



Theodo
Group

Right-First-Time Code: Early Defect Detection for Product Teams

UXDX - 9/10/2024



Software is eating the world

Marc Andreessen, 2011

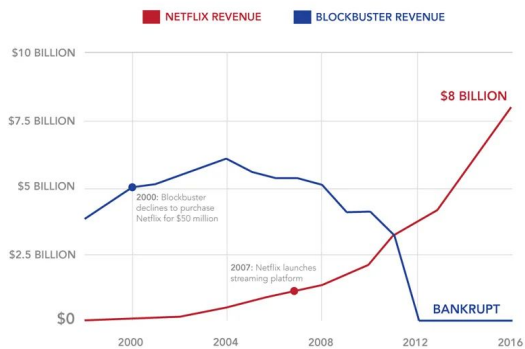
Cofounder of Mosaic, Netscape, Opsware and
VC firm Andreessen Horowitz





It started 20 years ago when American startups disrupted entire sectors using software

NETFLIX VS. BLOCKBUSTER (1998 - 2016)



Source: Disrupted or Disrupter: Which One Will You Be? (Cloud Technology Partners, 2017)

NETFLIX

Amazon is now worth 2.5 Walmarts

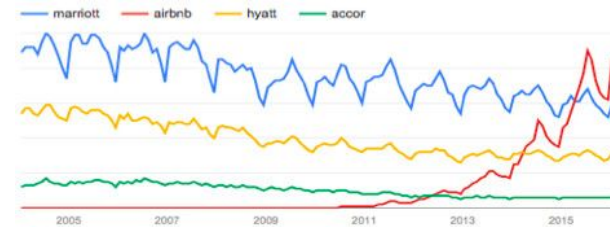
Daily market cap



Source: FactSet

amazon

Airbnb - interest over time



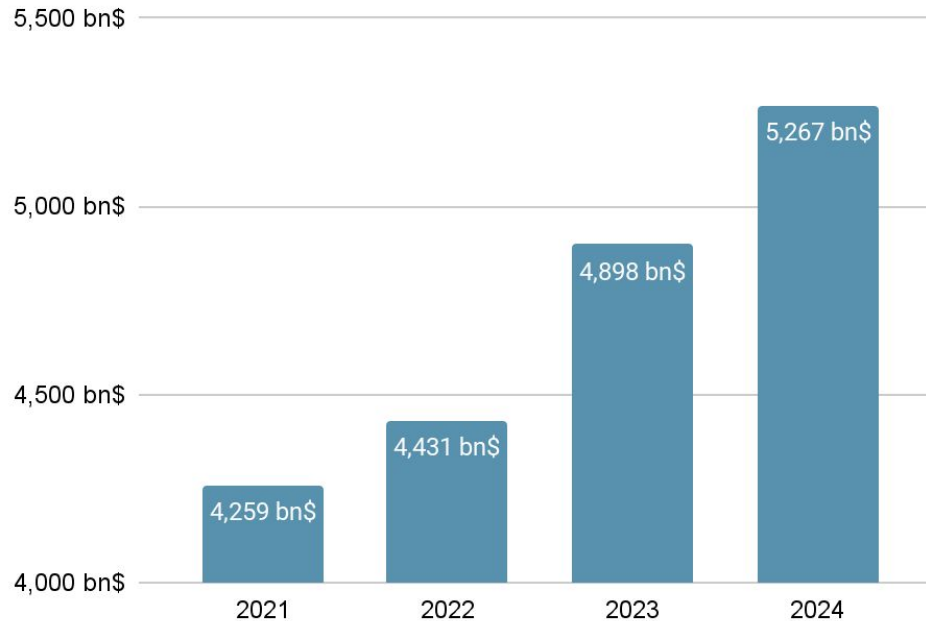
Source: Interest over time - web search worldwide, 2004 - 2016, Google





Recent global events have not changed Gartner's expectations of further growth in IT spending, to reach 5.3 trillion\$ in 2024

Gartner Worldwide IT Spending Forecast



<https://www.gartner.com/en/newsroom/press-releases/2024-07-16-gartner-forecasts-worldwide-it-spending-to-grow-7-point-5-percent-in-2024>

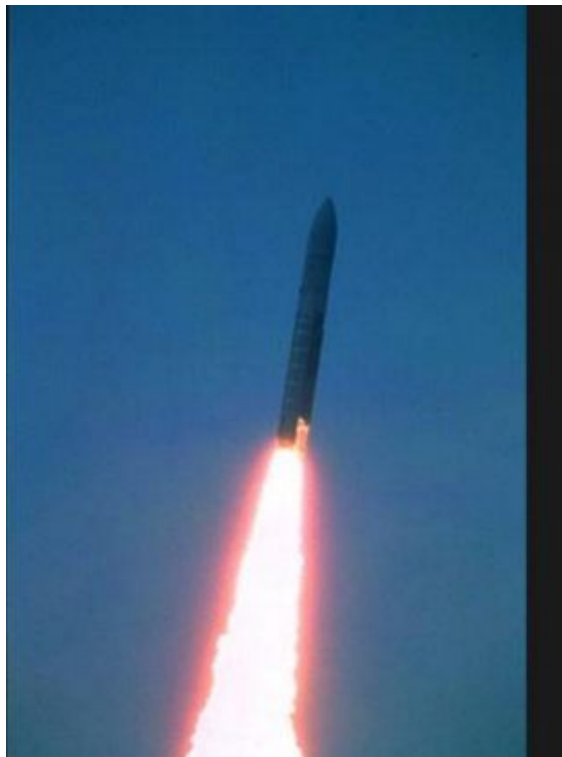


Good news for tech product teams?



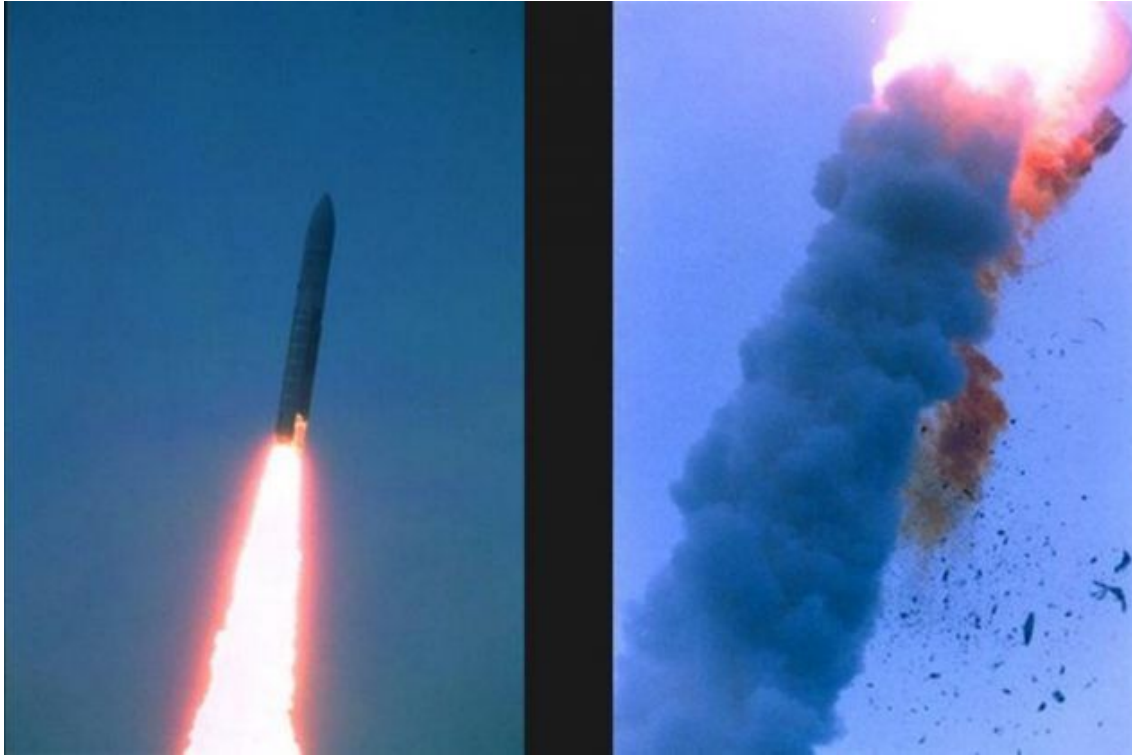


Good news for tech product teams?





Until bugs start having expensive consequences. For example this 500 m\$ firework





Due to a 32bit integer passed to a function expecting 16bit integers...

```
-- Overflow is correctly handled for the vertical component
L_M_BV_32 := TBD.T_ENTIER_16S((1.0 / C_M_LSB_BH) *
                                G_M_INFO_DERIVE(T_ALG.E_BH));

if L_M_BV_32 > 32767 then
  P_M_DERIVE(T_ALG.E_BV) := 16#7FFF#;
elseif L_M_BV_32 < -32768 then
  P_M_DERIVE(T_ALG.E_BV) := 16#8000#;
else
  P_M_DERIVE(T_ALG.E_BV) := UC_16S_EN_16NS(TBD.T_ENTIER_16S(L_M_BV_32));
end if;

-- But not for the horizontal one
P_M_DERIVE(T_ALG.E_BH) := UC_16S_EN_16NS(TBD.T_ENTIER_16S((1.0 / C_M_LSB_BH) *
                                G_M_INFO_DERIVE(T_ALG.E_BH)));
```

Source: <https://www-users.cse.umn.edu/~arnold/disasters/ariane5rep.html>



And that's despite the extreme quality processes in the space industry!



To add GPS to the shuttle navigation requires
6,366 lines of code...

Source: <https://www.fastcompany.com/28121/they-write-right-stuff>



And that's despite the extreme quality processes in the space industry!



To add GPS to the shuttle navigation requires
6,366 lines of code...
... and 2,500 pages of specs before that.

Source: <https://www.fastcompany.com/28121/they-write-right-stuff>



And that's despite the extreme quality processes in the space industry!



To add GPS to the shuttle navigation requires
6,366 lines of code...
... and 2,500 pages of specs before that.

For the whole program, the specs are 40,000
pages long.

Source: <https://www.fastcompany.com/28121/they-write-right-stuff>



What does 40,000 pages look like?



That's Margaret Hamilton, NASA's first software engineer

That's the Apollo Guidance Computer (AGC) source code she wrote, that sent the first men to the moon

Source: <https://skeptics.stackexchange.com/questions/31602/is-this-a-photo-of-margaret-hamilton-standing-next-to-apollo-project-code-that-s>



What does 40,000 pages look like?



That's Margaret Hamilton, NASA's first software engineer

That's the Apollo Guidance Computer (AGC) source code she wrote, that sent the first men to the moon

That's only 11,000 pages

Source: <https://skeptics.stackexchange.com/questions/31602/is-this-a-photo-of-margaret-hamilton-standing-next-to-apollo-project-code-that-s>



That's 40,000 pages





So which practices for a future world full of software?

Quality
required



4 pages of specs for
every 10 lines of code

Scalable to
millions of devs

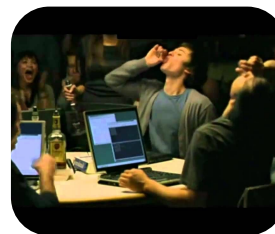


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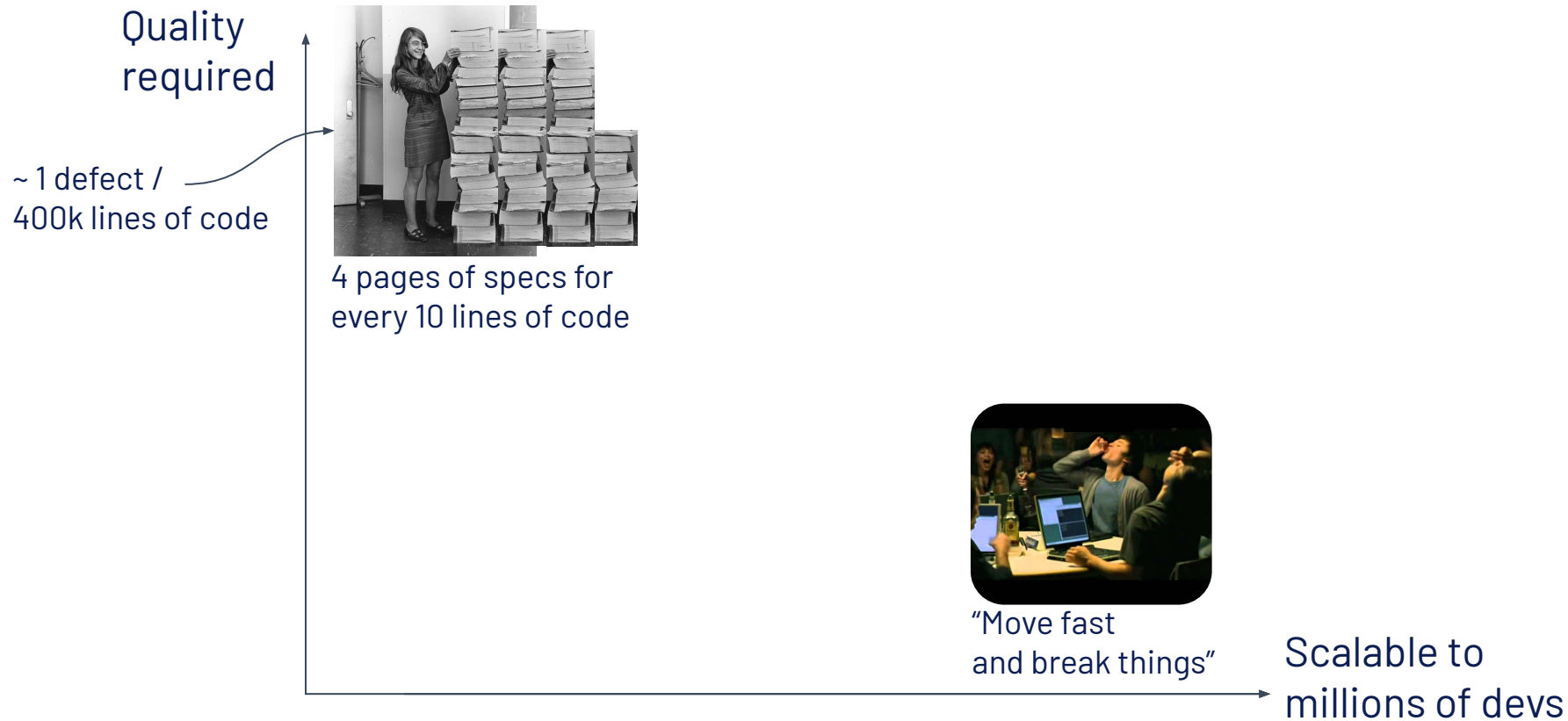


"Move fast
and break things"

Scalable to
millions of devs

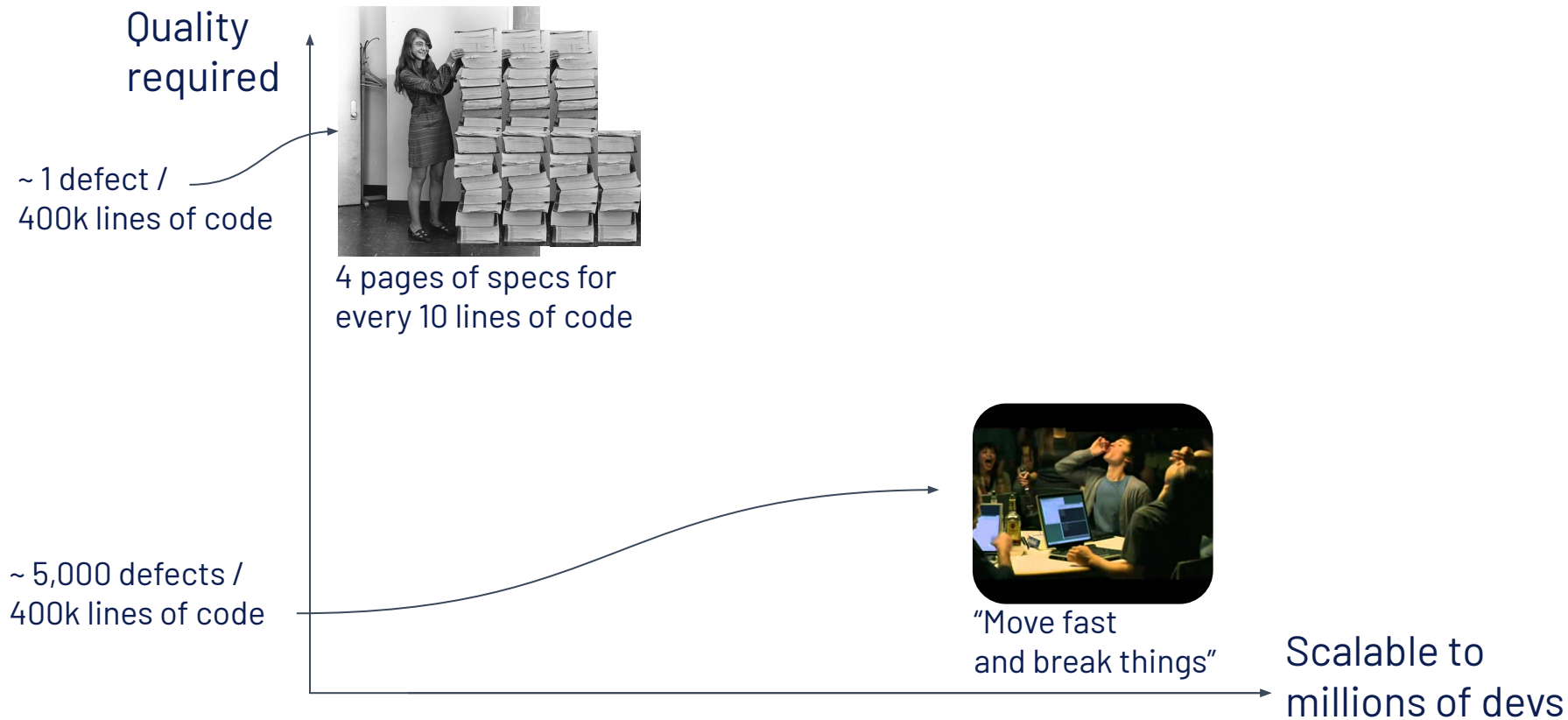


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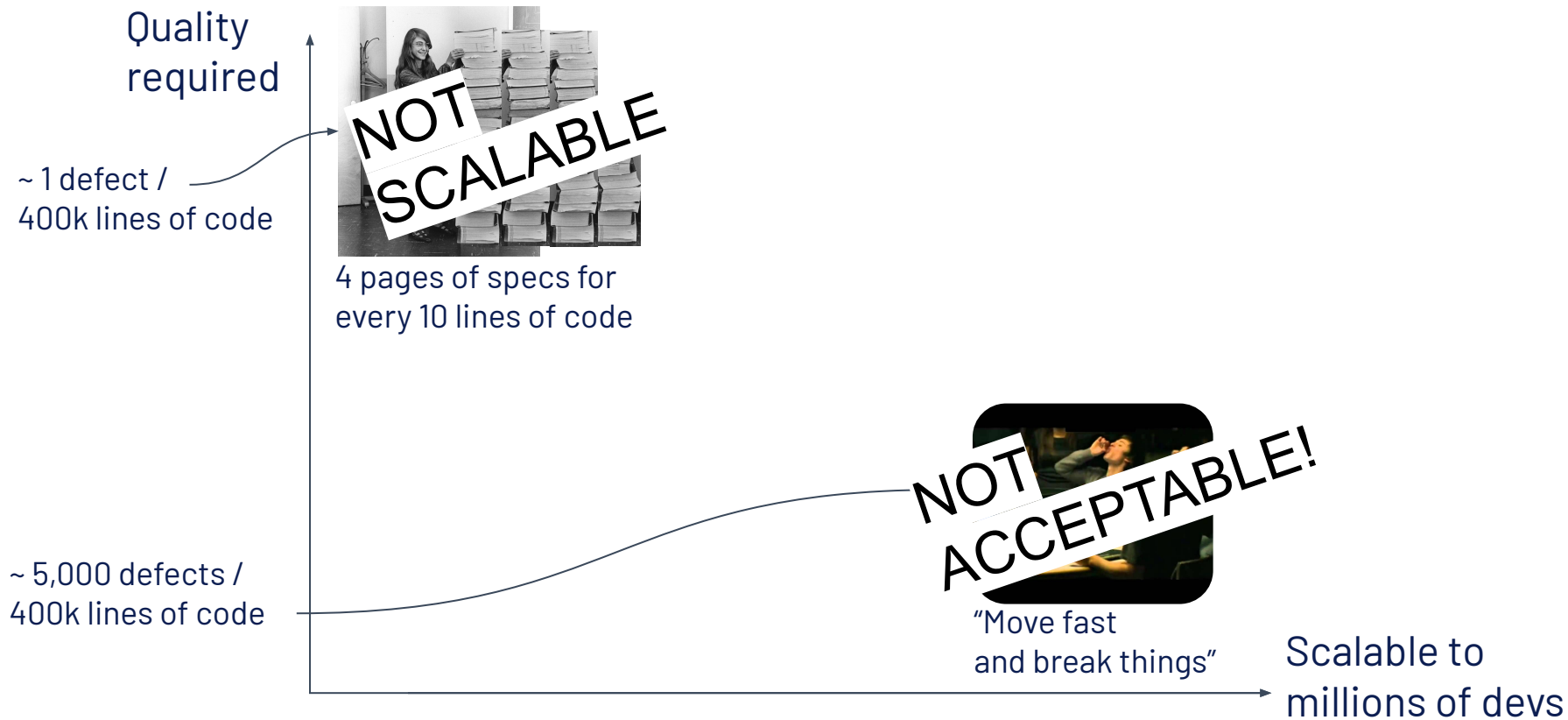


So which practices for a future world full of software?



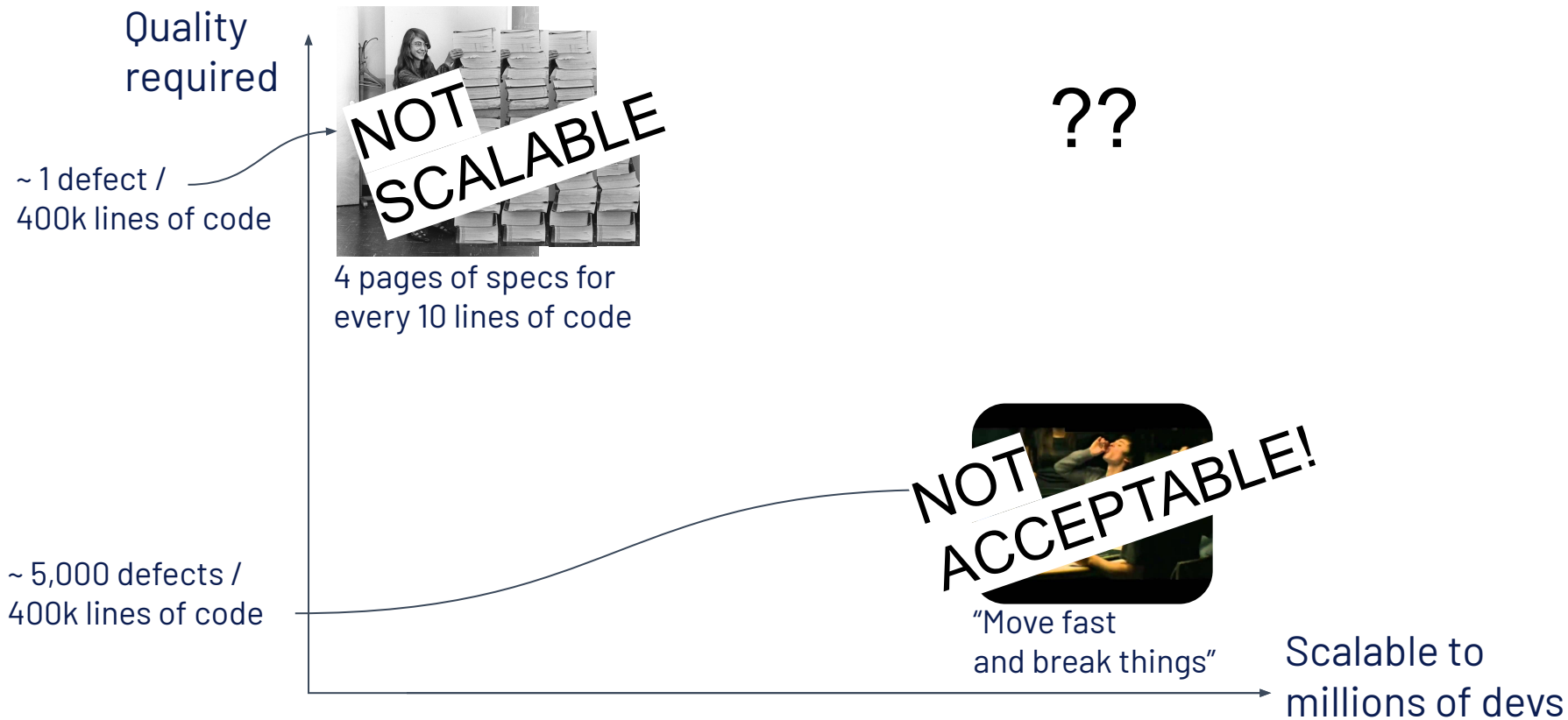


So which practices for a future world full of software?





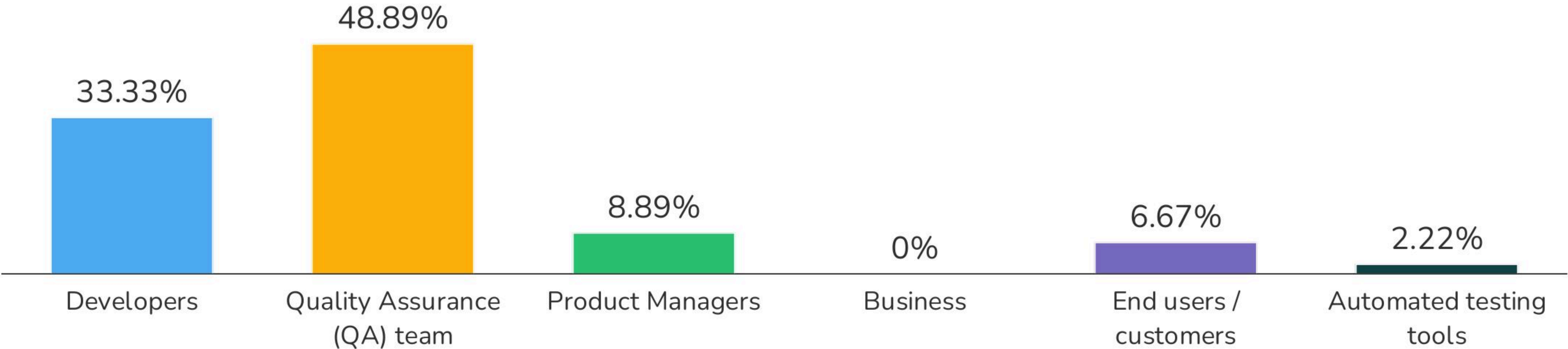
So which practices for a future world full of software?



```
<div id="keywords_info_bar">  
  <div style="float: left;" for="keywords">  
    <div class="field_information_container">  
      <div id="keywords_count_info" class="field_information">  
        <div style="margin-top: -3px;"></div>  
      <div id="keywords_log" class="field_information">  
        <div></div>  
      </div>  
    </div>  
  </div>  
</div>
```

Shared experiences on how you measure defects and track improvement in your organisation?

Who is responsible for identifying defects in your products?



```
<div id="keywords_info_bar">  
  <div style="float: left;" for="keywords">  
    <div class="field_information_container">  
      <div class="keywords_count_info" class="field">  
        <a href="#">keywords</a>  
      </div>  
      <div id="keywords_log" class="field">  
        <div class="field">  
          <div class="field">  
            <div class="field">  
              <div class="field">  
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                  <div class="field">  
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        </div>  
      </div>  
    </div>  
  </div>  
</div>
```

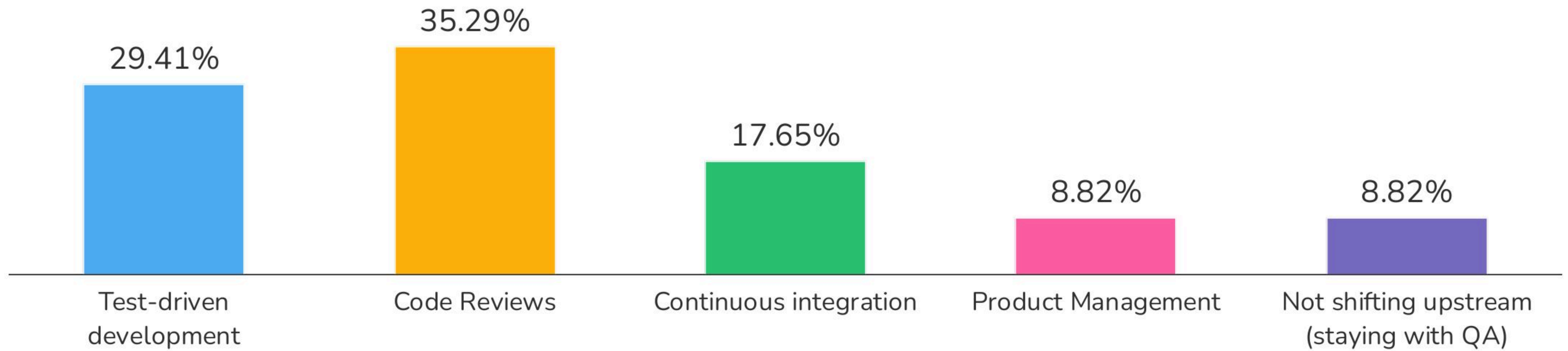


Shared experiences of the furthest left you have shifted detection of defects?

```
<div id="keywords">  
  <div class="tag-editor">  
    <div class="tag-editor">  
      <div class="tag-editor">  
        <div class="tag-editor">  
          <div class="tag-editor">  
            <div class="tag-editor">  
              <div class="tag-editor">  
                <div class="tag-editor">  
                  <div class="tag-editor">  
                    <div class="tag-editor">  
                      <div class="tag-editor">  
                        <div class="tag-editor">  
                          <div class="tag-editor">  
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                      </div>  
                    </div>  
                  </div>  
                </div>  
              </div>  
            </div>  
          </div>  
        </div>  
      </div>  
    </div>  
  </div>  
</div>
```

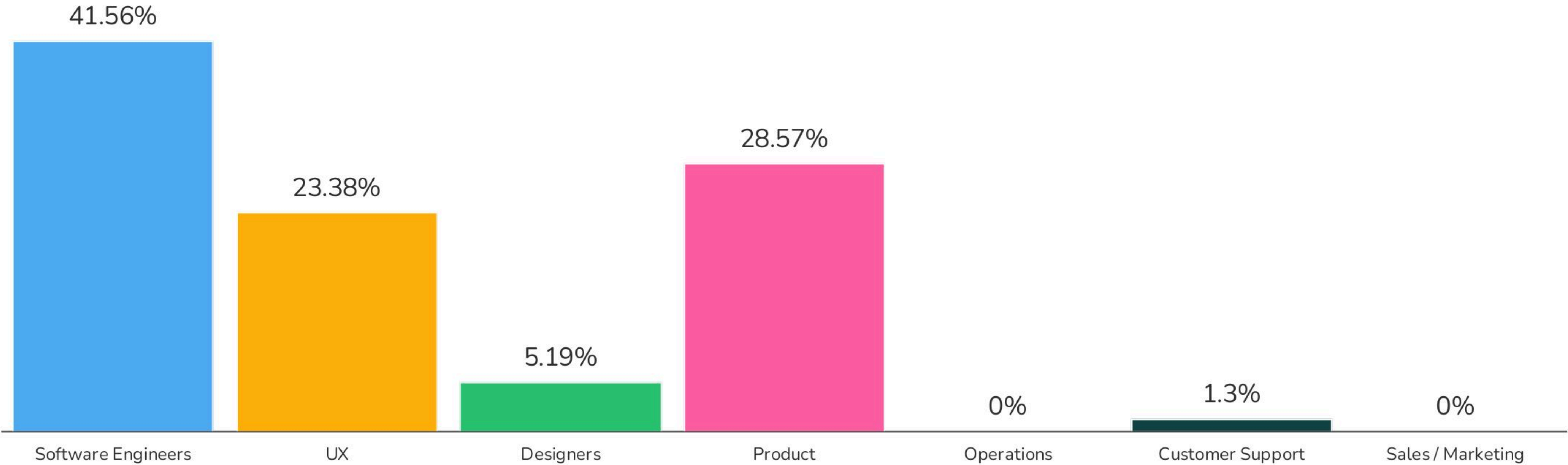


What is the furthest left you have shifted detection of defects?



Shared experiences on systematic learning from defects?

Who's involved in learning from defects?



Thank you!



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