instances for Testing	m4.large clusters are $0.80/hr; running 24/7 not to top $600/month			

High-Level Requirements:

1. Major databases need to run in the Docker environment.
2. Docker environment must be able to connect to all outside resources.
3. Systems must be able to handle fail-over automatically.
4. Adjusted monthly budget must be under current monthly budget of $4,700.00.
5. Training for Development engineers and thorough documentation must be completed.

<table>
<tr>
<td>High-Level Assumptions/ Constraints:</td>
<td>
1. Monthly AWS can not exceed current expenditure of $4,700.00 per month.
2. Lead project engineer cannot spend more than 50% of work hours on this project.
3. Docker and Kubernetes must be utilized.
4. System environment must run on AWS.
5. First two milestones cannot take longer than two quarters; third milestone must be achieved within one quarter.
6. End customers can experience no outage in services.
7. Access to AWS systems will be stable and proper computer equipment available.
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<td>High-Level Risks:</td>
<td>
<table>
<tr><th></th><th>Mitigation/Contingency</th><th>Impact/ Probability</th></tr>
<tr><td>1. An increase in the complexity might destabilize the working set of systems.</td><td>Resource monitoring to ensure it doesn't</td><td>High/High</td></tr>
<tr><td>2. Effort to update these systems might be spent with no savings in costs.</td><td>Move to spot instance pricing</td><td>Medium/Low</td></tr>
<tr><td>3. SAAS offerings might ultimately be unsuitable for the Docker environment.</td><td>Those offerings would have had their own individual environments</td><td>High/Medium</td></tr>
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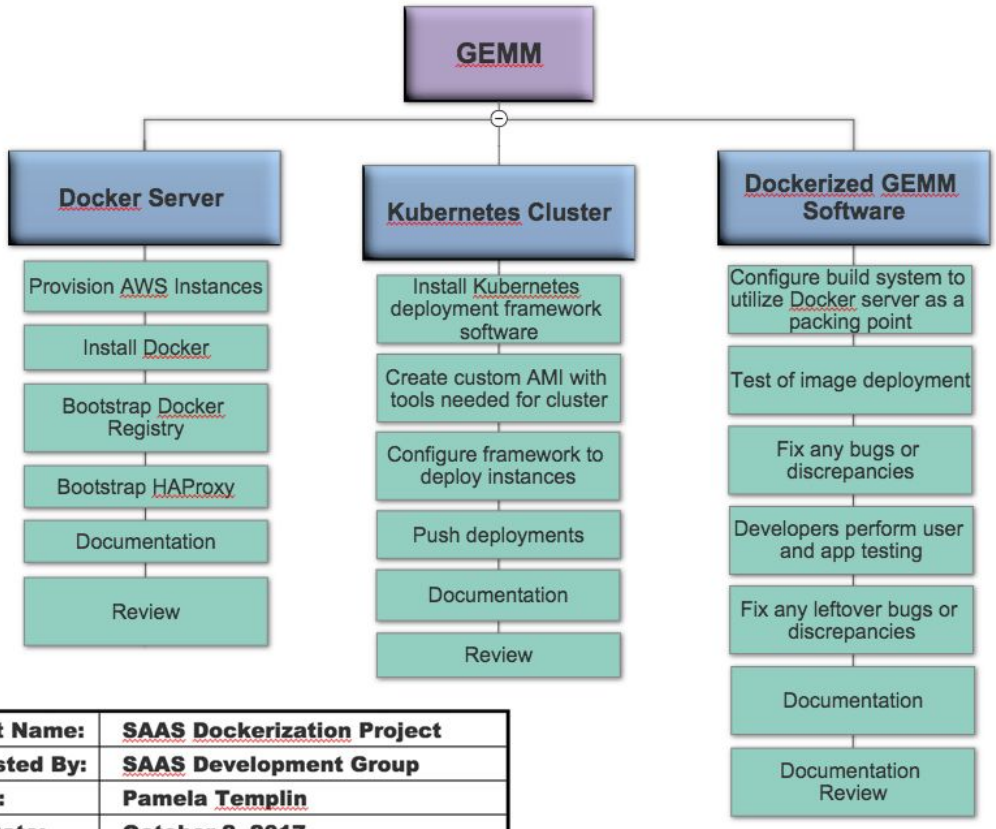
High-Level Deliverables:	1. A scalable, cluster system environment that could run all company SAAS offerings. 2. Thorough documentation. 3. Training on the design, creation, and maintenance of the system environment.
Summary Milestone Schedule:	1. Test cluster running in standard environment 2. SAAS services running Docker 3. Integration environment of prototype Kubernetes cluster running with verification that SAAS services can run and connect to outside network 4. Run completed design on staging systems in operation mode in critical development systems path 5. Move new system onto production systems
Summary Communication Plan:	1. Weekly project team meetings 2. Daily DevOps Scrum 3. Wiki page detailing project status for team members and management 4. Company emails announcing milestone successes

Project Name:	SAAS Dockerization Project; GEMM
Requested By:	SAAS Development Group
Author:	Pamela Templin
Document:	WBS
Proposed Start Date:	Mon 10/2/17
Proposed Finish Date:	Fri 6/15/18

WBS ID	Level	Task Name
D1	**1**	**Docker Server**
D2	2	Provision AWS Instances
D3	2	Install Docker
D4	2	Bootstrap Docker Registry
D5	2	Bootstrap HAProxy
D6	2	Documentation
D7	2	Review
K1	**1**	**Kubernetes Cluster**
K2	2	Install Kubernetes deployment framework software
K3	2	Create custom AMI with tools needed for cluster
K4	2	Configure framework to deploy instances
K5	2	Push deployments
K6	2	Documentation
K7	2	Review
G1	**1**	**Dockerized GEMM SW**
G2	2	Configure build sys to utilize Docker server as a packing pt.
G3	2	Test of image deployment
G4	2	Fix any bugs or discrepancies
G5	2	Developers perform user and app testing
G6	2	Fix any leftover bugs or discrepancies
G7	2	Documentation
G8	2	Review



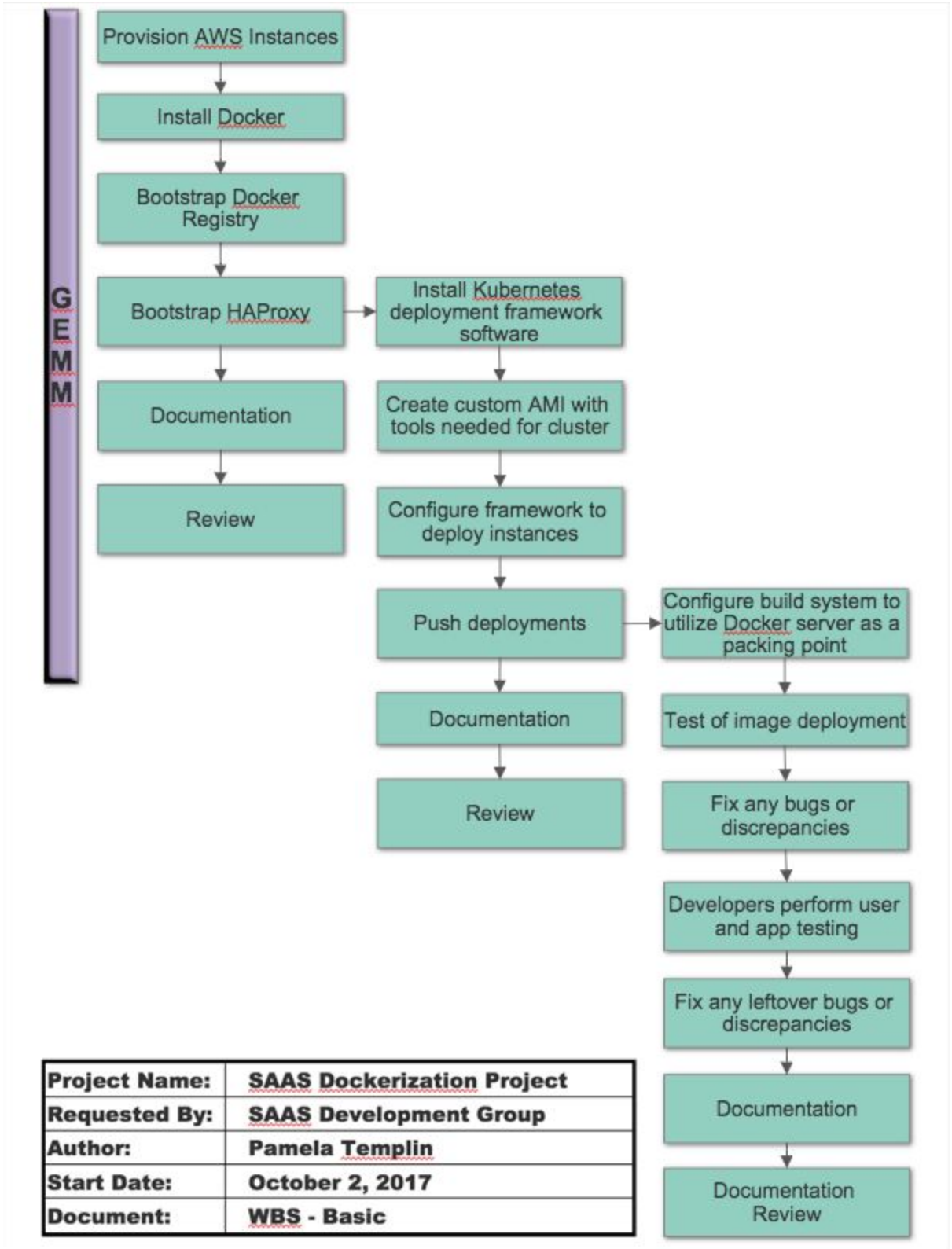
Project Name:	**SAAS Dockerization Project**
Requested By:	**SAAS Development Group**
Author:	**Pamela Templin**
Start Date:	**October 2, 2017**
Document:	**WBS - Basic**

Project Name:	SAAS Dockerization Project; GEMM
Requested By:	SAAS Development Group
Author:	Pamela Templin
Document:	WBS Sequencing
Proposed Start/Finish Date:	10/2/17 - 6/15/18

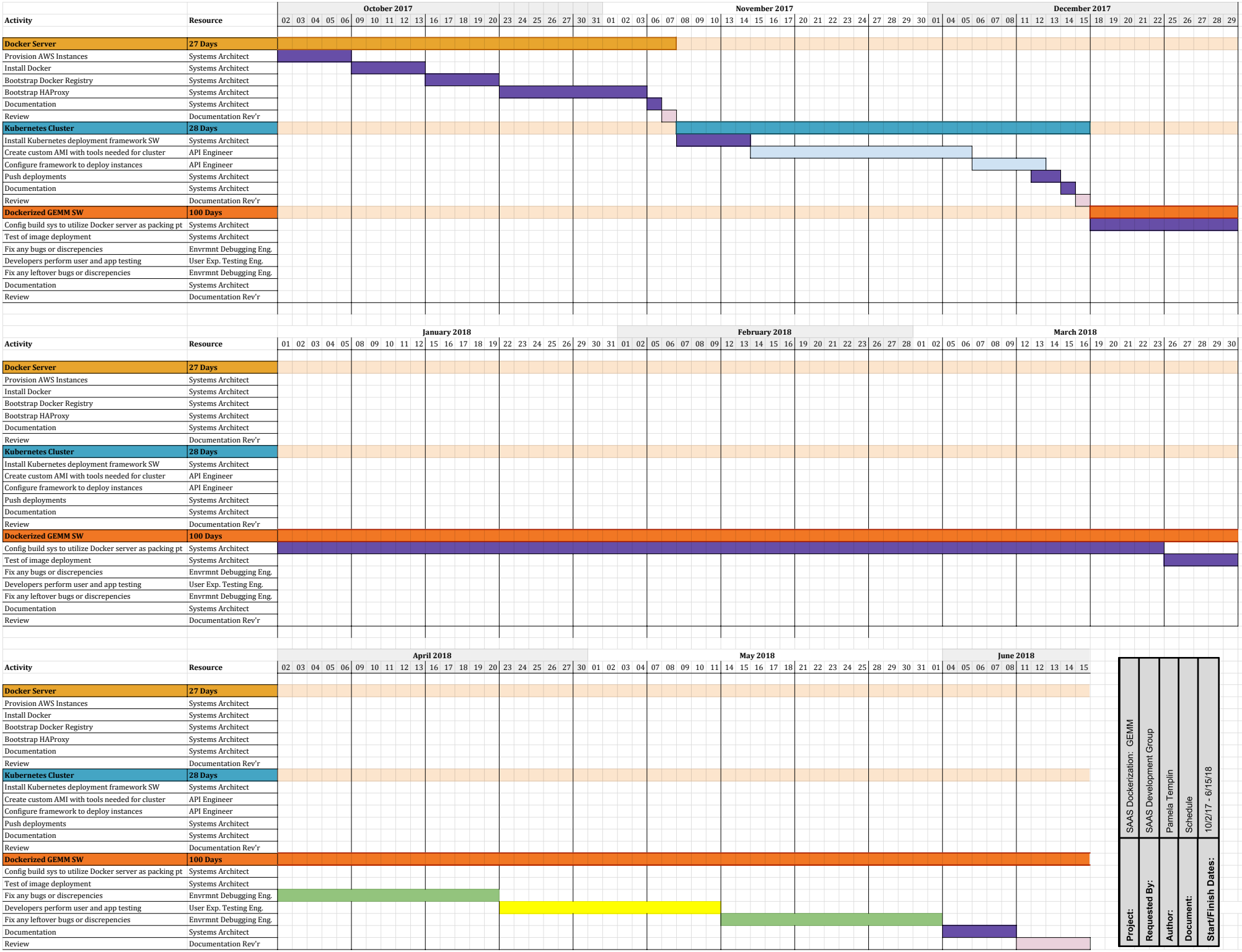
WBS ID	Task ID	Level	Task Name	Time	Start	Finish
D1	**1**	**1**	**Docker Server**	**27 d**	**10/2/17**	**11/7/17**
D2	2	2	Provision AWS Instances	5 d	10/2/17	10/6/17
D3	3	2	Install Docker	5 d	10/9/17	10/13/17
D4	4	2	Bootstrap Docker Registry	5 d	10/16/17	10/20/17
D5	5	2	Bootstrap HAProxy	10 d	10/23/17	11/3/17
D6	6	2	Documentation	1 d	11/6/17	11/6/17
D7	7	2	Review	1 d	11/7/17	11/7/17
K1	**8**	**1**	**Kubernetes Cluster**	**28 d**	**11/8/17**	**12/15/17**
K2	9	2	Install Kubernetes deployment software	5 d	11/8/17	11/14/17
K3	10	2	Create custom AMI w/tools for cluster	12 d	11/15/17	12/5/17
K4	11	2	Configure framework to deploy instances	4 d	12/6/17	12/11/17
K5	12	2	Push deployments	2 d	12/12/17	12/13/17
K6	13	2	Documentation	1 d	12/14/17	12/14/17
K7	14	2	Review	1 d	12/15/17	12/15/17
G1	**15**	**1**	**Dockerized GEMM SW**	**100 d**	**1/2/18**	**6/15/18**
G2	16	2	Configure build sys to utilize Docker server as packing pt	60 d	1/2/18	3/23/18
G3	17	2	Test of image deployment	5 d	3/26/18	3/30/18
G4	18	2	Fix any bugs or discrepancies	15 d	4/2/18	4/20/18
G5	19	2	Developers perform user and app testing	10 d	4/23/18	5/11/18
G6	20	2	Fix any leftover bugs or discrepancies	10 d	5/14/18	6/1/18
G7	21	2	Documentation	5 d	6/4/18	6/8/18
G8	22	2	Review	5 d	6/11/18	6/15/18

Indicates time missing for holidays

Indicates time missing for resource vacations



Project Name:	**SAAS Dockerization Project**
Requested By:	**SAAS Development Group**
Author:	**Pamela Templin**
Start Date:	**October 2, 2017**
Document:	**WBS - Basic**


October 2017
November 2017
December 2017
January 2018
February 2018
March 2018
April 2018
May 2018
June 2018
Activity
Resource
Docker Server
27 Days
Provision AWS Instances
Systems Architect
Install Docker
Systems Architect
Bootstrap Docker Registry
Systems Architect
Bootstrap HAProxy
Systems Architect
Documentation
Systems Architect
Review
Documentation Rev'r
Kubernetes Cluster
28 Days
Install Kubernetes deployment framework SW
Systems Architect
Create custom AMI with tools needed for cluster
API Engineer
Configure framework to deploy instances
API Engineer
Push deployments
Systems Architect
Documentation
Systems Architect
Review
Documentation Rev'r
Dockerized GEMM SW
100 Days
Config build sys to utilize Docker server as packing pt
Systems Architect
Test of image deployment
Systems Architect
Fix any bugs or discrepencies
Envrmnt Debugging Eng.
Developers perform user and app testing
User Exp. Testing Eng.
Fix any leftover bugs or discrepencies
Envrmnt Debugging Eng.
Documentation
Systems Architect
Review
Documentation Rev'r
Project:
SAAS Dockerization: GEMM
Requested By:
SAAS Development Group
Author:
Pamela Templin
Document:
Schedule
Start/Finish Dates:
10/2/17 - 6/15/18

Project Name:	SAAS Dockerization Project; GEMM	Requested By:	SAAS Development Group
Author:	Pamela Templin	Document:	Project Budget
Proposed Start Date:	10/2/17	Proposed Finish Date:	6/15/18

Source of Project Cost

	PROJECT TASKS	LABOR HOURS	LABOR COST ($)	MATERIAL COST ($)	TRAVEL COST ($)	OTHER COST ($)	TOTAL PER TASK
Docker Server	Provision AWS Instances	20	$69.71	$0.00	$0.00	$0.00	$1,394.20
	Install Docker	20	$69.71	$0.00	$0.00	$0.00	$1,394.20
	Bootstrap Docker Registry	20	$69.71	$0.00	$0.00	$0.00	$1,394.20
	Bootstrap HAProxy	40	$69.71	$0.00	$0.00	$0.00	$2,788.40
	Documentation	4	$69.71	$0.00	$0.00	$0.00	$278.84
	Review	2	$59.69	$0.00	$0.00	$0.00	$119.38
	Subtotal	**106**	---------	**$0.00**	**$0.00**	**$0.00**	**$7,369.22**
Kubernetes Cluster	Install Kubernetes deployment framework software	20	$69.71	$0.00	$0.00	$0.00	$1,394.20
	Create custom AMI w/tools for cluster	24	$79.33	$0.00	$0.00	$0.00	$1,903.92
	Configure framework to deploy instances	8	$79.33	$0.00	$0.00	$0.00	$634.64
	Push deployments	8	$69.71	$0.00	$0.00	$0.00	$557.68
	Documentation	4	$69.71	$0.00	$0.00	$0.00	$278.84
	Review	2	$59.69	$0.00	$0.00	$0.00	$119.38
	Subtotal	**66**	---------	**$0.00**	**$0.00**	**$0.00**	**$4,888.66**

Project Name:	SAAS Dockerization Project; GEMM	Requested By:	SAAS Development Group
Author:	Pamela Templin	Document:	Project Budget
Proposed Start Date:	10/2/17	Proposed Finish Date:	6/15/18

Dockerized GEMM Software	Configure build system to utilize Docker server as a packing point	240	$69.71	$0.00	$0.00	$0.00	$16,730.40
	Test of image deployment	20	$69.71	$0.00	$0.00	$0.00	$1,394.20
	Fix any bugs or discrepancies	12	$69.71	$0.00	$0.00	$0.00	$836.52
	Developers perform user and app testing	8	$69.71	$0.00	$0.00	$0.00	$557.68
	Fix any leftover bugs or discrepancies	8	$69.71	$0.00	$0.00	$0.00	$557.68
	Documentation	20	$69.71	$0.00	$0.00	$0.00	$1,394.20
	Documentation review	10	$59.69	$0.00	$0.00	$0.00	$596.90
	Subtotal	**318**	---	**$0.00**	**$0.00**	**$0.00**	**$22,067.58**
PROJECT MGNT	Progress Meetings/Reports	8.5	$345.85	$0.00	$0.00	$0.00	$2,939.73
	Internal Status Meetings/Reports	8.5	$145.74	$0.00	$0.00	$0.00	$1,238.79
	Third-Party Vendor Interface	2	$69.71	$0.00	$0.00	$0.00	$139.42
	Interface to Other Internal Departments	3	$145.74	$0.00	$0.00	$0.00	$437.22
	Subtotal	**22**	---	**$0.00**	**$0.00**	**$0.00**	**$4,755.16**
OTHER COST	AWS Instances for Development	0	$0.00	$0.00	$0.00	$5,000.00	$5,000.00
	AWS Instances for Testing	0	$0.00	$0.00	$0.00	$5,000.00	$5,000.00
	Subtotal	**0**	---	**$0.00**	**$0.00**	**$10,000.00**	**$10,000.00**

Project Name:	SAAS Dockerization Project; GEMM	Requested By:	SAAS Development Group
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Proposed Start Date:	10/2/17	Proposed Finish Date:	6/15/18

		LABOR HOURS	LABOR COST ($)	MATERIAL COST ($)	TRAVEL COST ($)	OTHER COST ($)	
Totals		**512**	**$39,080.62**	**$0.00**	**$0.00**	**$10,000.00**	**$49,080.62**

Budget Explanation:

1. The hourly costs for the man-hours comes from the hourly rates of the employees' salaries. These numbers might
shift if different employees took any of the roles involved.

2. The hours for the three (3) phases comes from the projected schedule taken from interviews with the engineers.

3. The expenses for the AWS Instances was taken from an average of previous invoices.

Project Name:	SAAS Dockerization Project; GEMM	Requested By:	SAAS Development Group
Author:	Pamela Templin	Document:	RAM Table
Proposed Start Date:	10/2/17	Proposed Finish Date:	6/15/18

		Dept.:	DevOps	DevOps	DevOps	Development	Development	Management
		Name:	Sr. DevOps Engineer	Sr. DevOps Engineer	DevOps Engineer	Senior Engineer	Senior Engineer	VP of Engineering
		Role:	API Engineer	Systems Architect	Doc Review	User Exp Testing	Systems/ Debugging	Authority
WBS ID	**Task Description**	**Due Date**						
D1	**Docker Server**							
D2	Provision AWS Instances	10/6/17	A, I	R				I
D3	Install Docker	10/13/17	A	R				I
D4	Bootstrap Docker Registry	10/20/17	A	R				I
D5	Bootstrap HAProxy	11/3/17	A , C	R				I
D6	Documentation	11/6/17	A	R				I
D7	Review	11/7/17	A	C	R			I
K1	**Kubernetes Cluster**							
K2	Install Kubernetes deployment software	11/14/17	A, I	R				I
K3	Create custom AMI w/tools needed for cluster	12/5/17	A, R	I				I
K4	Configure framework to deploy instances	12/11/17	A, R	I				I

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Proposed Start Date:	10/2/17	Proposed Finish Date:	6/15/18

K5	Push deployments	12/13/17	A , C	R				I
K6	Documentation	12/14/17	A	R				I
K7	Review	12/15/17	A	C	R			I
G1	**Dockerized GEMM SW**							
G2	Configure build system to utilize Docker server as a packing point	3/23/18	A , C	R				I
G3	Test of image deployment	3/30/18	A	R				I
G4	Fix any bugs or discrepancies	4/20/18	A	C			R	I
G5	Developers perform user and app testing	5/11/18	A , C	C		R		I
G6	Fix any leftover bugs or discrepancies	6/1/18	A	C			R	I
G7	Documentation	6/8/18	A	R				I
G8	Review	6/15/18	A	C	R			I

Key			
[R] Responsible	The person that is *responsible* for producing the deliverables or task; should only be one person (can also be [R]).	**[C] Consulted**	People who must be consulted before a final decision can be made.
[A] Accountable	The person that is *accountable* for the deliverable or task; should only be one person (can also be [R]).	**[I] Informed**	The people who must be informed after any final decision has been made.

Project Name:	SAAS Dockerization Project; GEMM	Author:	Pamela Templin
Requested By:	SAAS Development Group	Document:	Risk Assessment
Proposed Start:	10/2/17	Proposed Finish:	6/15/18

Risk ID	1. BASIC RISK INFORMATION				
R1-P	Risk Description or Event Statement	Report Date	Impact H / M / L	Impact Description	Chance H / M / L
	If the increase in the complexity is too severe, the working set of systems might become destabilized.	9-12-17	HIGH	If destabilization occurs, the systems could be off-line while fail-over occurred.	HIGH
	2. RISK MITIGATION				
	Risk Responsibility	Mitigation Description			
	Systems Architect	Monitoring in place to make sure doesn't happen.			
	3. RISK CONTINGENCY				
	Contingency Description				
	If destabilization happens without fail-over, then environment rebooting would be required.				

Risk ID	1. BASIC RISK INFORMATION				
R2-A	Risk Description or Event Statement	Report Date	Impact H / M / L	Impact Description	Chance H / M / L
	There is a chance that a great deal of effort to update these systems might become destabilized.	9-12-17	MED	The project would end up costing the company money with no savings in the future.	LOW
	2. RISK MITIGATION				
	Risk Responsibility	Mitigation Description			
	Systems Architect	Research in advance			
	3. RISK CONTINGENCY				
	Contingency Description				
	Instead of on-demand, the company would move to spot instance pricing; the complexity would increase, but the savings would off-set that.				

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Requested By:	SAAS Development Group	Document:	Risk Assessment
Proposed Start:	10/2/17	Proposed Finish:	6/15/18

Risk ID	1. BASIC RISK INFORMATION			
R3-P	Risk Description or Event Statement	Report Date	Impact H / M / L	Impact Description	Chance H / M / L
	If there are unknown configurations, dependencies, etc, the SAAS offerings might ultimately be unsuitable for the Docker environment.	9-12-17	HIGH	The project would end up costing the company money with no future savings.	MED
	2. RISK MITIGATION				
	Risk Responsibility	Mitigation Description			
	Systems Architect and API Engineer	Research in advance			
	3. RISK CONTINGENCY				
	Contingency Description				
	Those offerings would have had their own individual environments.				

Risk ID	1. BASIC RISK INFORMATION			
R4-S	Risk Description or Event Statement	Report Date	Impact H / M / L	Impact Description	Chance H / M / L
	If the deployment framework doesn't work as well as expected, as in a node dies and then isn't replaced by AWS.	9-12-17	HIGH	Client access could be impaired.	LOW
	2. RISK MITIGATION				
	Risk Responsibility	Mitigation Description			
	Systems Architect	Have two spare nodes in place to take.			
	3. RISK CONTINGENCY				
	Contingency Description				
	It may be possible to bring up a node manually.				

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Requested By:	SAAS Development Group	Document:	Risk Assessment
Proposed Start:	10/2/17	Proposed Finish:	6/15/18

Risk ID	1. BASIC RISK INFORMATION				
R5-C	Risk Description or Event Statement	Report Date	Impact H / M / L	Impact Description	Chance H / M / L
	If there are other unknowns, the testing for user interface might reveal major bugs or security issues.	9-12-17	MED	To fix any serious bugs or security problems would require more time and would extend the project.	LOW
	2. RISK MITIGATION				
	Risk Responsibility	Mitigation Description			
	Systems Testing and Debugging Engineer	Research in advance and proper QA.			
	3. RISK CONTINGENCY				
	Contingency Description				
	Any bugs would be examined and code prepared to fix any issues.				