



COM5940 NEW MEDIA BUSINESS MODEL & INNOVATION:

LESSON 7 - DEPLOY DOCKER CONTAINER TO THE CLOUD

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Today's agenda.

1. **MVP development in WordPress.**
2. **From virtual machine to container and serverless services in the cloud.**
3. **Demonstration of container and serverless technology.**
4. **Implications for your final project and job application.**
5. **3C implementation in WordPress.**

MVP Development

with WordPress

什么是精益创业？



超智方程

寻找蓝颜知己 共创知识体系 精进思维模型 提高各项技能

3人赞同了该文章

一、精益创业就是用最小的成本和最快的速度试错。

1.上世纪七八十年代崛起的那些科技企业，他们采用的是火箭发射式创业：几个技术大牛凑在一起，研究竞争对手的产品，发现它们的弱点，然后大家封闭起来悄无声息的搞一个产品出来，往市场上一投放就轰动了。其结果往往是未知的，要么极其成功，要么极其失败，风险极大。

2.上世纪的大型汽车公司，使用大型机器批量生产大量零件，一个型号的汽车可能要批量生产几十万辆，等他们发现市场不需要了，再调整也来不及了。后起之秀丰田汽车提出精益生产的概念，使用小机器，一次只造很少的零件，调整更快，成本更低，很快抢占了一些比较小的、比较零散的本土市场。

3.创业也应该坚持精益思路，小步快跑、快速迭代，先用最低的成本，上一个简单的不能再简单的产品，这个产品只有一个最核心的功能，然后看看大家对这个产品的反应，如果反应好，继续投入精力改善产品，然后再看大家的反应，再改善再反馈。如果最初的简陋版产品大家不买单，就果断放弃。

▲ 赞同 3

▼

● 添加评论

↗ 分享

♥ 喜欢

★ 收藏

〔〕申请转载

...

Source: <https://zhuanlan.zhihu.com/p/152237298>

二、精益创业的核心是验证价值假设和增长假设。

1. 规避了隐性假设你才能获得关于用户需求的正确认知。所谓隐性假设，就是我们没有意识到的前提。比如我们聚会时候认识新朋友，都会说“加个微信吧”，这句话里就有个隐性假设，那就是他也用微信。但这个假设不一定对，你必须先验证。
2. 隐形假设包括价值假设和增长假设。价值假设是说，你决定做一个产品或者一个功能，你之所以认准这个方向，是基于背后“它对用户有价值”的假设，你动手做之前一定要先验证这个价值的真伪。
3. 增长假设是你获得了用户认可后，还需要验证产品能不能被更多用户使用，用户会不会帮你传播产品。这个假设很多人会忽略，大家觉得验证过产品的价值后，用户量增不增长只是个运营手法问题，实际上并不是这样，用户能增长也是个基本假设，必须验证。

三、精益思维适用于创业之外的领域。

1. 精益创业思维可以用在电视剧拍摄上。方法是先拍摄一部几十分钟的样片，交代主要的人物关系、矛盾冲突、故事背景，然后邀请几十位观众参加小规模试映会，再根据观众的反馈来决定剧情要作那些修改，是否需要调整演员，以及决定是否投拍。在每一季结束时，制作方再根据收视率和

Product-Market Fit (产品-市场匹配)



眺望

发布时间: 2020-07-04 09:43

关注

"PMF的3个影响因素", 分别是"实际市场规模", "目标客户的支付意愿"和"当前市场的解决方案是否充足".

Source: <https://baijiahao.baidu.com/s?id=1671248771977675&446&wfr=spider&for=pc>

这其中的"PMF"就是"Product-Market Fit". 看了一篇不错的文章PMF：为何硅谷大神把它念奉为创业公司“唯一重要的东西”？，收藏下.

其中提到了“精益创业”（Lean Startup），以后有机会多看看.

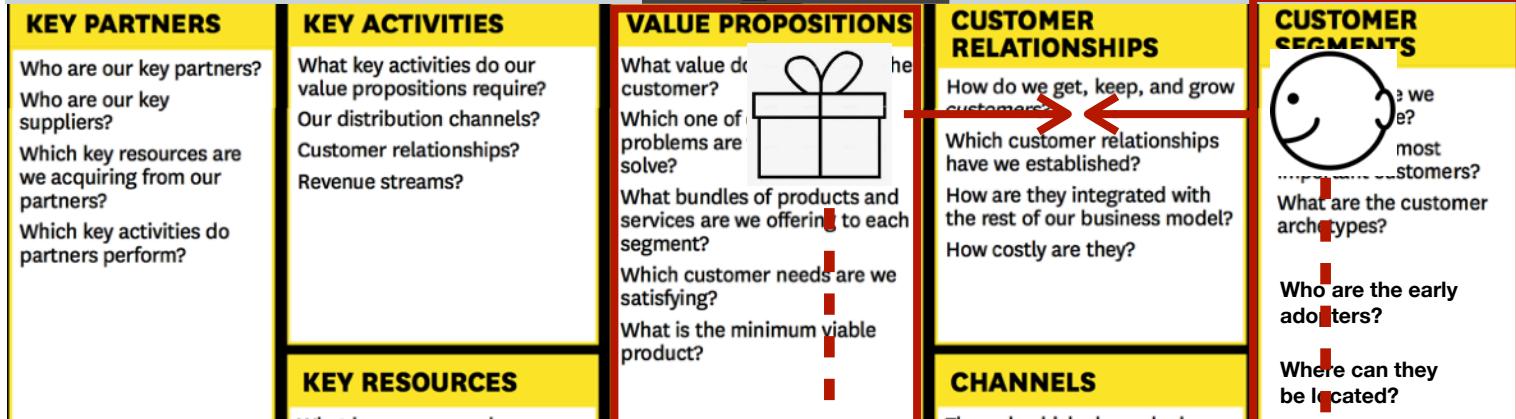
“ 导读：定义一个产品的PMF是充满挑战的，因为这需要时间和你对目标市场的深刻洞察！”

“互联网企业99%创业失败，只是因为没有找准它”

听说过“精益创业”（Lean Startup）的人都知道最小化可行性产品（MVP, Minimal Viable Product）的理念——即通过一个最小化、却可以满足核心需求的产品来测试市场的反应。MVP背后的核心原则就是减少时间成本。

但在互联网行业，很多创业者把精益创业等同于自行开发MVP，然后快速试错。

事实是，产品仅仅是将一个创意变成结构化、自动化服务的工具。在你将创意变成自动化服务之前，你应该做的是首先通过人工的方式来确定你的创意是否可行，即寻找Product-Market Fit：产品-市场匹配，同样也是精益创业中最重要的概念之一。



COST STRUCTURE

What are the most important costs inherent to our business model?

Which key resources are most expensive?

Which key activities are most expensive?

For what values are our customers ready to pay?

For what do they currently pay?

What is the revenue model?

What are the pricing tactics?

Source: "Why Lean Start-up Changes Everything" by Steve Blank, Harvard Business Review May 2013

最小化可行产品 MVP(Minimum Viable Product)



最小化可行架构 MVA (Minimum Viable Architecture)



E.g. No-code/Low-code Tools/Hybrid App

Source: <https://www.3pillarglobal.com/insights/creating-an-agile-enterprise-with-minimum-viable-architecture/>



Forbes

The Low-Code/No-Code Movement: More Disruptive Than You Realize



Jason Bloomberg Former Contributor

Enterprise & Cloud

I write and consult on digital transformation in the enterprise.

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This article is more than 4 years old.

- The burgeoning Low-Code/No-Code space has become an extraordinarily disruptive page in the enterprise digital story, leading to extensive confusion among enterprises and vendors alike.
- The big analyst firms aren't much help: **Gartner** calls it High-Productivity Application Platform-as-a-Service, while Forrester divides the world into Low-Code Development and Mobile Low-Code Development – merely adding to the confusion.

But even the Low-Code and No-Code terminology itself is misleading, as the distinction isn't about whether people need to code or not. The distinction is more

Source:<https://www.forbes.com/sites/jasonbloomberg/2017/07/20/the-low-codeno-code-movement-more-disruptive-than-you-realize/?sh=53ea944d722a>

Guest

No-code/low-code: Why you should be paying attention

Image Credit: bluebay2014/Getty Images

Web site low-code/no-code platforms:

Enterprises of all sizes can leverage these platforms. The leading contenders are [WordPress](#), [Wix](#), [Squarespace](#), and [WebFlow](#).

Source: <https://venturebeat.com/2021/02/14/no-code-low-code-why-you-should-be-paying-attention/>



WORDPRESS *As a no-code platform* ?

WordPress as a no-code platform: how we built this application

Source: <https://indiehackers.tips/wordpress-as-a-no-code-platform-how-we-built-this-application/>

Build Your Startup in Hours - WordPress for MVPs

Published on January 15, 2015



Photo: <https://www.flickr.com/photos/tgumbel/176473611/>



Mario Peshev

CEO @ DevriX && CTO @ Brainjolt Media. Advisor, Entrepreneur.com/Forbes Contributor.

35 articles

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Source: <https://www.linkedin.com/pulse/build-your-startup-hours-wordpress-mvpss-mario-peshev/>

WordPress Usage Statistics

The following WordPress statistics focus on WordPress' market share and other usage statistics.

WordPress now powers 40.0% of websites, with a 40.0% share in the CMS market.

Besides being the most widely-used CMS, WordPress is also the fastest growing. Of the top 10 million websites online, more than 500 sites built each day are powered by WordPress (versus 60-80/day that are built on managed platforms such as [Shopify](#) or [Squarespace](#)).

Adding to that, WordPress powers [14.7% of the world's top websites](#).

Source: <https://kinsta.com/blog/wordpress-statistics/>

These top websites include The New York Times, Spotify, TechCrunch, The White House website, BBC America, and even the [Facebook](#) Newsroom! The fact that WordPress can work well for all of these different entities is a testament to how flexible it is. WordPress can effectively act as the backend for many different types of websites, including personal blogs, news websites, [portfolios](#), and ecommerce websites.

There are some 17 blog posts published on WordPress *per second*, and if you ever doubt the popularity of WordPress, know that there are 37 million global searches made for the term "WordPress" on a monthly basis. Furthermore, [real-time WordPress activity data](#) shows that each month, there are over 409 million people viewing over 20 billion WordPress pages, with over 70 million new posts, and 77 million new comments.

Create custom content type using Pods.



Pods – Custom Content Types and Fields

[Activate](#)[More Details](#)

Pods is a framework for creating, managing, and deploying customized content types and fields.

By [Pods Framework Team](#)

★★★★★ (321)

100,000+ Active
Installations

Last Updated: 1 week ago

✓ Compatible with your version of WordPress

Bringing People Together in Beijing Hutong
天台胡同

胡同下午茶爱好者的聚集地

开始探索

本期精选 Selection

Howdy, master

Dashboard Posts Media Pages Comments Shortcoder Custom CSS & JS Choices Exhibitions Portfolios Restaurants

All Restaurants Add New Categories Tags

Restaurants Add New

All (4) | Mine (3) | Published (4)

Bulk actions Apply All dates All Categories Filter

Title	Categories	Tags	Date
Good Food Kitchen	—	—	Published 2021/02/08 at 1:30 pm
Fusan Coffee	Special	—	Published 2021/01/28 at 2:58 pm
StillWater	Special	—	Published 2021/01/28 at 2:53 pm
The Bake Shop	Special	—	Published 2021/01/28 at 2:26 pm

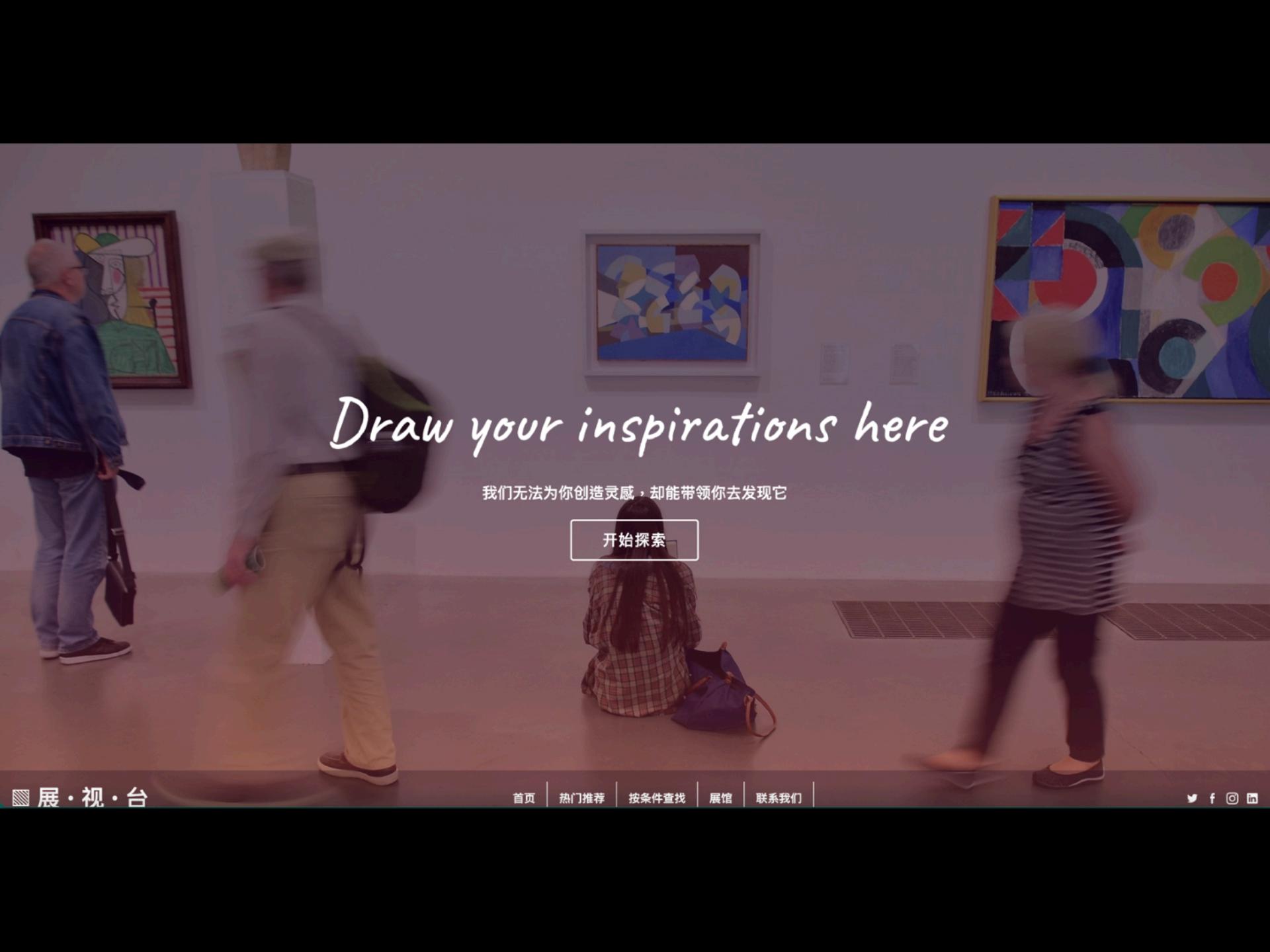
Bulk actions Apply

Search Restaurants

Screen Options

Title	Categories	Tags	Date
—	—	—	—

4 items



Draw your inspirations here

我们无法为你创造灵感，却能带领你去发现它

开始探索

Howdy, master

Dashboard Posts Media Pages Comments Shortcoder Custom CSS & JS Choices Exhibitions

All (3) | Published (3)

Bulk actions All dates All Categories

	Title	Categories	Tags	Date
<input type="checkbox"/>	Public • Park	—	—	Published 2021/01/19 at 4:04 am
<input type="checkbox"/>	More • More • More	—	—	Published 2021/01/17 at 2:54 pm
<input type="checkbox"/>	A Room That Can Move	—	—	Published 2021/01/17 at 10:20 am

All Exhibitions Add New Categories Tags

Screen Options

Manage Pods

[Add New](#)[Type](#)[All \(7\)](#)[Custom Post Type \(5\)](#)[Post Type \(extended\) \(2\)](#)

7 pods, 3 groups, 28 fields

Label	Name	Type	Groups	Fields
Choices	choice	Custom Post Type	0	2
Exhibitions	exhibition	Custom Post Type	1	7
Page	page	Post Type (extended)	0	2
Portfolios	portfolio	Custom Post Type	0	1
Post	post	Post Type (extended)	0	1
Restaurants	restaurant	Custom Post Type	1	11
Venues	venue	Custom Post Type	1	4
Label	Name	Type	Groups	Fields

7 pods, 3 groups, 28 fields

11 0 + New Delete Cache Howdy, master

Dashboard Posts Media Pages Comments Custom CSS & JS Exhibitions Appearance Plugins

All (8) | Active (8) | Must-Use (1) | Drop-in (1) | Auto-updates Disabled (8)

Screen Options ▾ Help ▾

Search installed plugins...

Bulk actions ▾ Apply 8 items

<input type="checkbox"/> Plugin	Description	Automatic Updates
<input type="checkbox"/> Cache Cleaner - Scheduled Deactivate	Scheduled Cache Clean UP. Keep your Cache Folders Fresh. Version 1.0.7 By Lumiverse Dynamic View details	Enable auto-updates
<input type="checkbox"/> Classic Editor Deactivate Settings	Enables the WordPress classic editor and the old-style Edit Post screen with TinyMCE, Meta Boxes, etc. Supports the older plugins that extend this screen. Version 1.6 By WordPress Contributors View details	Enable auto-updates
<input type="checkbox"/> Easy Query Deactivate Settings Query Builder	A query builder plugin for WordPress. Version 2.0.4 By Darren Cooney View details	Enable auto-updates
<input type="checkbox"/> Pods - Custom Content Types and Fields Add-Ons Opt In Deactivate	Pods is a framework for creating, managing, and deploying customized content types and fields Version 2.7.26 By Pods Framework Team View details	Enable auto-updates
<input type="checkbox"/> Simple Custom CSS and JS Settings Deactivate	Easily add Custom CSS or JS to your website with an awesome editor. Version 3.34.1 By SilkyPress.com View details	Enable auto-updates
<input type="checkbox"/> Edit Pods Add New	Plugin for developers. Display in the admin bar, the name of the template (PHP file) for this page. Display with different colors if the template owns to the current theme, the theme parent, or a plugin. An option page allows to chose if every logged user can see the template file in the admin-bar, or just the administrators of the website. (with "administrator" role) Version 4.5.0 By Gilles Dumas View details	Enable auto-updates
<input type="checkbox"/> Components - Migrate Packages - Pod Pages - Pod Templates - Roles & Capabilities Settings ↳ Add-Ons Help	Manage your WP files. Version 6.9 By mnndpsingh287 View details	Enable auto-updates
	Description	Automatic Updates

Edit Pods Add New Components - Migrate Packages - Pod Pages - Pod Templates - Roles & Capabilities Settings ↳ Add-Ons Help

Add New Pod [« Back to Manage](#)

1 Create or Extend

2 Configure

Pods are content types that you can customize and define fields for based on your needs. You can choose to create a Custom Post Type, Custom Taxonomy, or Custom Settings Pages for site-specific data. You can also extend existing content types like WP Objects such as Post Types, Taxonomies, Users, or Comments.

Not sure what content type you should use? Check out our [Content Type Comparison](#) to help you decide.

Create New

Create entirely new content types using Post Types, Taxonomies, or Custom Settings Pages.

Extend Existing

Extend any existing content type within WordPress, including Post Types (Posts, Pages, etc), Taxonomies (Categories, Tags, etc), Media, Users, or Comments.

11 0 + New Delete Cache

Howdy, master

Dashboard Posts Media Pages Comments Custom CSS & JS Exhibitions Appearance Plugins Users Tools Settings

Add New Pod [« Back to Manage](#)

1 Create or Extend ✓ **2 Configure**

Creating a new Content Type allows you to control exactly what that content type does, how it acts like, the fields it has, and the way you manage it.

Create a New Content Type

Content Type [?](#)

Singular Label [?](#)

Plural Label [?](#)

[Advanced +](#)

[Start Over](#) [Next Step](#)

Pods Admin

Edit Pods

Add New

Components

- Migrate Packages

- Pod Pages

- Pod Templates

- Roles & Capabilities

Settings

↳ Add-Ons

Help



W 11 0 + New Delete Cache

Dashboard Posts Media Pages Comments Custom CSS & JS Exhibitions Appearance Plugins Users Tools Settings

Pods Admin

Edit Pods Add New Components

- Migrate Packages
- Pod Pages
- Pod Templates
- Roles & Capabilities

Settings

↳ Add-Ons

Help

Add New Pod [« Back to Manage](#)

1 Create or Extend ✓ 2 Configure

Creating a new Content Type allows you to control exactly what that content type does, how it acts like, the fields it has, and the way you manage it.

Create a New Content Type

Content Type [?](#) Custom Post Type (like Posts or Pages) ▾

Singular Label [?](#) restaurant

Plural Label [?](#) restaurants

[Advanced +](#)

Start Over Next Step

The screenshot shows the 'Add New Pod' wizard in the Pods Admin section of the WordPress dashboard. The current step is 'Create or Extend'. The 'Content Type' dropdown is set to 'Custom Post Type (like Posts or Pages)'. The 'Singular Label' field contains 'restaurant' and the 'Plural Label' field contains 'restaurants', both highlighted with a red border. Below these fields is an 'Advanced +' link. At the bottom are 'Start Over' and 'Next Step' buttons.

11 0 + New Delete Cache Howdy, master

Dashboard Posts Media Pages Comments Custom CSS & JS Exhibitions restaurant Appearance Plugins Users Tools Settings Pods Admin

Edit Pod: **restaurant** Edit

Success! Pod created successfully.

Manage Fields Labels Admin UI Advanced Options Auto Template Options REST API

Manage Fields Add Field

No fields have been added yet

Add Field

Manage ([Back to Manage](#)) Delete Pod Save Pod

Edit Pods Add New Components - Migrate Packages - Pod Pages - Pod Templates - Roles & Capabilities Settings Help

Success! Pod created successfully.

Manage Fields Labels Admin UI Advanced Options Auto Template Options REST API

Manage Fields Add Field

New Field

Basic Additional Field Options Advanced REST API

Label chi_title Name chi_title Field Type Plain Text

Description

Field Type Plain Text

Options Required

Cancel Save Field

Manage (Back to Manage) Delete Pod Save Pod

Labels Admin UI Advanced Options Auto Template Options REST API

Label Name Field Type Add Field

Pods Admin Edit Pods Add New Components - Migrate Packages - Pod Pages - Pod Templates - Roles & Capabilities Settings Add-Ons Help

Version 5.6

Success! Pod created successfully.

Manage Fields Labels Admin UI Advanced Options Auto Template Options REST API

Manage Fields Add Field

Label ⓘ	Name ⓘ	Field Type ⓘ
chi_title	chi_title	Plain Text
Label ⓘ	Name ⓘ	Field Type ⓘ

Add Field Manage (« Back to Manage) Delete Pod Save Pod

Howdy, master

Posts Media Pages Comments Custom CSS & JS Exhibitions restaurant Appearance Plugins Users Tools Settings

Pods Admin

Edit Pods

Add New Components

- Migrate Packages
- Pod Pages
- Pod Templates
- Roles & Capabilities

Settings

↳ Add-Ons

Help

Version 5.6

Success! Pod created successfully.

Manage Fields Labels Admin UI Advanced Options Auto Template Options REST API

Manage Fields Add Field

Label	Name	Field Type
chi_title	chi_title	Plain Text

New Field

Basic Additional Field Options Advanced REST API

Label pic1

Name

Description

Field Type

Options

Text

- Plain Text
- Website
- Phone
- E-mail
- Password

Paragraph

- Plain Paragraph Text
- WYSIWYG (Visual Editor)
- Code (Syntax Highlighting)

Date / Time

- Date / Time
- Date
- Time

Number

- Plain Number
- Currency

Relationships / Media

File / Image / Video

Embed

Relationship

Other

Yes / No

Color Picker

Add Field

Manage (« Back to Manage) Delete Pod Save Pod

Version 5.6

Howdy, master

Success! Pod created successfully.

Manage Fields Labels Admin UI Advanced Options Auto Template Options REST API

Manage Fields Add Field

Label	Name	Field Type
chi_title	chi_title	Plain Text

New Field

Basic Additional Field Options Advanced REST API

Label pic1

Name pic1

Description

Field Type File / Image / Video

Options Required

Cancel Save Field

Label Name Field Type Add Field

Manage ([Back to Manage](#))

Delete Pod Save Pod

WP Posts Media Pages Comments Custom CSS & JS Exhibitions restaurant Appearance Plugins Users Tools Settings

Pods Admin Edit Pods Add New Components - Migrate Packages - Pod Pages - Pod Templates - Roles & Capabilities Settings Help

eonsite.io/wp-admin/admin.php?page=pods&action=edit&id=107&do=create#save-field

Version 5.6

Success! Pod created successfully.

Manage Fields Labels Admin UI Advanced Options Auto Template Options REST API

Manage Fields Add Field

Manage (Back to Manage) Delete Pod Save Pod

Label	Name	Field Type
chi_title	chi_title	Plain Text
pic1	pic1	File / Image / Video

Add Field

Pods Admin Edit Pods Add New Components - Migrate Packages - Pod Pages - Pod Templates - Roles & Capabilities Settings Help

11 0 + New Delete Cache Howdy, master

Media Pages Comments Custom CSS & JS Exhibitions restaurant Appearance Plugins Users Tools Settings Pods Admin

Manage Fields Labels Admin UI Advanced Options Auto Template Options REST API

Manage (Back to Manage) Delete Pod Save Pod

Public

Publicly Queryable

Exclude from Search

User Capability ? post

Additional User Capabilities

Enable Archive Page

Hierarchical

Rewrite

Custom Rewrite Slug

Rewrite with Front

Rewrite Feeds

Rewrite Pages

Query Var

Exportable

Default Status Draft

Howdy, master

11 0 + New Delete Cache
Rewrite With Front

- Pod Templates
- Roles & Capabilities
Settings
↳ Add-Ons
Help

Rewrite Feeds
Rewrite Pages
Query Var
Exportable
Default Status Draft

Supports Title
 Editor
 Author
 Featured Image
 Excerpt
 Trackbacks
 Custom Fields
 Comments
 Revisions
 Page Attributes
 Post Formats

Advanced Supports

Built-in Taxonomies Categories (category) (category)
 Link Categories (link_category) (link_category)
 Tags (post_tag) (post_tag)

Manage ([« Back to Manage](#))
[Delete Pod](#) [Save Pod](#)



Howdy, master

New Delete Cache

Rewrite With Front

Rewrite Feeds

Rewrite Pages

Query Var

Exportable

Default Status Draft

Supports

Title

Editor

Author

Featured Image

Excerpt

Trackbacks

Custom Fields

Comments

Revisions

Page Attributes

Post Formats

Advanced Supports

Built-in Taxonomies

Categories (category) (category)

Link Categories (link_category) (link_category)

Tags (post_tag) (post_tag)

Manage ([« Back to Manage](#))

Delete Pod

Save Pod

Howdy, master

Manage Components

Category All Field Types Tools Integration Migration Advanced

Name	Category	Description
Advanced Content Types	Advanced	A content type that exists outside of the WordPress post and postmeta table and uses custom tables instead. You most likely don't need these and we strongly recommend that you use Custom Post Types or Custom Taxonomies instead. FOR ADVANCED USERS ONLY. Version 2.3 by Pods Framework Team
Advanced Relationships	Advanced	Add advanced relationship objects for relating to including Database Tables, Multisite Networks, Multisite Sites, Themes, Page Templates, Sidebars, Post Type Objects, and Taxonomy Objects Version 2.3 by Pods Framework Team
Builder Integration	Integration	Integration with the Builder theme / child themes from iThemes; Adds new modules to the Layout engine Version 1.0 by Pods Framework Team
Helpers	Advanced	A holdover from Pods 1.x for backwards compatibility purposes, you most likely don't need these and we recommend you use our WP filters and actions instead. Version 2.3 by Pods Framework Team
Markdown Syntax	Field Types	Integration with Markdown (http://michelf.com/projects/php-markdown/); Adds an option to enable Markdown syntax for Paragraph text fields. Version 1.0 by Pods Framework Team
Migrate: Import from the Custom Post Type UI plugin	Migration	Import Custom Post Types and Taxonomies from Custom Post Type UI (http://webdevstudios.com/plugin/custom-post-type-ui/) Version 1.0 by Pods Framework Team
Migrate: Packages	Migration	Import/Export your Pods, Fields, and other settings from any Pods site; Includes an API to Import/Export Packages via PHP Version 2.0 by Pods Framework Team
Pages	Advanced	Creates advanced URL structures using wildcards in order to enable the front-end display of Pods Advanced Content Types. Not recommended for use with other content types. Version 2.3 by Pods Framework Team
Roles and Capabilities	Tools	Create and Manage WordPress User Roles and Capabilities; Uses the 'Members' plugin filters for additional plugin integrations; Portions of code based on the 'Members' plugin by Justin Tadlock Version 1.0 by Pods Framework Team
Table Storage	Advanced	Enable a custom database table for your custom fields on Post Types, Media, Taxonomies, Users, and Comments. Version 2.3 by Pods Framework Team
Templates	Advanced	An easy to use templating engine for Pods. Use {@field_name} magic tags to output values, within your HTML markup. Version 2.3 by Pods Framework Team
Translate Pods Admin	I18n	Allow UI of Pods and fields to be translated. Version 0.2 by Pods Framework Team
Name	Category	Description

12 components

Make sure these options are enabled.

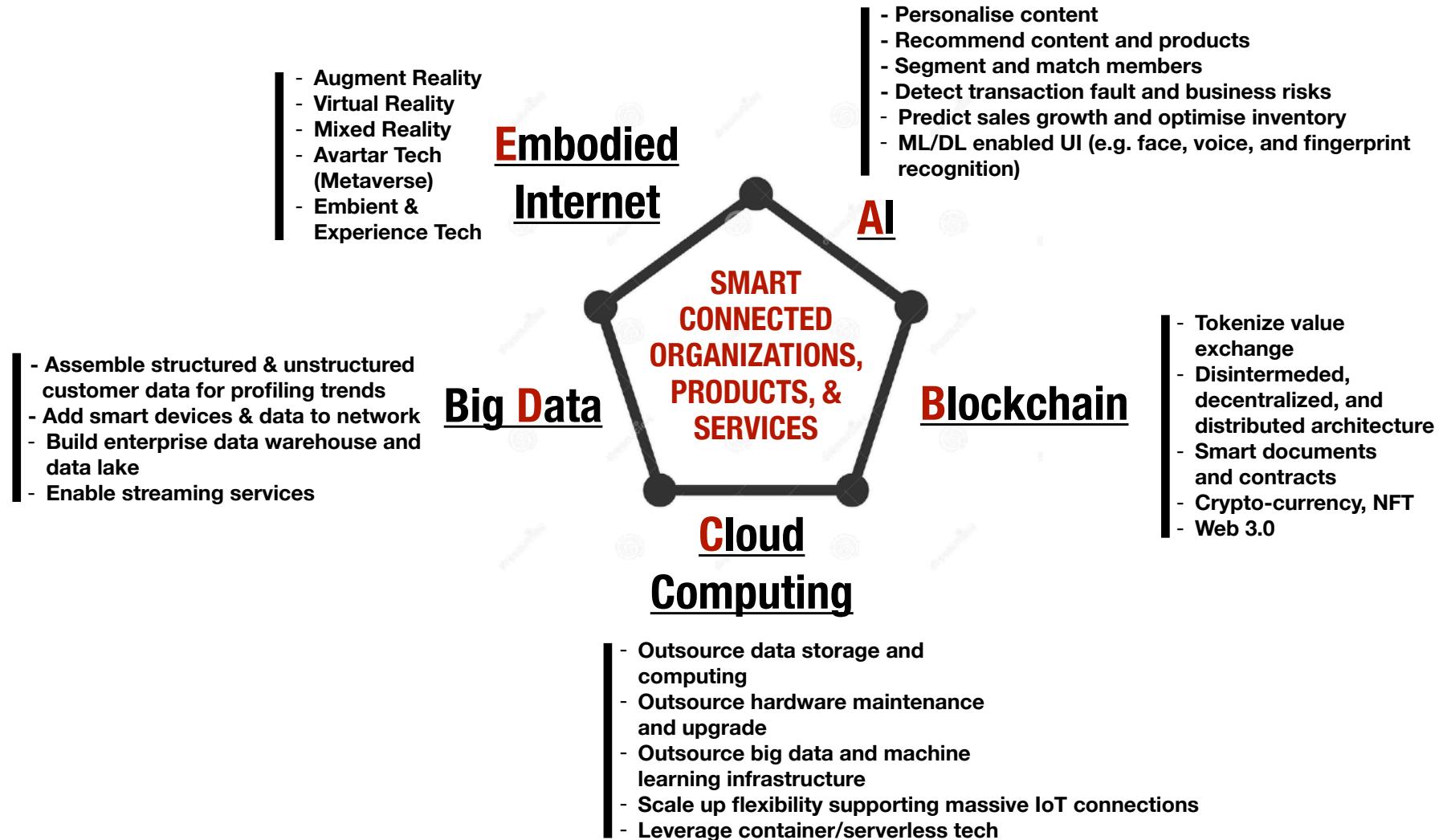


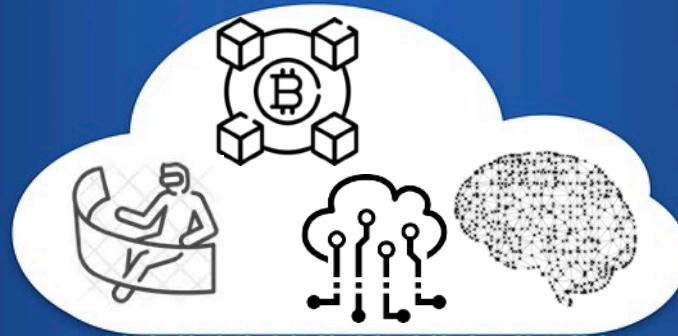
We need **YOU** in 2020 and beyond

Things are changing for Pods and we want you to be a part of it! Our goal is to be fully funded by users like you. Help us reach our goal of 200 recurring donors in 2020.

[Learn More](#) [JOIN NOW](#)

Cloud development essentials: From virtualisation to containerisation.





```
1 01 01 00 10 10 01 00 10 01 10 00 10 11 00 11 00 0  
1 01 11 11 10 11 00 11 10 10 01 10 10 11 01 10 11 10 0  
0 10 10 10 10 10 00 00 11 00 00 00 00 00 01 01 11 10 0  
0 11 01 11 00 00 01 00 11 11 00 11 11 01 10 00 10 00 1  
0 00 11 00 01 11 01 10 10 01 00 11 11 11 01 01 01 11 0  
1 11 10 01 01 01 00 01 01 00 01 00 11 00 00 01 10 0  
1 10 01 01 01 11 01 00 10 00 00 10 00 01 10 11 00 10 1  
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0 11 11 10 11 11 10 00 10 00 01 11 10 11 00 01 00 11 0  
0 11 01 00 01 00 11 10 10 10 10 00 10 11 11 00 00 01 11 1
```



In the last 25 years, the rise of the web, mobile internet, social media, e-commerce, and IoT has placed tremendous demand on outsourcing and cloud services. The continuous digital transformation and outbreak of COVID19 have accelerated the trend.

The Cloud Stack

- Google Map, Gmail
- Office 365, Adobe Cloud
- Zoom, Airtable

SaaS (software as a Service)

e.g. **Zoom, Office 365, Adobe Cloud, Airtable, ParseHub**)

- OS, database server, lang runtime
- Back-end development tools and frameworks, web/app server
- Other AI/Big data, IOT, streaming support

PaaS (Platform as a Service)

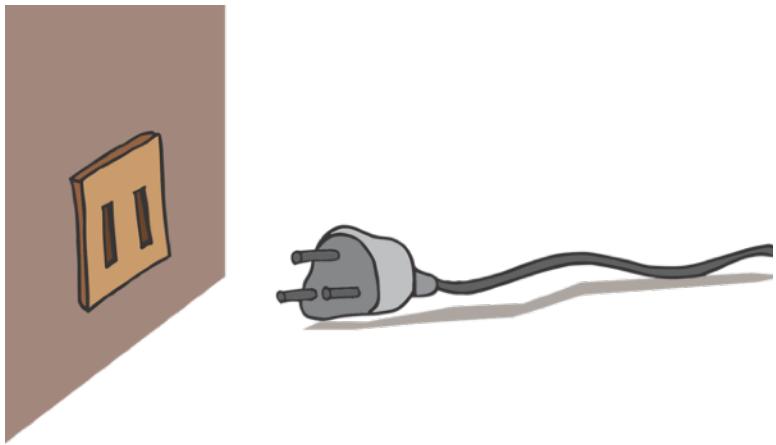
e.g. **PythonAnywhere, Pantheon**

- Virtual machine, hardware servers
- Load balancing, networking, storage, routers, security, 7/24 uninterrupted power supply

IaaS (Infrastructure as a Service)

e.g. **AWS EC2, Azure VM**

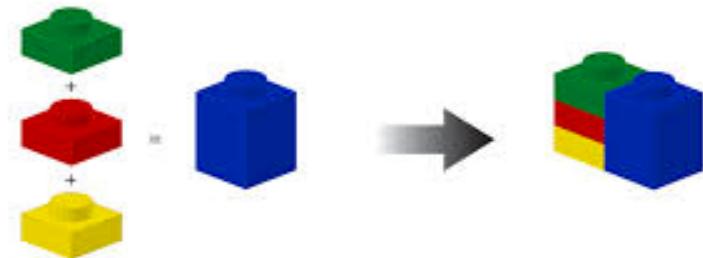
Private Cloud / Hybrid Cloud / Public Cloud



**Cloud computing is
essentially based on the
utility model.**

Componentization and Connectivity:

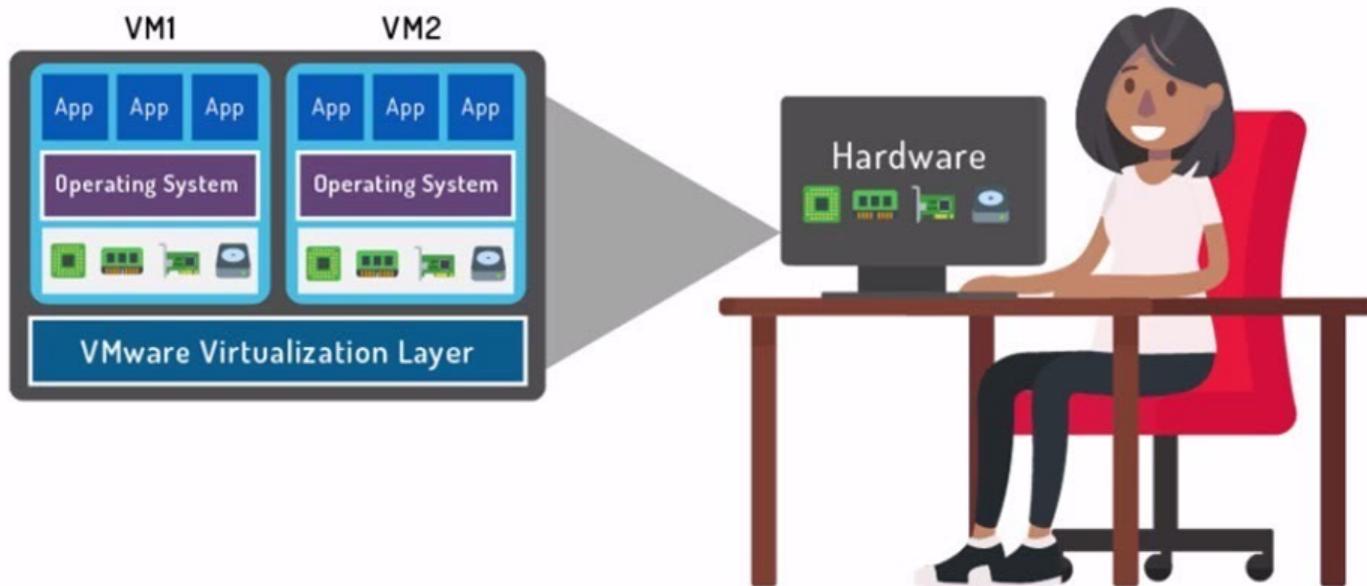
The forces behind the rapid development of hardware and software businesses in the IT industry.

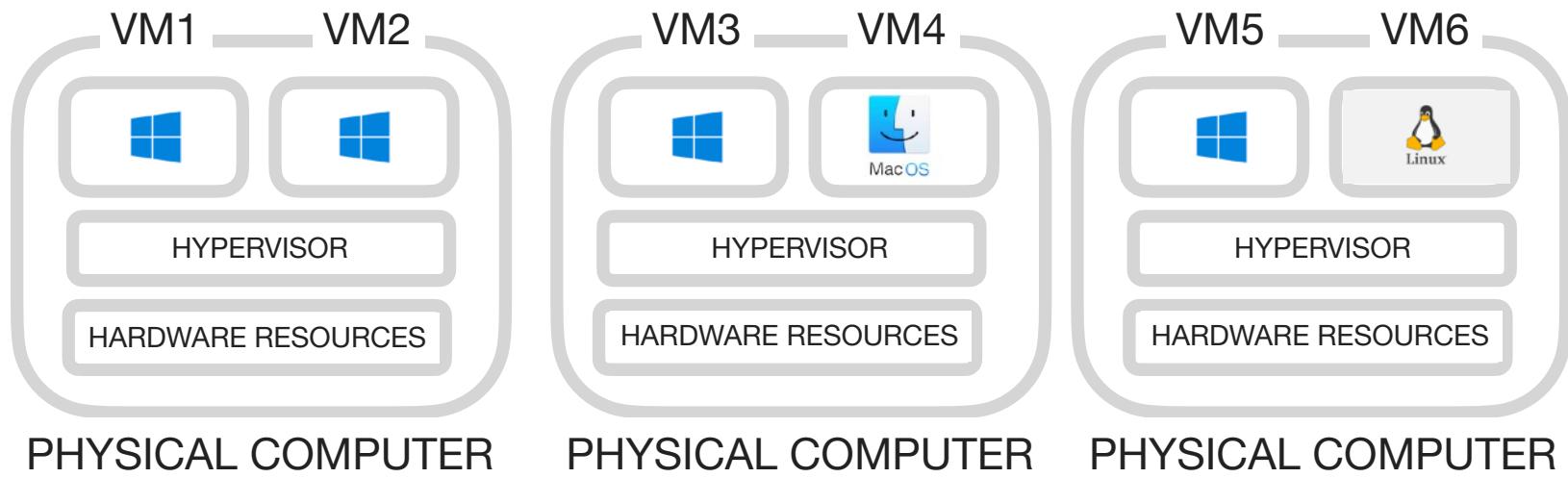


****Moorse's Law and Metcalfe's Law**

**Virtualization of servers, memory
and processor, to virtualisation of
storage and networks.**

What is Virtualization?





Popular Hypervisor programs: IBM KVM, VMWare, Oracle VirtualBox

Demonstration of a virtual machine (VM).



VirtualBox

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Here you will find links to VirtualBox binaries and its source code.

VirtualBox binaries

By downloading, you agree to the terms and conditions of the respective license.

If you're looking for the latest VirtualBox 6.0 packages, see [VirtualBox 6.0 builds](#). Please also use version 6.0 if you need to run VMs with software virtualization, as this has been discontinued in 6.1. Version 6.0 will remain supported until July 2020.

If you're looking for the latest VirtualBox 5.2 packages, see [VirtualBox 5.2 builds](#). Please also use version 5.2 if you still need support for 32-bit hosts, as this has been discontinued in 6.0. Version 5.2 will remain supported until July 2020.

VirtualBox 6.1.4 platform packages

- [Windows hosts](#)
- [OS X hosts](#)
- [Linux distributions](#)
- [Solaris hosts](#)

The binaries are released under the terms of the GPL version 2.

See the [changelog](#) for what has changed.

You might want to compare the checksums to verify the integrity of downloaded packages. *The SHA256 checksums should be favored as the MD5 algorithm must be treated as insecure!*

- [SHA256 checksums](#), [MD5 checksums](#)

Note: After upgrading VirtualBox it is recommended to upgrade the guest additions as well.

VirtualBox 6.1.4 Oracle VM VirtualBox Extension Pack



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Download Ubuntu Server

Ubuntu Server 18.04.4 LTS

The long-term support version of Ubuntu Server, including the Train release of OpenStack and support guaranteed until April 2023 — 64-bit only.

[Download](#)

Virtualization allows more flexible services to be migrated to the cloud.

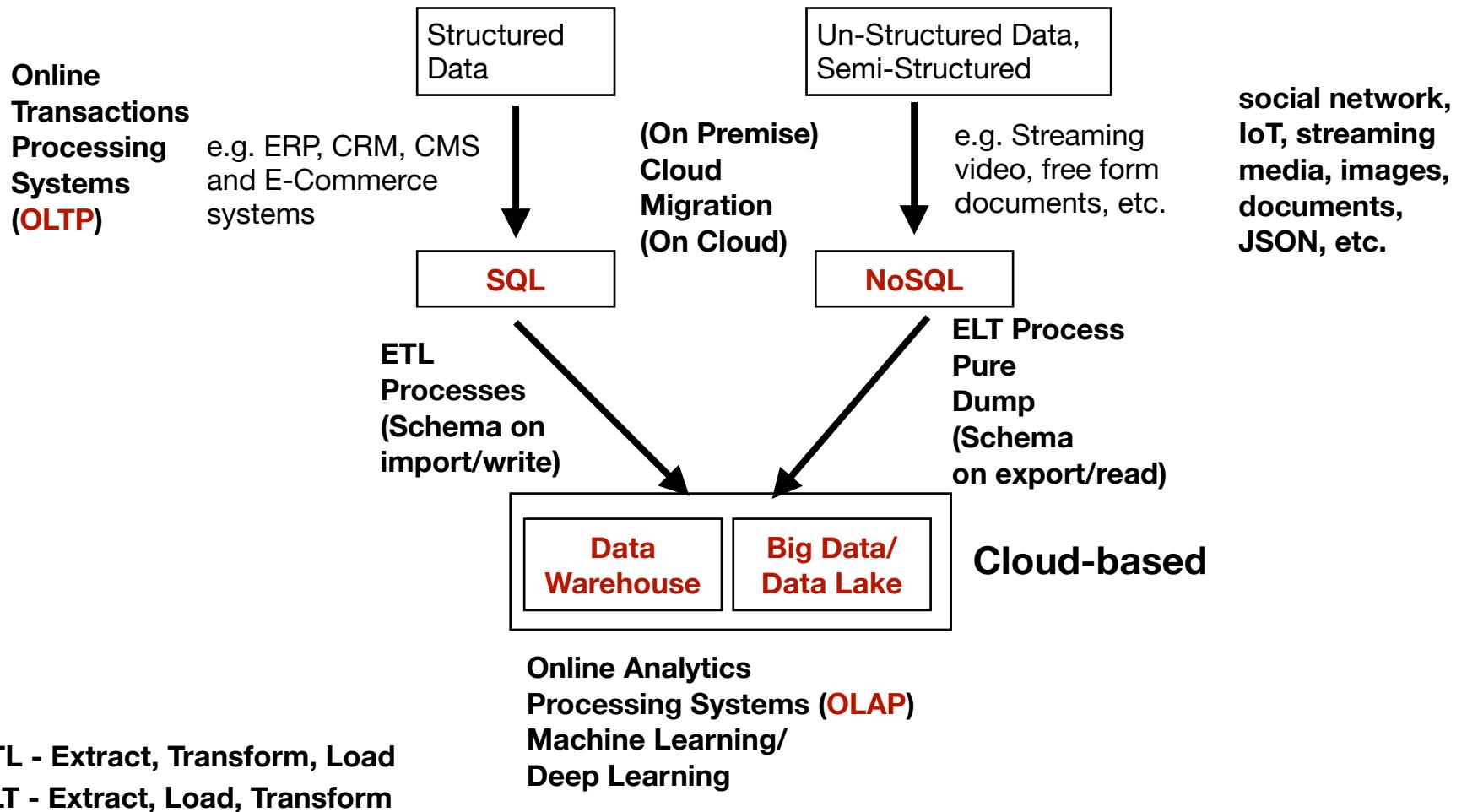
Difference between IaaS, PaaS and SaaS

On-Premises	IaaS	PaaS	SaaS
Applications	Applications	Applications	Applications
Data	Data	Data	Data
Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware
O/S	O/S	O/S	O/S
Virtualization	Virtualization	Virtualization	Virtualization
Servers	Servers	Servers	Servers
Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking

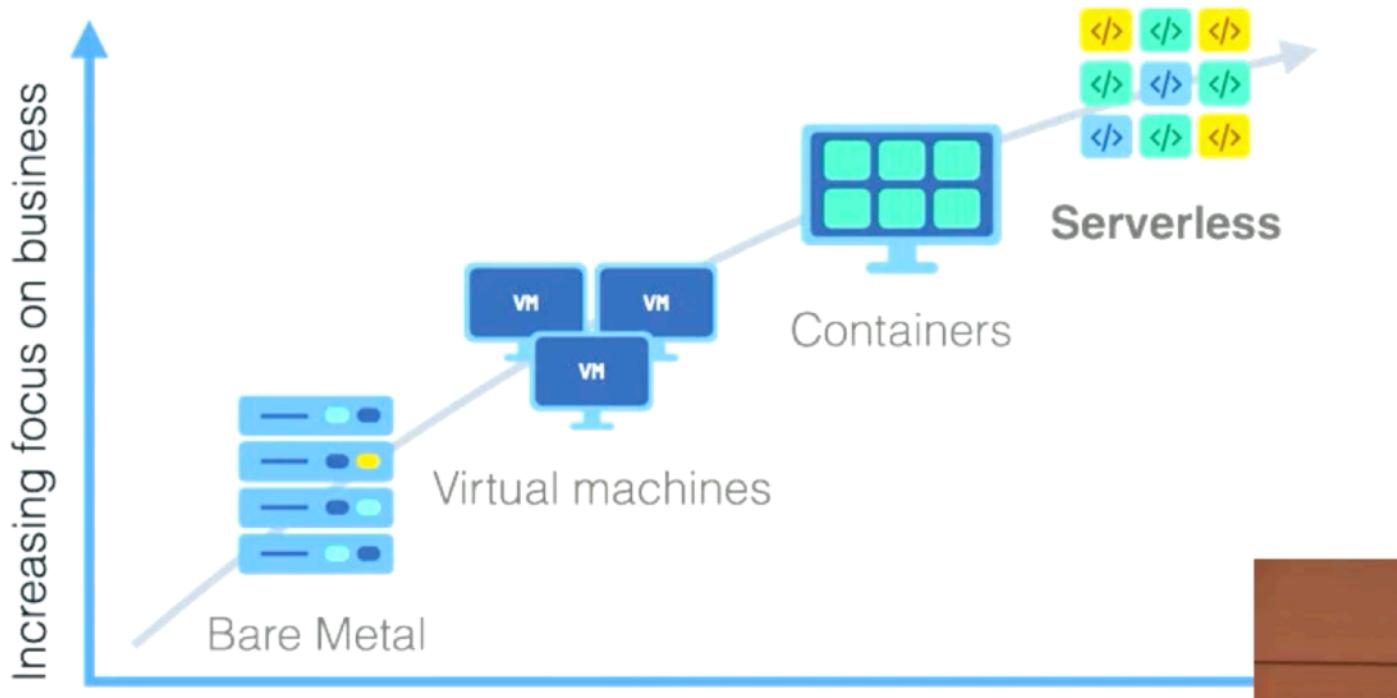
Source: SimplyLearn

Managed by you

Managed by Vendor



Major trends in cloud deployment methods.

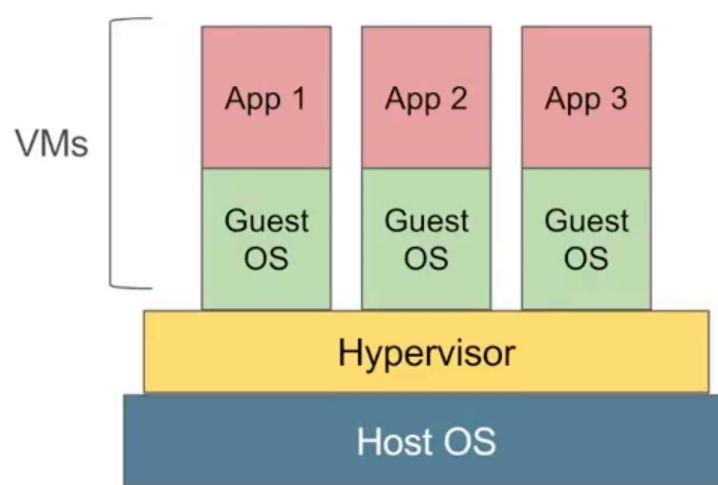


Source: IBM

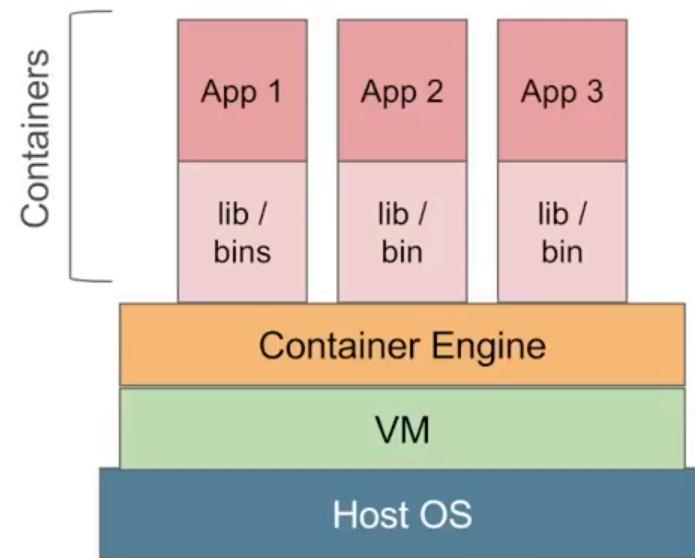
What is a container? Introducing Docker.

Docker Container vs. Virtual Machine

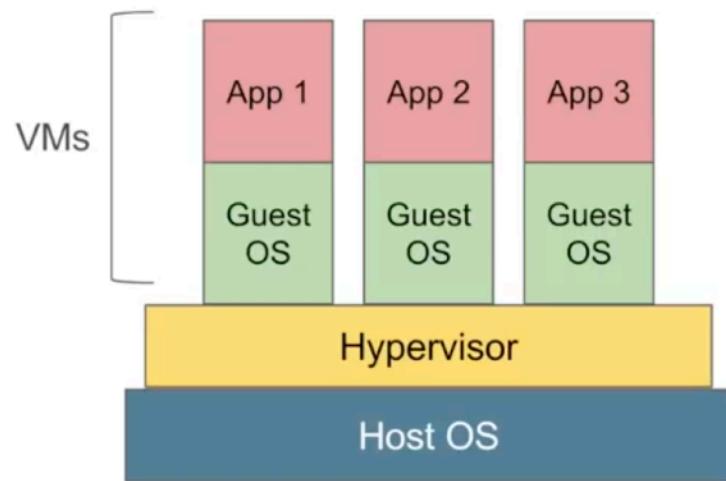




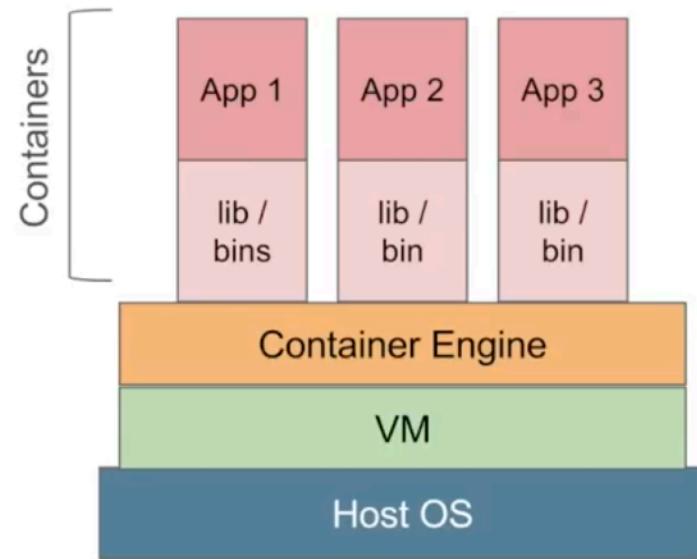
Virtualization



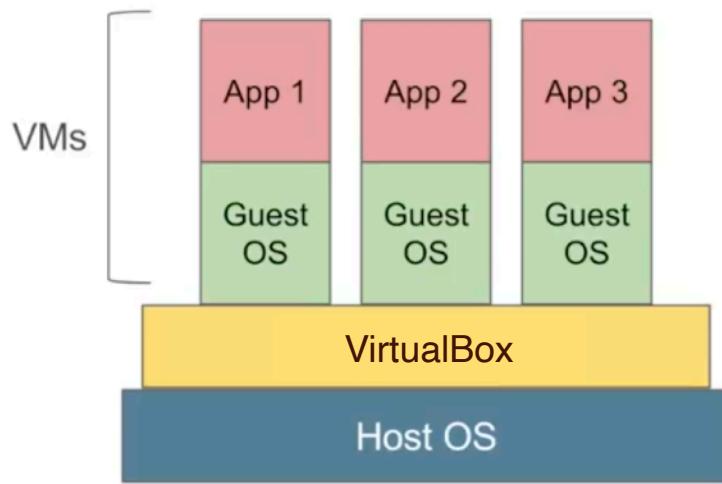
Containerization



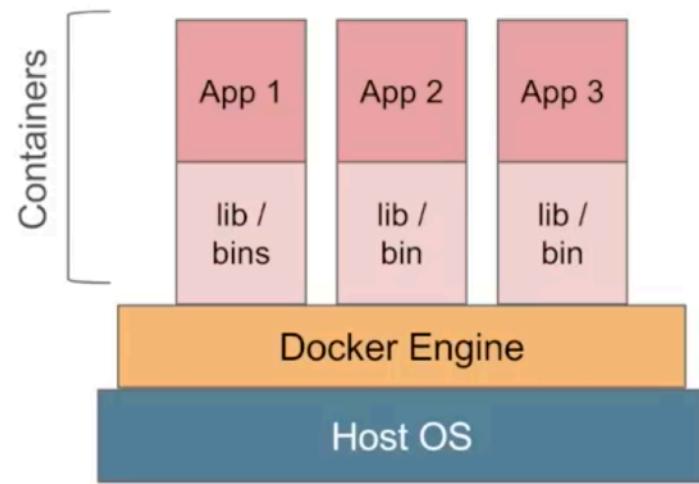
Virtualization



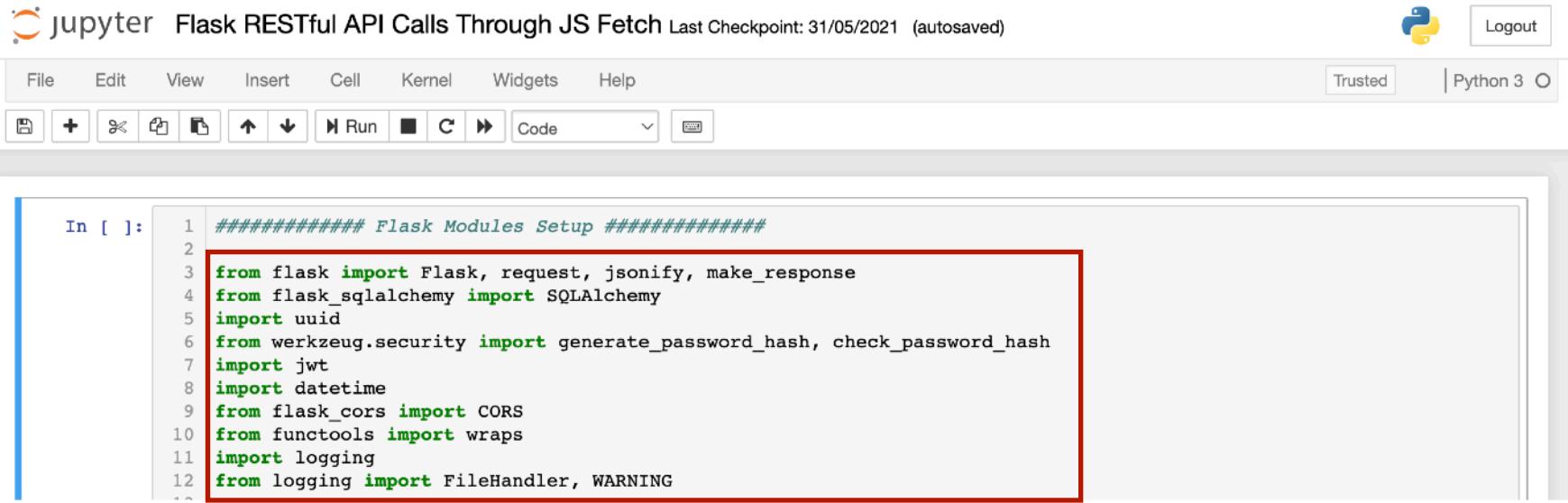
Containerization



Virtualization



Containerization



The screenshot shows a Jupyter Notebook interface. The top bar includes the Jupyter logo, the title "Flask RESTful API Calls Through JS Fetch", the last checkpoint date "31/05/2021 (autosaved)", a Python logo icon, and "Logout". The menu bar has options: File, Edit, View, Insert, Cell, Kernel, Widgets, Help. Below the menu is a toolbar with icons for file operations like Open, Save, Run, and Kernel. The main area shows a code cell labeled "In []:" containing Python code for setting up a Flask application. The code imports various modules including Flask, SQLAlchemy, UUID, Werkzeug security, CORS, and logging. A red box highlights the first 12 lines of the code.

```
In [ ]: ##### Flask Modules Setup #####
1 from flask import Flask, request, jsonify, make_response
2 from flask_sqlalchemy import SQLAlchemy
3 import uuid
4 from werkzeug.security import generate_password_hash, check_password_hash
5 import jwt
6 import datetime
7 from flask_cors import CORS
8 from functools import wraps
9 import logging
10 from logging import FileHandler, WARNING
```

Do you still remember the version compatibility problem encountered in earlier sessions of the course? In software applications and development, this is called the dependency hell. I gave you a Jupyter Notebook to run on your laptop, but due to version dependency problem, you could not make it work and waste a lot of time. If I had given you a “**container**” of codes, the problem could have been solved.

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Docker Desktop

Install Docker Desktop – the fastest way to containerize applications.

[Mac with Intel Chip](#)[Mac with Apple Chip](#)

MOST COMMON

Also available for [Windows](#) and [Linux](#)

The Docker Subscription Service Agreement has been updated.



Our [Docker Subscription Service Agreement](#) includes a change to the terms for Docker Desktop

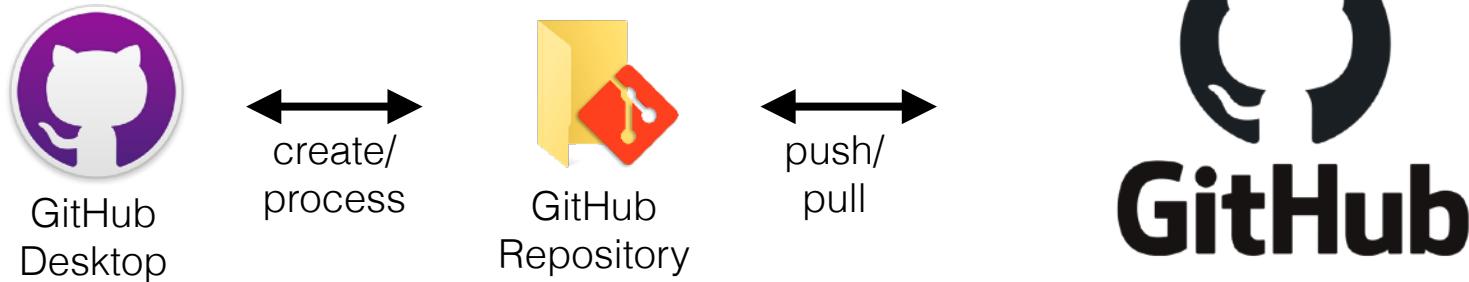
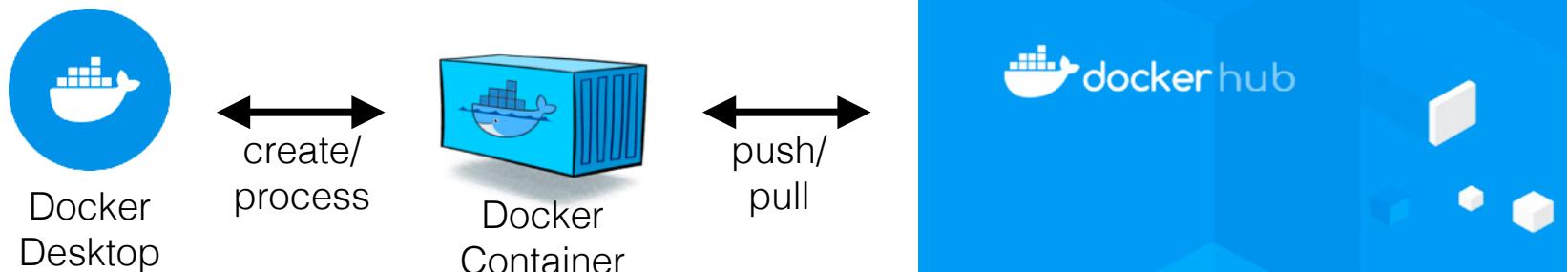
- It **remains free** for small businesses (fewer than 250 employees AND less than \$10 million in annual revenue), personal use, education, and non-commercial open source projects.
- It requires a paid subscription ([Pro](#), [Team](#) or [Business](#)), for as little as \$5 per user per month, for professional use in larger businesses.

<https://www.docker.com/products/docker-desktop>

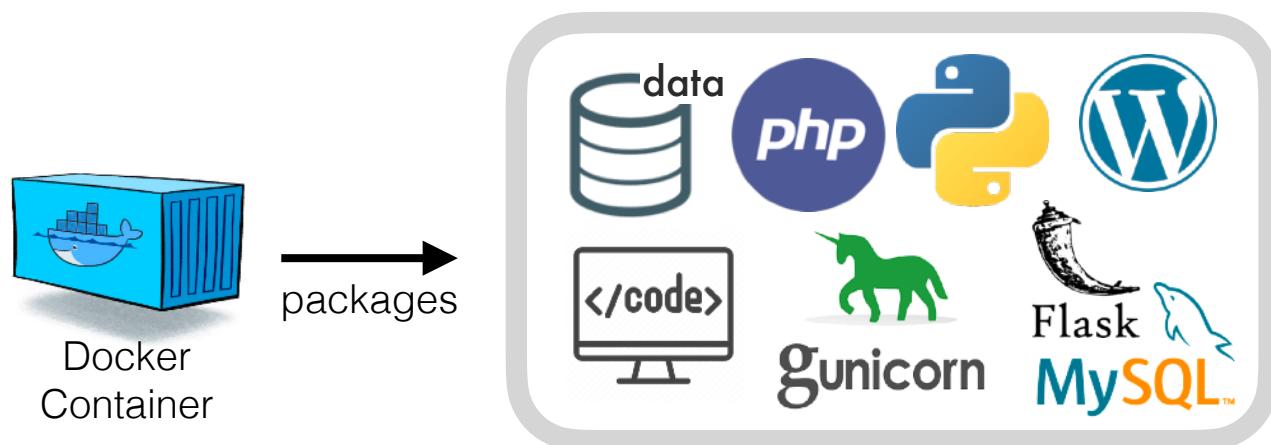
After registration with a **DockerHub** account and downloading and installing the **Docker Desktop** program, you can validate your installation with the following commands:

1. mkdir dockerproj
2. cd dockerproj
3. docker —version (or docker ps)

Docker Container Generation Process



Use Docker container to **package your app** and **ship** to your team mates for testing without worrying about **OS compatibility** and **modules dependency** problems.

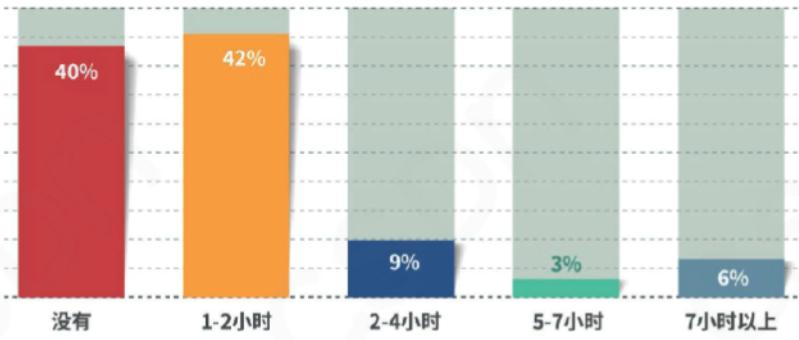


2021-2022 中国开发者调查报告

Survey Report on Developers in China

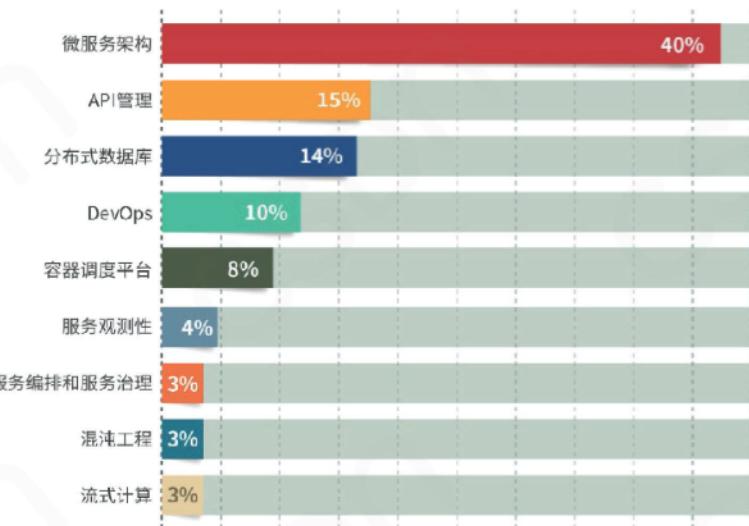
<https://csdn.gitcode.host/Survey-Report-on-Developers-in-China/survey/2021/>

虽然有相当一部分开发者在工作中并没有使用到云原生相关技术，但有42%的开发者表示，每天会花1-2小时学习相关知识。



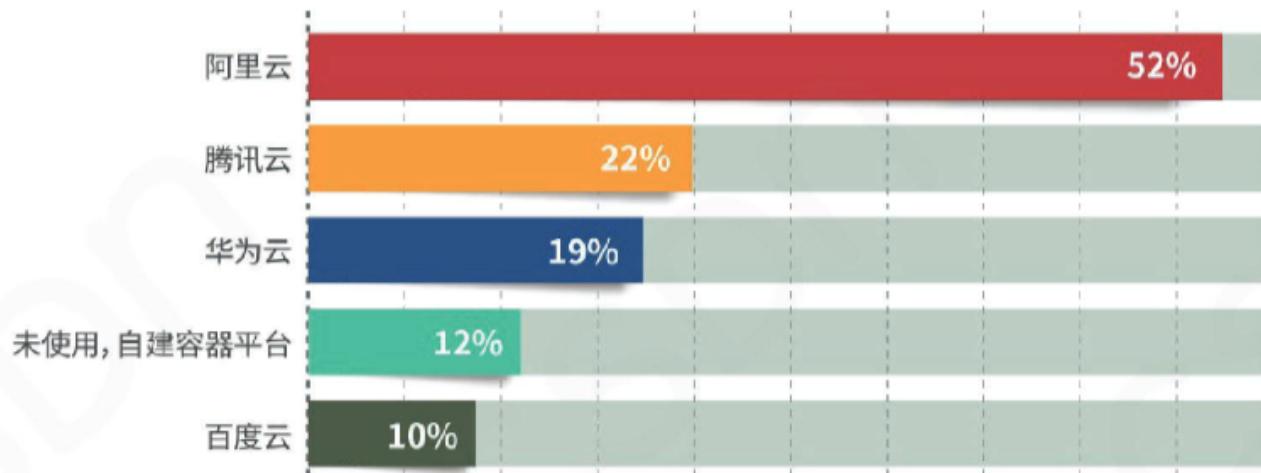
图表47 开发者对云原生学习、实践的每日时长

云原生涉及领域众多，其中以微服务架构为最，40%的开发者专注于微服务架构领域。



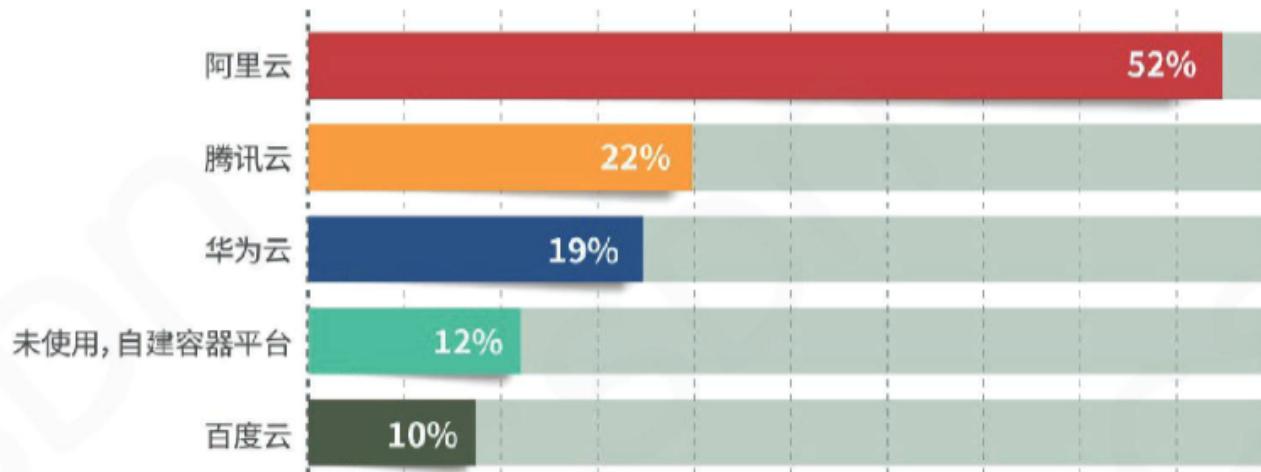
图表48 开发者涉足云原生领域排行

在国内主流容器云平台的使用上，阿里云占领先地位，有52%的开发者在使用阿里云。也有12%的开发者表示，他们自建容器云平台。



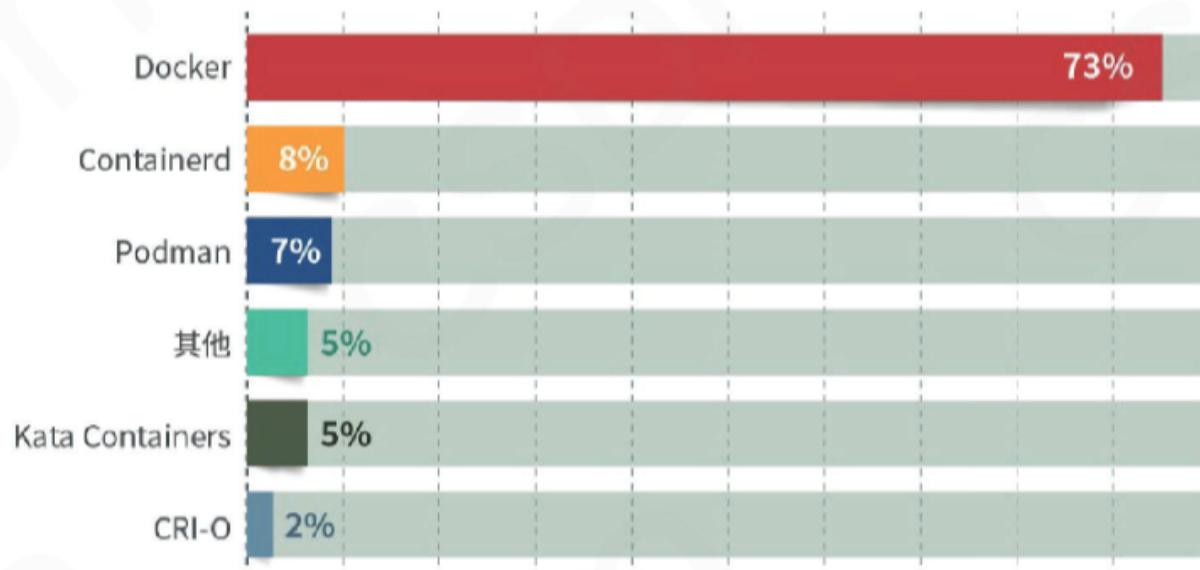
图表58 容器云平台使用情况Top 5 (调查项为多选)

在国内主流容器云平台的使用上，阿里云占领先地位，有52%的开发者在使用阿里云。也有12%的开发者表示，他们自建容器云平台。



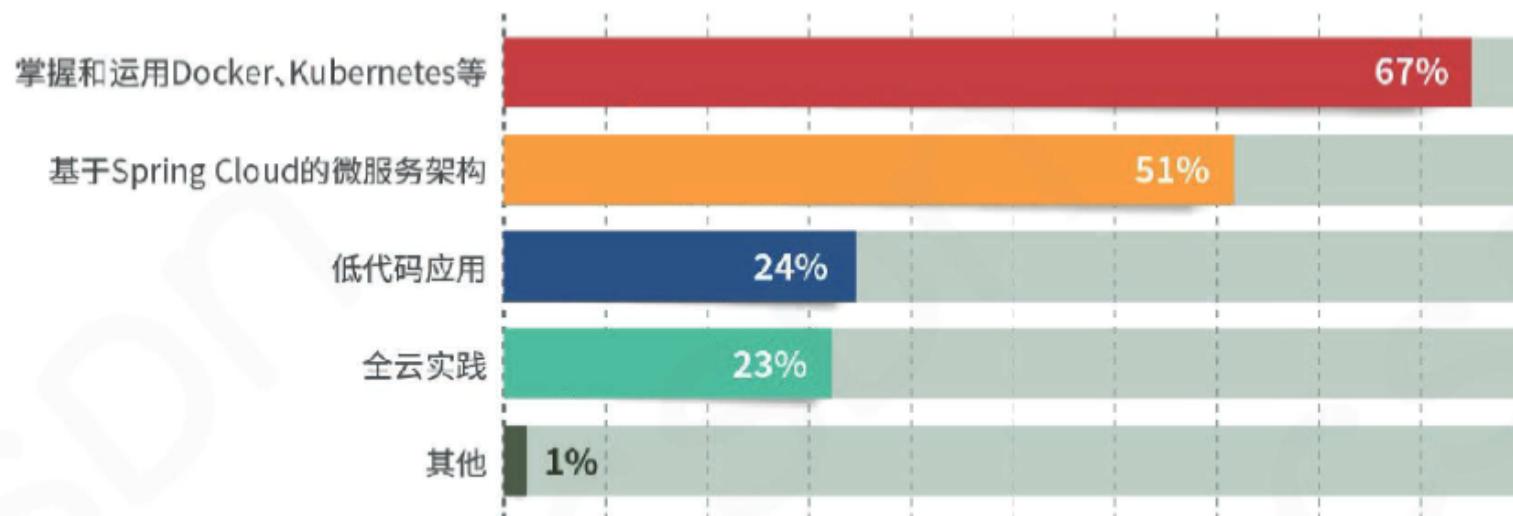
图表58 容器云平台使用情况Top 5 (调查项为多选)

Docker是当今最知名的容器平台之一，它于2013年发布，尽管Kubernetes曾放弃对Docker的支持，但数据显示，73%的开发者使用的容器运行时环境是基于Docker构建的。



图表59 容器运行时环境

在云原生时代，容器化技术和微服务化技术是开发者最为关注的，67%的开发者认为，掌握和运用 Docker、Kubernetes 等技术最为重要。当然，51%的开发者同样认为微服务架构也非常重要。



图表63 云原生时代中必不可少的技能 (调查项为多选)

专栏首页 > Rainbond开源「容器云平台」 > Docker这么火，但是你真的了解吗？

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存储

数据存储首席吐槽官，伴你同行

1人赞同了该回答

引言：“没有集装箱，就不会有全球化。”《经济学家》里将普通的集装箱评价得气场两米八，而IT领域里，Docker（容器）技术对于软件定义数据中心SDDC的价值，大抵也如是。

Docker这么火，但是你真的了解吗？

2018-05-31 阅读 495

对决策层：可以直观感受的是软件开发的人力成本和资源消耗会减少。

对产品经理：版本更新迭代，功能增删改速度明显提升，可以使产品应用交付的周期缩短。

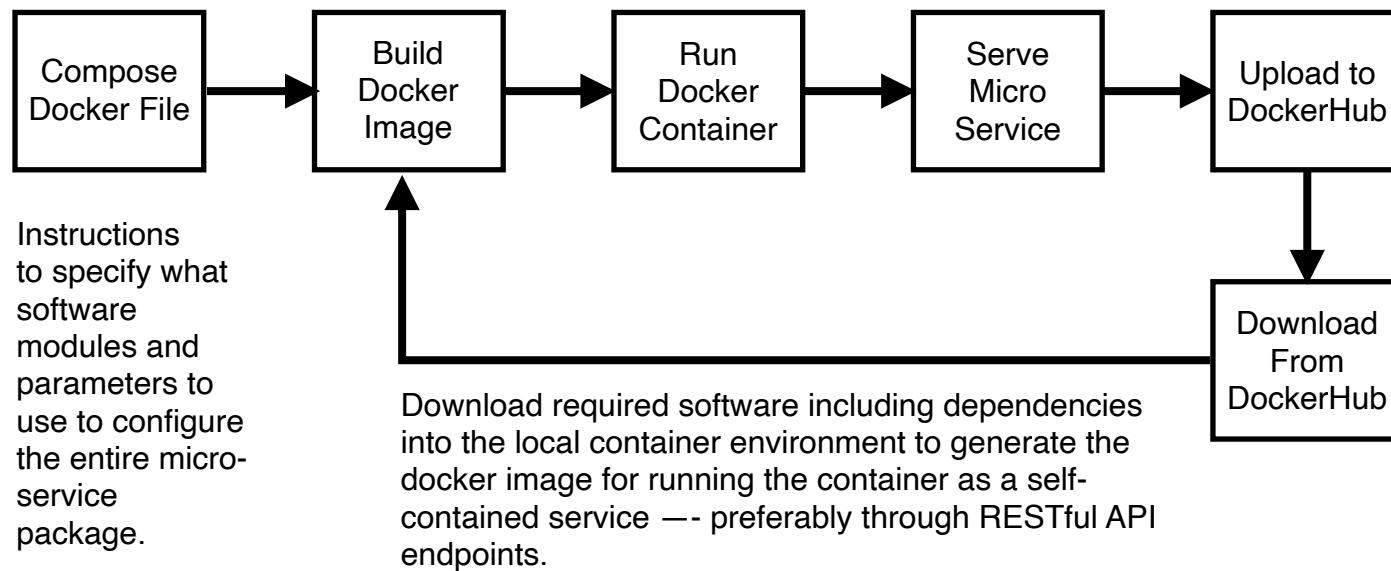
对开发者及运维：开发测试运维环境统一，达到敏捷开发，高效运维的目标。

在了解Docker之前，我们先了解一下集装箱这个概念。

source: <https://www.zhihu.com/question/66924865>

source: <https://cloud.tencent.com/developer/article/1139846>

How Docker works.





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Build and Ship any Application Anywhere

Docker Hub is the world's easiest way to create, manage, and deliver your team's container applications.

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Docker Hub is the world's largest library and community for container images

Source: <https://hub.docker.com>

Demonstration of a Docker Container #1.

Source: <https://github.com/vastevenson/docker-flask-test> (with DockerFile)

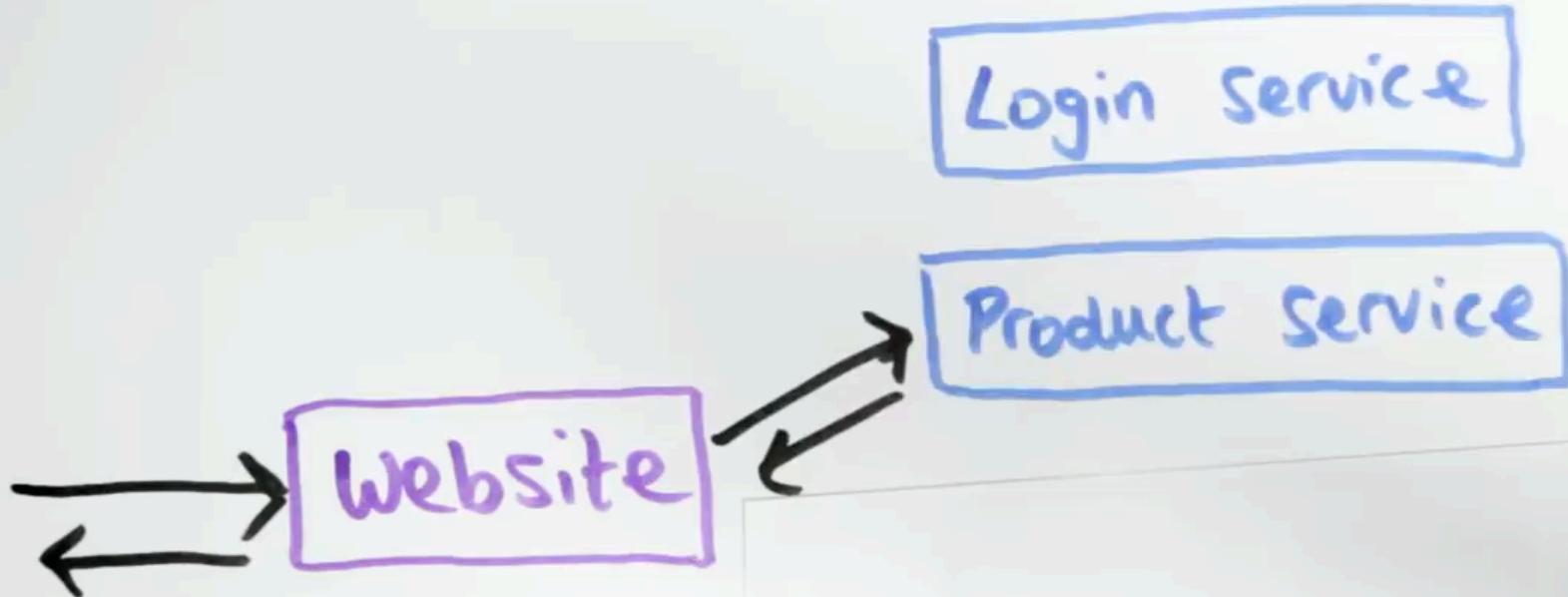
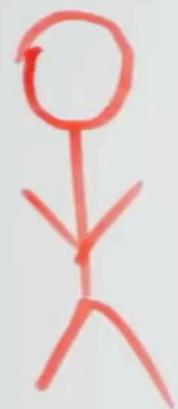
Video: <https://www.youtube.com/watch?v=wrMJoKpK2mk>

1. Sign up with Docker Hub (<https://hub.docker.com>)
2. Open a terminal window (On Window, run **PowerShell**. On Mac, type **Terminal** in the search field, then click **Terminal**.)
3. Once in terminal mode, type **pwd** to display your current directory.
4. Make a directory (e.g. docker-flask-test), which stands for the docker app name.
5. Create Dockerfile, requirements.txt, and Flask app file and templates directory (with templates).
6. Next, build the image as defined in the Dockerfile.
7. **docker build -t <docker username>/<directory/app name> .** (Don't forget the dot must have a space before it) to build the image.
8. **docker images** (show the built image result)
9. **docker run -d -p 5000:5000 <docker username>/<directory/app name>**
10. Test run the docker container app at port 5000 and push it to Docker Hub for sharing.

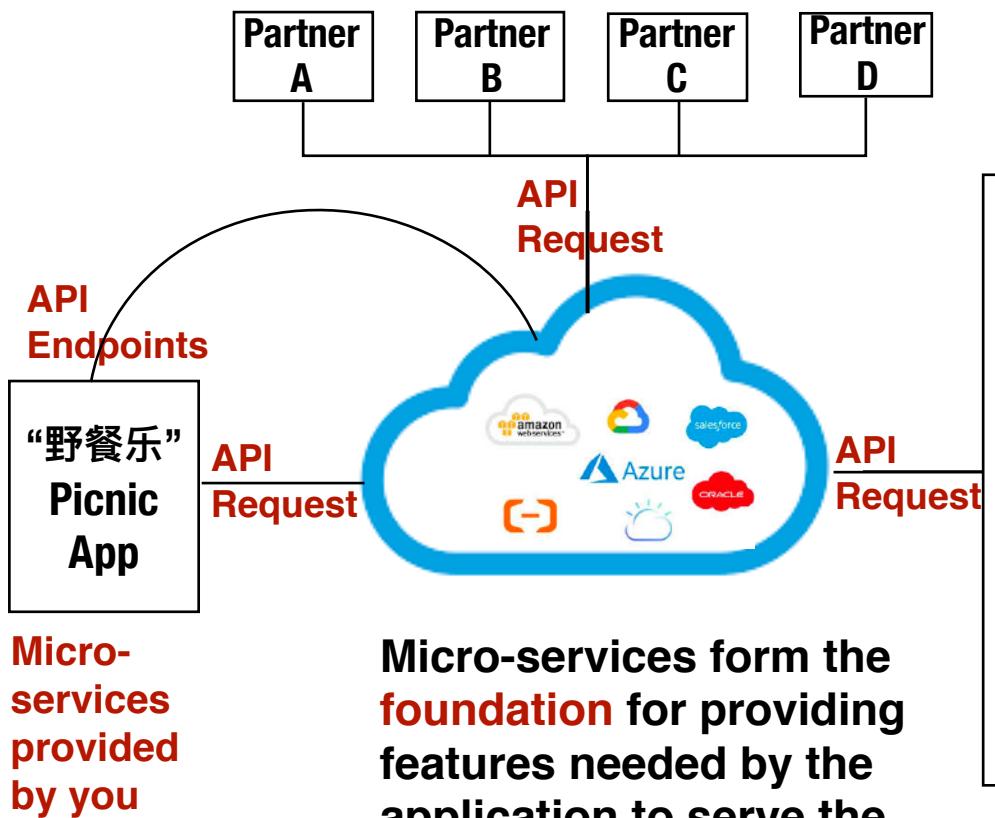
Demonstration of a Docker Container #2.

Source: <https://gist.github.com/bradtraversy/faa8de544c62eef3f31de406982f1d42> (Docker Compose File)

Video: <https://www.youtube.com/watch?v=pYhLEV-sRpY>



Business partners requesting your services through API requests.



Micro-services form the foundation for providing features needed by the application to serve the ultimate users/customers

Micro-services



Docker Enterprise Edition

Docker Cloud

Docker Compose

Overview of Docker Compose

Install Compose

Getting started

Compose (docker-compose) CLI reference

Compose file reference

Docker stacks and distributed application bundles

Using Compose with Swarm

Environment file

Environment variables in Compose

Extend services in Compose

Networking in Compose

Using Compose in production

Link environment variables (deprecated)

Control startup order

Sample apps with Compose

Docker Compose release notes



Install Docker Compose

Estimated reading time: 7 minutes

You can run Compose on macOS, Windows, and 64-bit Linux.

Prerequisites

Docker Compose relies on Docker Engine for any meaningful work, so make sure you have Docker Engine installed either locally or remote, depending on your setup.

- On desktop systems like Docker for Mac and Windows, Docker Compose is included as part of those desktop installs.
- On Linux systems, first install the [Docker](#) for your OS as described on the Get Docker page, then come back here for instructions on installing Compose on Linux systems.
- To run Compose as a non-root user, see [Manage Docker as a non-root user](#).

Install Compose

Follow the instructions below to install Compose on Mac, Windows, Windows Server 2016, or Linux systems, or find out about alternatives like using the `pip` Python package manager or installing Compose as a container.

[Mac](#)[Windows](#)[Linux](#)[Alternative Install Options](#)

Install Compose on macOS

Docker for Mac and Docker Toolbox already include Compose along with other Docker apps, so Mac users do not need to install Compose separately. Docker install instructions for these are here:

- [Get Docker for Mac](#)
- [Get Docker Toolbox \(for older systems\)](#)

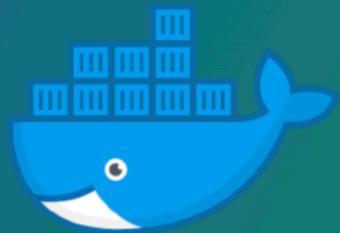
Master builds

<https://docs.docker.com.zh.xy2401.com/v17.12/compose/install/>

 Request docs changes Get support

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[Prerequisites](#)[Install Compose](#)[Master builds](#)[Upgrading](#)[Uninstallation](#)[Where to go next](#)



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Difference between Dockerfile and docker-compose

Docker - Beginners | Intermediate | Advanced

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Difference between Dockerfile and docker-compose

A **Dockerfile** is a text document that contains all the commands/Instruction a user could call on the command line to assemble an image.

For example

<https://signup.heroku.com/>

Instructions for creating an image for building single container.

Instructions for assembling multiple containers to deliver an application.

Difference between Dockerfile and docker-compose

A **Dockerfile** is a text document that contains all the commands/Instruction a user could call on the command line to assemble an image.

For example

```
FROM centos:latest
LABEL maintainer="collabnix"
RUN yum update -y && \
    yum install -y httpd net-tools && \
    mkdir -p /run/httpd
EXPOSE 80
ENTRYPOINT apachectl "-DFOREGROUND"
```

Using **docker build** command we can build an image from a Dockerfile.

Docker Compose is a tool for defining and running multi-container Docker applications. With Compose, you use a YAML file to configure your application's services. Then, with a single command, you create and start all the services from your configuration. By default, docker-compose expects the name of the Compose file as **docker-compose.yml** or **docker-compose.yaml**. If the compose file have different name we can specify it with **-f** flag.

A docker-compose.yml looks like this:

```
version: '3'
services:
  web:
    build: .
    ports:
      - "5000:5000"
    volumes:
      - .:/code
      - logvolume01:/var/log
    links:
```

Use **Dockerfile** to build **each image** then use **compose** to **assemble the images**.

Wordpress & Docker

This file will setup Wordpress, MySQL & PHPMyAdmin with a single command. Add the code below to a file called "docker-compose.yaml" and run the command

```
$ docker-compose up -d
# To Tear Down
$ docker-compose down --volumes

version: '3'

services:
  # Database
  db:
    image: mysql:5.7
    volumes:
      - db_data:/var/lib/mysql
    restart: always
    environment:
      MYSQL_ROOT_PASSWORD: password
      MYSQL_DATABASE: wordpress
      MYSQL_USER: wordpress
      MYSQL_PASSWORD: wordpress
    networks:
      - wpsite
  # phpmyadmin
  phpmyadmin:
    depends_on:
      - db
    image: phpmyadmin/phpmyadmin
    restart: always
    ports:
      - '8080:80'
    environment:
      PMA_HOST: db
      MYSQL_ROOT_PASSWORD: password
    networks:
      - wpsite
  # Wordpress
  wordpress:
    depends_on:
      - db
    image: wordpress:latest
    ports:
      - '8000:80'
    restart: always
    volumes: ['./:/var/www/html']
    environment:
      WORDPRESS_DB_HOST: db:3306
      WORDPRESS_DB_USER: wordpress
      WORDPRESS_DB_PASSWORD: wordpress
    networks:
      - wpsite
  networks:
    wpsite:
    volumes:
      db_data:
```

Here is a **docker-compose.yml** file for assembling multiple services in delivering a **WordPress** app.



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Root user email address

Used for account recovery and some administrative functions

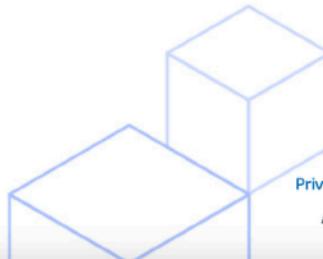
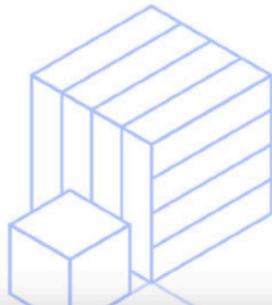
AWS account name

Choose a name for your account. You can change this name in your account settings after you sign up.

Verify email address

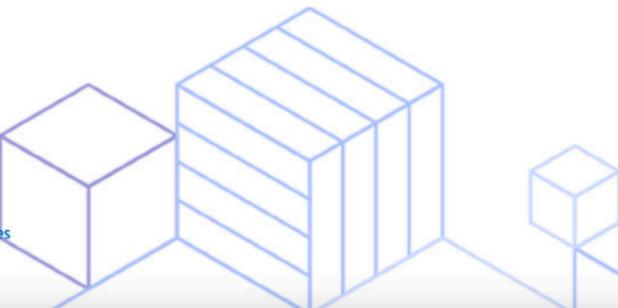
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Use cases

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Use pre-configured development

Create custom websites

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Build small business applications

Launch line-of-business software

Spin up test environments

Easy to create and delete



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You are creating this instance in **Tokyo, Zone A** (ap-northeast-1a)

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Select a platform



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挖不出用户需求？不懂量化落地效果？这套系统化的用户体验宝典请收好。戳这领取>>

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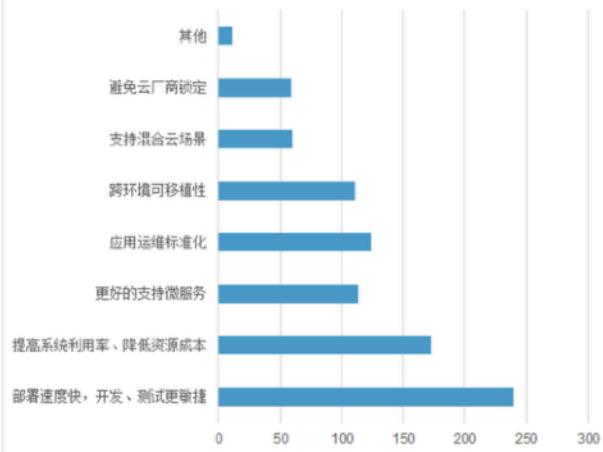


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44%

考虑使用容器技术的主要原因分为以下几个方面：容器技术部署速度快，开发测试更敏捷，能提高系统利用率，降低资源成本；并且容器技术良好的可移植性可以推动DevOps流程改进和标准化；同时容器技术能更好地支持微服务。

6. 考虑容器技术的原因



当然，使用容器技术也充满挑战，在本次调查中也有所体现。调查者反映最多的是缺乏Docker相关经验，目前国内在生产环境成功应用的公开案例很少。另外，市场不成熟、严重依赖开源产品、相关配置跟不上没有安全保障，容器网络互连互通的经验欠缺都是影响容器技术被采用的因素，这些都需要我们与行业自身共同努力。

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Why We Built Pantheon With Containers Instead of Virtual Machines

By [Zack Rosen](#) September 26, 2013 [!\[\]\(5dd258c39005c764fec29b7244dca2d4_img.jpg\)](#) [!\[\]\(0c899f1e4d9c066ee357e24d895ffc36_img.jpg\)](#) [!\[\]\(4ee6eaac14821bf325e5e1fe8a9a3da0_img.jpg\)](#)**Approximate Reading Time: 5 Minutes**

We believe that the future cloud will [run on containers](#), not virtual machines. Pantheon's container based infrastructure is a huge departure from traditional virtual machine and server based "hosting" model. This is why:

Pantheon currently runs more than 70,000 custom WordPress and Drupal sites. Developers can install and develop their own code, modules, and themes — and we run their sites at scale on our unified platform. Each "site" actually has a dev site, a test site, and a live site. Some even have many dev sites using [Multidev](#). This means we run three or more custom-code applications per site. When you add all of them up you get more than 210,000 custom WordPress and Drupal web applications running on Pantheon. If you count Drupal alone, this makes Pantheon the [single largest Drupal infrastructure in the world](#).

Each application has to be secure and resource isolated. If Pantheon was built with "hosting" architecture each site would have to be run on its own separate virtual machine (unless we resorted to shared hosting, which would provide terrible service for our customers). A custom Drupal app needs to run on at least an Amazon EC2 [m1.medium](#) to keep from keeling over, and that's just for a development environment.

So, why containers? If we built Pantheon with hosting architecture we would need at least 200,000 virtual machines! Can you imagine running 200,000+ Amazon EC2 m1.medium's all with custom applications? Never mind

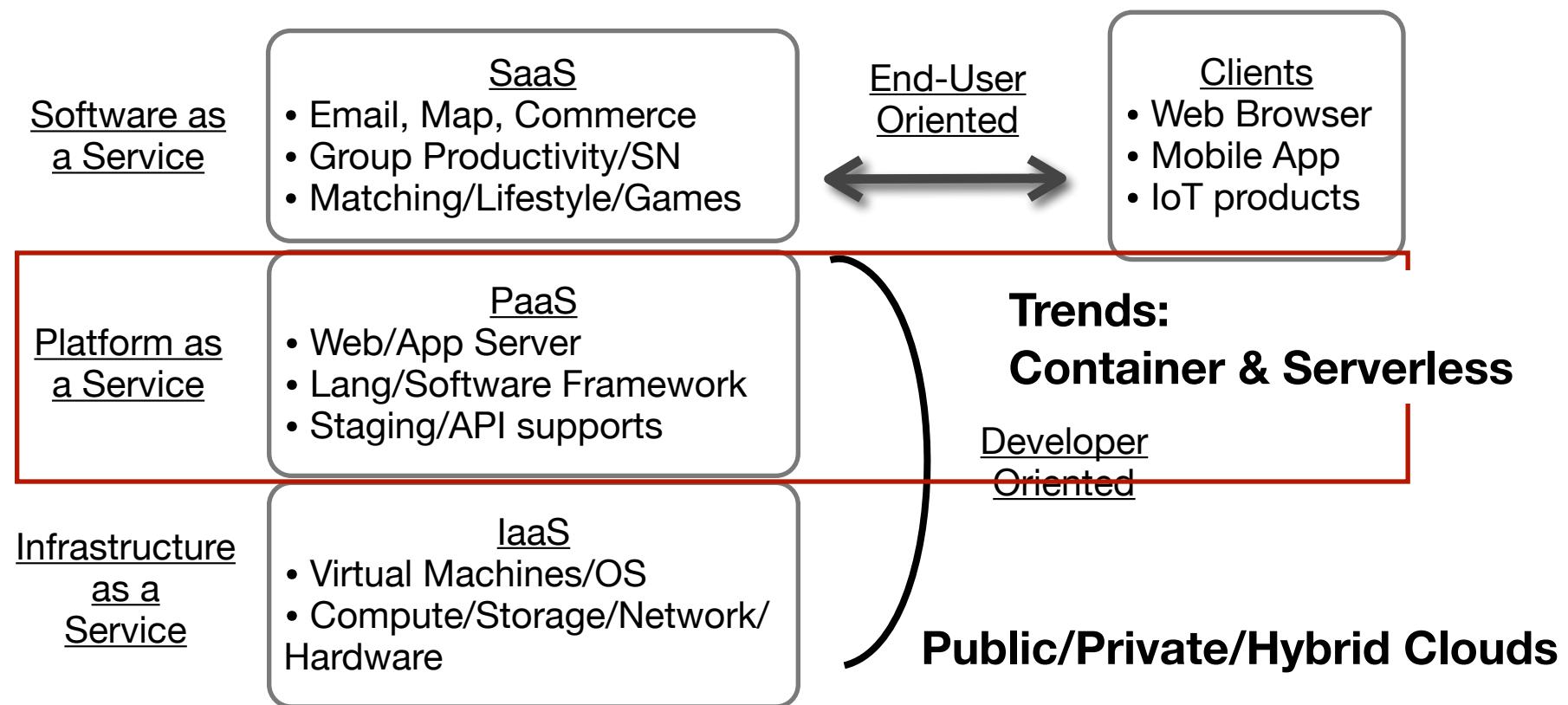
**Zack Rosen**

CEO & Co-Founder

[!\[\]\(366aa7fe8d47e78150bf143b5a307b35_img.jpg\) LinkedIn](#)[!\[\]\(252e01ece4e4abea7611aeb6551597f9_img.jpg\) Twitter](#)**Insight.****Delivered Monthly.**

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云计算的原始三层架构



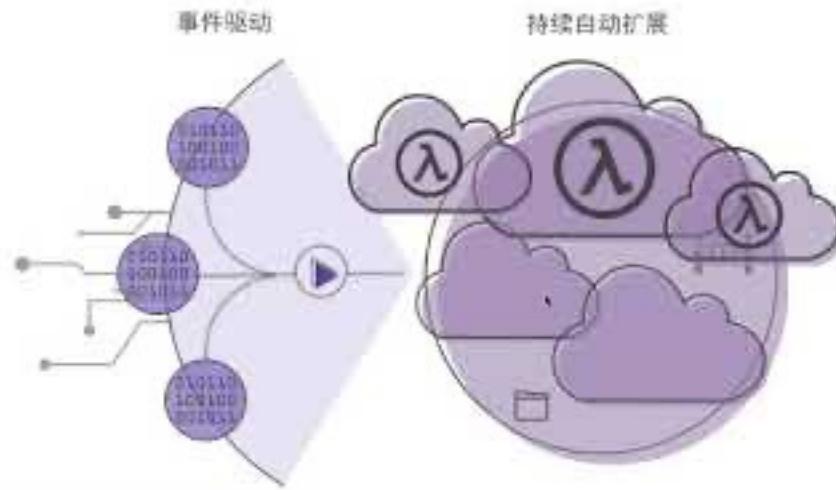
The Advantages of CaaS over IaaS

Comparison Between IaaS and CaaS

	IaaS	CaaS
Ease of Setup		X
Installation & Maintenance of VM and OS	X	
No Setup of Hardware	X	X
Ease of Deployment		X
Control Over Processing Environment	X	

**What is a serverless?
Introducing Function as a Service (FaaS).**

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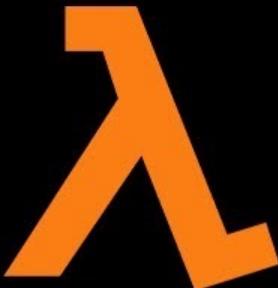
BUILD A

REST API

API Gateway

+

Lambda



云计算服务架构重组

Software as a Service

- Email, Map, Commerce
- Group Productivity/SN
- Matching/Lifestyle/Games

Function as a Service

- Serverless (e.g. Lambda, Cloud Run)
- Process & scalability on demand
- API/Event Driven/idle time no cost

Platform as a Service

- Web/App Server
- Lang/Software Framework
- Staging/API supports

Container as a Service

- Container Mgmt (e.g. Kubernetes)
- Container (e.g. Docker)
- Micro-service

Infrastructure as a Service

- Virtual Machines/OS
- Compute/Storage/Network/Hardware

End-User Oriented

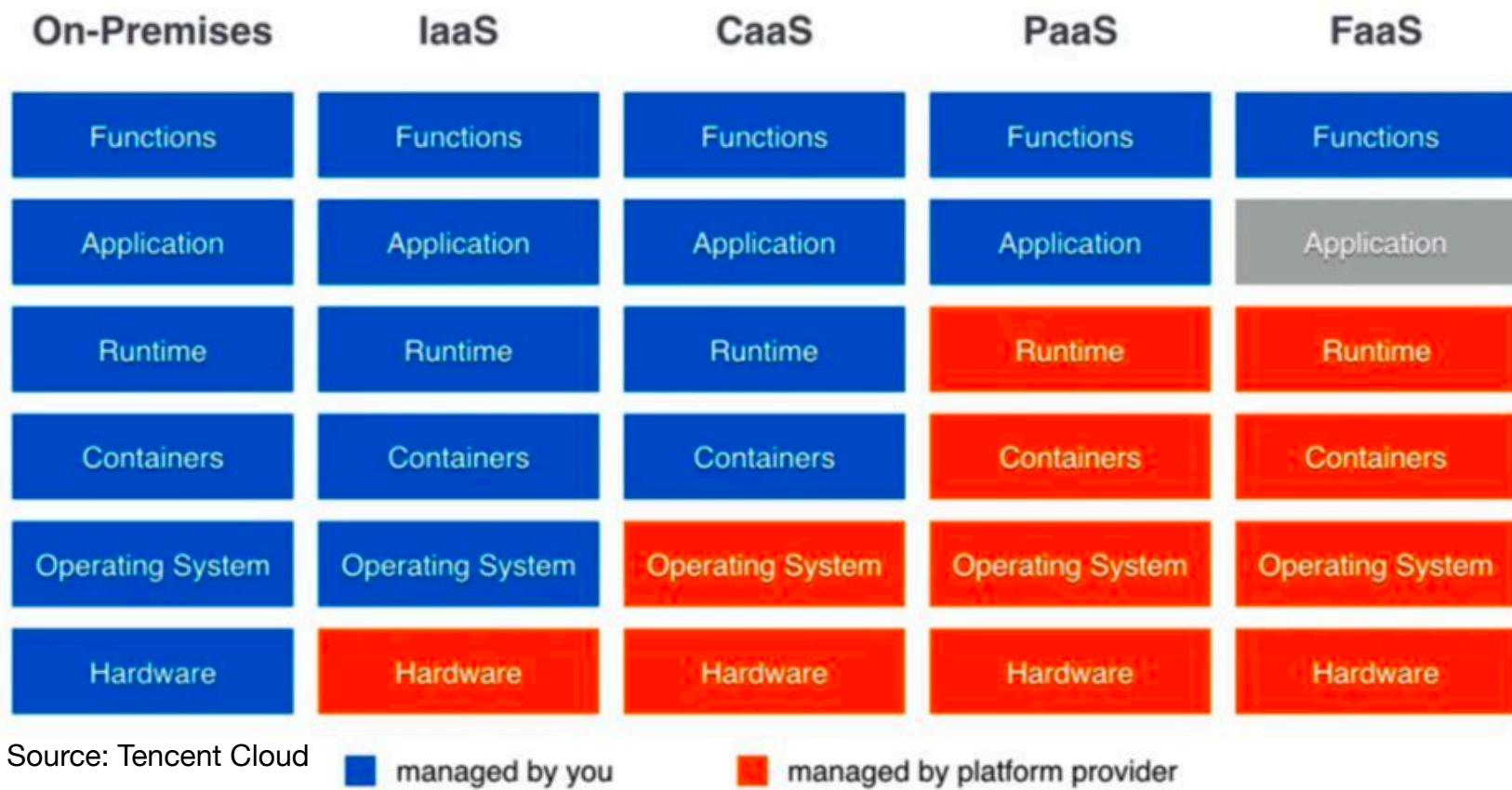
Clients

- Web Browser
- Mobile App
- IoT products

Developer Oriented

Public/Private/Hybrid Clouds

云计算的发展



为什么说每个开发者都应该关注Serverless ?



快科技

发布时间：03-27 15:56 | 快科技官方百家号

如果说云计算是过去、现在和未来，那么Serverless就是云计算的未来。Gartner报告中表明，2020年全球将有20%的企业部署Serverless。Serverless以其学习成本低、运维友好、灵活性高的特点为开发、运维团队所喜爱，在国内外也开始走上了大规模考察乃至实践的应用之路。

但不可否认的是，Serverless还没有出现最佳实践，国内外也都处在探索的过程中。3月21日，腾讯云TVP技术闭门会请来了国内外Serverless技术的佼佼者、使用者坐而论道，共话Serverless从概念到实践的发展之路。

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Serverless 大咖说

“

腾讯内部支持微信小程序等核心应用的serverless技术，已对所有用户开放。提供一站式开发、部署，运维serverless解决方案。

”

Yunong Xiao

· 腾讯云中间件 总经理兼首席架构师

眺望曙光

TVP技术闭门会线上特辑

TVP Tencent Cloud
Valuable Professional

Serverless 大咖说

”

Serverless 是一种未来的开发方式，属于每一个开发者。

”

王俊杰

· 腾讯云 Serverless 技术专家

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Serverless

前端为什么要关注 Serverless?

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<https://www.zhihu.com/question/378776917>

Serverless爆发，AWS微软卡位，腾讯云阿里云华为云紧跟

发布时间：2020-03-17 17:47:55 来源：中国软件网 作者：刘学习



[摘要]Serverless落地应用增多，市场格局初定，云服务商纷纷试水，机会与挑战并存。

3月10日，云原生基金会CNCF发布了2019年年度调查报告。41%的受访者表示已经在使用无服务器Serverless计算，20%的受访者表示计划在未来12-18个月应用Serverless计算。

之前的3月1日，市场研究机构Forrester发布的最新报告认为，Serverless计算的兴起，让FaaS成为继IaaS、PaaS、SaaS之后一种新的云计算能力提供方式。

在Serverless计算最主要的技术方向——函数即服务平台(FaaS)方面，AWS、微软两家企业居于领导者象限，腾讯云、阿里云与谷歌云、Nimbell、IBM、Cloudflare等处于强劲表现者象限，Oracle则处于挑战者象限。

云计算企业已经习惯了“大投入有大回报”的行业规律。从2014年开始，云服务商不管是AWS、微软、谷歌云，还是国内的阿里云、腾讯云、华为云、百度智能云等，在Serverless上都有大笔投入。

2020年，Serverless服务市场将迎来大爆发的机会。而现在Serverless服务市场新座次的排

案例解读

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阿里技术 2020-03-25



随着无线、小程序、IoT的发展、5G的到来，移动研发越来越向多端化发展。传统的移动架构存

The promotional banner has an orange hexagonal background pattern. At the top left is the Alibaba Group logo and at the top right is the TAO TECHNOLOGY logo. The title '淘系云原生时代的业务研发' and subtitle '闲鱼serverless云端一体化研发实践' are displayed in bold white text. A photo of speaker Yang Yu holding a microphone is shown with his name '扬羽' and title '演讲嘉宾'. The broadcast time '直播时间' and date '3月25日 16: 00–17: 00' are listed. The '分享大纲' section includes four bullet points: '闲鱼无线架构以及云端一体化模式新机会'、'一体化研发的核心挑战与解法'、'业务落地以及带来的价值' and '展望'. A decorative graphic of overlapping orange cubes is on the right side.

Alibaba Group 阿里巴巴集团 | TAO TECHNOLOGY 淘系技术部

淘系云原生时代的业务研发

闲鱼serverless云端一体化研发实践

演讲嘉宾
扬羽

阿里巴巴淘系技术部闲鱼 技术专家
闲鱼架构组成员,负责serverless、
云端一体化研发模式在闲鱼的探索和落地

直播时间

3月25日 16: 00–17: 00

分享大纲

- ◆ 闲鱼无线架构以及云端一体化模式新机会
- ◆ 一体化研发的核心挑战与解法
- ◆ 业务落地以及带来的价值
- ◆ 展望

Why the widespread interest?

Serverless (FaaS) doesn't charge for idle time (Since no VM instance is running).

Comparison Between CaaS/PaaS and FaaS

	PaaS	FaaS
Ease of Setup	X (with containers)	X
Maintenance of Platform	X	Minimal
Setup of App Servers	X	Minimal
No Payment for Idle Time		X
Control Over App Stack vs. Functions	App Stack and API	API Triggered Functions

The Rise of DevOps

DevOps到底是什么意思？

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作者 | 小枣君

提到DevOps这个词，我相信很多人一定不会陌生。

作为一个热门的概念，DevOps近年来频频出现在各大技术社区和媒体的文章中，备受行业大咖的追捧，也吸引了很多吃瓜群众的围观。

那么，DevOps是什么呢？

有人说它是一种方法，也有人说它是一种工具，还有人说它是一种思想。更有甚者，说它是一种哲学。

越说越玄乎，感觉都要封神啦！DevOps这玩意真的有那么夸张吗？它到底是干嘛用的？为什么行业里都会对它趋之如鹜呢？

虽然敏捷开发大幅提升了软件开发的效率和版本更新的速度，但是它的效果仅限于开发环节。研发们发现，运维那边，依旧是铁板一块，成为了新的瓶颈。

运维工程师，和开发工程师有着完全不同的思维逻辑。运维团队的座右铭，很简单，就是“稳定压倒一切”。运维的核心诉求，就是不出问题。

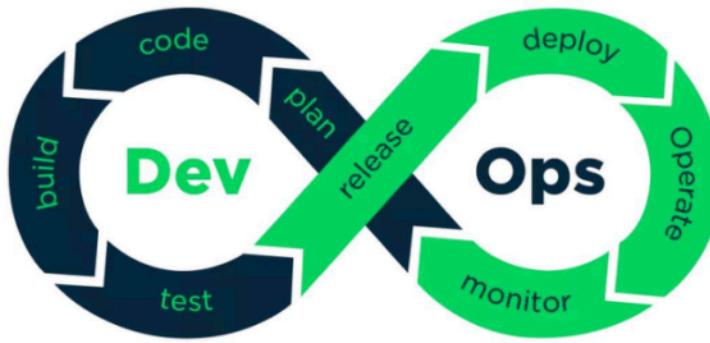
什么情况下最容易出问题？发生改变的时候最容易出问题。所以说，运维非常排斥“改变”。

于是乎，矛盾就在两者之间集中爆发了。

这个时候，我们的DevOps，隆重登场了。

DevOps到底是什么

DevOps这个词，其实就是Development和Operations两个词的组合。它的英文发音是 /də'vɔps/，类似于“迪沃普斯”。



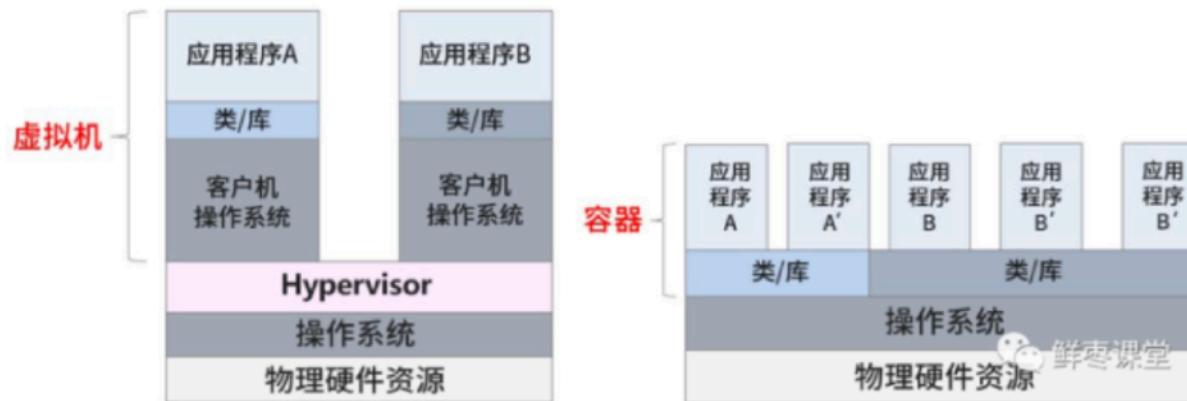
DevOps的维基百科定义是这样的：

DevOps是一组过程、方法与系统的统称，用于促进开发、技术运营和质量保障（QA）

微服务架构下，不同的工程师可以对各自负责的模块进行处理，例如开发、测试、部署、迭代。

而虚拟化，其实就是一种敏捷的云计算服务。它从硬件上，将一个系统“划分”为多个系统，系统之间相互隔离，为微服务提供便利。

容器就更彻底了，不是划分为不同的操作系统，而是在操作系统上划分为不同的“运行环境”（Container），占用资源更少，部署速度更快。



明白了吧？虚拟化和容器，其实为DevOps提供了很好的前提条件。开发环境和部署环境都可以更好地隔离了，减小了相互之间的影响。

Container saves time.

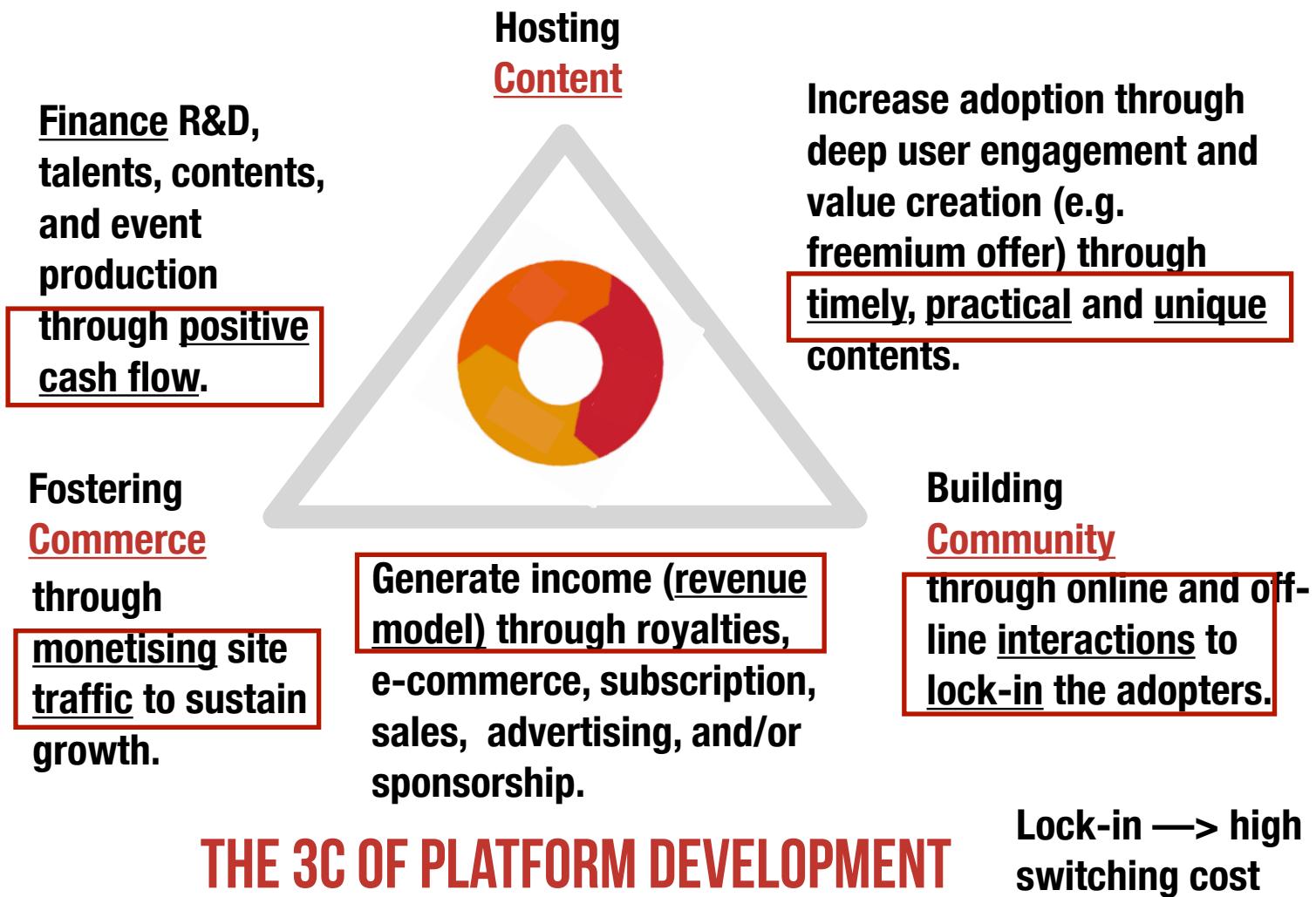
Serverless saves money.

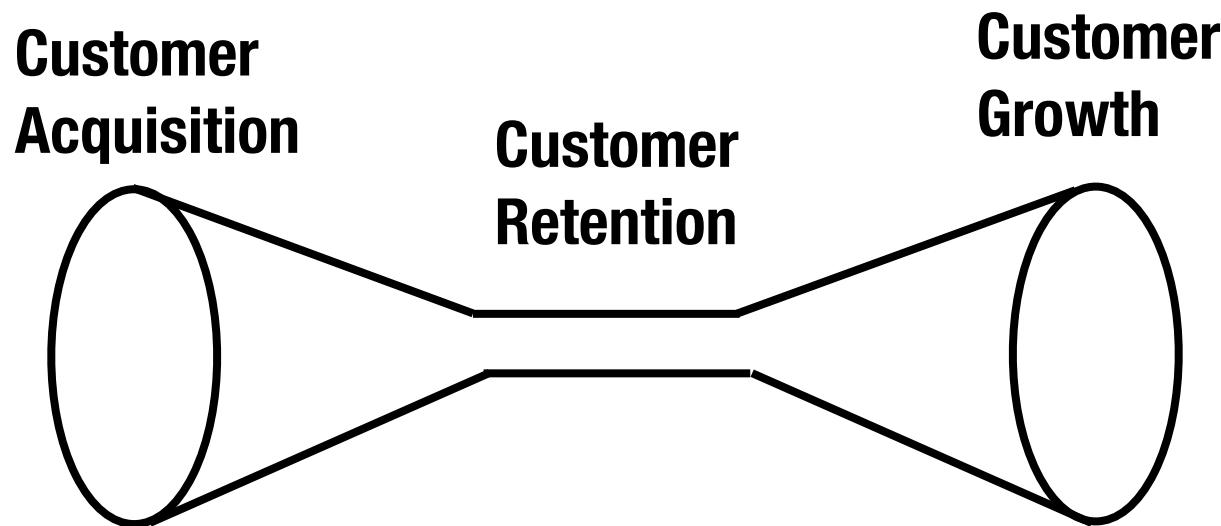
DevOps integrate the two into agile development.

Implications for your final project and job application.

1. Agile SCRUM development needs infrastructure and operational (i.e. DevOp) support as development and production blur together due to shorter product cycles.
2. Product manager needs to know the trade-offs in using different infrastructure components and services to cut development costs and time.
3. As team members need to collaborate across disciplines, having someone with full-stack development and operation skills and experience on the team will enable better integration.
4. As a result, a project manager has to be well-rounded enough to scout talents with cross-disciplinary capabilities to help bridge the gaps.

3C implementation in WordPress.

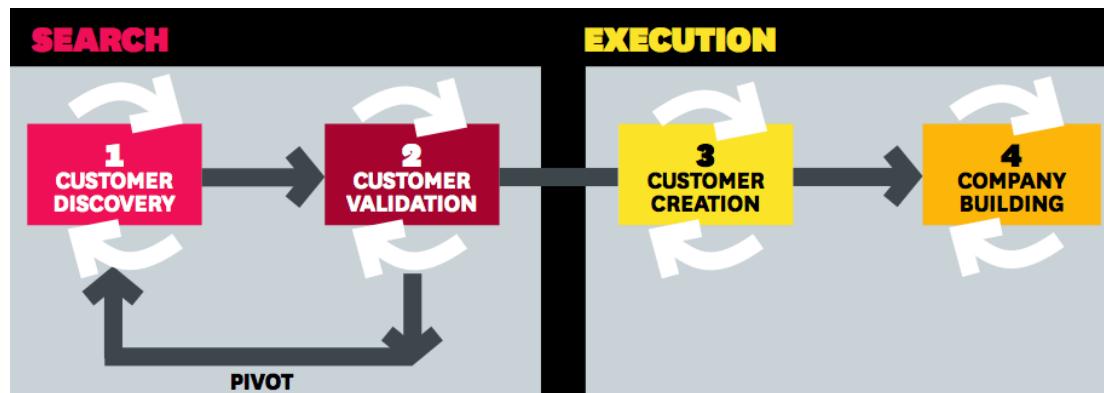




The Conversion Funnel Through the 3C

USING 3C TO DRIVE CUSTOMER DEVELOPMENT (2A3R)

1. Acquisition
2. Activation
3. Retention
4. Revenue
5. Referral



Source: "Why Lean Start-up Changes Everything" by Steve Blank,
Harvard Business Review May 2013

Source: Dave McClure 《Startup Metrics for Pirates》

Howdy, master

0 + New Autoptimize

Help ▾

Add Plugins [Upload Plugin](#)

Search Results Featured Popular Recommended Favorites Keyword ▾ fake| 297 items 1 of 9

Gutenberg Blocks by Kadence Blocks – Page Builder Features [Install Now](#) [More Details](#) Active

Custom Blocks for for Gutenberg to help extend the editing capabilities.

By Kadence WP

★★★★★ (106) Last Updated: 4 hours ago

200,000+ Active Installations ✓ Compatible with your version of WordPress

Starter Templates by Kadence WP [More Details](#)

Build a Beautiful "performance optimized" website with 3 mouse clicks.

By Kadence WP

★★★★★ (10) 70,000+ Active Installations Last Updated: 1 month ago ✓ Compatible with your version of WordPress

WooCommerce [More Details](#) Active

WooCommerce is the world's most popular open-source eCommerce solution.

By Automatic

★★★★★ (3,841) Last Updated: 4 days ago

5+ Million Active Installations Untested with your version of WordPress

WooCommerce Google Analytics Integration [Install Now](#) [More Details](#)

Provides integration between Google Analytics and WooCommerce.

By WooCommerce

★★★★★ (84) Last Updated: 1 month ago

100,000+ Active Installations ✓ Compatible with your version of WordPress

WP File Manager

FakerPress

Collapse menu

Google Analytics Integration with WooCommerce

All accounts > Data Driven Product & S... All Web Site Data ▾ Try searching "Users today"

Analytics

ADMIN USER

Property setup

Property details

A property represents a business's web and/or app data. An account can contain one or more properties. [Learn more](#)

*Navigate to your [Firebase account](#) if you want to create a new property for an existing Firebase project.

Create a Google Analytics 4 property to measure your web and/or app data.

Property name: com5940 WordPress Web App Demo

Reporting time zone: Hong Kong (GMT+08:00) Hong Kong Time

Currency: Hong Kong Dollar (HKD HK\$)

You can edit these property details later in Admin.

Hide advanced options

Create a Universal Analytics property

The Universal Analytics property is a part of an earlier version of Google Analytics and only supports web measurement. It is not recommended for new Analytics users, and it will not support app measurement. Turn this on if you'd like to create a Universal Analytics property.

Website URL: https://dev-wp5940.pantheonsite.io/

Create both a Google Analytics 4 and a Universal Analytics property

This will create two properties with connected site tags, so you only need to tag your website once. [Learn more](#)

Enable enhanced measurement for Google Analytics 4 property

Automatically measure interactions on your sites in addition to standard screen view measurement.

Data from on-page elements such as links and embedded videos may be collected with relevant events. You must ensure that no personally-identifiable information will be sent to Google. [Learn more](#)

Create a Universal Analytics property only

87 more properties can be created on this account.

Next

© 2021 Google | [Analytics home](#) | [Terms of Service](#) | [Privacy Policy](#) | [Send feedback](#)

All accounts > Data Driven Product & S... All Web Site Data ▾ Try searching "Users today"

Analytics ADMIN USER

Create property

Property setup

About your business

Business information

Help us tailor your experience by answering the following.

Industry category

Jobs & Education ▾

Business size

Small - 1 to 10 employees

Medium - 11 to 100 employees

Large - 101 to 500 employees

Very Large - 500+ employees

How do you intend to use Google Analytics with your business? (Check all that apply)

Measure customer engagement with my site or app

Optimize my site or app experience

Measure data across multiple devices or platforms

Optimize my advertising cost

Increase my conversions

Measure content monetization

Analyze my online sales

Measure app installs

Measure lead generation

Other

Learning Analytics

Create Previous

Analytics | All accounts > com5940 WordPress W... | Try searching "Top channels by users"

ADMIN USER

Account + Create Account

CUHK Classes

- Account Settings
- Account User Management
- All Filters
- Account Change History
- Trash Can

Property + Create Property

Design Entrepreneurship Analytics (UA-71445513-10)

- GA4 Setup Assistant
- Property Settings
- Property User Management
- Tracking Info
- Property Change History
- Data Deletion Requests
- PRODUCT LINKING
- Google Ads Linking
- AdSense Linking
- Ad Exchange Linking
- All Products
- Postbacks
- Audience Definitions
- Custom Definitions

View + Create View

All Web Site Data

- View Settings
- View User Management
- Goals
- Content Grouping
- Filters
- Channel Settings
- Ecommerce Settings
- Calculated Metrics BETA
- PERSONAL TOOLS & ASSETS
- Segments
- Annotations
- Multi-Channel Funnels Settings
- Custom Channel Grouping BETA
- Custom Alerts

The screenshot shows the Google Analytics Admin interface. The left sidebar has 'ADMIN' selected. The main area shows three columns: 'Account' (CUHK Classes), 'Property' (Design Entrepreneurship Analytics), and 'View' (All Web Site Data). In the 'Property' column, the 'Ecommerce Settings' link is highlighted with a red box. In the 'View' column, the 'Calculated Metrics BETA' link is also highlighted with a red box.

ADMIN

USER

View

All Web Site Data

View Settings

View User Management

Goals

Content Grouping

Filters

Channel Settings

Ecommerce Settings

 Calculated Metrics BETA

PERSONAL TOOLS & ASSETS

Segments

Annotations

Multi-Channel Funnels Settings

 Custom Channel Grouping BETA

Custom Alerts

Ecommerce set-up

Enable Ecommerce

Use the Ecommerce developer reference guide to properly set-up the tracking code for your site.

ON

Enable Enhanced Ecommerce Reporting

ON

Checkout Labeling optional

Create labels for the checkout-funnel steps you identified in your ecommerce tracking code. Use easily understood, meaningful names as these will appear in your reports.

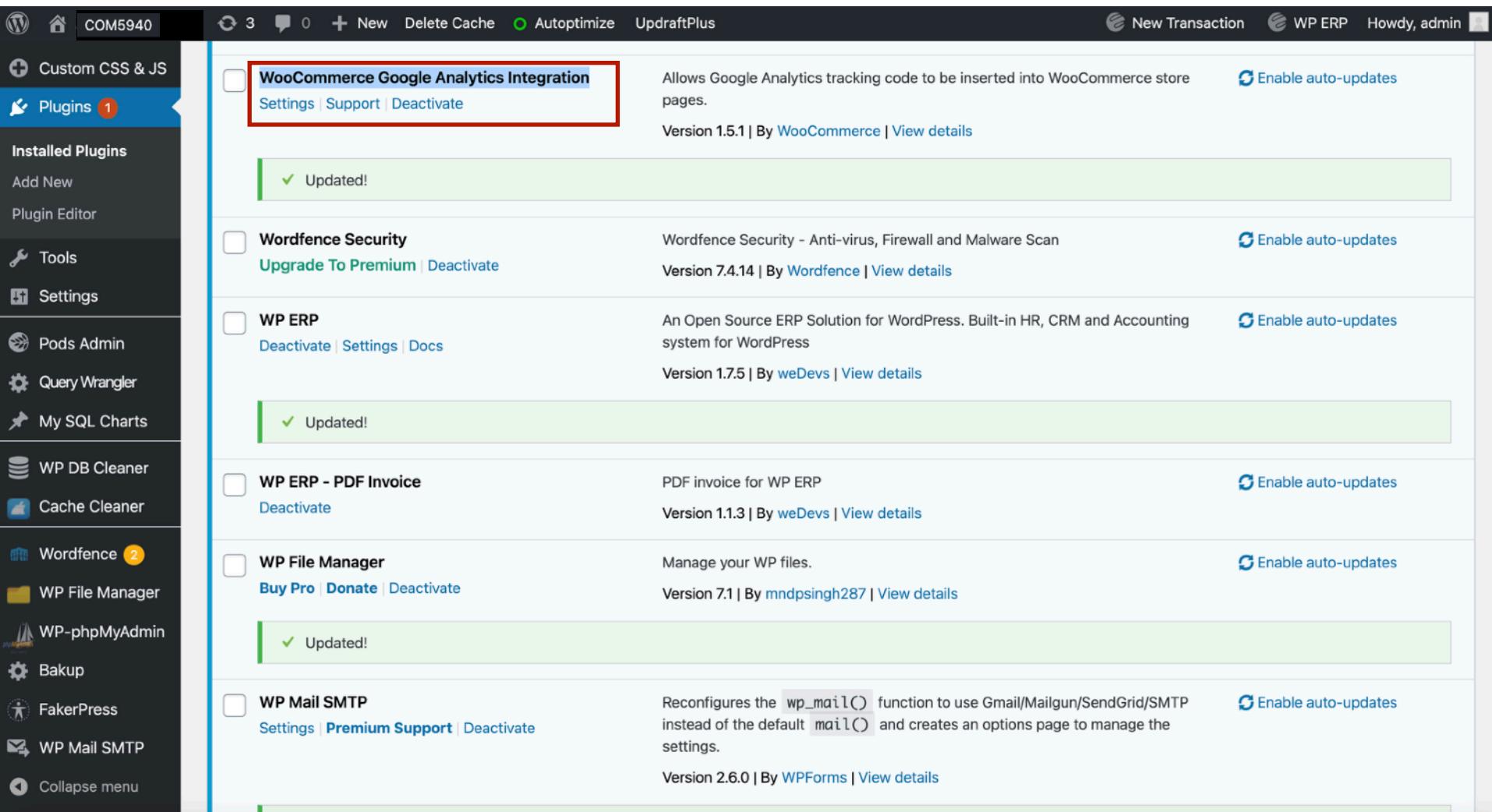
FUNNEL STEPS

+

Add funnel step

Save

Cancel



COM5940

3 0 + New Delete Cache Autoptimize UpdraftPlus

New Transaction WP ERP Howdy, admin

Posts Media Pages Comments WP ERP HR Announcement

WooCommerce

Orders Customers Home Reports Settings Status Extensions Analytics Marketing Products Profitori Ultimate Member User Frontend Users

Integration

General Products Shipping Payments Accounts & Privacy Emails **Integration** Advanced

Hey there! It's been one month since you installed Ultimate Member. How have you found the plugin so far?
I love it! | It's good but could be better | I don't like the plugin

Awesome! You have been using [Advanced DB Cleaner](#) for more than 1 week. Would you mind taking a few seconds to give it a 5-star rating on WordPress? Thank you in advance :) [Ok, you deserved it](#) | [I already did](#) | [No, not good enough](#)

Welcome aboard on MySQL Charts!

 WP User Frontend - Version 3.5.13
Welcome to the new version of WP User Frontend. See what's been changed in the 3.5.13 version.
[What's New?](#)

Get detailed insights into your sales with Google Analytics Pro
Add advanced tracking for your sales funnel, coupons and more. [\[Learn more >\]](#)

[MaxMind Geolocation](#) | [Google Analytics](#)

Google Analytics

Google Analytics is a free service offered by Google that generates detailed statistics about the visitors to a website.

Google Analytics Tracking ID

Log into your Google Analytics account to find your ID. e.g. G-XXXXXX or UA-XXXXX-X

COM5940

3 0 + New Delete Cache Autoptimize UpdraftPlus

New Transaction WP ERP Howdy, admin

Marketing Products Profitori Ultimate Member User Frontend Users Appearance Custom CSS & JS Plugins 1 Tools Settings Pods Admin Query Wrangler My SQL Charts WP DB Cleaner Cache Cleaner Wordfence 2 WP File Manager WP-phpMyAdmin

Integration

Google Analytics

Google Analytics is a free service offered by Google that generates detailed statistics about the visitors to a website.

Google Analytics Tracking ID Log into your Google Analytics account to find your ID. e.g. G-XXXXXX or UA-XXXXX-X

Tracking Options

Use Global Site Tag
The Global Site Tag provides streamlined tagging across Google's site measurement, conversion tracking, and remarketing products. This must be enabled to use a Google Analytics 4 Measurement ID (e.g., G-XXXXXX). [See here for more information](#).

Enable Standard Tracking
This tracks session data such as demographics, system, etc. You don't need to enable this if you are using a 3rd party Google analytics plugin.

"Display Advertising" Support
Set the Google Analytics code to support Display Advertising. [Read more about Display Advertising](#).

Use Enhanced Link Attribution
Set the Google Analytics code to support Enhanced Link Attribution. [Read more about Enhanced Link Attribution](#).

Anonymize IP addresses

COM5940

3 0 + New Delete Cache Autoptimize UpdraftPlus

New Transaction WP ERP Howdy, admin

Ultimate Member User Frontend Users Appearance Custom CSS & JS Plugins 1 Tools Settings Pods Admin Query Wrangler My SQL Charts WP DB Cleaner Cache Cleaner Wordfence 2 WP File Manager WP-phpMyAdmin Bakup FakerPress WP Mail SMTP

Integration

This requires a payment gateway that redirects to the thank you/order received page after payment. Orders paid with gateways which do not do this will not be tracked.

Enhanced eCommerce

Add to Cart Events

Enable Enhanced eCommerce

Enhanced eCommerce allows you to measure more user interactions with your store, including: product impressions, product detail views, starting the checkout process, adding cart items, and removing cart items. Universal Analytics or Global Site Tag must be enabled for Enhanced eCommerce to work. If using Universal Analytics, turn on Enhanced eCommerce in your Google Analytics dashboard before enabling this setting. [See here for more information.](#)

Remove from Cart Events

Product Impressions from Listing Pages

Product Clicks from Listing Pages

Product Detail Views

Checkout Process Initiated

Save changes

All accounts > UA - Google Merchandise Store

1 Master View Try searching “Top channels by users”

Analytics Home Customization Reports Realtime Audience Acquisition Behavior Conversions Goals E-commerce Overview Shopping Behavior Checkout Behavior Product Performance Sales Performance Product List Performance Marketing Multi-Channel Funnels Attribution BETA Discover Admin

All Users 100.00% Sessions + Add Segment

Sessions Shopping Progression Abandonments

All Sessions 147,312 Sessions with Product Views 26,818 18.2% Sessions with Add to Cart 0 Sessions with Check-Out 3,857 2.62% Sessions with Transactions 1,124 0.76%

153,000 144,000 135,000 127,000 118,000 110,000 102,000 94,000 86,000 78,000 70,000 62,000 54,000 46,000 38,000 30,000 22,000 14,000 6,000 0

18.2% 0% 0% 29.12%

No Shopping Activity 118,623 80.53% No Cart Addition 24,831 92.59% Cart Abandonment 0 0% Check-Out Abandonment 2,734 70.88%

Sessions Abandonments % Completion rate Search

User Type	All Sessions	Sessions with Product Views	%	Sessions with Add to Cart	%	Sessions with Check-Out	%	Sessions with Transactions	%
1 New Visitor	108,336	18,455	17.03%	0	0.00%	1,435	1.32%	418	0.39%
2 Returning Visitor	38,976	8,363	21.46%	0	0.00%	2,422	6.21%	706	1.81%

Show rows: 10 Go to: 1 1 - 2 of 2

Google Merchandise Store Data

Thank you for your time!