

ThoughtWorks®

51Testing

互联网+时代下的软件测试思与变

刘冉
2017.4

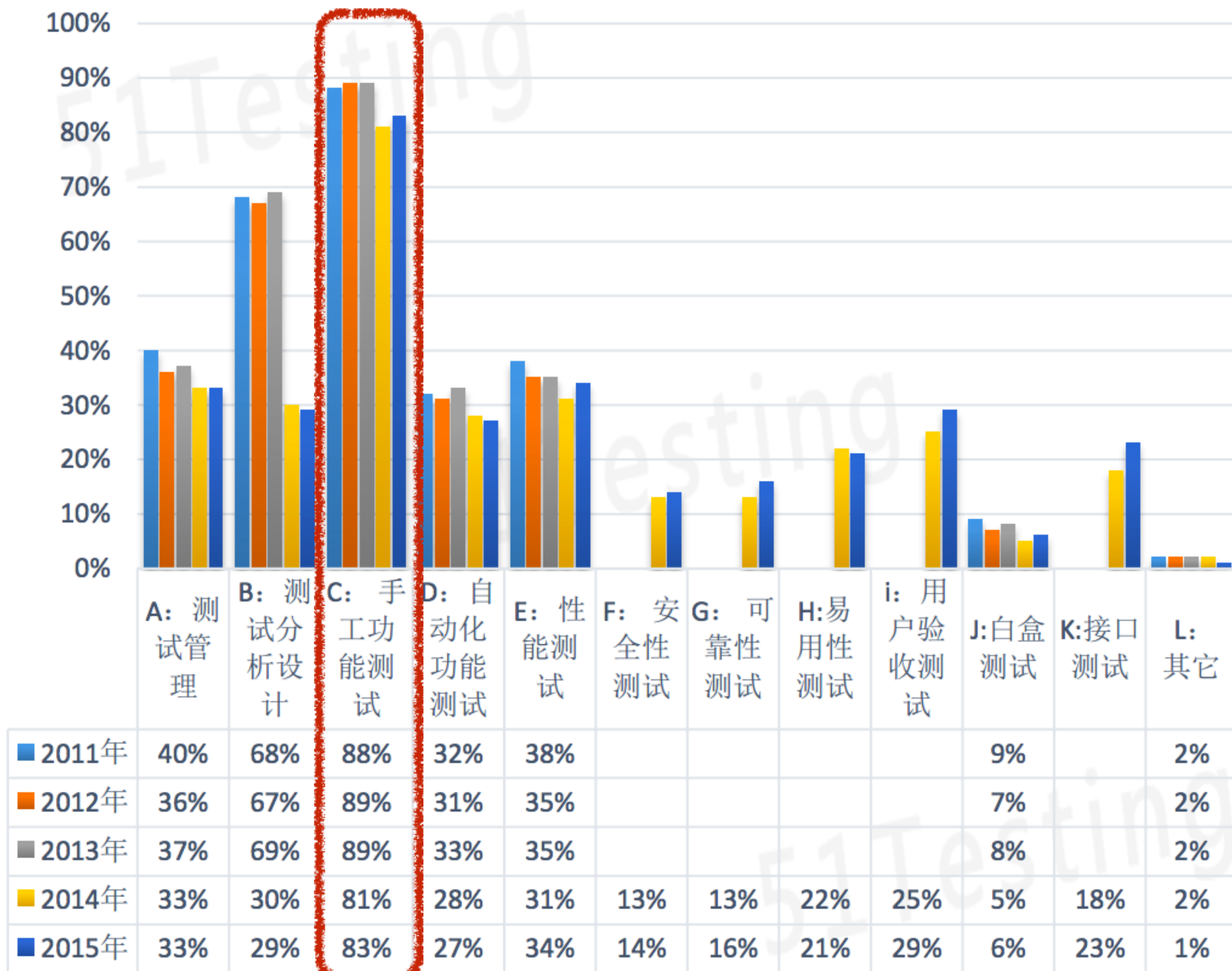


议程

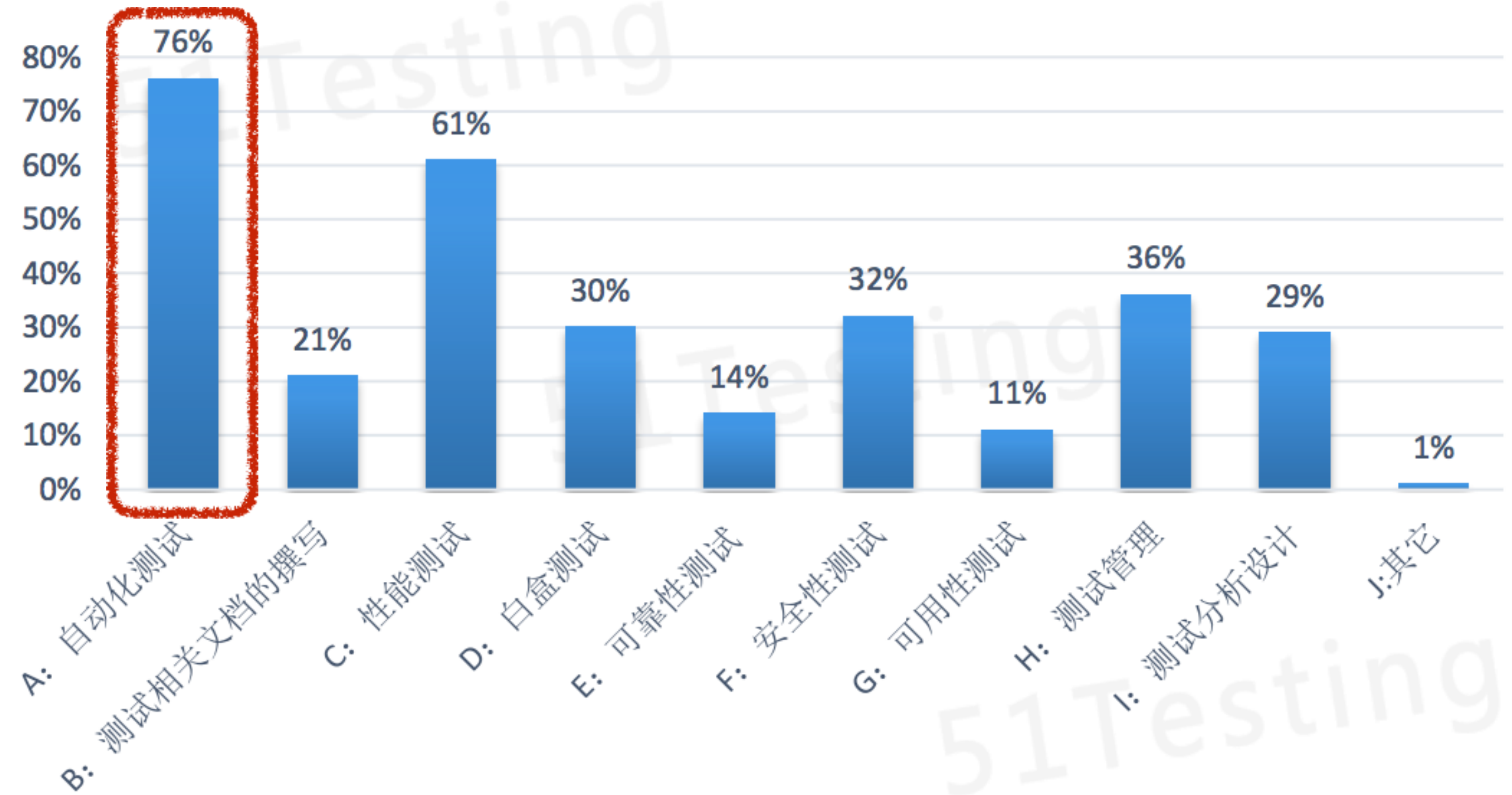
- 测试全自动化 - (持续交付)
- 提高测试效率与降低测试成本 - (DEVOPS, 云, 开源)
- 业务价值优化 - (产品环境下的QA)
- 微服务 (MICRO SERVICES) 与无服务器 (SERVERLESS) 的测试
- 其他的一些测试趋势

测试的现状

历年软件测试从业人员从事的测试工作类型分布



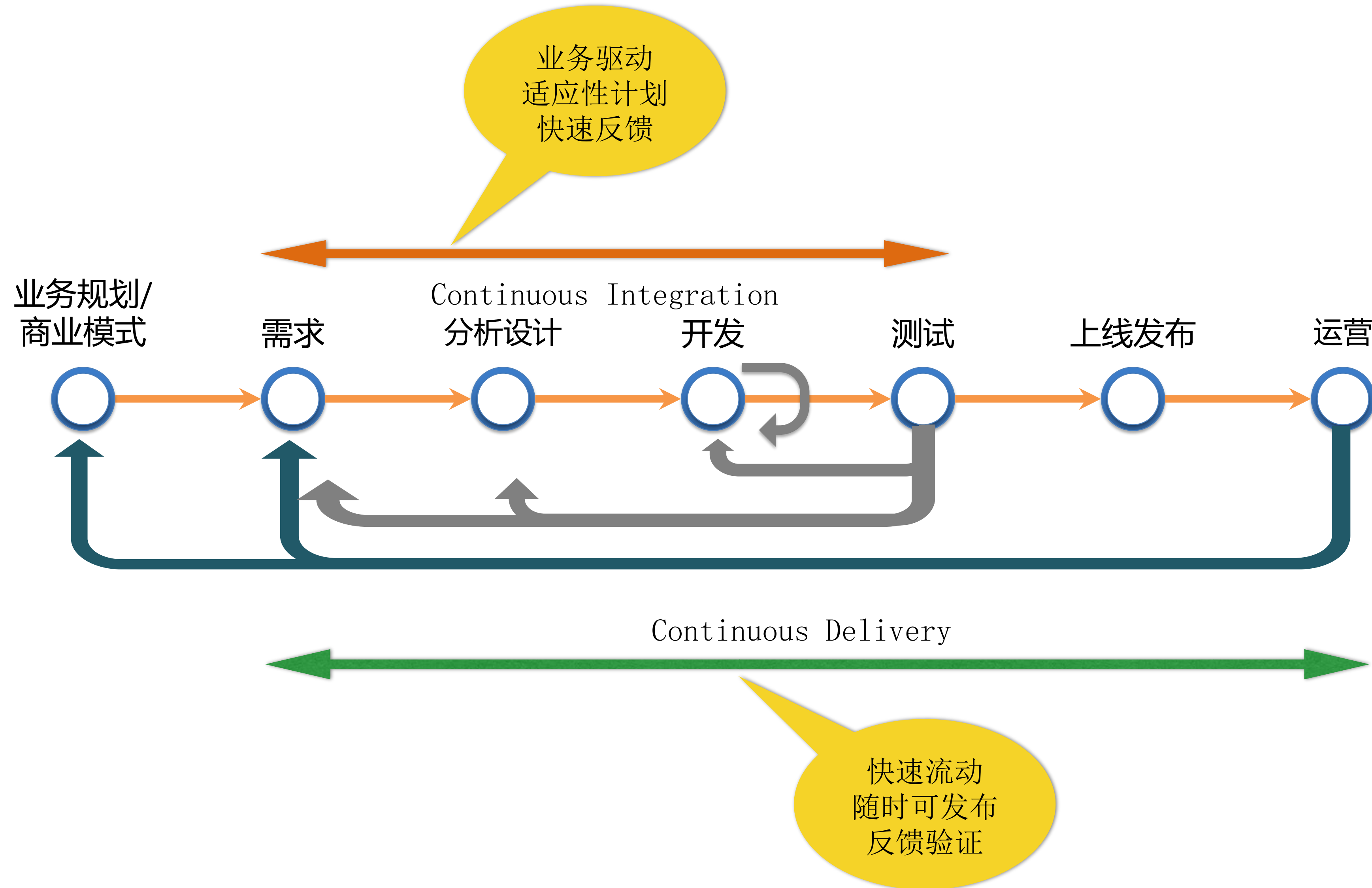
2015年软件测试人员希望提高的软件测试技能



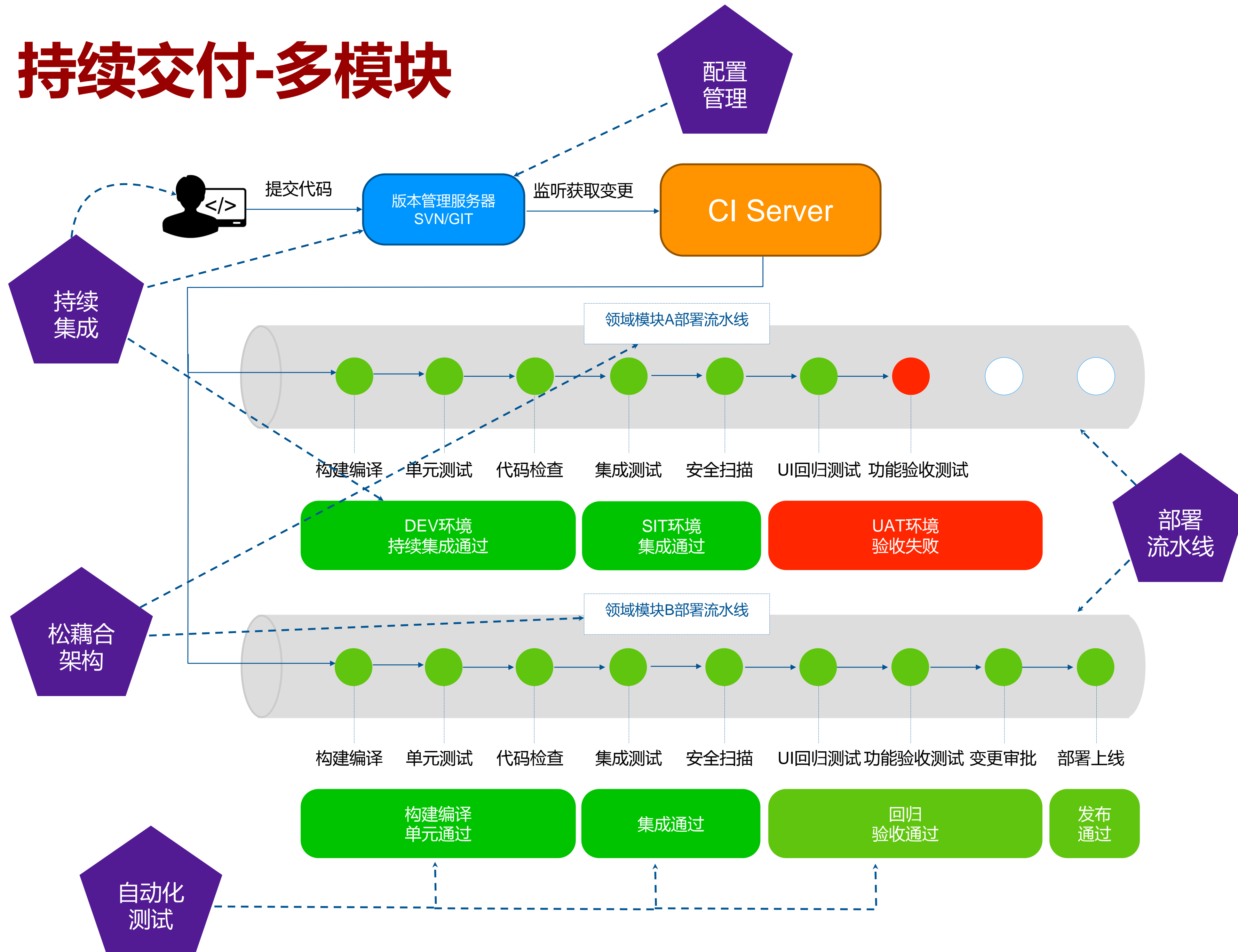
测试全自动化

快速、高质量交付能力实现持续交付

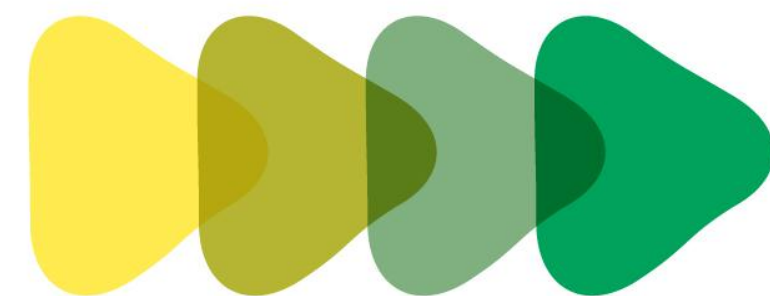
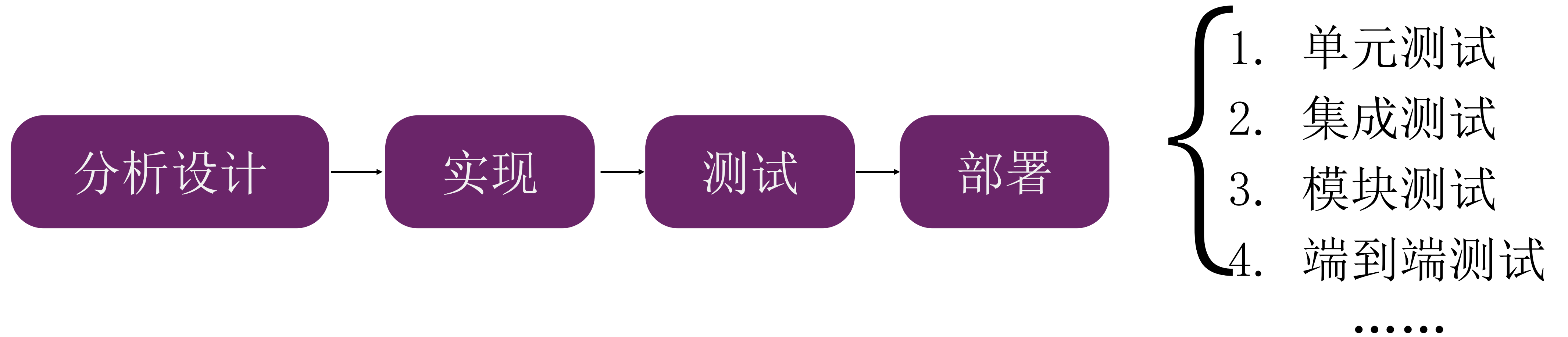
持续交付



持续交付-多模块



持续交付中自动化测试



UI对比回归测试、契约测试、依赖测试与监控、A/B测试

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UI对比回归测试

UI对比回归测试

UI自动化end-to-end测试的最后一公里

firefox-build

Number Difference

89	78	68	85	89	78	68	85	96	80	98
96	80	98	92	22	33	55	66	89	78	68
83	82	83	93	89	78	68	85	96	80	98
91	90	87	89	87	11	22	55	83	82	83
93	92	88	93	87	11	22	55	91	90	87
90	86	80	83	89	78	68	85	93	92	88
94	87	91	85	87	11	22	55	90	86	80
83	84	94	91	87	11	22	55	94	87	91
89	91	82	87	87	11	22	55	83	84	94
85	95	76	88	89	78	68	85	89	91	82
87	83	85	77	87	11	22	55	85	95	76
82	72	81	69	87	11	22	55	87	83	85
81	77	80	90	89	78	68	85	82	72	81

firefox-prod

Number Difference

89	78	68	85	89	78	68	85	96	80	98
96	80	98	92	22	33	55	66	89	78	68
83	82	83	93	89	78	68	85	96	80	98
91	90	87	89	87	11	22	55	83	82	83
93	92	88	93	87	11	22	55	91	90	87
90	86	80	83	89	78	68	85	93	92	88
94	87	91	22	87	11	22	55	90	86	80
83	84	94	91	87	11	22	55	94	87	91
89	91	82	87	87	11	22	55	83	84	94
85	95	76	88	89	78	68	85	89	91	82
87	83	85	77	87	11	22	55	85	95	76
82	72	81	69	44	11	22	55	87	83	85
81	77	80	90	89	78	11	85	82	72	81

Number Difference

89	78	68	85	89	78	68	85	96	80	98
96	80	98	92	22	33	55	66	89	78	68
83	82	83	93	89	78	68	85	96	80	98
91	90	87	69	87	11	22	55	83	82	83
93	92	88	93	87	11	22	55	91	90	87
90	86	80	83	89	78	68	85	93	92	88
94	87	91	88	87	11	22	55	90	86	80
83	84	94	91	87	11	22	55	94	87	91
89	91	82	87	87	11	22	55	83	84	94
85	95	76	88	89	78	68	85	89	91	82
87	83	85	77	87	11	22	55	85	95	76
82	72	81	69	87	11	22	55	87	83	85
81	77	80	90	89	78	68	85	82	72	81

(A)pprove this diff

UI对比回归测试

firefox-build

Event Handling

Show Content

firefox-prod

Event Handling

Show Content

VIFF EXAMPLES!

CSS Diff

Content Diff

Responsive

Multiple Browsers

Multiple Environments

Partial Diff

Browserstack

Event Handling

Event Handling

Show Content

VIFF EXAMPLES!

CSS Diff

Content Diff

Responsive

Multiple Browsers

Multiple Environments

Partial Diff

Browserstack

Event Handling

(A)pprove this diff

UI对比回归测试

firefox-build

Responsive

CSS Diff	Content Diff
Responsive	
Multiple Browsers	Multiple Environments

firefox-prod

Responsive

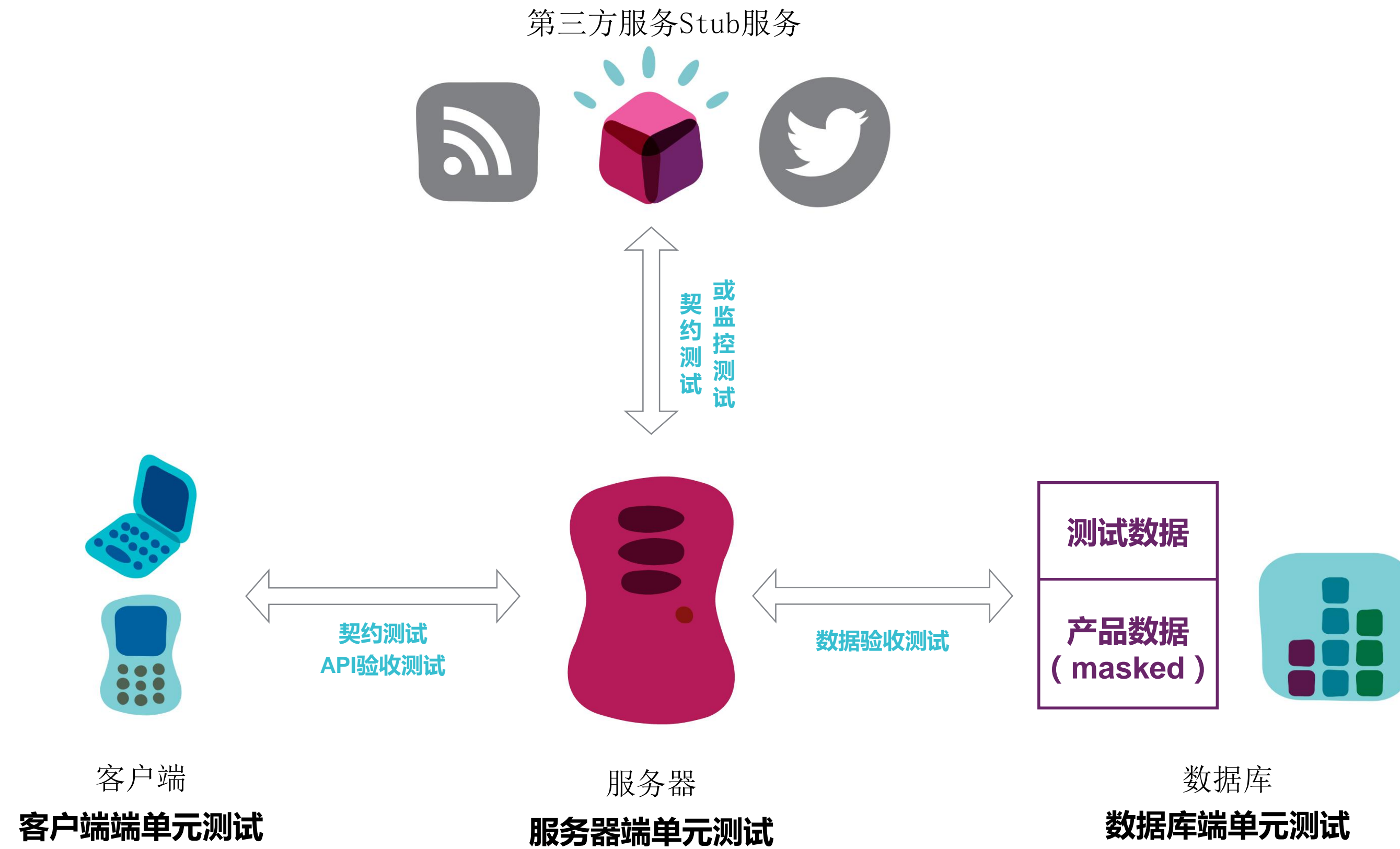
CSS Diff
Content Diff
Responsive

Responsive

CSS Diff	Content Diff	
Content Diff		
Multiple Browsers	Multiple Environments	
Multiple Browsers		

(A)pprove this diff

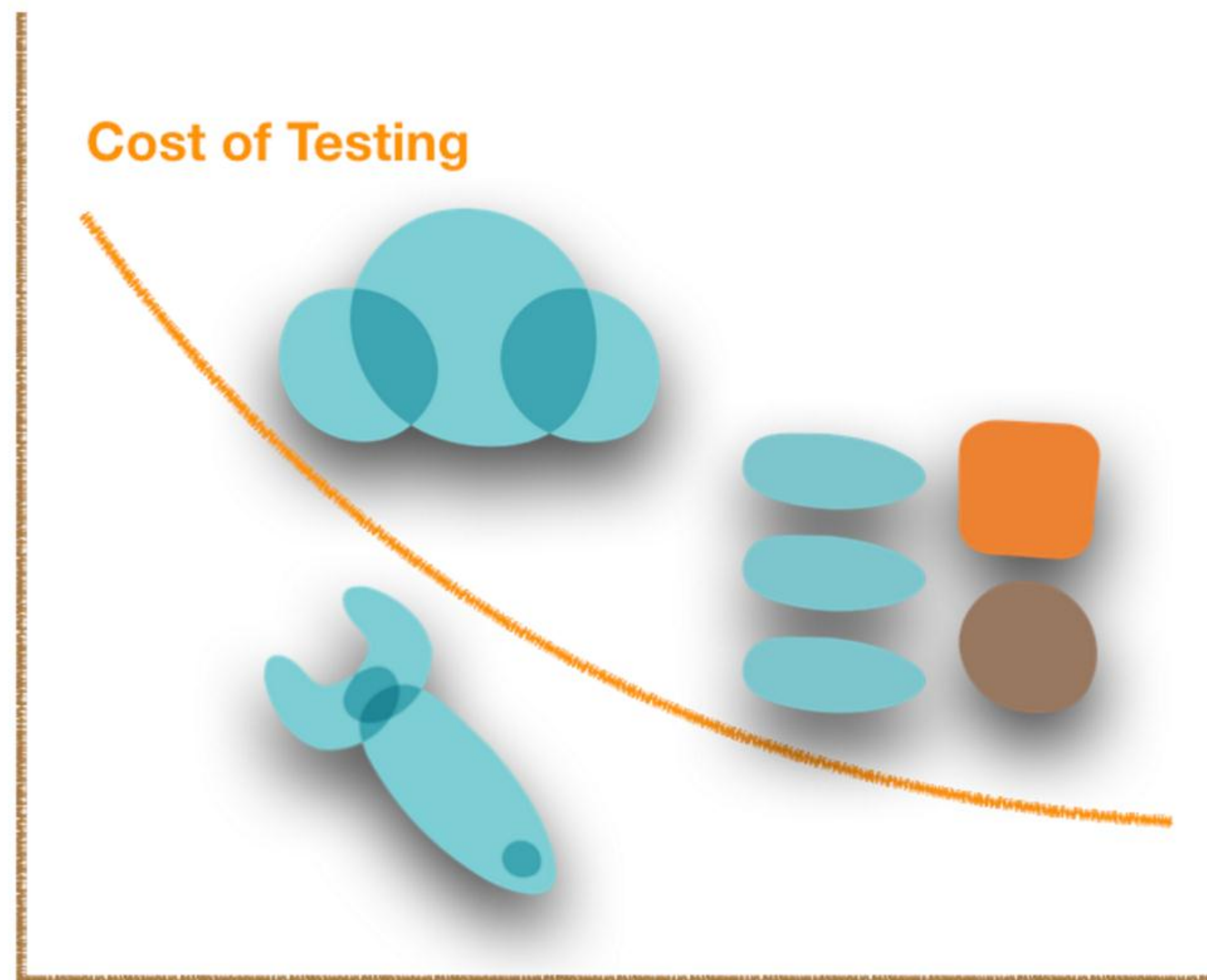
测试架构



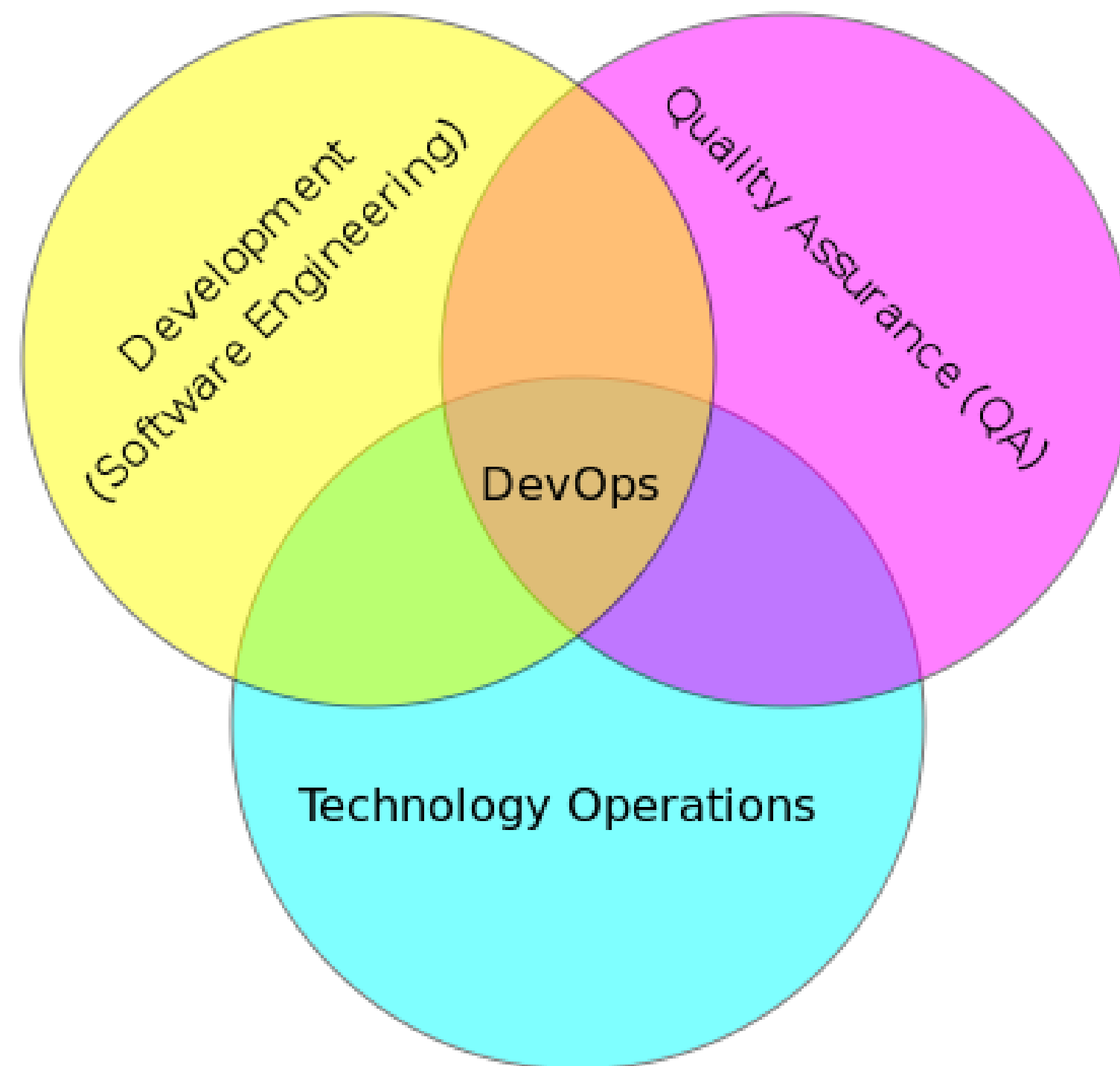
E2E 系统测试

提高测试效率 降低测试成本

DevOps、云和开源



DEVOPS

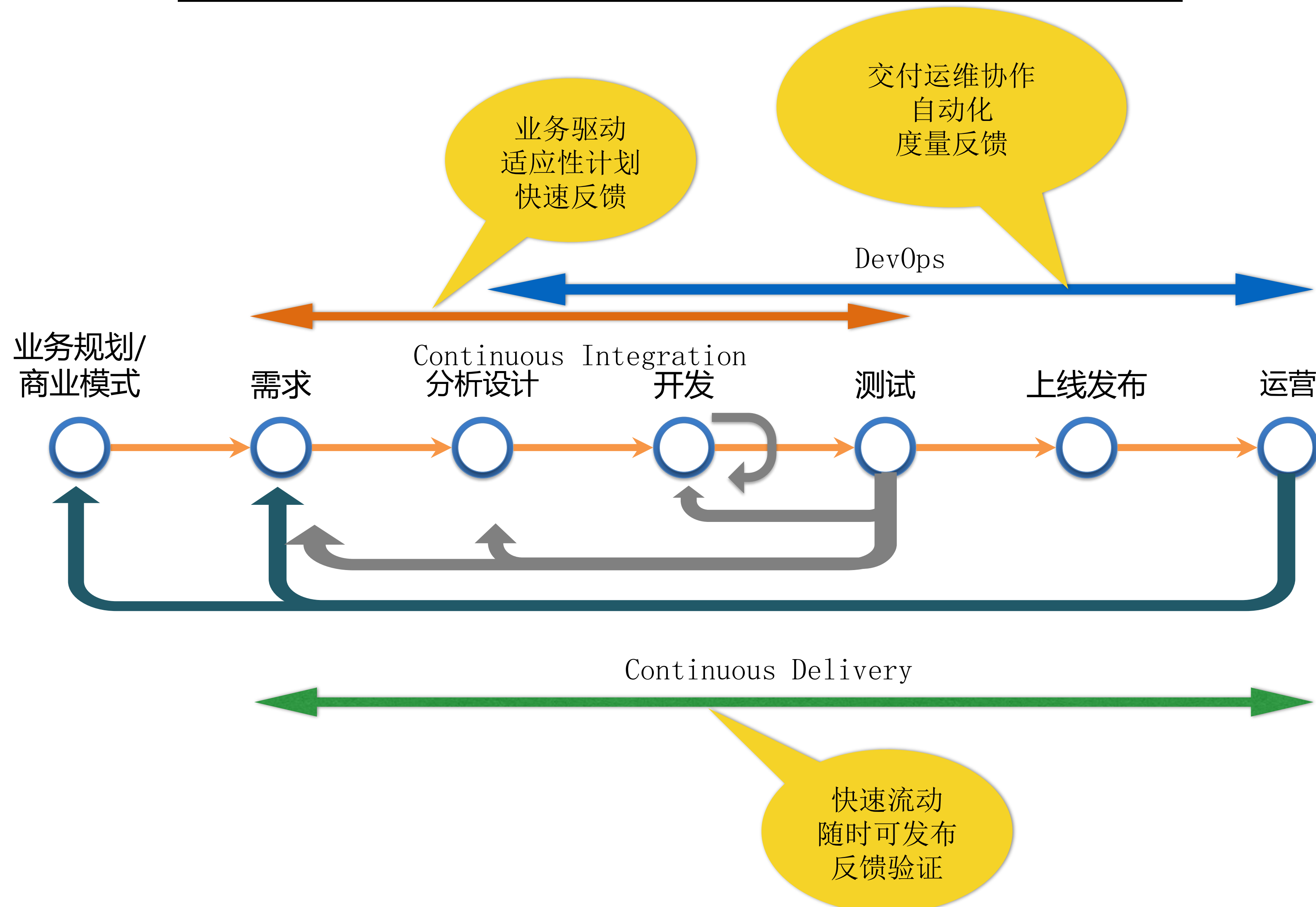


DevOps（英文Development和Operations的组合）是一组过程、方法与系统的统称，用于促进开发（应用程序/软件工程）、技术运营和质量保障（QA）部门之间的沟通、协作与整合。它的出现是由于软件行业日益清晰地认识到：为了按时交付软件产品和服务，开发和运营工作必须紧密合作。

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— 维基百科

DEVOPS



云技术、容器化和开源工具

措施：

- 云和容器化可以快速自动化搭建测试工具、测试数据和测试环境（Phoenix Environment）

- 轻量级、开源的测试工具：

Postman、Browsersync、Gatling、Locust……

云中的移动测试



容器化 (DOCKOR)

软件
产品

测试场景

- 安装不同版本的编译软件: gcc3.4, gcc4.3 ...,gdb...
- 配置不同的产品依赖软件包: glibc,java,...
- 在不同发行版中进行源码编译。



物理机

虚拟机

容器



14.04, 14.10,
15.04, 15.10



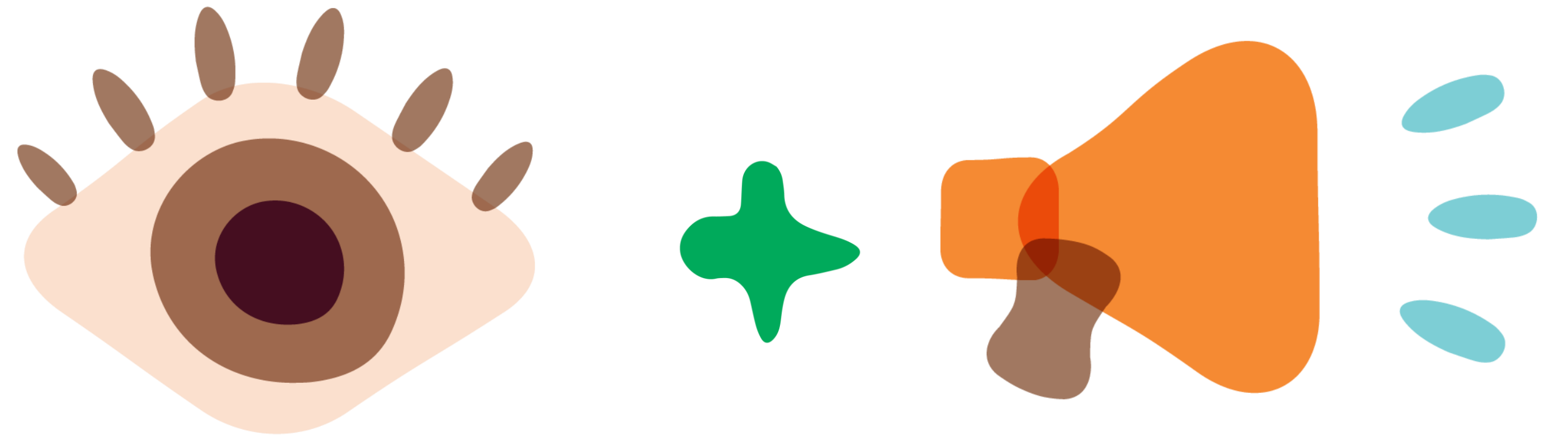
7.0, 7.x
8.0, 9.0



11.x



23, 24



业务价值优化

产品环境下的QA

产品环境的QA

■ 可调试性、
日志分析和优化

The screenshot shows the Splunk Search & Reporting interface. At the top, there's a navigation bar with 'Search', 'Pivot', 'Reports', 'Alerts', and 'Dashboards'. Below that, a search bar contains the query 'Index=* host=* | top punct' and a 'Last 7 days' filter. A green box highlights the search bar with the label '搜索条件' (Search Conditions). Below the search bar, a table shows search results with columns 'punct', 'count', and 'percent'. A green box highlights this table with the label '搜索结果集' (Search Results Set). Below the table, there's a 'Preview' section showing a list of events. A green box highlights this section with the label '展开每条结果' (Expand each result). To the right, a detailed view of an event is shown, including the time and the full error message. A green box highlights this detailed view with the label '详细错误信息' (Detailed error information).

搜索条件

punct	count	percent
...	8	57.142857
...	2	14.285714
...	2	14.285714
...	2	14.285714

展开每条结果

详细错误信息

产品环境的QA

■ 用户数据分析

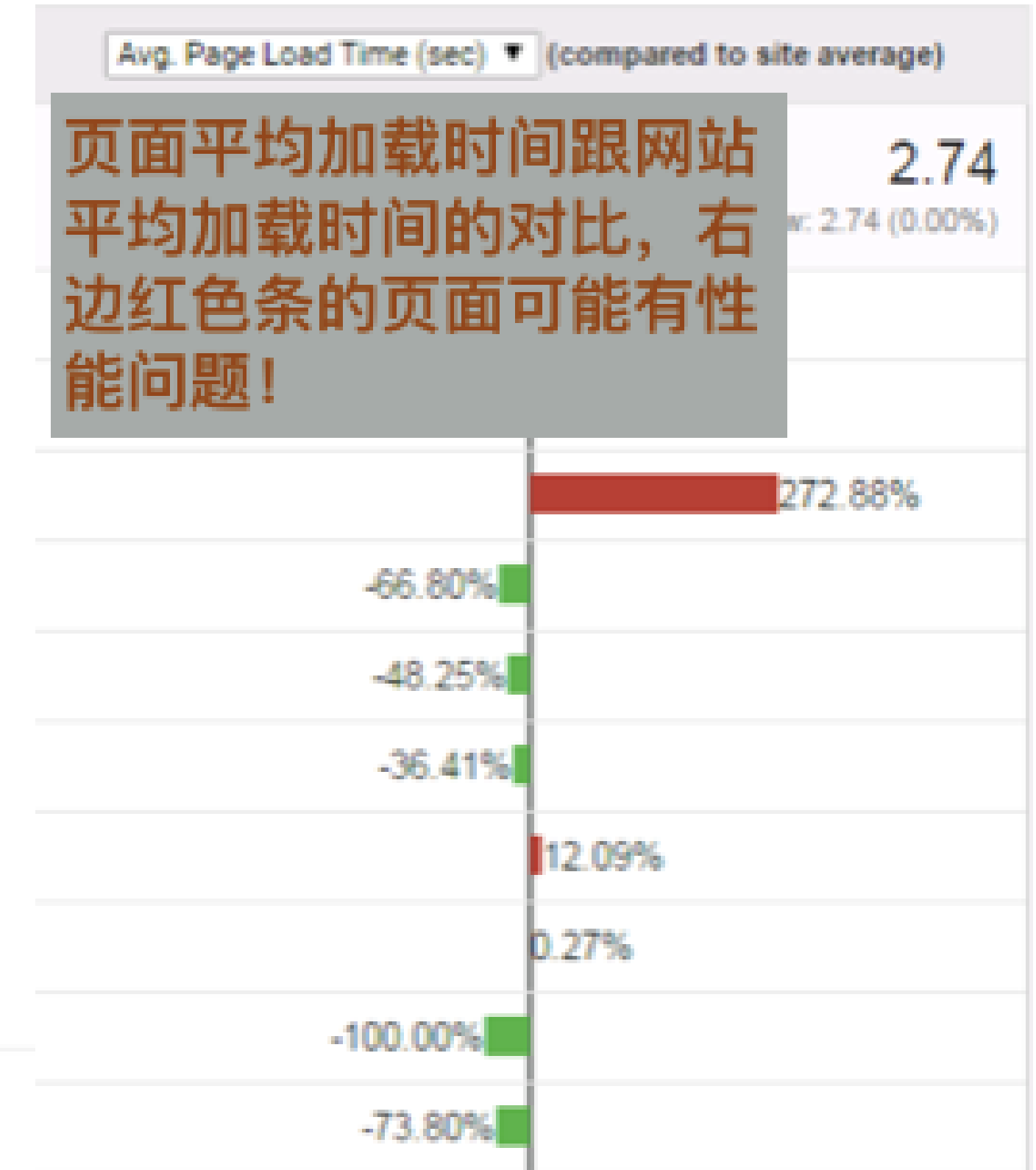
浏览器使用分布

Browser	Sessions	% Sessions
1. Internet Explorer	215,568	94.90%
2. Chrome	11,506	5.07%
3. Safari	66	0.03%
4. Firefox	8	0.00%
5. Edge	1	0.00%



Version	Sessions	% Sessions
1. 11.0	191,308	(88.75%)
2. 9.0	16,327	(7.57%)
3. 7.0	7,933	(3.68%)

IE分布



● Avg. Page Load Time (sec)



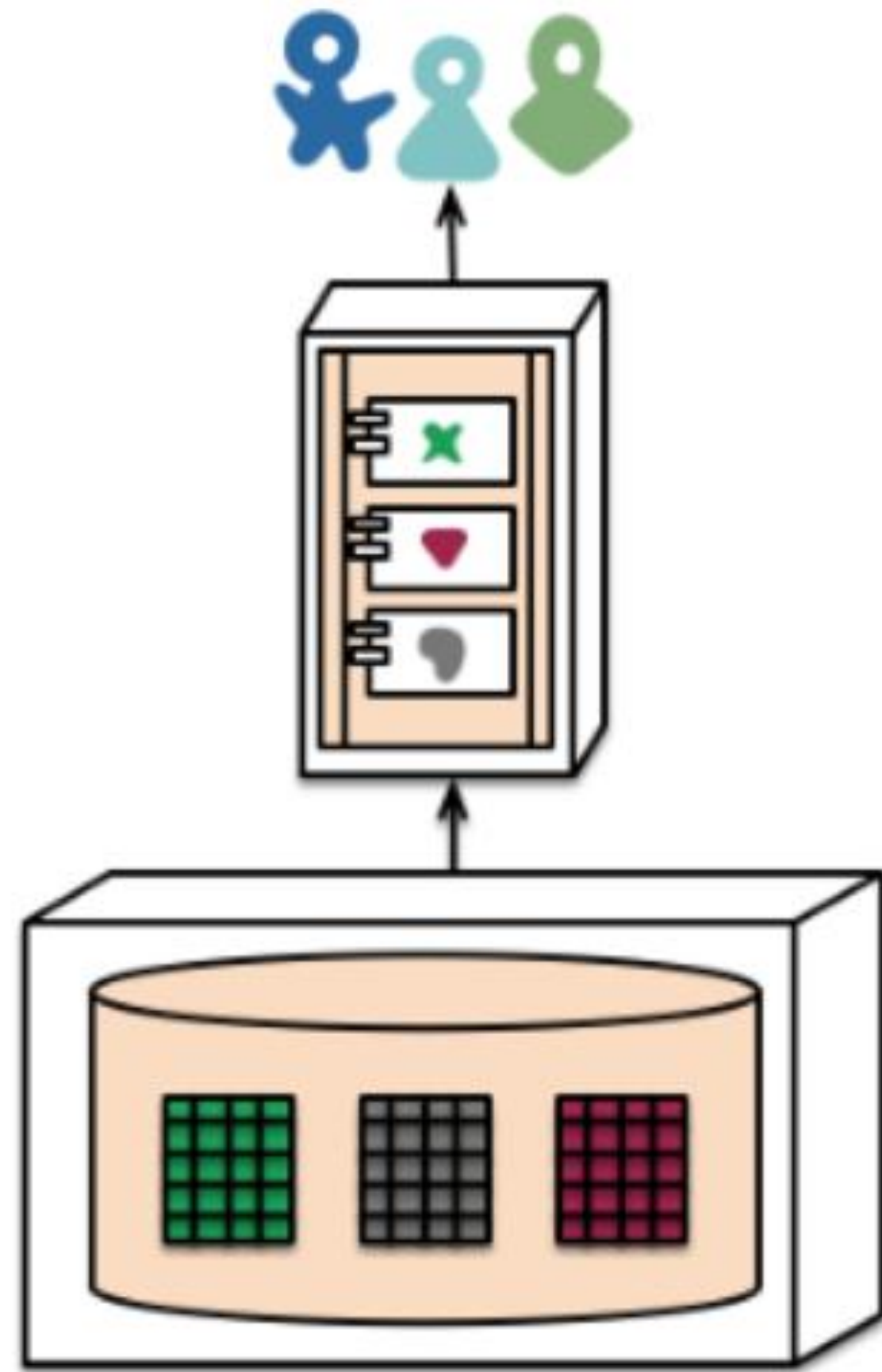
产品环境的QA

■ API/功能监控

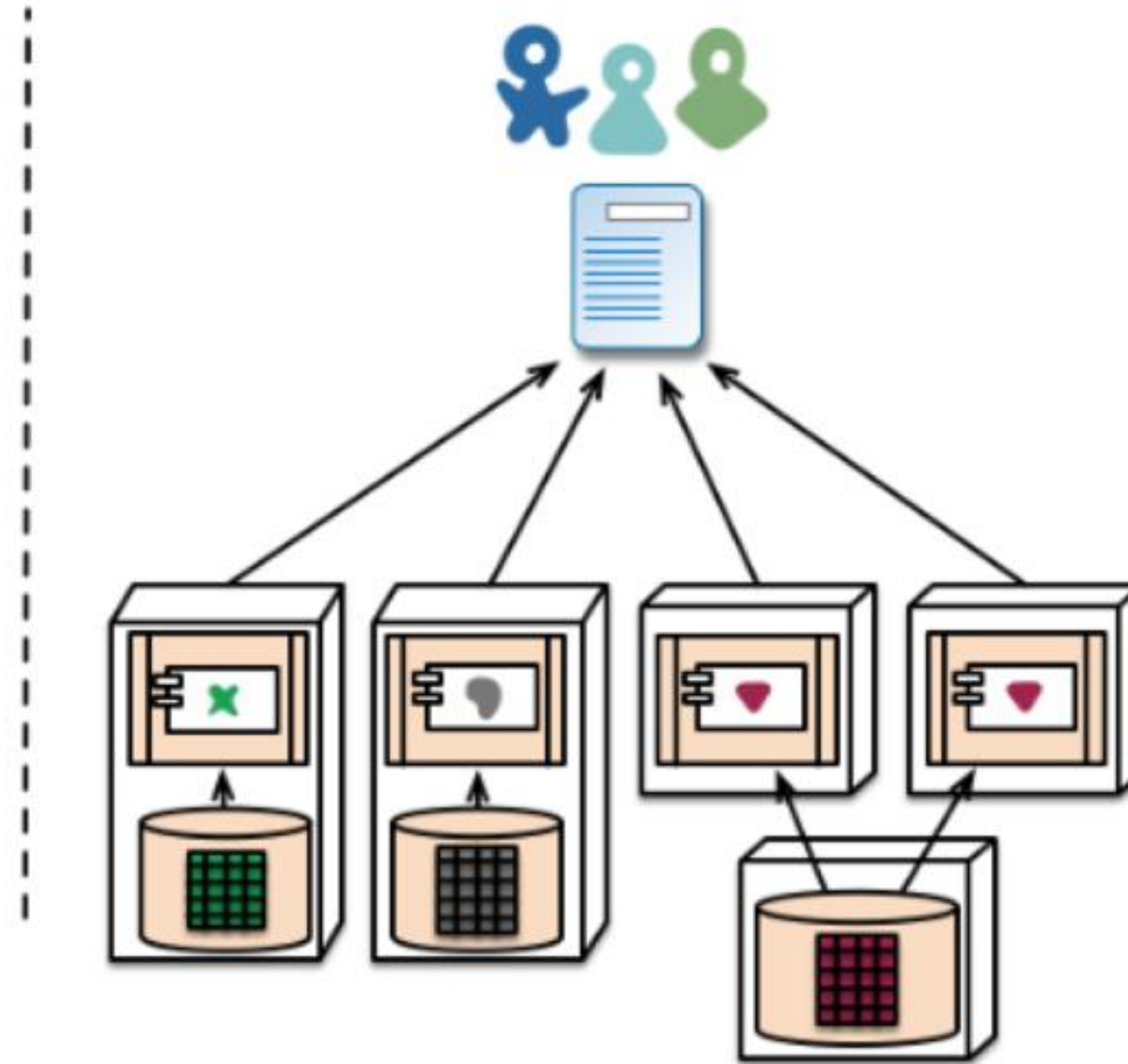
The screenshot displays an 'API Status Board' with a legend at the top: a green checkmark for 'good', a yellow warning triangle for 'elevated', and a red 'x' for '5xx'. A note indicates '4xx (possibly Zapier related)'. The table below tracks the status of several services over time.

Service	Now	May 5	May 4	May 3	May 2	May 1	April 30	Apr
Active Campaign	✓	✓	✓	✓	✓	✓	✓	✓
AgileZen	✓	✓	✓	✓	✓	✓	✓	✓
AlphaMail	✓	✓	✓	✓	✓	✓	✓	✓
Ambassador	✓	✓	✓	✓	✓	✓	✓	✓
AngelList	✓	✓	✓	✓	✓	✓	✓	✓
App.net (alpha)	✓	✓	✓	✓	✓	✓	✓	✓
Asana	✓	✓	✓	✓	✓	✓	✓	✓
...

微服务 (MICRO SERVICES)



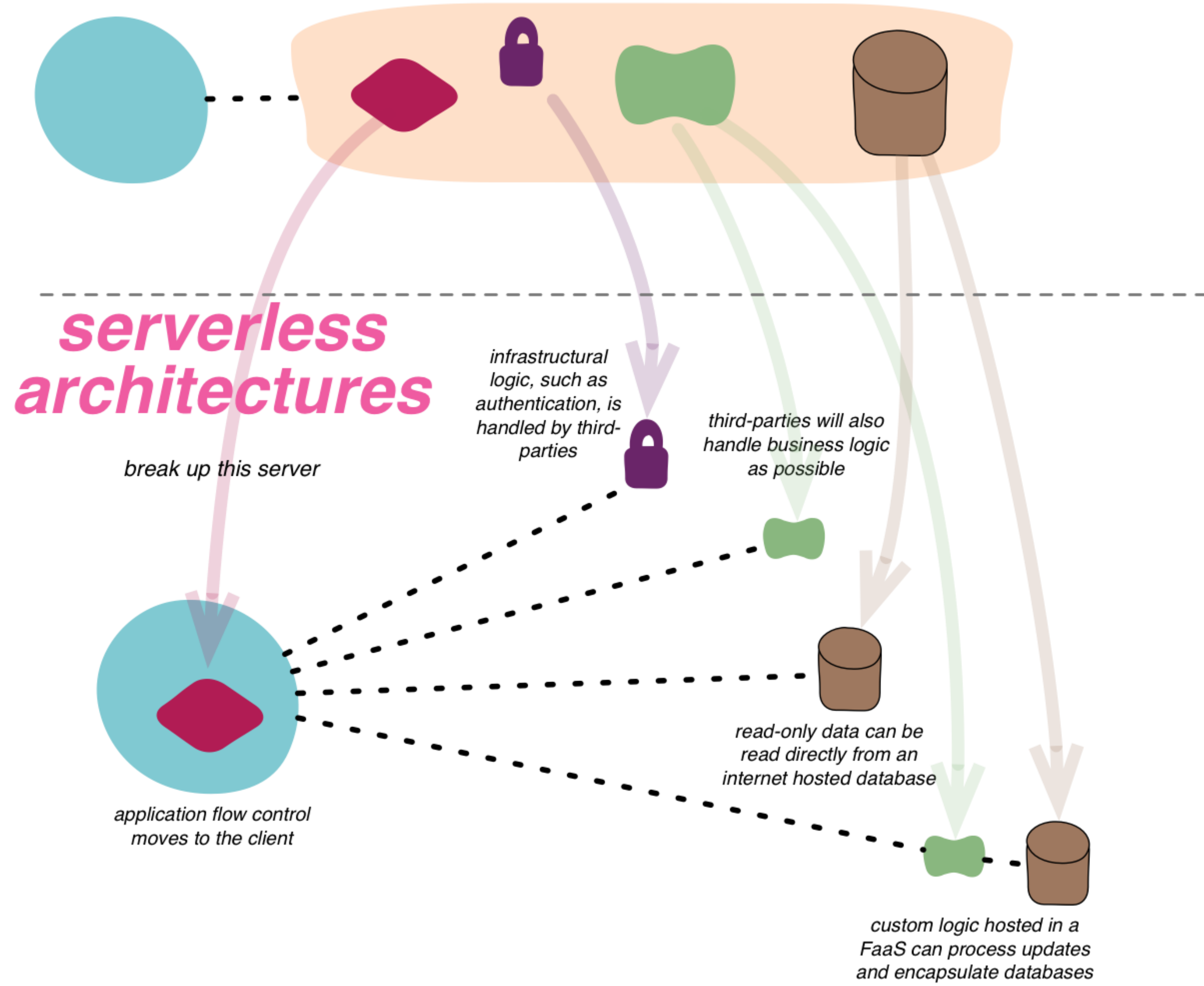
monolith - single database



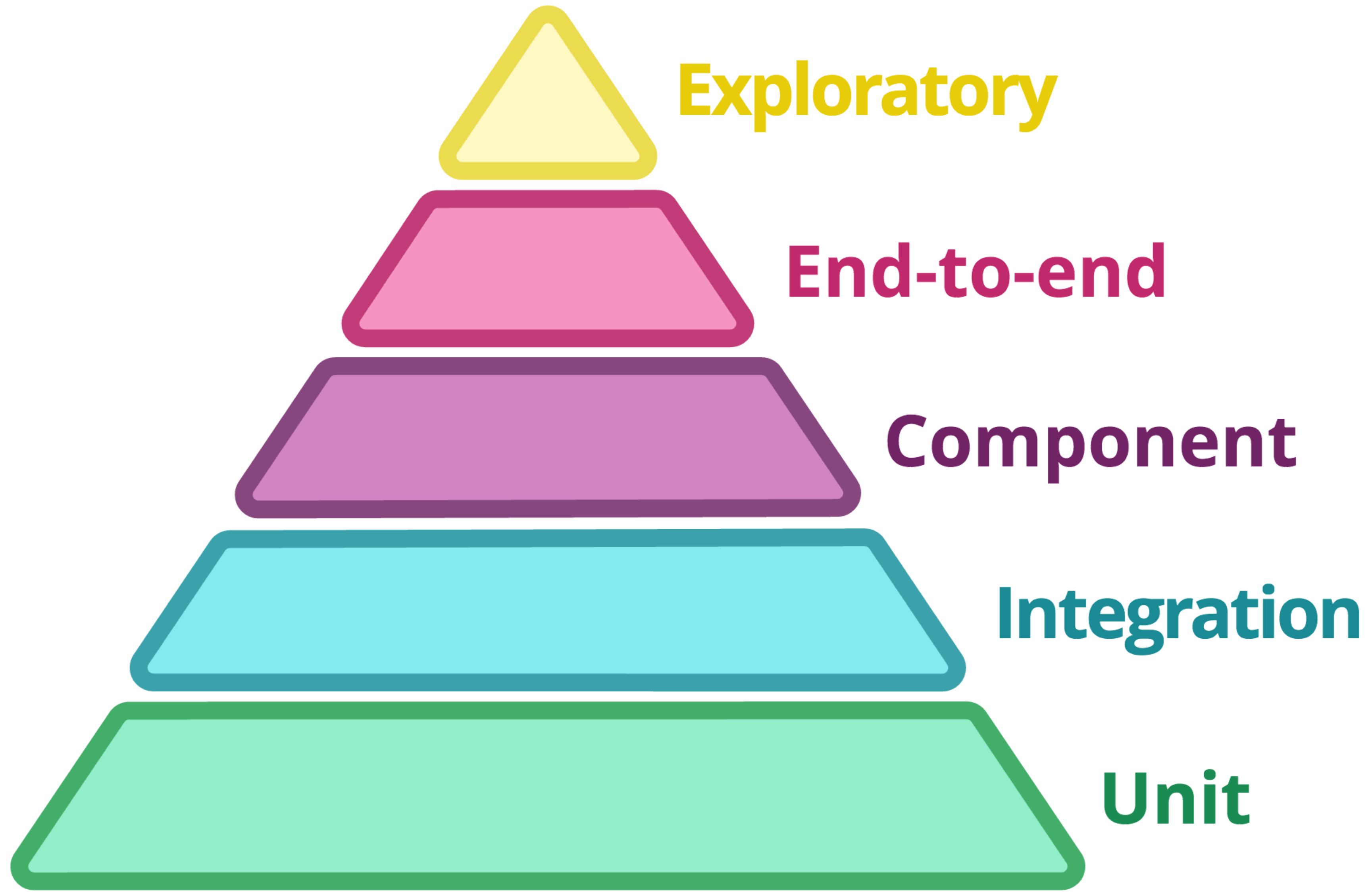
microservices - application databases

无服务器 (SERVERLESS)

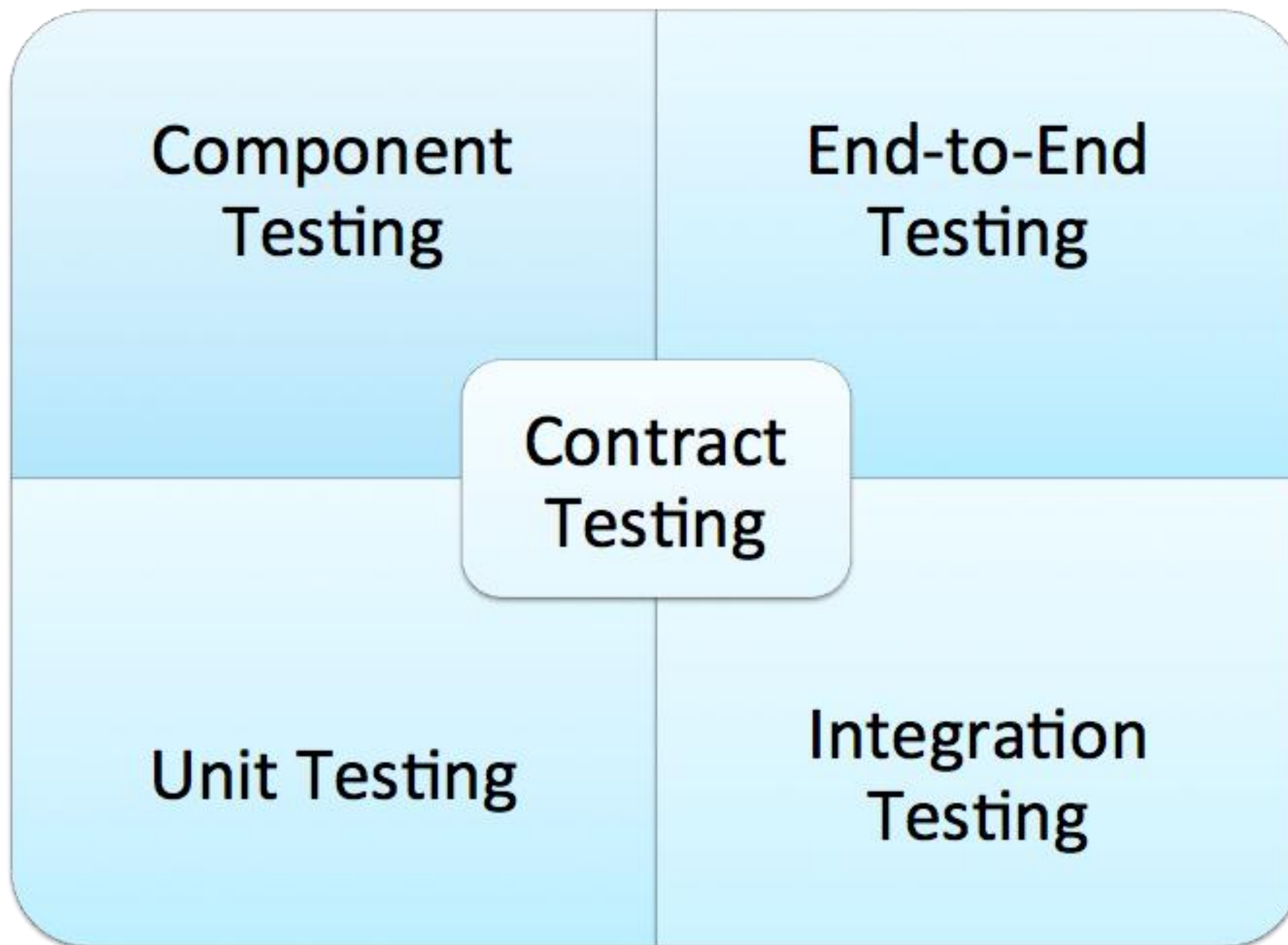
A traditional internet delivered app has a client communicating with a long-lived server process that handles most aspects of the application's logic



它们的测试策略




它们的测试策略



微服务的开发方式

 Provider驱动开发

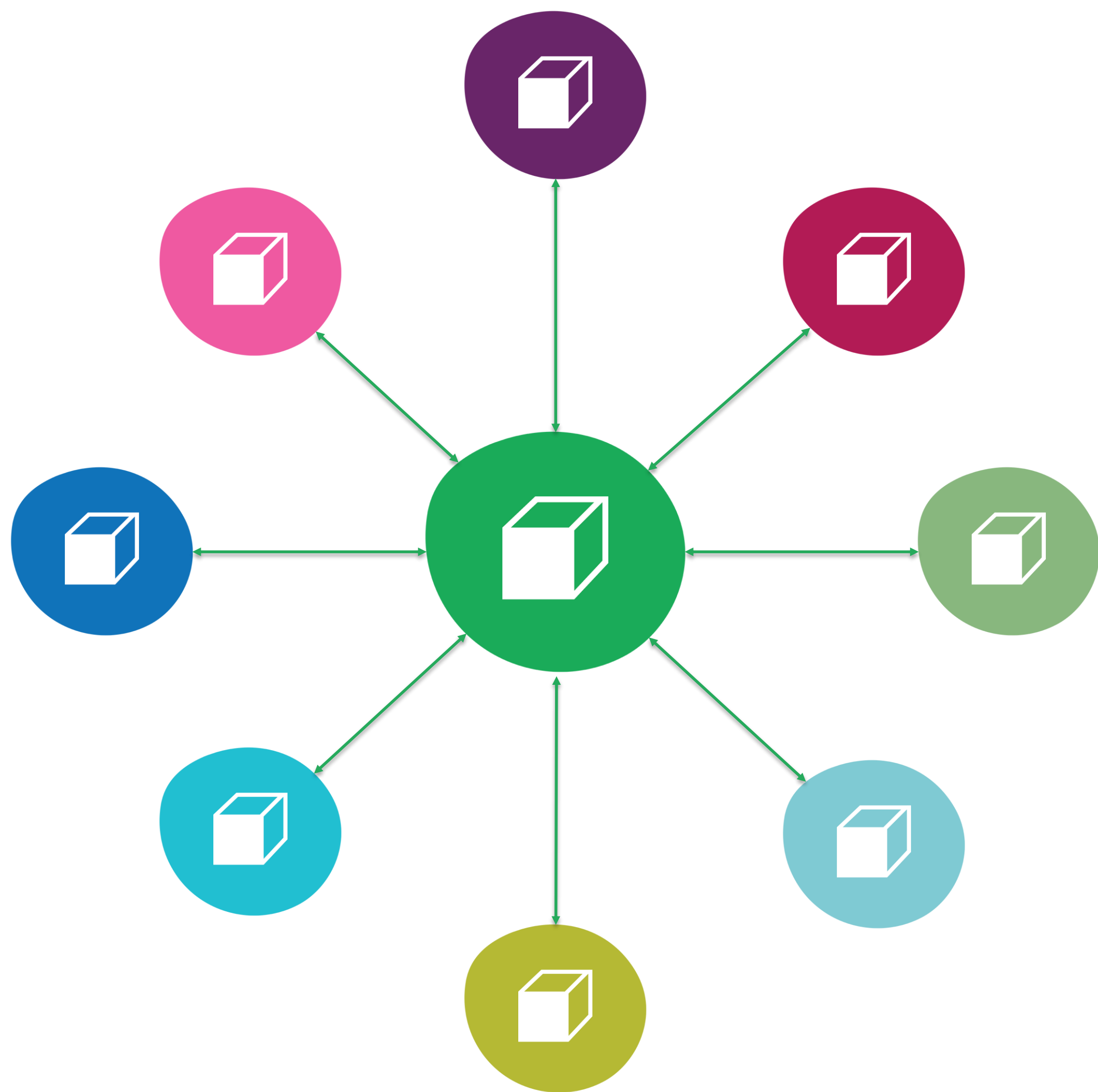
 Consumer驱动开发

企业级微服务开发的困难

- 团队之间业务交流困难
- 难以快速响应外部需求变化
- 开发流程责任链混乱
- API部署以后才发现问题



- 明确团队间业务交流流程
- 快速响应外部需求变化
- 明确开发流程责任链
- 能在API部署前发现问题

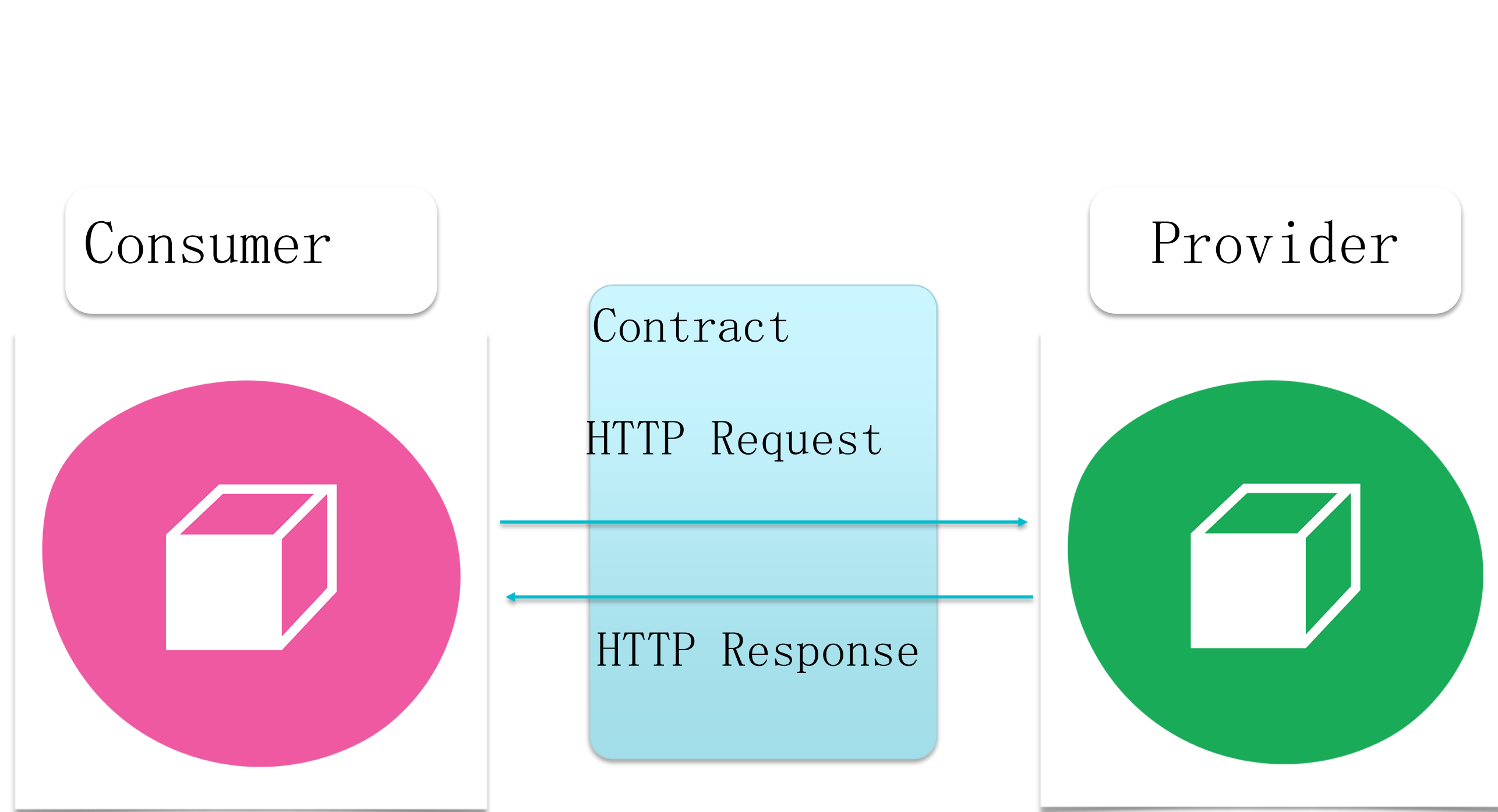


如何使用测试来驱动跨团队微服务的开发，并且在开发过程中快速实现回归测试？



契约测试

什么是契约测试



Consumer: Service API的使用者，向provider发起HTTP请求来获取数据；

Provider: Service API的提供者，接收consumer的HTTP请求并返回数据；

Contract: 契约，一种定义在consumer与provider之间的交互方式；



契约测试为Consumer Driven Contract Development 提供测试驱动技术

CONSUMER DRIVEN CONTRACT DEVELOPMENT



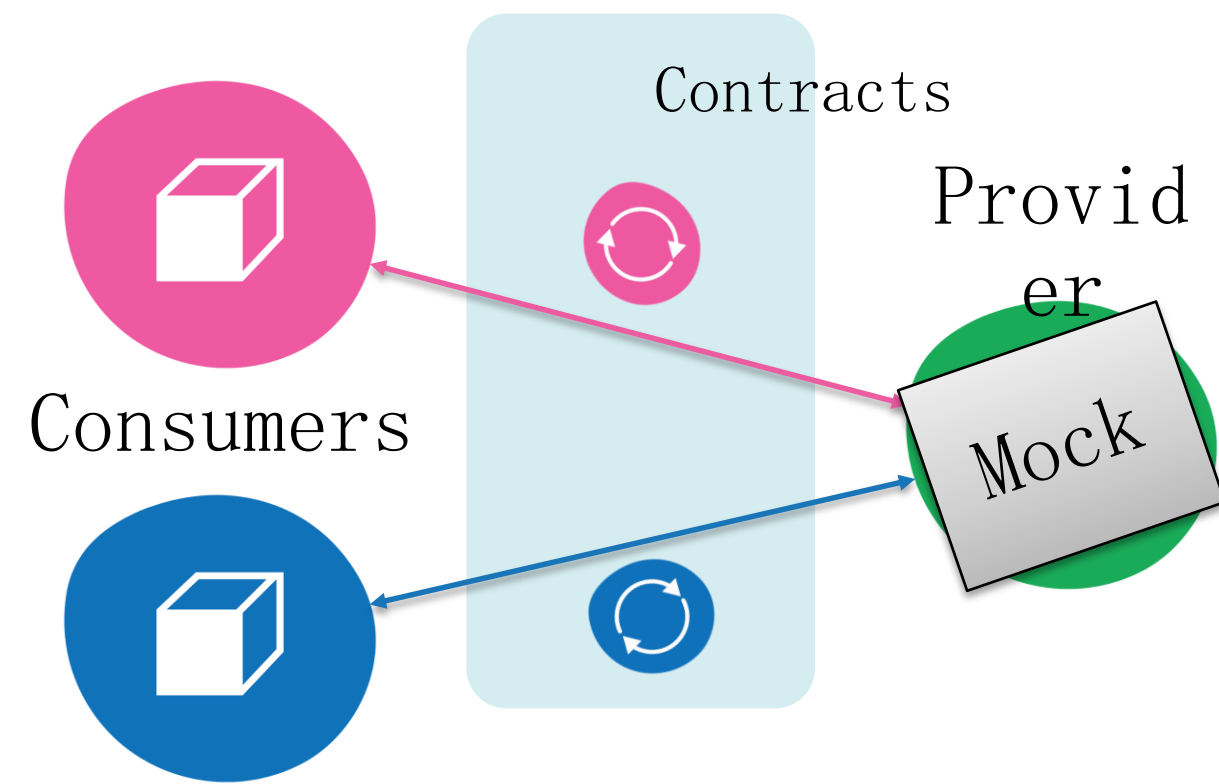
Consumer:

- 基于新API实现契约测试
- 实现新API直到通过契约测试
- 生成新API的契约

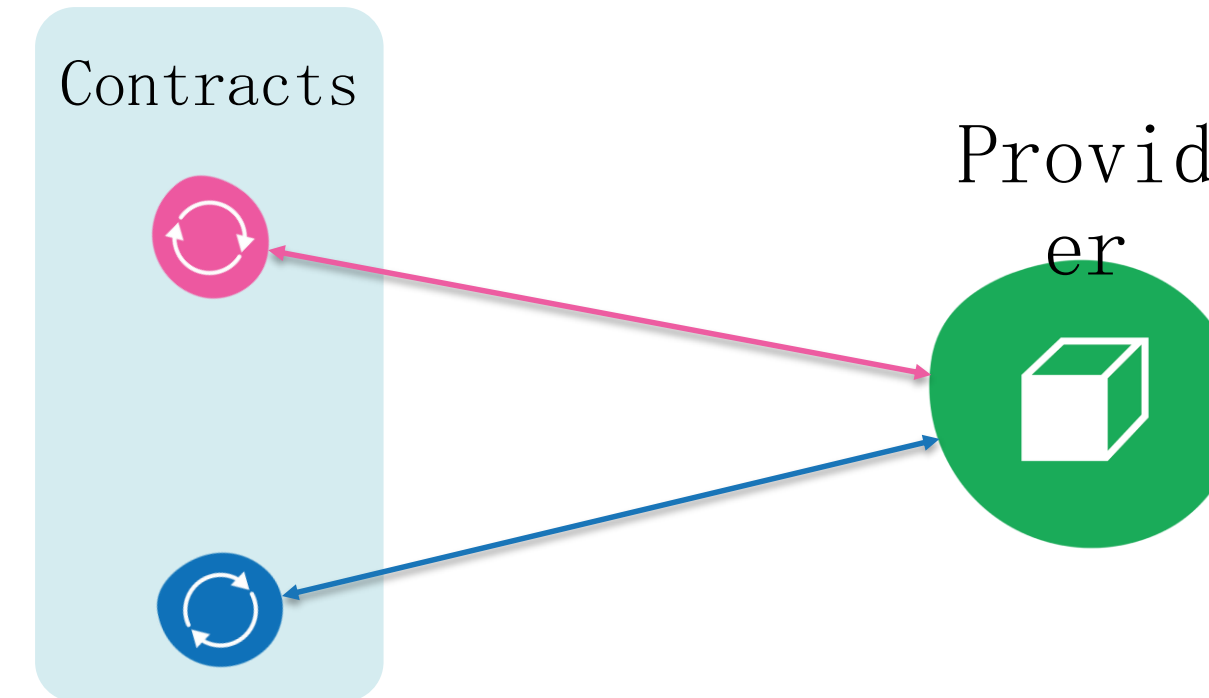
Provider:

- 基于契约实现新API直到通过契约测试

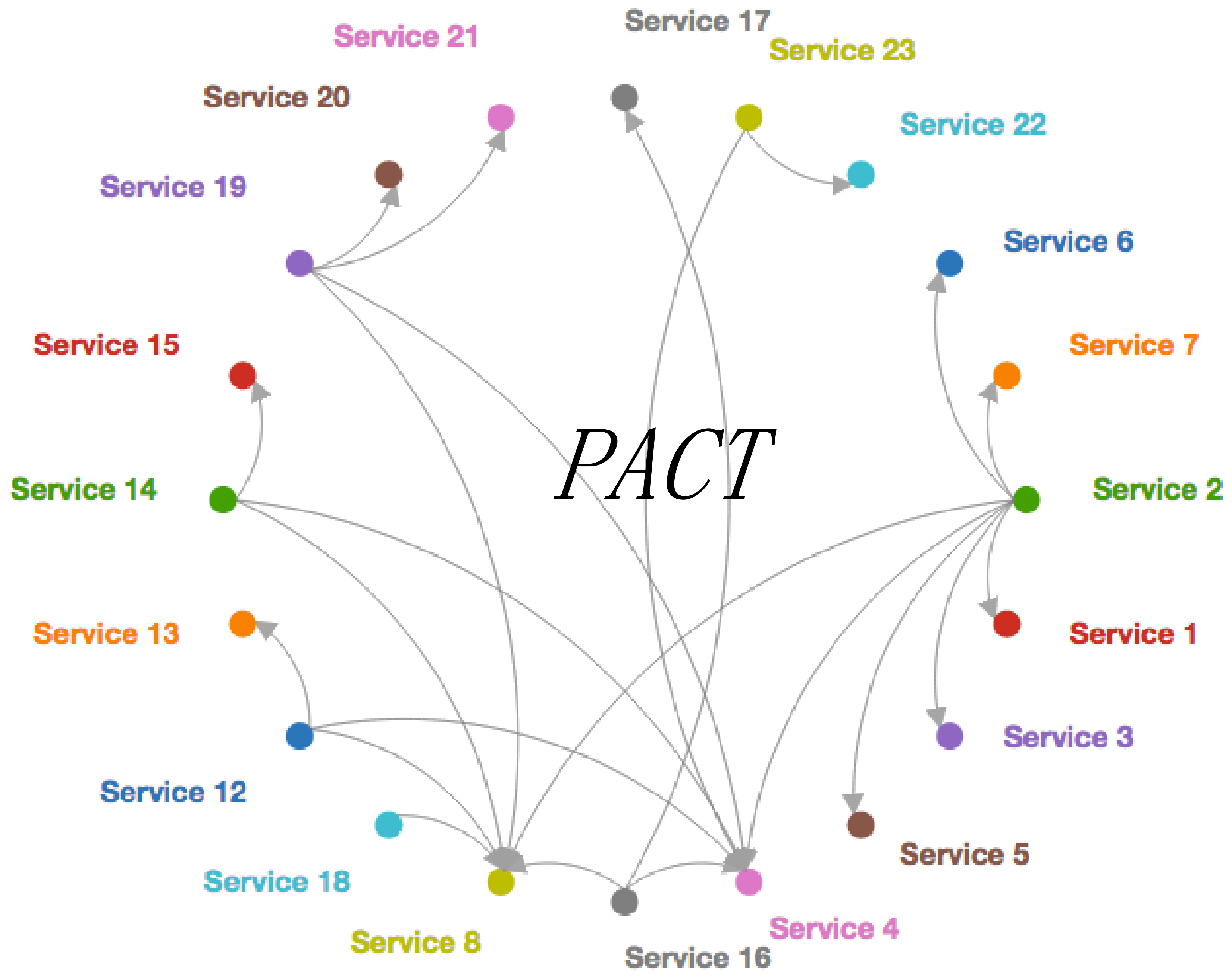
契约测试的实践方式



Consumer测试环境



Provider测试环境



其他的一些测试趋势

- Quality Assistance
- AI Exploring Testing
- Testability
- Mutation Testing

THANK YOU

For questions or suggestions:

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