

# README

vs. IEEE, RUP, SWEBOK, CMMI

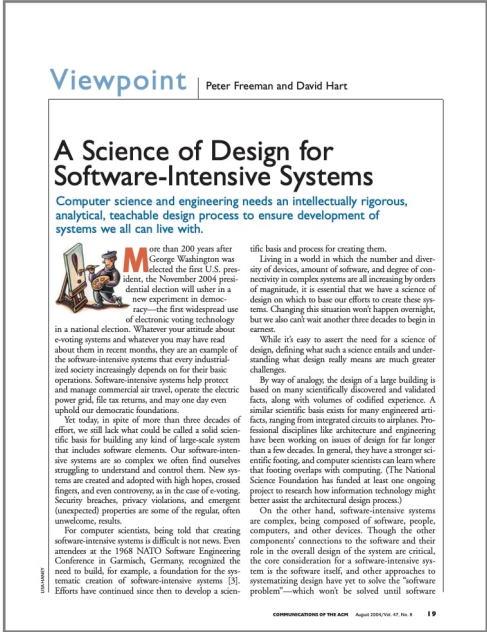
YEGOR BUGAYENKO

Lecture #1 out of 16

80 minutes

The slidedeck was presented by the author in this [YouTube Video](#)

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“Design encompasses all the activities involved in conceptualizing, framing, implementing, commissioning, and ultimately modifying complex systems—not just the activity following requirements specification and before programming, as it might be translated from a stylized software engineering process.”

— Peter Freeman and David Hart. A Science of Design for Software-Intensive Systems. *Communications of the ACM*, 47(8):19–21, 2004. doi:10.1145/1012037.1012054

Software vs. Interiors

SDD at IEEE 1016

SAD at RUP

TS at CMMI

SWEBOK

README

Books, Venues, Call-to-Action

Chapter #1:

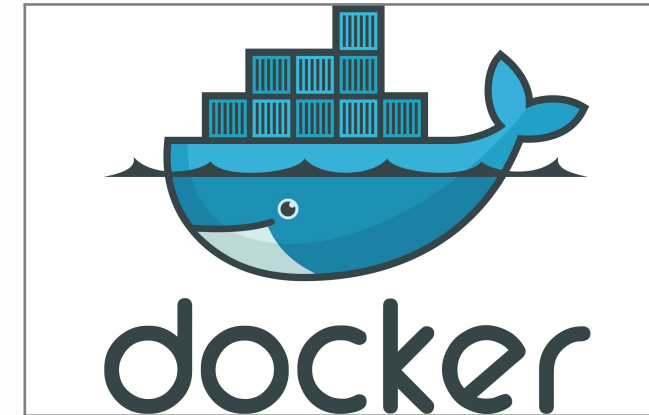
## Software vs. Interiors



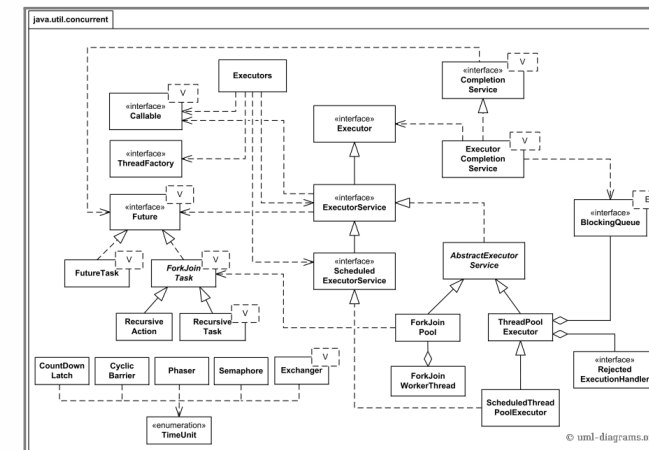
## Interior



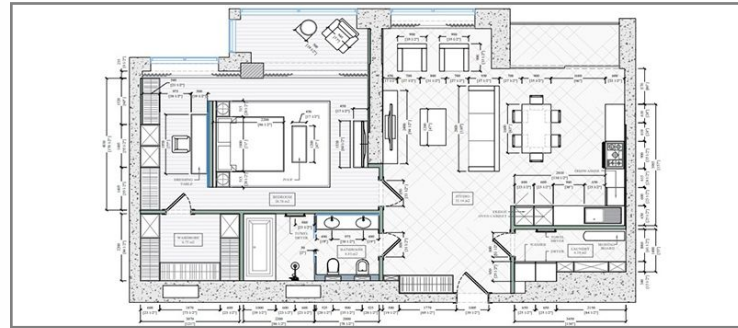
# Interior Design



Software



# Software Design



How to explain it?  
Standards



How to design?  
Patterns

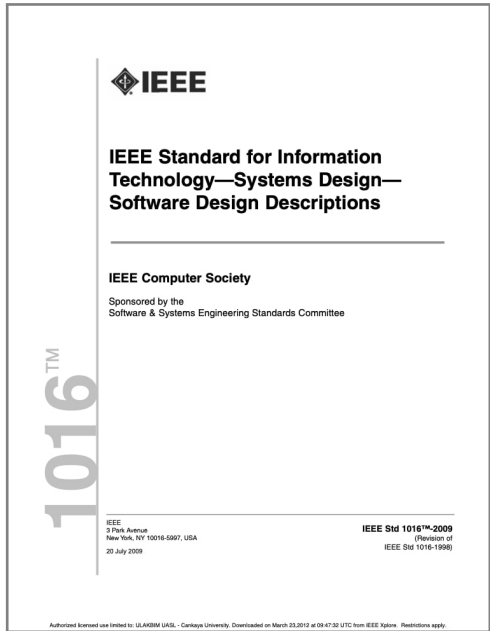


1. A good documentation  
is a precursor to a good design.

Chapter #2:

**SDD at IEEE 1016**





“An SDD is a representation of a software design to be used for recording design information and communicating that design information to key design stakeholders. This standard is intended for use in design situations in which an explicit SDD is to be prepared.”

— IEEE Standards Board. IEEE Std 1016-2009: Standard for Information Technology — Systems Design — Software Design Descriptions, 2009

Inactive-Reserved on March 2020


## Glossary

A request is data package sent from a client to a server.

A client is a computer with a web browser.

A server is a computer with a software installed.

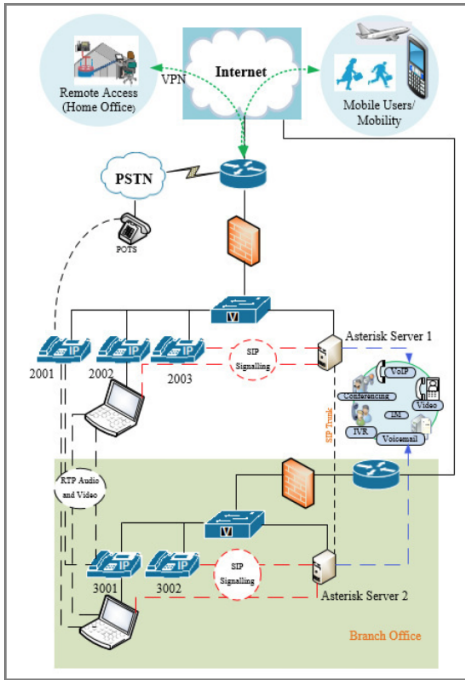




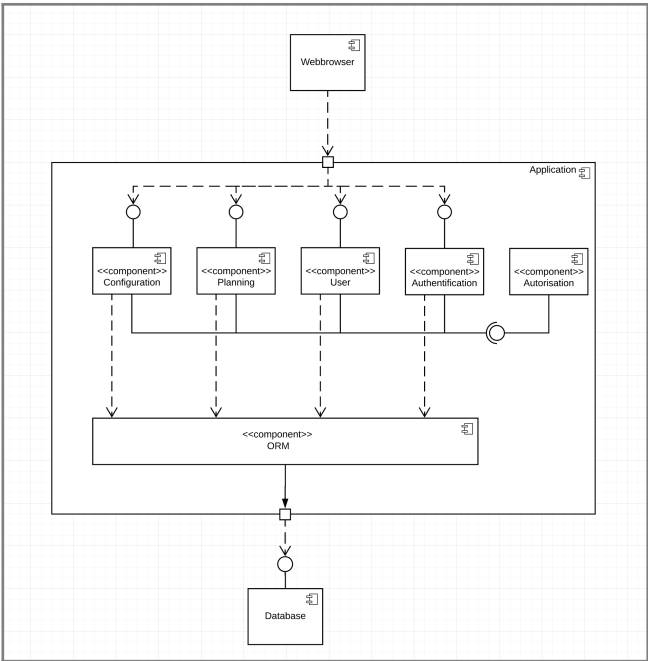
2.If I don't understand you,  
it's your fault!

Languages

NOT like this:

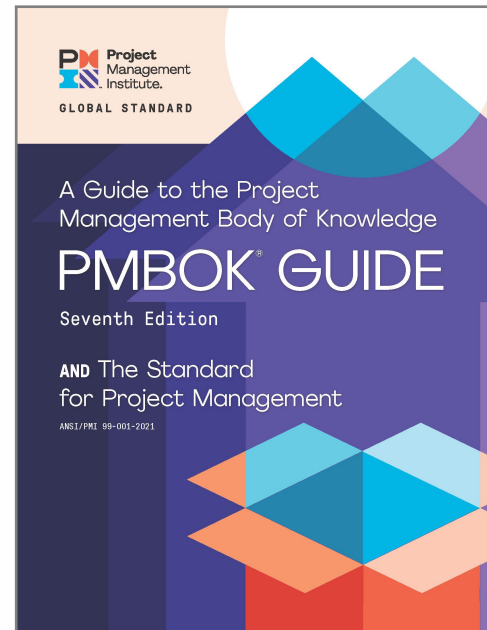


But like this:



UML + visual-paradigm.com

## Stakeholders



“Identify Stakeholders is the process of identifying the people, groups, or organizations that could impact or be impacted by a decision, activity, or outcome of the project.”

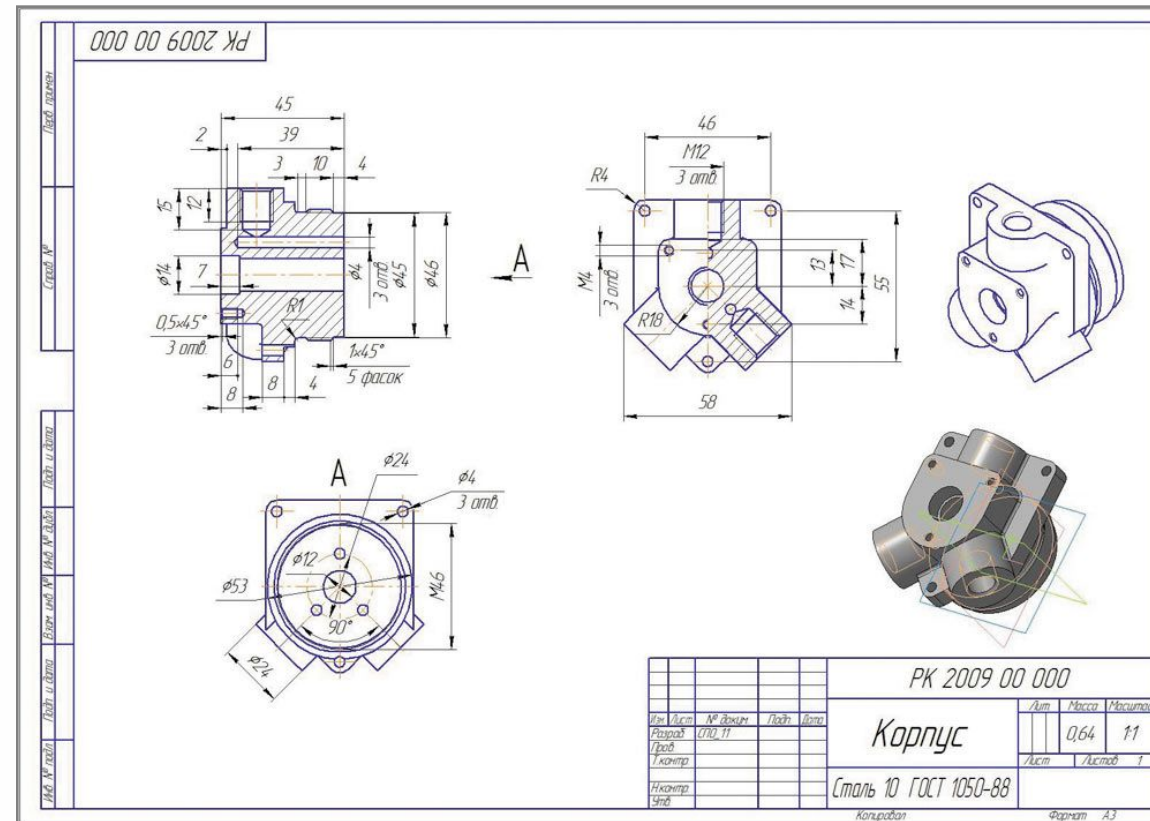
— Project Management Institute. *Guide to the Project Management Body of Knowledge (PMBOK® Guide) and the Standard for Project Management*. Project Management Institute, 2021

## Concerns

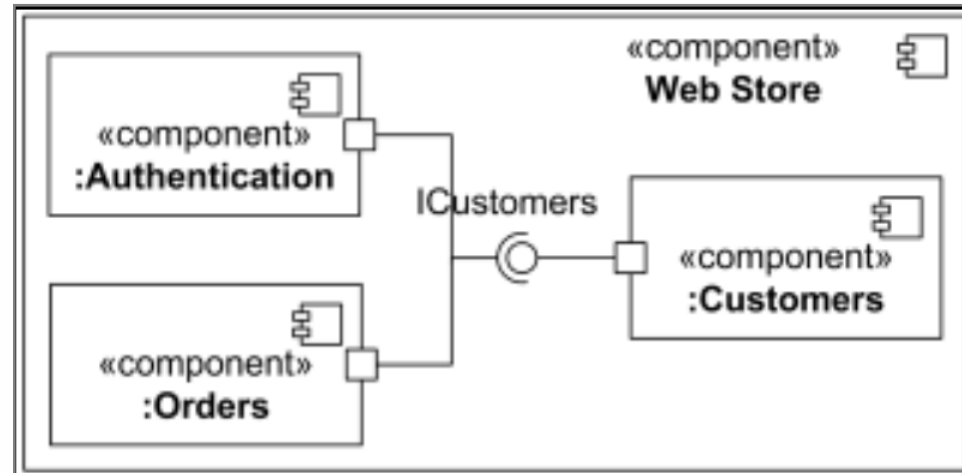
Functional  
and  
Non-Functional Requirements

[ Glossary Languages Stakeholders Concerns Views Elements Rationale ]

## Viewpoints



## Elements






## Rationale

### Why MongoDB, why not MySQL?

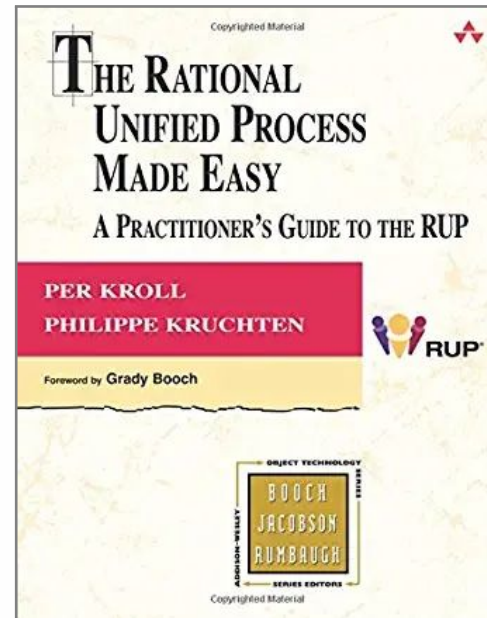
Multi-Criteria Decision Making (MCDM)  
Architecture Trade-off Analysis Method (ATAM)  
Decision Table  
Multi Factor Analysis  
Decision Matrix



3. Don't expect them to trust you,  
make them trust your decisions.

Chapter #3:

## SAD at RUP

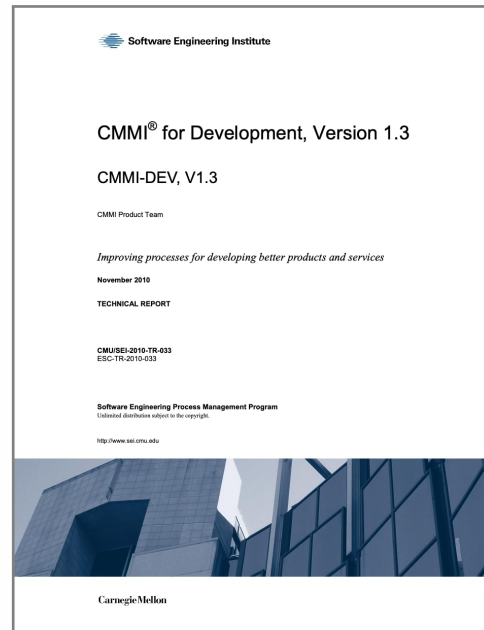


“The main responsibility of the architect is to describe the architecture of the system in a major artifact of the RUP product, called the Software Architecture Document (SAD). For many projects, this may be the only part of the design that is described in an actual document, as most design aspects can be documented in UML models and in the code itself.”

— Per Kroll and Philippe Kruchten. *The Rational Unified Process Made Easy: A Practitioner's Guide to the RUP*. Addison-Wesley, 2003

Chapter #4:

**TS at CMMI**



“Detailed design is focused on software product component development. The internal structure of product components is defined, data schemes are generated, algorithms are developed, and heuristics are established to provide product component capabilities that satisfy allocated requirements.”

— CMMI Product Team. CMMI for Development, Version 1.3, 2010

## Chapter #5: **SWEBOK**



“Viewed as a process, software design is the software engineering life cycle activity in which software requirements are analyzed in order to produce a description of the software’s internal structure that will serve as the basis for its construction.”

— Pierre Bourque and Richard E. Fairley. *Guide to the Software Engineering Body of Knowledge (SWEBOK® Guide), Version 3.0*. IEEE, 2014. doi:[10.5555/2616205](https://doi.org/10.5555/2616205)





4. Stay away from MS Word,  
instead, use  $\text{\LaTeX}$  with Git.

## Chapter #6: **README**

```
# Sample Markdown

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod.

## Text basics

This is italic and this is bold. Another italic and another bold.

__Here is some quotation__. Lorem ipsum dolor sit amet, consectetur
adipiscing elit, sed do eiusmod tempor incididunt ut labore et
dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation.

## Links

This is an [example inline link](http://example.com/) and [another one with a
title](http://example.com/ "Hello, world"). And [another][someref] one.

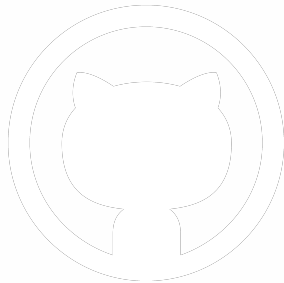
## Code |

This is inline code: `some code here`.

<script>
  document.location = 'http://example.com/?q=markdown+cheat+sheet';
</script>

```java
public class HelloWorld {
  public static void main(String[] args) {
    System.out.println("Hello, world!");
  }
}
...

[someref]: http://example.com "rich web apps"
[MarkdownREF]: http://daringfireball.net/projects/markdown/basics
[gfm]: http://github.github.com/github-flavored-markdown/
```

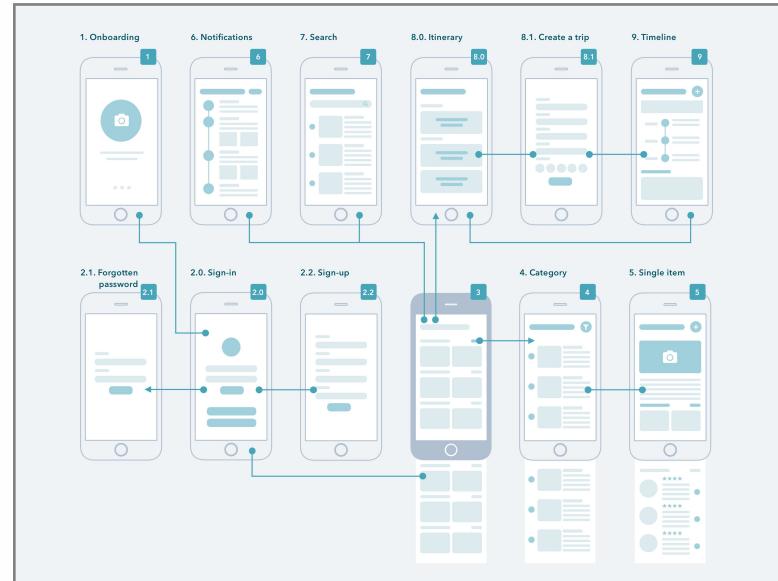


GitHub

Markdown


by John Gruber

since 2004



## UI mockups

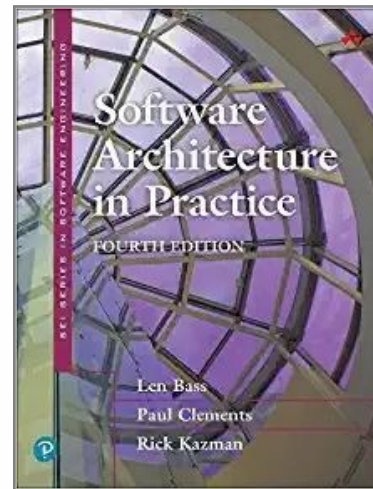
moqups.com, balsamiq.com, sketch.com, dribbble.com, etc.



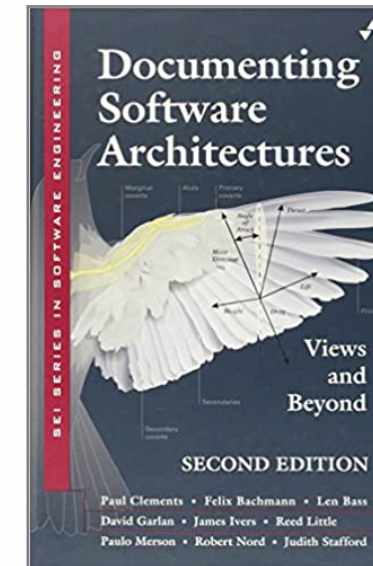
5. Brevity is a virtue,  
redundancy is a sin.

Chapter #7:

## Books, Venues, Call-to-Action



Len Bass, Paul Clements, and Rick Kazman. *Software Architecture in Practice*. Pearson Education, 4 edition, 2021



Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Paulo Merson, Reed Little, and Robert Nord. *Documenting Software Architectures: Views and Beyond*. Addison-Wesley, 2 edition, 2011

## Where to publish:

IEEE International Conference on Software Architecture (ICSA)



## Call to Action:

Create and explain the design of a QR-code generator app in the README.md file in a new GitHub repository. Sample: [www.4qrcode.com](http://www.4qrcode.com)

## Still unresolved issues:

- How to synchronize an SDD with the source code?
- How to generate the code from an SDD?
- How to embed diagrams into the source code?
- How to validate source code vs. the SDD?

# Bibliography

Len Bass, Paul Clements, and Rick Kazman. *Software Architecture in Practice*. Pearson Education, 4 edition, 2021.

IEEE Standards Board. IEEE Std 1016-2009: Standard for Information Technology — Systems Design — Software

Design Descriptions, 2009.

Pierre Bourque and Richard E. Fairley. *Guide to the Software Engineering Body of Knowledge (SWEBOK® Guide), Version 3.0*. IEEE, 2014. doi:[10.5555/2616205](#).

Paul Clements, Felix Bachmann, Len Bass, David Garlan, James Ivers, Paulo Merson, Reed Little, and Robert Nord. *Documenting Software Architectures: Views and Beyond*. Addison-Wesley, 2 edition, 2011.

Peter Freeman and David Hart. A Science of Design for Software-Intensive Systems. *Communications of the*

*ACM*, 47(8):19–21, 2004. doi:[10.1145/1012037.1012054](#).

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CMMI Product Team. CMMI for Development, Version 1.3, 2010.