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Michael Kelly, www.MichaelDKelly.com

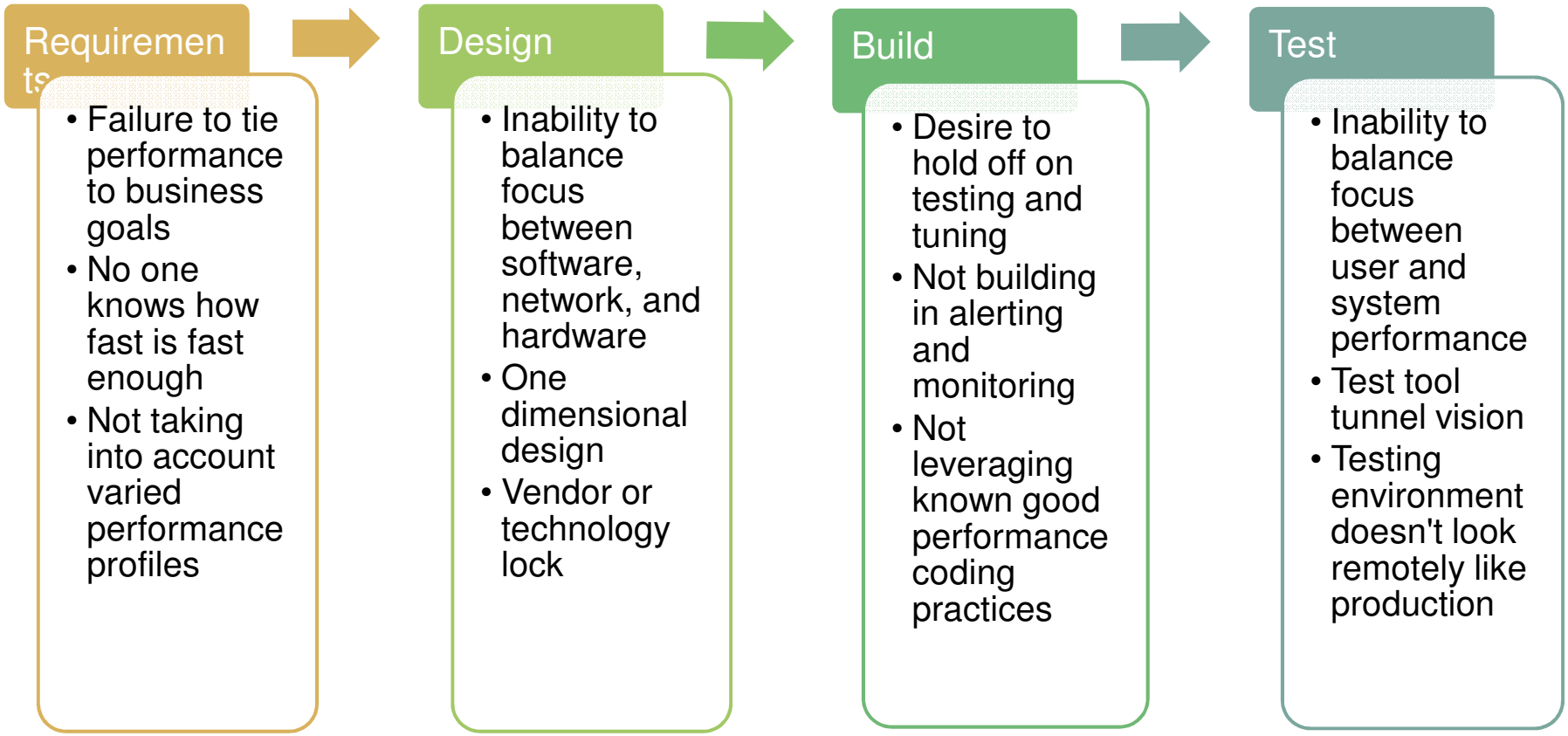
PERFECTING APPLICATION PERFORMANCE BUILDS

Advice on issues relating to requirements, design, build and test phases

It's about tradeoffs

- Application performance is often a series of tradeoffs that occur throughout requirements, design, build, and test phases:
  - You have classic project pressures: timelines and budgets
  - You have process tradeoffs: waterfall vs. agile
  - You have technology tradeoffs: open source vs. commercial
  - You have feature tradeoffs: "ability to upload documents of unlimited size"
  - You have people tradeoffs: differing areas of expertise

Common Problems



Requirements

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Failure to tie performance to business goals

The problems

- Few teams take the time to tie application performance to business metrics: (revenue, user satisfaction, repeat visits, etc…)
- Examples:
  - Bing
  - Yahoo!
  - Shopzilla
  - Netflix

Some solutions

- Take the time to define both top-line and bottom-line application business metrics
- Work to prioritize that list of metrics to better understand what's most important (creating tiers can help)
- Identify what processes and transactions will affect those key metrics

No one knows how fast is fast enough

The problems

- Failure to analyze production
- No one knows how fast is fast enough
- Even if they do, no one knows how fast an individual component needs to perform to achieve overall performance goals
- Performance requirements, goals, and targets become guesses

Some solutions

- Build a cross-functional teams to provide performance recommendations
- Tie performance to business goals, not to “industry standards”
- Define SLAs across the application

Not taking into account varied performance profiles

The problems

- Many applications have different performance profiles
  - Go-live looks different than steady state
  - Different quarters have different performance profiles
  - Etc…

  and they failure to capture different requirements based on these different needs

Some solutions

- When you define your usage models, take into account different aspects of your business:
  - Seasonal variance
  - New product release
  - Advertising campaign or new partnership
  - New company acquisition
  - Etc…

Design

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Inability to balance focus between software, network, and hardware

The problems

- Separate teams for networking, hardware, databases, application development
- The application team is overly focused on the software, not thinking of deployment hardware and configuration
- Develop software solutions to problems that can be solved by other methods

Some solutions

- Get people moving between teams to help build a more balanced perspective
- When designing performance solutions (clustering, load balancing, monitoring, etc…) involve other teams

One dimensional design

The problems

- Overly focused on how "beautiful" the application will be
- Overly focused on replicating the design of an existing system
- Overly focused on leveraging a specific technology

Some solutions

- Try using mocked up side-by-side comparisons
  - performance impact
  - A/B testing
  - Etc…
- Involve outside consultants
- Design workshops with experts in different technologies

Vendor or technology lock

The problems

- Inability to evaluate other vendors or technologies to solve the problem
  - application servers
  - queuing technologies
  - databases
  - service providers
  - switches/routers
  - etc…

Some solutions

- Design workshops with experts in different technologies
- When you've got your final technology stack, ask yourself if you really "selected" each technology or if you're only using it because it's "the default"

Build

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Desire to hold off on testing and tuning

The problems

- No performance testing at the unit, component, service level
- An attitude that says tuning should be held off until testing
- Compartmentalized development teams

Some solutions

- Provide developers with the tools and time to do unit level performance testing
- Make sure teams can hit component level-performance goals *before* integration begins
- When you review performance results, invite the consumers of your software to attend and provide feedback

Not building in alerting and monitoring

The problems

- Didn't plan for alerting and monitoring in the design
- You plan for alerting and monitoring, but the project falls behind and it's an "optional" feature
- Trusting that alerting and monitoring are features of your tool or technology selections
- Not leveraging the alerting and monitoring features of your tool or technology selections

Some solutions

- Do sequence diagram walkthroughs
- Have some backup monitoring tools
- Add project tasks to explore the alerting and monitoring features of the tools/technologies you're using

Not leveraging known good performance coding practices

The problems

- Not leveraging known good performance practices
  - reduce DNS lookups
  - optimizing images
  - working effectively with Ajax
  - etc…

Some solutions

- Just-in-time training
- External audit
- Contests to optimize code

Test

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Inability to balance focus between user and system performance

The problems

- Overly focused on end user performance
- Overly focused on transactional performance
- Overly focused on web application performance

Some solutions

- For one or two early tests, take the time track a transaction through every level of the system and get individual timings under load

Test tool tunnel vision

The problems

- Inability to evaluate or leverage multiple technologies to solve the problem
  - testing tools
  - monitoring tools
  - virtual environments
  - etc…

Some solutions

- Create a portfolio of tools, grouped by technology
- Leverage multiple tools at the same time
- Develop the habit of validating numbers using multiple methods

Testing environment doesn't look remotely like production

The problems

- Hardware: underpowered, miss-configured, shared deployments, etc…
- Data: too few records, non-representative, etc…
- Network: reduced bandwidth, miss-configured , etc…
- Load generation: load not distributed, IP spoofing, etc…

Some solutions

- Hardware, network, and configuration comparison spreadsheets
- Dumps of data from production or processes that generate data
- Setup a load generation configuration standard for your organization
- Bring in someone to audit your load generation configuration

Resources

Articles

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Presentations

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Books

- Meier, J.D., Carlos Farre, Prashant Bansode, Scott Barber, and Dennis Rea. Performance Testing Guidance for Web Applications. Microsoft, 2007.
- Menasce, Daniel A., Virgilio A. F. Almeida. Capacity Planning for Web Services. Prentice Hall, 2002.
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- Smith, Connie U. Performance Engineering of Software Systems. Addison-Wesley, 1990.

Thank You

Questions?

Michael Kelly

Email: mike@michaeldkelly.com
Twitter: michael_d_kelly
LinkedIn: michaeldkelly

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