Module Roadmapping

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Abstract

This module addresses roadmapping.
Abstract

This article describes what a roadmap is, how to create and maintain a roadmap, the involvement of the stakeholders, and criteria for the structure of a roadmap.
The Roadmap Integrates Five Views

- **Customer objectives**
- **Application**
- **Functional**
- **Conceptual**
- **Realization**

**Market**

**Products**

**Technology**

**People**

**Process**

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time, ca 5 years

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Roadmapping 3  Gerrit Muller

version: 2.0  October 19, 2014  RSPRoadmapStructure
Granularity of Roadmap Material

- **Top-level roadmap**: Single page, Poster part of many presentations
- **Supporting roadmaps**: Single page per view or per driver, Poster part of many presentations
- **Supporting reports**: Document per relevant subject
Problems that Occur without Roadmapping

- Frequent changes in product policy
- Late start up of long lead activities, such as people recruitment and process change
- Diverging activities of teams
- Missed market opportunities
Management with a Limited Horizon

2012  2013  2014

Feature still unknown

Do!

Stop

Do!
Roadmapping
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October 19, 2014
ROADanalogManagement
Creation or Update of Roadmap in Burst Mode

Market
Products
Technology
People
Process

Collective meeting ca 2 days
Collective meeting ca 2 days
Collective meeting ca 2 days

Roadmap

Shared Roadmap

preparation by expert teams
2 weeks to digest and prepare
2 weeks to digest and prepare

Roadmapping
Gerrit Muller
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ROADbursts
Typical Stakeholders of a Roadmap

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>business manager</td>
<td>overall enterprise responsible</td>
</tr>
<tr>
<td>marketing manager(s)</td>
<td>discipline or line managers</td>
</tr>
<tr>
<td>people, process, and technology manager manager(s)</td>
<td></td>
</tr>
<tr>
<td>operational manager(s)</td>
<td>project or program managers</td>
</tr>
<tr>
<td>architect(s)</td>
<td></td>
</tr>
</tbody>
</table>
Target of the First Session

Shared vision on market

First iteration of possible products as an answer to the market

Share technology status, as starting point for technology roadmap

Explore people and technology status, to identify main issues
Target of the Second Session

- Obtaining a shared vision on the desired technology roadmap
- Sharing the people and process issues required for the products defined in the first iteration
- Analyzing a few scenarios for products, technologies, people, and process
## The Roadmap Update Visualized in Time

<table>
<thead>
<tr>
<th>Market:</th>
<th>What is needed by the customers?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products:</td>
<td>How to package technologies into products to fulfill market needs?</td>
</tr>
<tr>
<td>Technology:</td>
<td>What technological trends are relevant? What technologies are needed?</td>
</tr>
<tr>
<td>People:</td>
<td>What kind of and how many people are required to realize the products and technologies?</td>
</tr>
<tr>
<td>Process:</td>
<td>What processes are required to let these people realize the products and technologies?</td>
</tr>
</tbody>
</table>

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**Roadmapping**

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ROADsequence

[HBV Embedded Systems Innovation]
From Roadmap to Detailed Plans

Roadmapping

Policy and Planning Process

Product Creation Process

Business plan: budget & allocation

201X

Q2 Q3 Q4

roadmap n

roadmapping

201Y

Q1 Q2 Q3 Q4

roadmap n + 1

budget

Q1 delta

Q2 delta

Q3 delta

budget

Q1 delta

Detailed planning

market events

tech hurdle

market events

tech hurdle

market events

tech hurdle

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ROADbudgetPlan
# 3-Tier Approach

<table>
<thead>
<tr>
<th></th>
<th>horizon</th>
<th>update</th>
<th>scope</th>
<th>type</th>
</tr>
</thead>
<tbody>
<tr>
<td>roadmap</td>
<td>5 years</td>
<td>1 year</td>
<td>portfolio</td>
<td>vision</td>
</tr>
<tr>
<td>budget</td>
<td>1 year</td>
<td>3 months</td>
<td>program</td>
<td>commitment</td>
</tr>
<tr>
<td>detailed plan</td>
<td>1 mnth-1yr</td>
<td>1 day-1 mnth</td>
<td>program or activity</td>
<td>control means</td>
</tr>
</tbody>
</table>
Selection of most important or relevant issues
Key drivers as a means to structure the roadmap
Nothing is certain; ambiguity is normal
Use facts whenever possible
Don’t panic in case of impossibilities
Recognizable issues for all stakeholders

Clear positioning in time; uncertainty can be visualized

The main events (enabling or constraining) must be present

Limited amount of information to maintain the overview
### Sources of Facts

<table>
<thead>
<tr>
<th>Source</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market analysis reports</td>
<td>number of customers, market size, competition, trends</td>
</tr>
<tr>
<td>Installed base</td>
<td>change requests, problem reports, historical data</td>
</tr>
<tr>
<td>Manufacturing (statistical process control)</td>
<td>statistical process control</td>
</tr>
<tr>
<td>Suppliers (roadmaps, historical data)</td>
<td>roadmaps, historical data</td>
</tr>
<tr>
<td>Internal reports (technology studies, simulations)</td>
<td>technology studies, simulations</td>
</tr>
</tbody>
</table>
Causes for Overestimation

Quantization effects of small activities (the amount of time is rounded to manweeks/months/years)

Uncertainty is translated into margins at every level (module, subsystem, system)

Counting activities twice (e.g., in technology development and in product development)

Quantization effects of persons/roles (full time project leader, architect, product manager, et cetera per product)

Lack of pragmatism (technical ambition is not too bad during the roadmap process, as long as it does not pre-empt a healthy decision)

Too many bells and whistles without business or customer value
Abstract

The lifecycle of a product category in the market determines many aspects of the architecting approach. The lifecycle consists typical of 4 phases: infancy, adolescence, mature and aging. A discontinuity in market success is seen in the transition from one phase to the next phase. The explanation given is that the phases differ in characteristics and require different approaches. The right approach for one phase is sub optimal for the next phase. A set of characteristics per phase is given and the consequences for architecting are discussed.
Ideal Bathtub Curve

- Infancy
- Adolescence
- Maturity
- Aging

- sales volume
- time
- decline
- stable
- growth
- taking shape

Market Product Life Cycle Consequences for Architecting
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MPLifecycleGraphIdeal
Market Product Life Cycle Phases in Practice

Infancy
Adolescence
Maturity
Aging

sales volume

time

ideal "bathtub" curve

observed curve

product unable to make transition

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MPLifecycleGraphPractical

Market Product Life Cycle Consequences for Architecting
Gerrit Muller
Examples of Product Classes on the Curve

- Infant: functional MRI
- Middle Childhood: digital TV
- Adolescence: DVD+RW, flat TV
- Mature: MRI scanner, DVD
- Elder: X-ray systems, VCR, TV

Market Product Life Cycle Consequences for Architecting

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MPLifecycleGraphExamples
## Attributes per Phase

<table>
<thead>
<tr>
<th></th>
<th>Infancy</th>
<th>Adolescence</th>
<th>Mature</th>
<th>Ageing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Driving factor</strong></td>
<td>Business vision</td>
<td></td>
<td>Stable business model</td>
<td>Harvesting of assets</td>
</tr>
<tr>
<td><strong>Value from</strong></td>
<td>Responsiveness</td>
<td>Features</td>
<td>Refinements / service</td>
<td>Refining existing assets</td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td>Discovery</td>
<td>Select strategic</td>
<td>Prioritize</td>
<td>Low effort high value only</td>
</tr>
<tr>
<td><strong>Dominant technical concerns</strong></td>
<td>Feasibility</td>
<td>Scaling</td>
<td>Legacy</td>
<td>Lack of product knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Obsolescence</td>
<td>Low effort for obsolete technologies</td>
</tr>
<tr>
<td><strong>Type of people</strong></td>
<td>Inventors &amp; pioneers</td>
<td>Few inventors &amp; pioneers</td>
<td>&quot;Engineers&quot;</td>
<td>&quot;Maintainers&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;designers&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Chaotic</td>
<td></td>
<td>Bureaucratic</td>
<td>Budget driven</td>
</tr>
<tr>
<td><strong>Dominant pattern</strong></td>
<td>Overdimensioning</td>
<td>Conservative expansion</td>
<td>Midlife refactoring</td>
<td>UI gadgets</td>
</tr>
</tbody>
</table>

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**Market Product Life Cycle Consequences for Architecting**

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MPLattributes
From Market, Product, Technology to People, Process

![Diagram showing the flow from Market, Product, Technology to People, Process]

- **Customer objectives**
  - Application
  - Functional
  - Conceptual

- **Technology**
  - Market
  - Products
  - Software

- **People**

- **Process**

### Table: Estimate by People Manager vs. Program Manager

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Orion</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Gemini</td>
<td>2</td>
<td>10</td>
<td>10</td>
<td>30</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td>20</td>
<td>40</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Scorpion</td>
<td>54</td>
<td>70</td>
<td>70</td>
<td>20</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Research</td>
<td>4</td>
<td>11</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Maintenance</td>
<td>22</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>132</td>
<td>136</td>
<td>128</td>
<td>101</td>
<td>95</td>
</tr>
</tbody>
</table>

- **Feedback**

- **After iteration**

- **System**
- **Electronics**
Summary of strategy process

- **Mission**: Business specific, but open and generic
- **Vision**: Input focus on roadmap

<table>
<thead>
<tr>
<th>Gemini</th>
<th>2002</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>300</td>
<td>70</td>
<td>90</td>
<td>100</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>$12\times7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systems</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optics</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>70</td>
<td>90</td>
<td>100</td>
<td>105</td>
</tr>
</tbody>
</table>

- **People**: Process, market, technology, products

- **Reality Facts**: Context overview

- **Input for Next Roadmap**

- **Sharpen Committal Plan**

Exercise Roadmapping
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RSPsummary
Make a roadmap on the basis of what you know at this moment, or what you perceive as the "shared expectation". Try to fill in as many views (market, products, technology, people and process) as possible. Present an overview by minimizing the contents to the most essential data.
Roadmap Creation

The Roadmap Integrates Five Views

- Customer objectives
- Market
- Functional
- Products
- Conceptual
- Technology
- Realization
- People
- Process
- time, ca 5 years

Multiple Levels

- Top-level roadmap
  - Single page
  - Poster
  - part of many presentations
- Supporting roadmaps
  - Single page per view or per driver
  - Poster
  - part of many presentations
- Supporting reports
  - Document per relevant subject

Creation in Teams

- Market
  - Market
    - Collective meeting ca 2 days
      - preparation by expert teams
      - 2 weeks to digest and prepare
  - Market
    - Collective meeting ca 2 days
      - 2 weeks to digest and prepare

Order of Creation

- Market: What is needed by the customers?
- Technology: What technological trends are relevant? What technologies are needed?
- People: What kind of and how many people are required to realize the products and technologies?
- Process: What processes are required to let these people realize the products and technologies?