

FUNDAMENTALS OF SOFTWARE ARCHITECTURE

Ben Khalfallah H la

02 - 06 - 2022

Shiny numbers

1,547 contributors

React <https://github.com/facebook/react>

2,567 contributors

Chromium <https://github.com/chromium/chromium>
<https://chromium.googlesource.com/chromium/src/>

12,485 contributors

Linux <https://github.com/torvalds/linux>

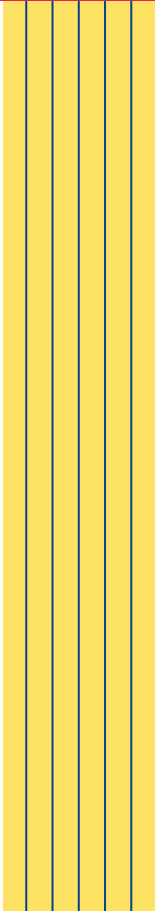
3,111 contributors

NodeJS <https://github.com/nodejs/node>



WHOA!

How is it possible ?



SNEAK PEEK

New Culture

“works now” vs “works indefinitely” mentality, three-dimensional problem: time, scale and trade-offs.

Collaboration Process

Collaboration includes style guides, git rules, code review, tests, documentation, deprecation process.

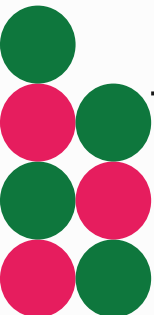


Architecture

Evolutionary, incremental, continual, agile, reactive, and emergent.

The Alliances

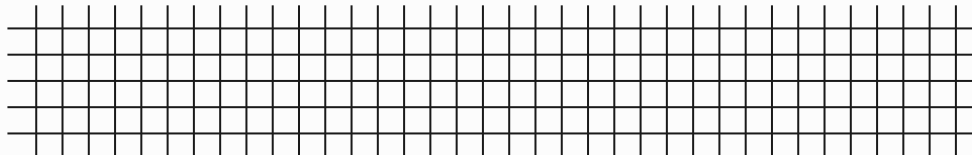
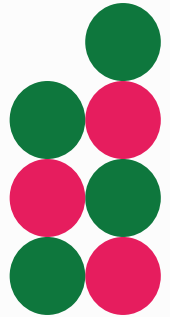
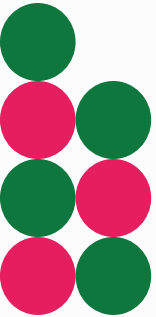
Good attitudes, autonomy, respect, understanding and mastery of context.





BEFORE WE START

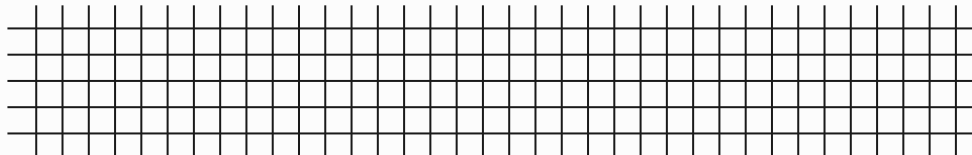
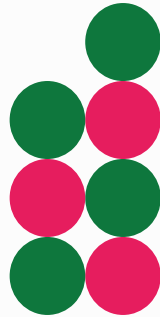
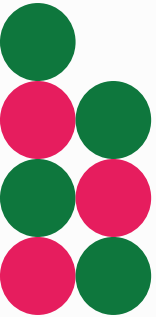
Try to see repositories, Pull Requests and issues of open-source projects to learn how to develop well, organize better and collaborate well in a group.





BEFORE WE START

You don't have to be a "Googley" to make good code and good architecture, it's all about "motivation" and "culture".



Fundamentals of Software Architecture

O'REILLY®



Fundamentals of Software Architecture

An Engineering Approach

Mark Richards & Neal Ford

Architecture is the stuff you can't Google. Everything in architecture is a trade-off, which is why the famous answer to every architecture question in the universe is "it depends."

You cannot Google the answer to whether REST or messaging would be better, or whether microservices is the right architecture style, because it does depend. It depends on the deployment environment, business drivers, company culture, budgets, timeframes, developer skill set, and dozens of other factors. Everyone's environment, situation, and problem is different, hence why architecture is so hard.

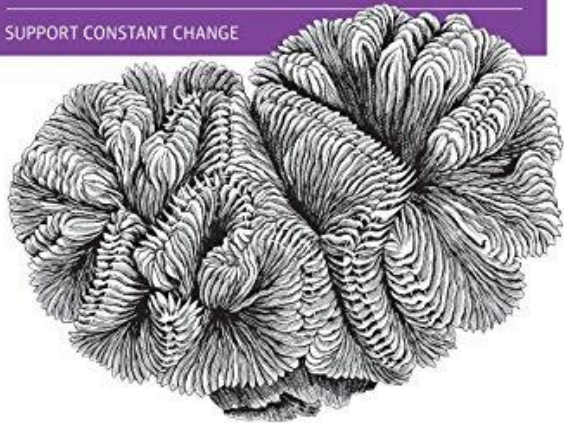
There are no right or wrong answers in architecture – only trade-offs.



Building Evolutionary Architectures

Building Evolutionary Architectures

SUPPORT CONSTANT CHANGE



Neal Ford, Rebecca Parsons & Patrick Kua

The software development ecosystem is constantly changing, providing a constant stream of new tools, frameworks, techniques, and paradigms.

Over the past few years, incremental developments in core engineering practices for software development have created the foundations for rethinking how architecture changes over time, along with ways to protect important architectural characteristics as it evolves.

This practical guide ties those parts together with **a new way to think about architecture and time.**



Conferences

<https://www.youtube.com/watch?v=8bEsNT7jdC4>

<https://www.youtube.com/watch?v=CglSFhwbl3s>

w-jax

**Building
Evolutionary
Architectures**

Patrick Kua



{N26}|

**Building
Evolutionary
Architectures**

@patkua

Øredev - Nov 2018



ØREDEV ☆

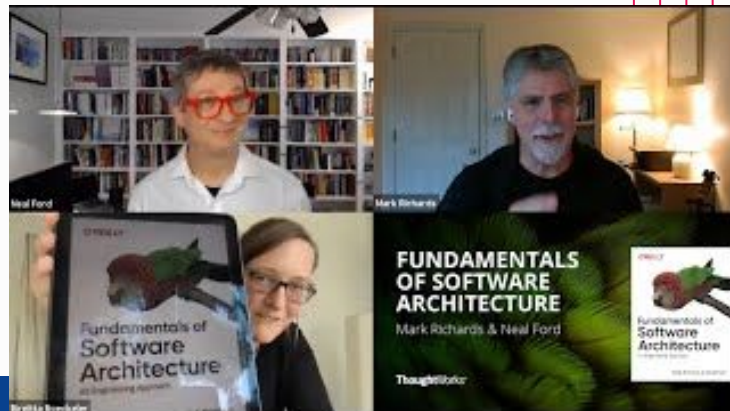


Patrick Kua

Building Evolutionary Architectures

SOFTWARE DEVELOPER CONFERENCE
MALMÖ, SWEDEN

oredev.org



Conferences



GOTO Berlin 2019

"Good Enough" Architecture

Stefan Tilkov
stefan.tilkov@innoq.com
@stilkov

INNOQ

<https://www.youtube.com/watch?v=PzEox3szeRc>

THE TEAM



Mark
Richards

<https://www.developer.toarchitect.com/mark-richards.html>

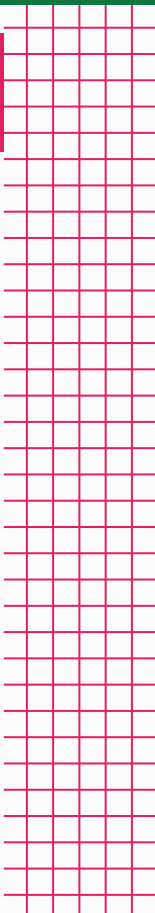
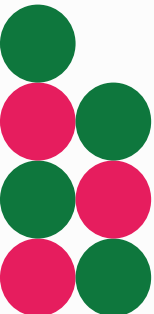
I am a hands-on **software architect, trainer, and published author. I've been in the industry since 1985**, and I have experience in the architecture and delivery of **Microservices Architectures, Service-Based Architectures, and Service-Oriented Architectures** in a variety of platforms and languages.



Neal Ford

<https://nealford.com/>

Neal Ford is **Director, Software Architect, and Meme Wrangler at ThoughtWorks**. His professional focus includes designing and building of large-scale enterprise applications. He is also an **internationally acclaimed speaker, speaking at over 300 developer conferences worldwide, delivering more than 2000 presentations.**



THE TEAM



**Rebecca
Parsons**

<https://www.thoughtworks.com/profiles/leaders/rebecca-parsons>

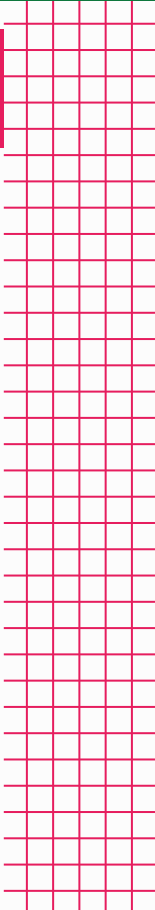
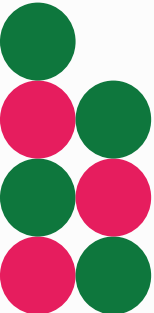
Before **joining Thoughtworks in 1999**, I was a researcher and college lecturer in computer science. After completing my degree, Master's and Ph.D, I conducted research in **compilers, program optimization, distributed computation, programming languages, theory of computation, machine learning and computational biology**. In 2007 I became CTO, responsible for driving Thoughtworks' excellence in **technology**.



**Patrick
Kua**

<https://www.patkua.com/about/>

He is a **technology leader with 20+ years of experience having done a wide variety of roles including being a developer, tech lead, consultant, CTO and more**. His current mission is accelerating the growth of technical leaders through coaching, mentoring and training.





01

Software **architecture**

ssss

04

Architecture Styles

Layered, pipeline, microkernel,
service-based, event-driven,
orchestration-driven,
microservices, ...

02

Modularity and Fitness
Functions

Cohesion, coupling,
abstractness, instability,
distance from the main
sequence, connascence.

05

Pitfalls and
Antipatterns

Techniques, soft skills, Vendor
King, Leaky Abstractions, Last
10% Trap, ...

03

Case Study: **Silicon
Sandwiches**

Architecture Kata : derive
architecture characteristics
from requirements.
<https://fundamentalsofsoftwarearchitecture.com/katas/>

06

Conclusion

Lessons learned &
summary.



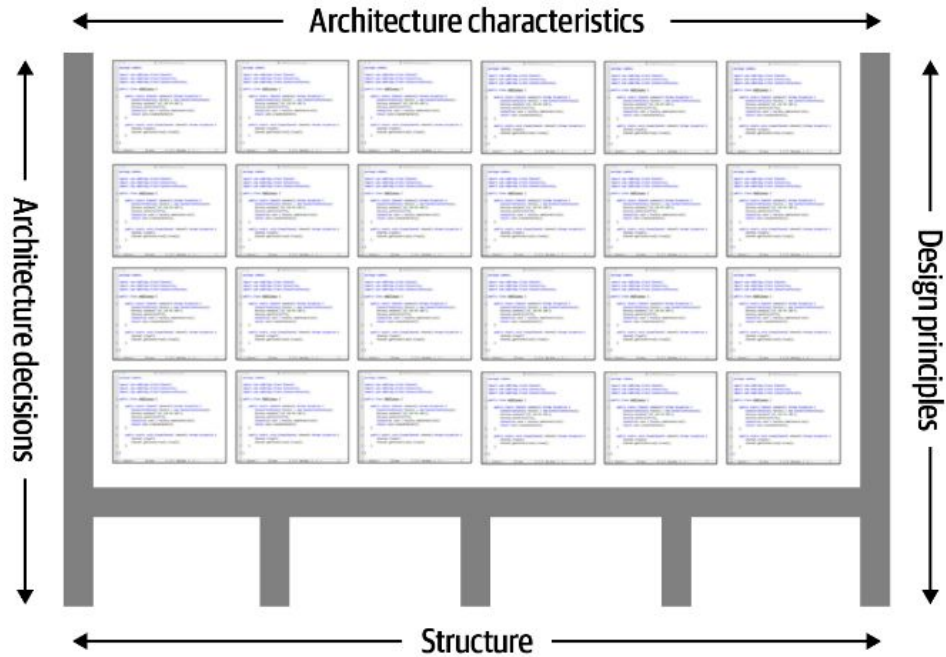
SOFTWARE ARCHITECTURE

Characteristics of an evolutionary architecture

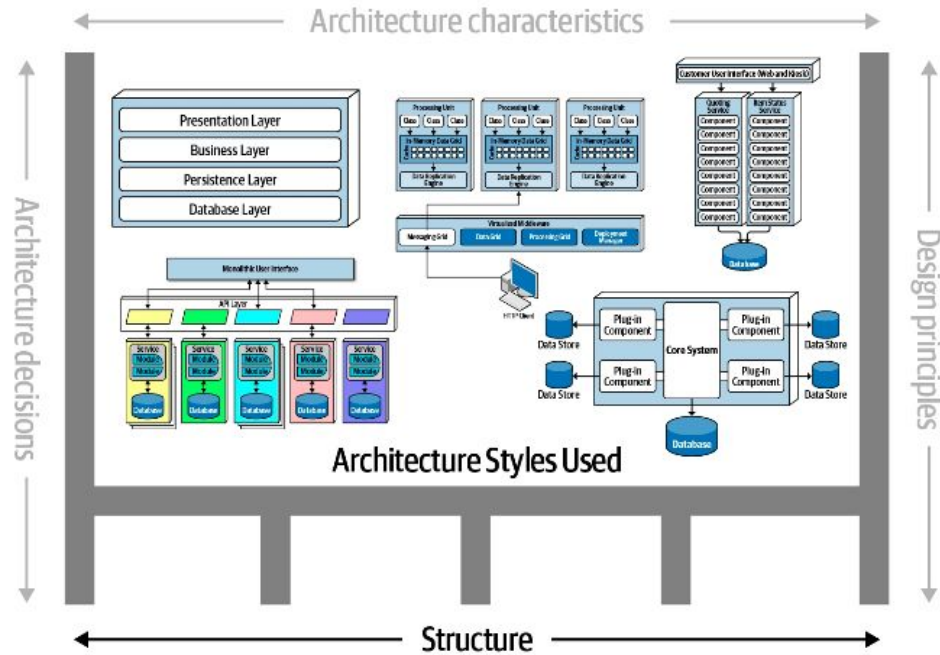


01

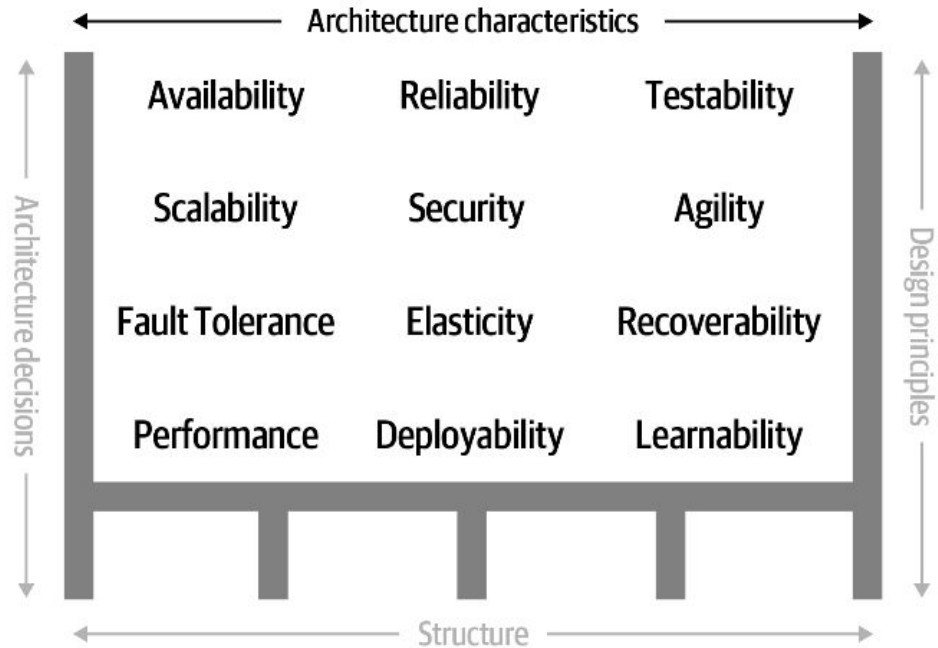
Defining software architecture



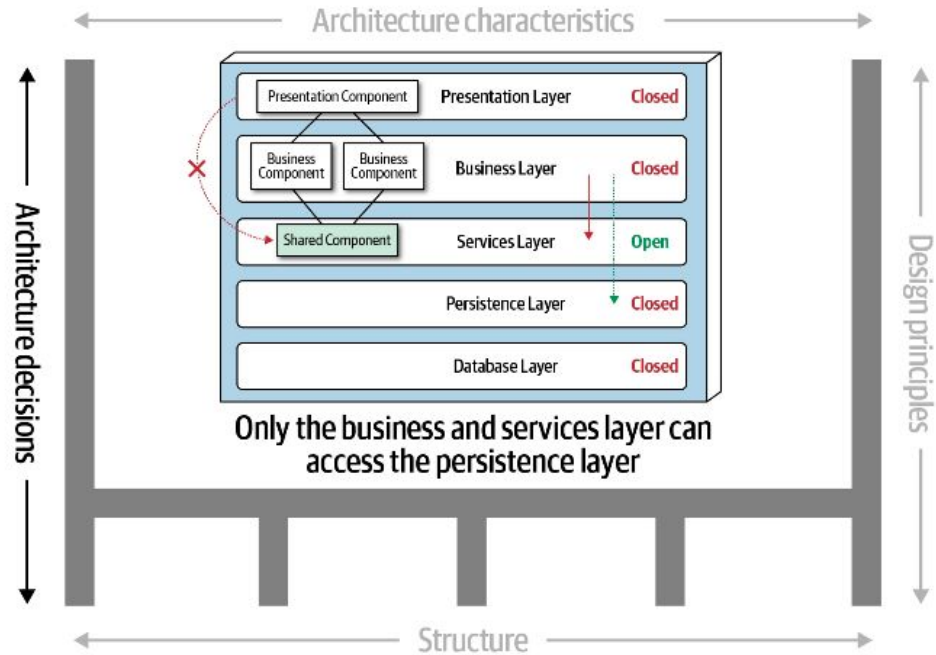
Architecture styles



Architecture characteristics



Architecture decisions



Architecture laws



Analyzing trade-offs



Incremental change



Guided change





Multiple architectural dimensions



Conway's law



Why evolutionary ?



MODULARITY AND FITNESS FUNCTIONS


Measuring modularity and architecture characteristics



A large blue number '02' is centered on a white grid background that forms a triangular shape pointing upwards. The grid lines are thin and black.



03



CASE STUDY: SILICON SANDWICHES

Derive architecture characteristics from requirements

04



ARCHITECTURE STYLES

There are no right or wrong answers in
architecture – only trade-offs.

A decorative grid pattern consisting of a series of small squares, colored in a light blue or grey, forming a triangular shape that points downwards. It is positioned behind the large blue number '05'.

05



PITFALLS AND ANTIPATTERNS

We identify two kinds of bad engineering practices that manifest in software projects—pitfalls and antipatterns.

CONCLUSION

Lessons learned & summary.

06





THANKS!

Do you have any questions?

<https://helabenkhalfallah.medium.com/>

Twitter : b_k_hela

You don't have to be a "Googley" to make good code and good architecture, it's all about "motivation" and "culture".

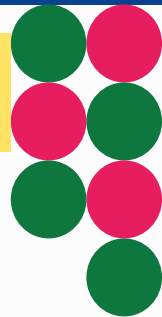


CONTENTS OF THIS TEMPLATE

Here's what you'll find in this [Slidesgo](#) template:

- A slide structure based on a project proposal, which you can easily adapt to your needs. For more info on how to edit the template, please visit [Slidesgo School](#) or read our [FAQs](#).
- An assortment of graphic illustrations that are suitable for use in the presentation can be found in the [alternative resources slide](#).
- A [thanks slide](#), which you must keep so that proper credits for our design are given.
- A [resources slide](#), where you'll find links to all the elements used in the template.
- [Instructions for use](#)
- Final slides with:
 - The [fonts and colors](#) used in the template.
 - A selection of [illustrations](#). You can also customize and animate them as you wish with the online editor. Visit [Storyset](#) to find more.
 - More [infographic resources](#), whose size and color can be edited.
 - Sets of [customizable icons](#) of the following themes: general, business, avatar, creative process, education, help & support, medical, nature, performing arts, SEO & marketing, and teamwork.

You can delete this slide when you're done editing the presentation.





01

About The **Project**

You can describe the topic of the section here

02

Major **Requirement**

You can describe the topic of the section here

03

Project **Goals**

You can describe the topic of the section here

04

Sneak Peak

You can describe the topic of the section here

05

Project Stages

You can describe the topic of the section here

06

Our **Team**

You can describe the topic of the section here



ABOUT THE PROJECT

You can enter a subtitle here if you need it



01

ABOUT THE PROJECT



Do you know what helps you make your point clear? Lists like this one:

- They're simple
- You can organize your ideas clearly
- You'll never forget to buy milk!

And the most important thing: the audience won't miss the point of your presentation



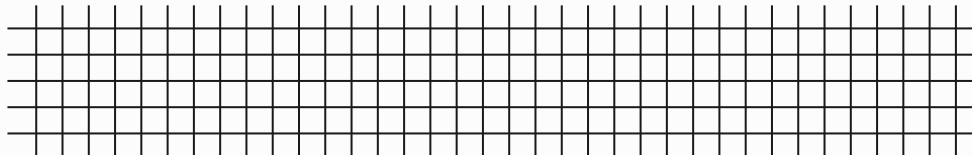
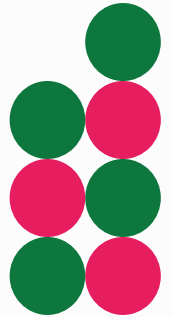
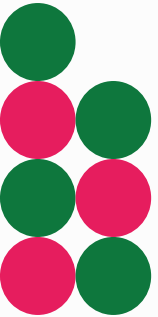
W H O A !

This can be the part of the presentation where you
introduce yourself, write your email...



OUR COMPANY

You can give a brief description of the topic you want to talk about here. For example, if you want to talk about Mercury, you can say that it's the smallest planet in the entire Solar System



WHAT WE'RE WORKING ON



Retail

Mercury is the closest planet to the Sun and the smallest of them all

Venus has a beautiful name and is the second planet from the Sun

Residential



Art

Earth is the third planet from the Sun and the only one that harbors life

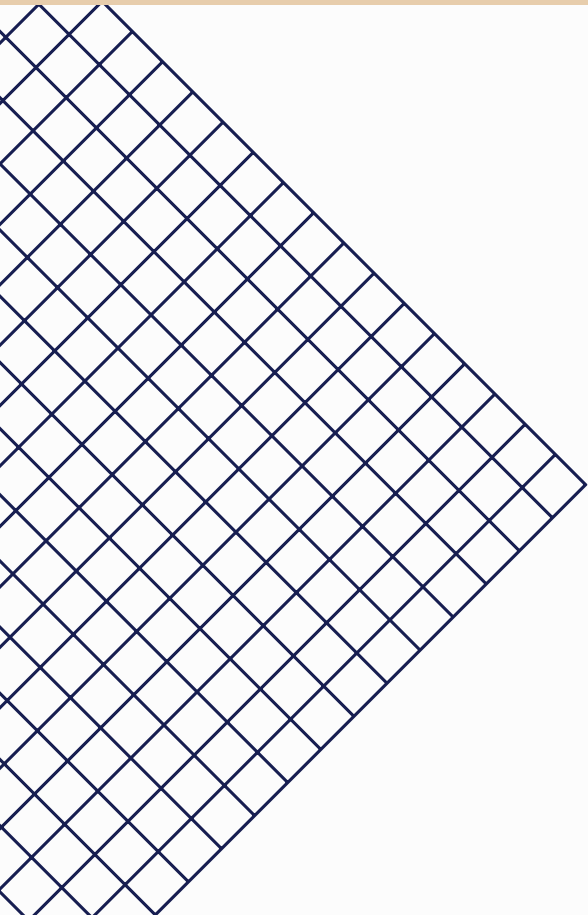
MAJOR REQUIREMENTS

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02





“This is a quote, words
**full of wisdom that
someone important
said** and can make the
reader get inspired.”

—Someone **Famous**



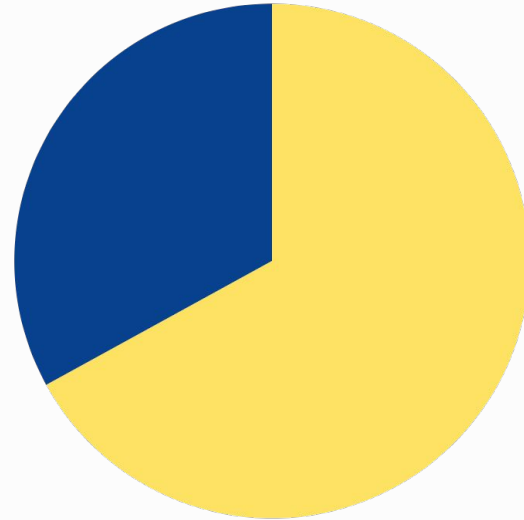
REQUIREMENTS IN A GRAPH

33%

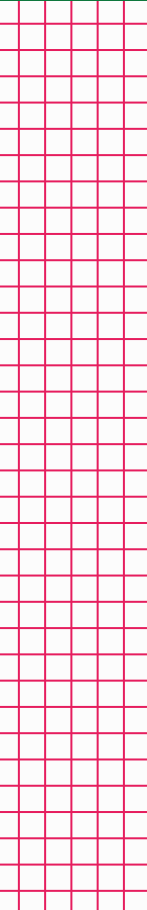
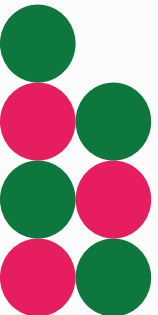
Venus has a beautiful name

67%

Mercury is the closest planet to the Sun



Follow the link in the graph to modify its data and then paste the new one here. [For more info, click here](#)



A woman with long dark hair is pointing at a grid of 16 sustainability icons on a white sheet of paper. A man is sitting across from her, looking at the paper. On the table, there is a small potted cactus, a green pen, and a green notebook. The background is a white desk with various office supplies.

now... **PLANNING**

Neptune is the farthest planet from the Sun. It's also the fourth-largest object



FUTURE... **DOING!**

Saturn is a gas giant and has several rings. It's composed mostly of hydrogen and helium

MAJOR REQUIREMENTS



Evaluating **Options**

Neptune is the farthest planet from the Sun. It's also the fourth-largest object

Saturn is a gas giant and has several rings. It's composed mostly of hydrogen and helium

How To **Sponsor**



BUDGET PROPOSAL

20k

Pluto is now considered a dwarf planet

34m

Mars is actually a very cold place

24%

Ceres is located in the main asteroid belt

2021

The **Sun** is the star at the center of it all

03

PROJECT GOALS

You can enter a subtitle here if you need it



PROJECT GOALS



Goal #01

Earth is the third planet from the Sun and the only one with life



Goal #03

The **Sun** is the star at the center of the Solar System



Goal #02

Despite being red, **Mars** is actually a cold place



Goal #04

Neptune is the farthest planet from the Sun

PREDICTED RESULTS

Ceres

Ceres is actually located in the main asteroid belt

Pluto

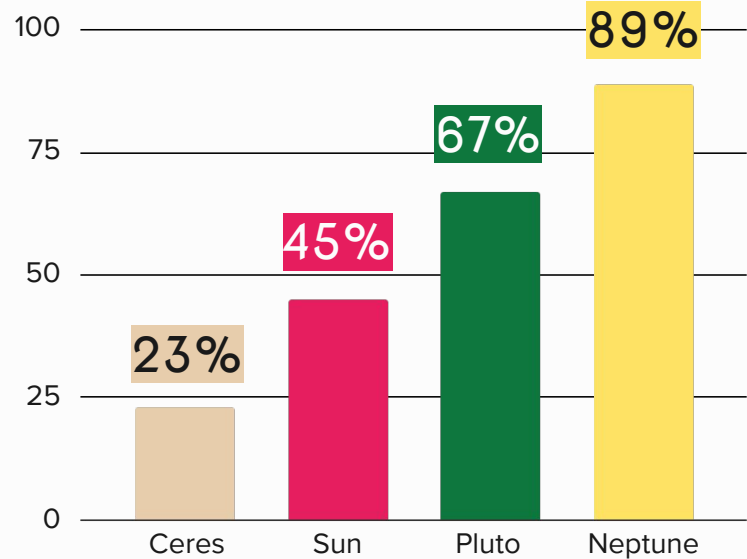
Pluto is now considered a dwarf planet! Hooray!

The Sun

The Sun is the star at the center of the Solar System

Neptune

Neptune is the farthest planet from the Sun



Follow the link in the graph to modify its data and then paste the new one here. [For more info, click here](#)

04

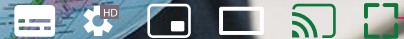
SNEAK PEEK

You can enter a subtitle here if you need it



Insert your multimedia content here

▶ ⏩ 🔊 0:50 / 2:50



SNEAK PEEK

New Look

Ceres is actually located in the main asteroid belt

Sponsors Available

Mars is actually a very cold place full of iron oxide dust

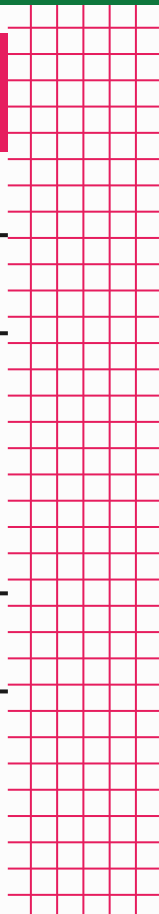
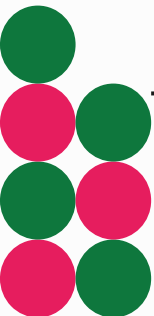


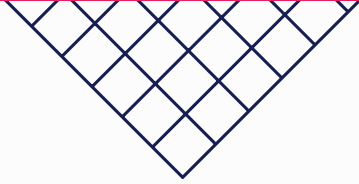
Design Process

Mercury is the smallest planet in the Solar System

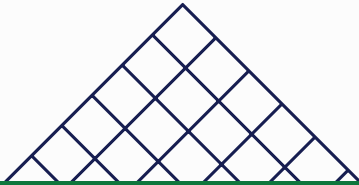
The Alliances

Saturn is composed of hydrogen and helium

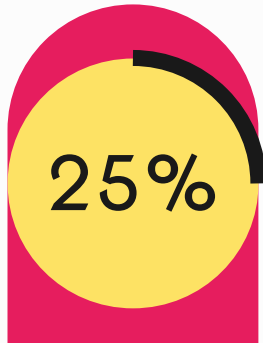




AWESOME
WORDS!

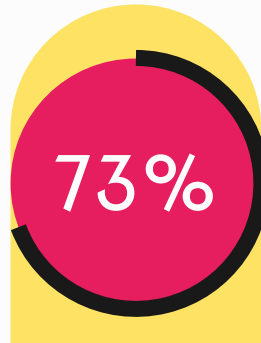


PROGRESS THROUGHOUT THE MONTHS



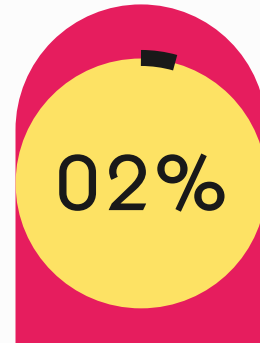
February

The **Sun** is the star at the center of everything



March

Pluto is now considered a dwarf planet



April

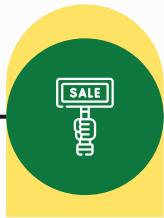
Ceres is located in the main asteroid belt

EVENT TIMELINE



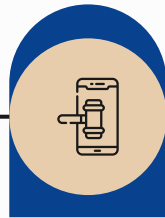
Day 01

Ceres is actually located in the main asteroid belt



Day 02

Pluto is now considered a dwarf planet. Hooray!



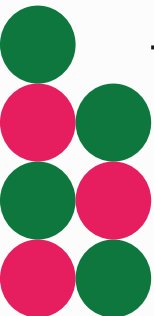
Day 03

The **Sun** is the star at the center of the Solar System



Day 04

Neptune is the farthest planet from the Sun. Whoa!





05



PROJECT STAGES

You can enter a subtitle here if you need it

PROJECT STAGES

Stage #01

The **Sun** is the star at the center of everything

Stage #02

The **Earth** is the planet where we all live on



Stage #03

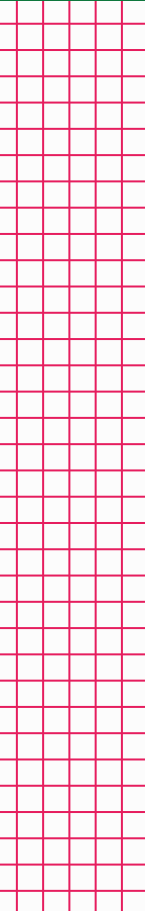
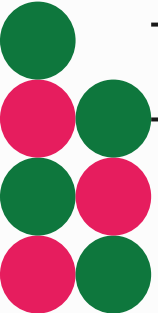
Pluto is now considered a dwarf planet

Stage #05

Mercury is the smallest planet of them all

Stage #04

Ceres is located in the main asteroid belt



A PICTURE REINFORCES THE **CONCEPT**



Images reveal large amounts of data, so remember: use an image instead of a long text.

Your audience will appreciate it!



24,052,018

Big numbers catch your audience's attention

LET'S SPONSOR
THE BEST EVENTS!



SAVE ENERGY

OUR TEAM

You can enter a subtitle here if you need it

06



OUR PARTNERS

Partner A

Saturn is a gas giant and has several rings

Partner D

Earth is the third planet from the Sun

Partner B

Jupiter is a gas giant and the biggest planet

Partner E

Venus has a beautiful name and is the second

Partner C

Despite being red, **Mars** is actually a cold place

Partner F

Mercury is the closest planet to the Sun

OUR TEAM



Tina
Marina

You can
describe your
team member

Adam
Stilinski

You can
describe your
team member

Arantxa
Torres

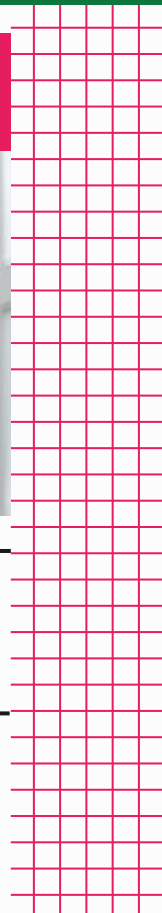
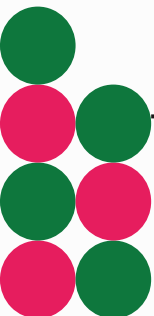
You can
describe your
team member

Mark
Flowers

You can
describe your
team member

Drake
Long

You can
describe your
team member



DESKTOP DEVICE



You can replace the image on the screen with your own work. Just right-click on it and select **“Replace image”**

THANKS!

Do you have any questions?

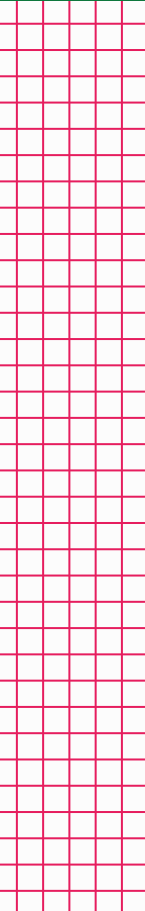
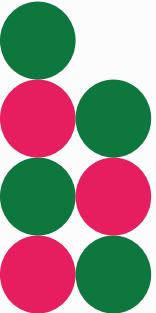
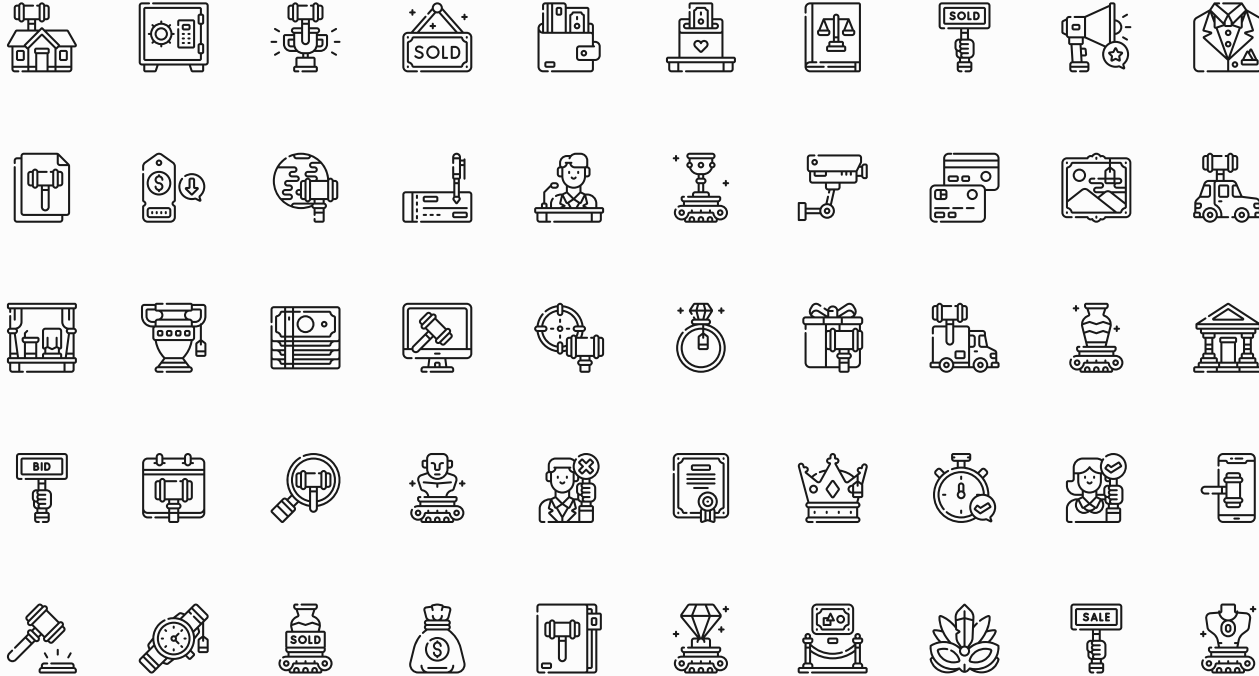
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+91 620 421 838
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ALTERNATIVE AUCTION ICONS



ALTERNATIVE ECONOMICS ICONS





ALTERNATIVE RESOURCES

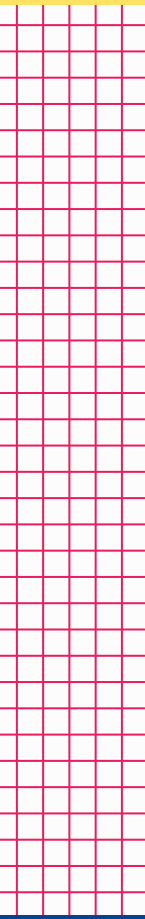
Here's an assortment of alternative resources whose style fits that of this template

Photos:

- Business People working on a graph
- Analyzing a graph
- Happy businesswoman giving presentation to her partners in business meeting
- Group of businesspeople analyzing graph in office
- Businesspeople discussing
- Businesspeople eating pizza at lunch break

Icons:

- Finance



SOME RESOURCES

Did you like the resources of this template? Get them for free at our other websites!

Photos:

- Two happy businesswoman shaking hands during business meeting
- Group of businesspeople hand working on graph over white background
- Two businesspeople working on natural resources preservation in office
- Smiling businesswoman giving presentation on world environment day to hr colleagues
- Happy young businessman holding globe in office
- Businesspeople at office meeting

Icons:

- Auction

