



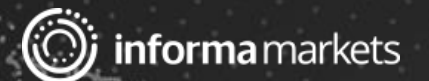
DesignNews

Real-Time System Software Architecture Design

DAY 5 : Beyond UML – Data, Isolation, and Security

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Webinar Logistics

- Turn on your system sound to hear the streaming presentation.
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THE SPEAKER



Jacob Beningo

Jacob@beningo.com

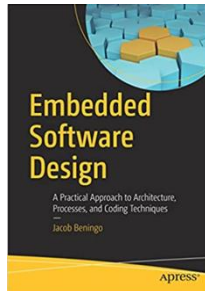


[jacobbeningo](#)

Beningo Embedded Group – CEO / Founder

Focus: Software Architecture, Processes, and Dev Skills

At Beningo Embedded Group, we believe everyone deserves the skills to confidently advance their careers, meet deadlines, and deliver quality embedded systems. We provide modern strategies, insights, and hands-on training to equip developers and teams with the tools they need to succeed.



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This week's topics:



What is Software Architecture?



Design Philosophies and Principles



Modeling with UML and the 4C Model



Data-Centric Architecture Design

Beyond UML – Data, Isolation, Security

•• What is UML?

01

The Unified Modeling Language (UML)

Definition:

UML is a standardized modeling language consisting of an integrated set of diagrams, developed to help system and software developers for specifying, visualizing, constructing and documenting the artifacts of software systems.

- Visual Paradigm

Models

- Representations of the software as it is to be built
- Communicates the requirements of stakeholders
- Allows review and reasoning of a component of a system
- Acts as a blueprint for the designers
- Give us a feel for system complexity

Stakeholders and Views

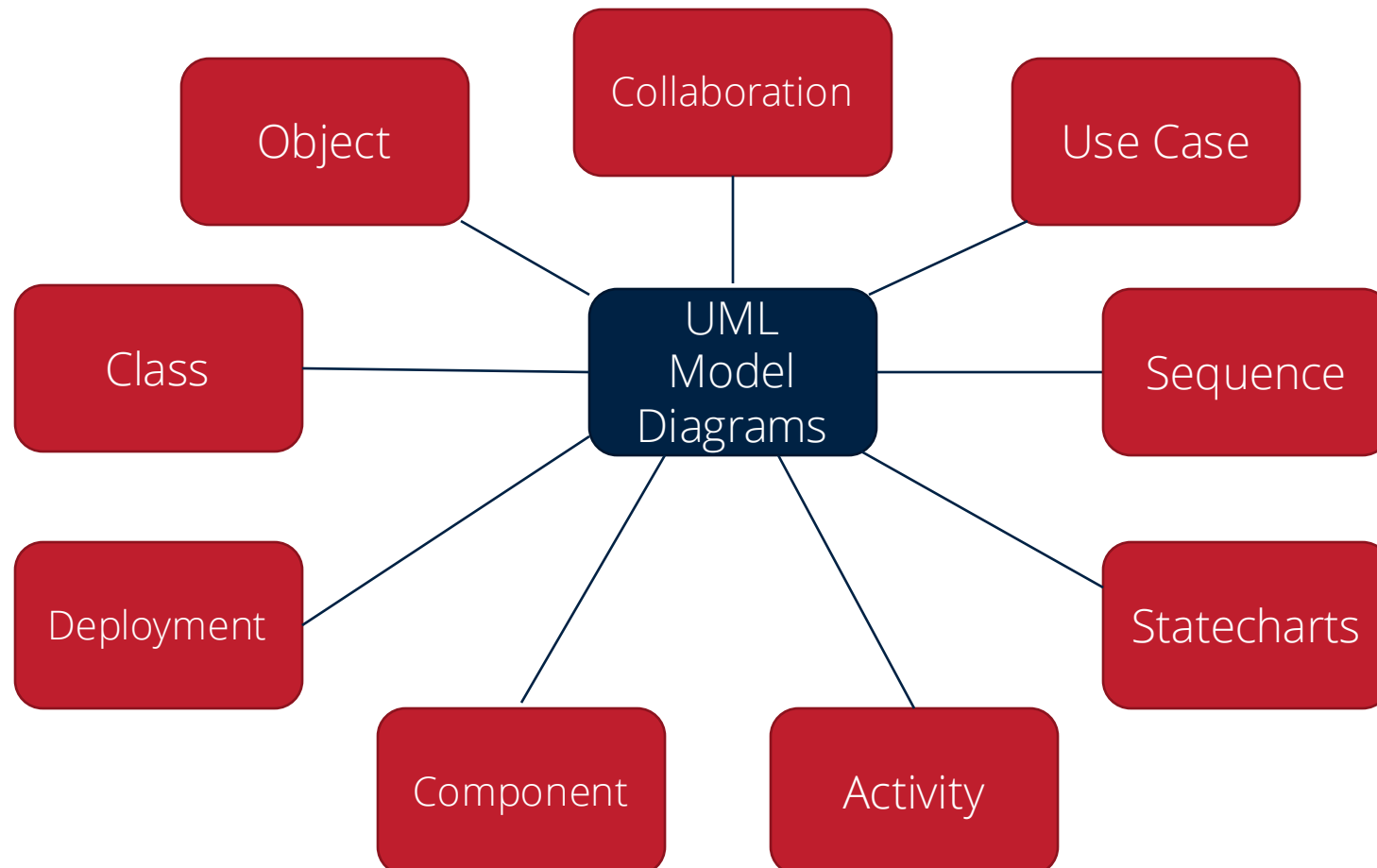
Stakeholders

- Each one has their own view, their own perspective on how the system works
- Many different types

Views

- Architectural view is an abstraction of a system from a particular perspective

Models, Views and Diagrams



Audience POLL Question

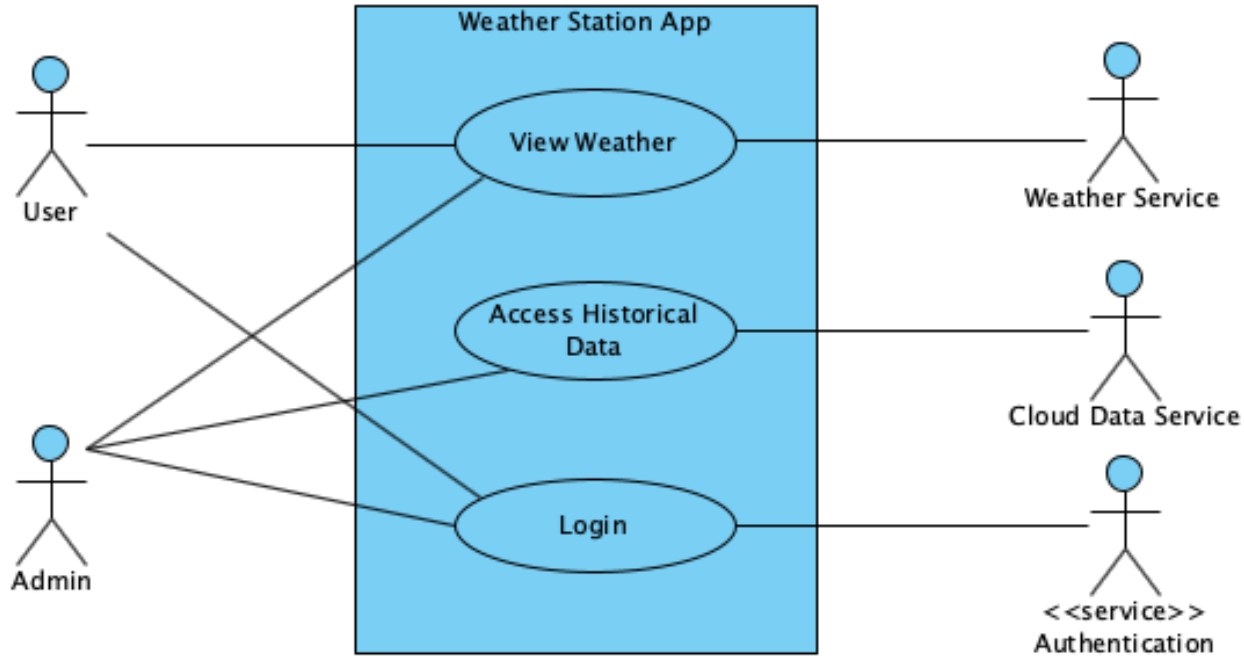
Are you currently using UML in your software design activities?

- a) Yes
- b) No
- c) Considering it
- d) Other

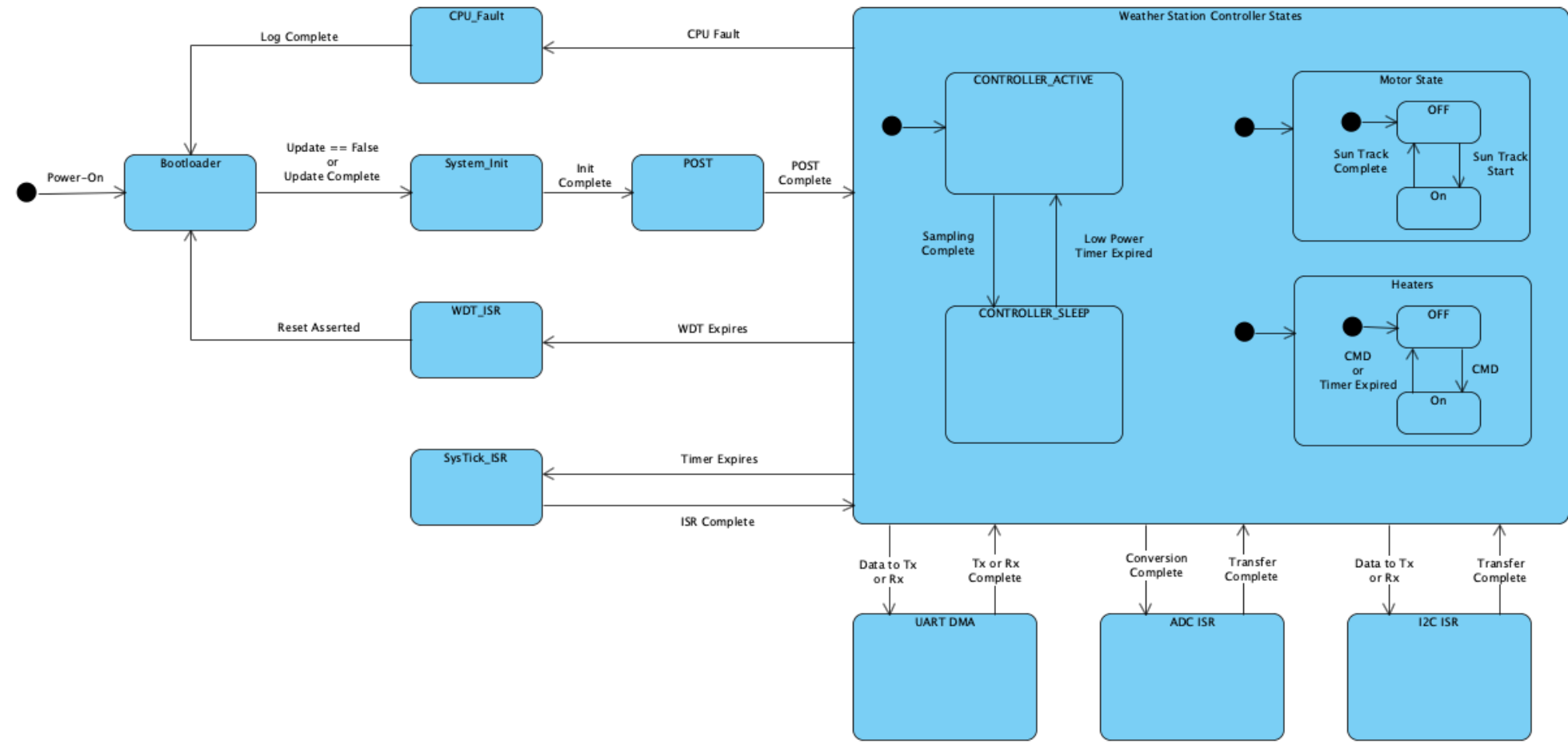
01

- Diagrams used by Embedded Designers

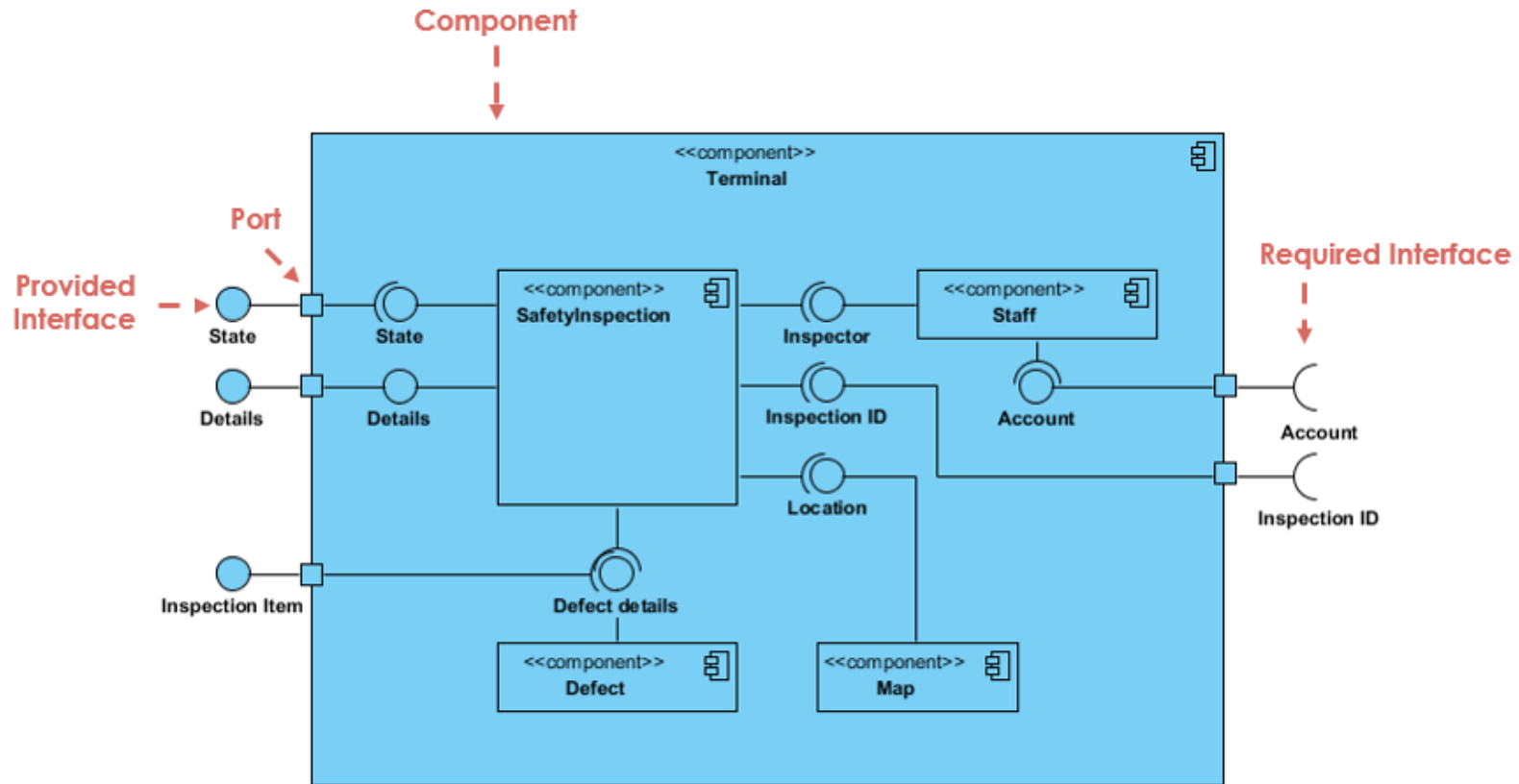
Use Case Diagrams



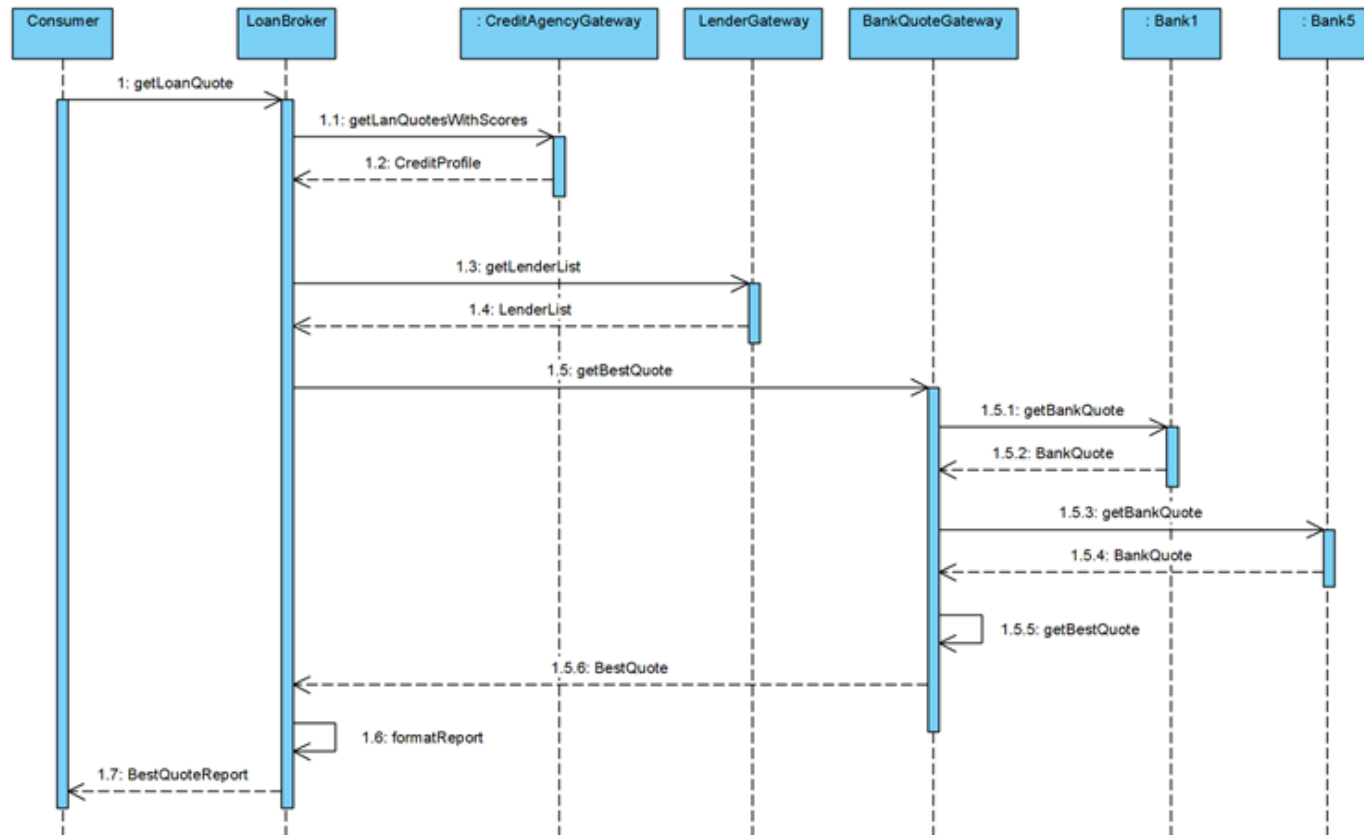
State Machines and State Charts



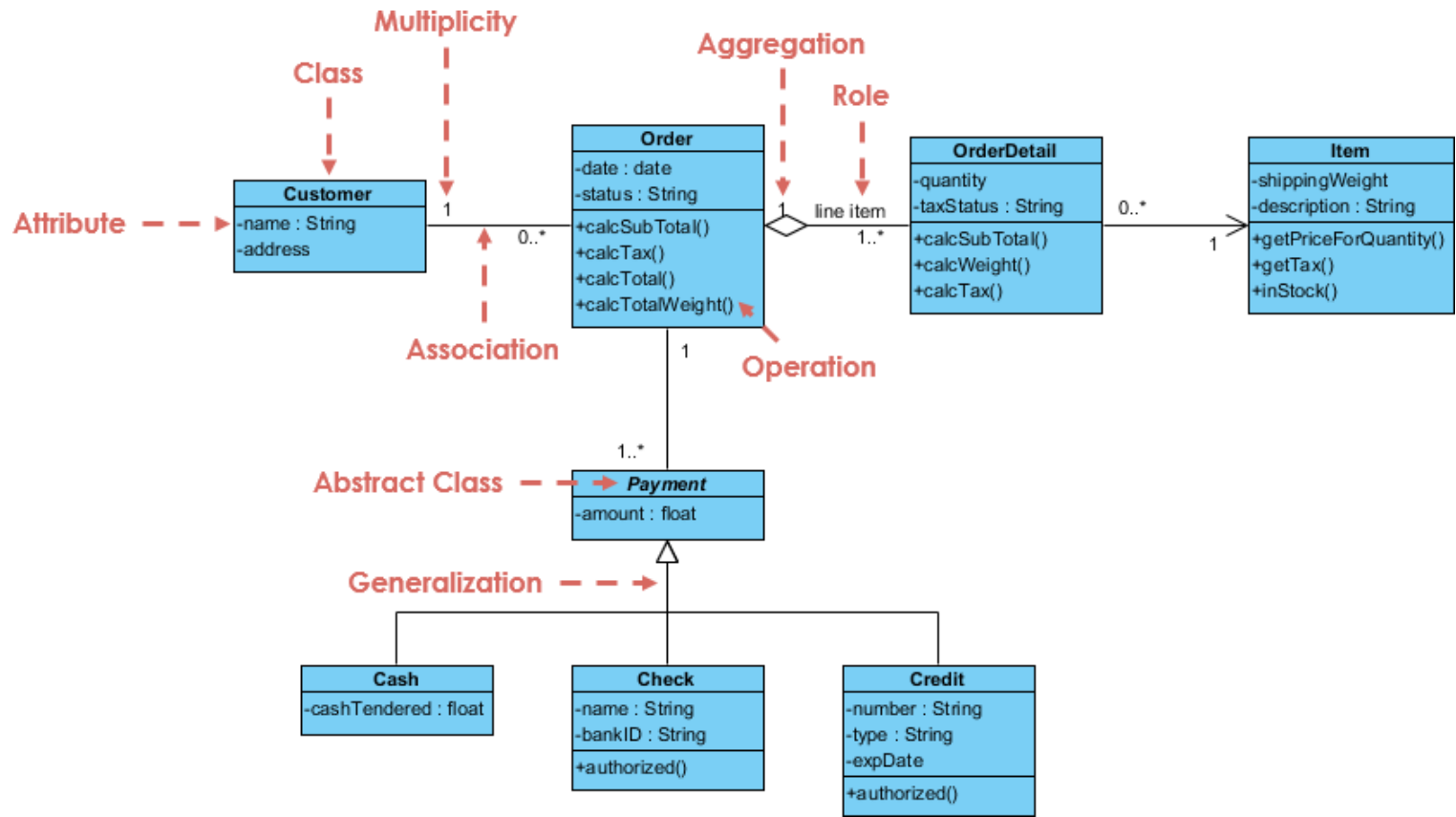
Component Diagram



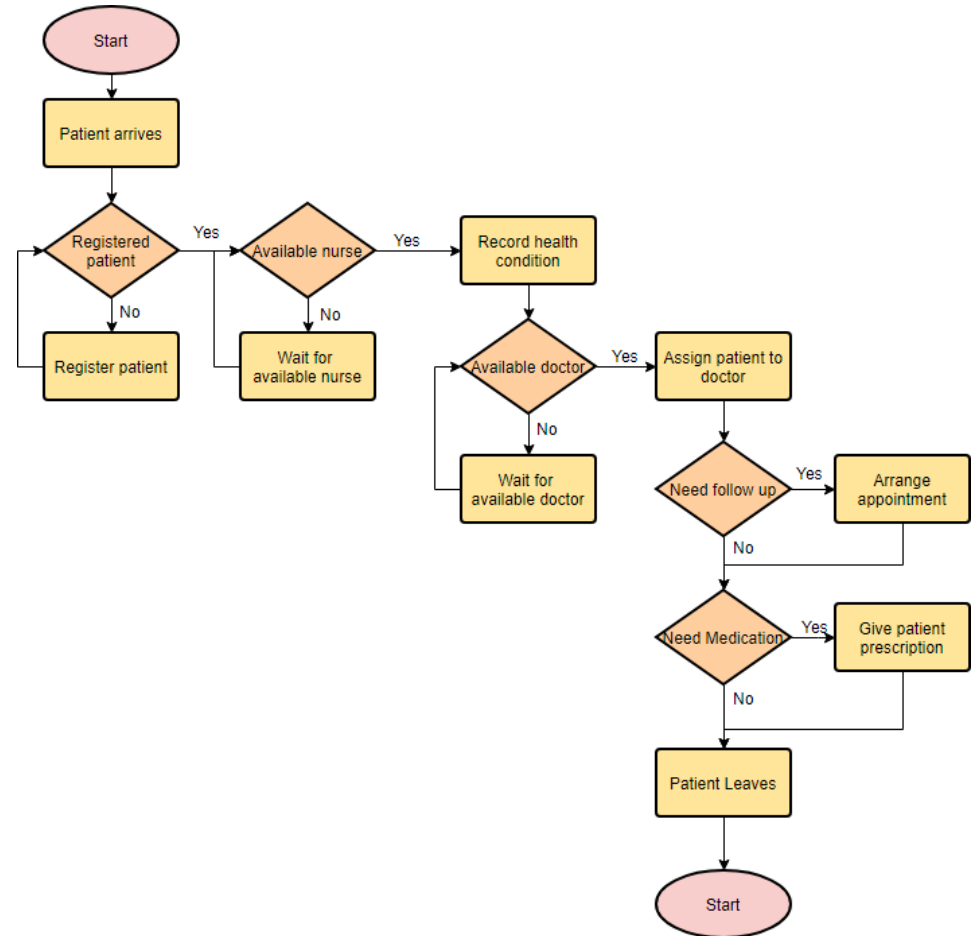
Sequence Diagrams



Class Diagrams



Flowcharts



Audience POLL Question

Which model type do you find to be the most helpful?

- a) Use Cases
- b) State Machines
- c) Component Diagrams
- d) Class Diagrams
- e) Flowcharts
- f) All the above

•• Beyond UML

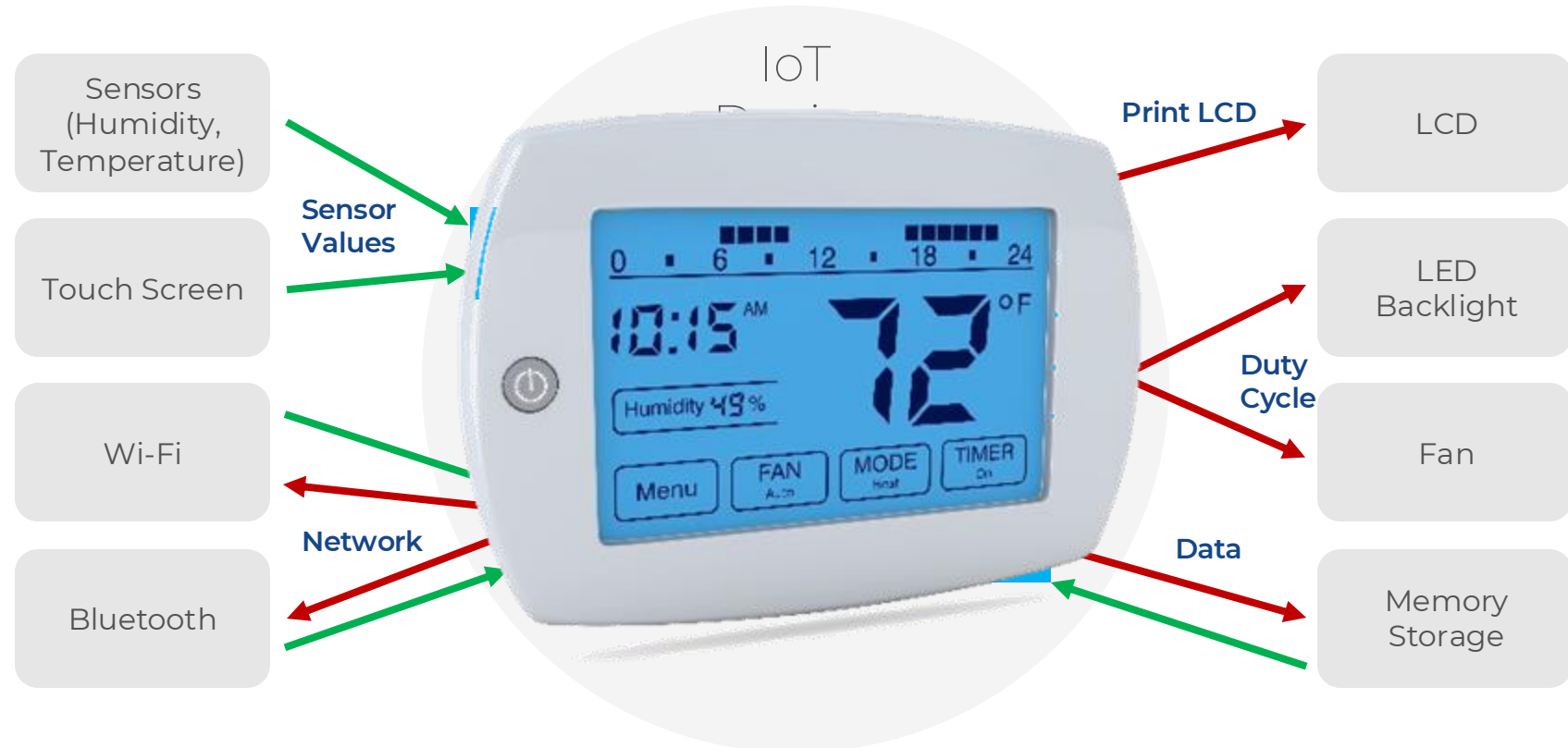
03

UML's Shortcomings

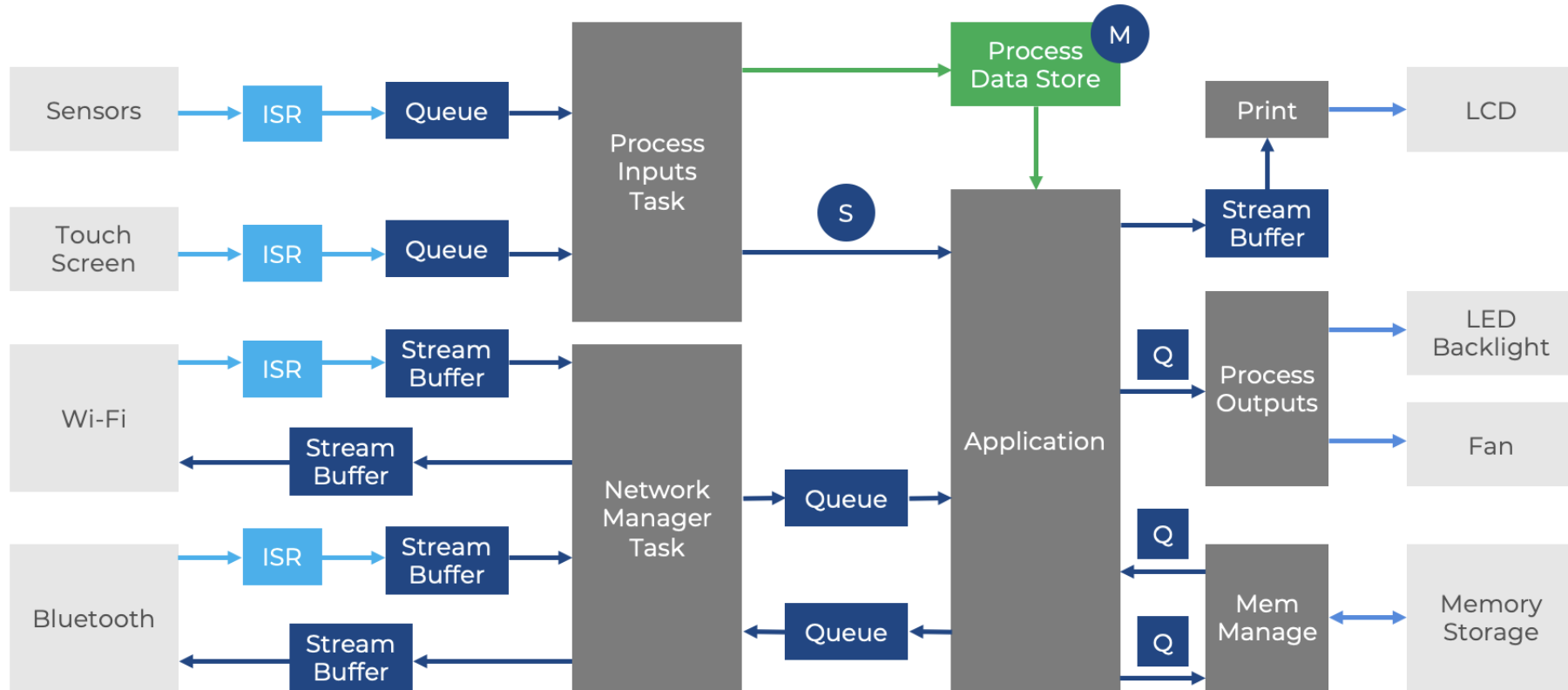
- How do we create:
 - A task model
 - For RTOS-based applications
 - An isolation model
 - The security architecture
- A dataflow model

The Outside-In Approach

1. Identify the major components
2. Draw a high-level block diagram
3. Label the inputs
4. Label the outputs
5. Identify the first-tier tasks
6. Determine concurrency levels and dependencies
7. Identify second tier tasks (application only tasks)



Example Dataflow



Audience POLL Question

Which approach should you use for software architecture?

- a) Data-flow
- b) 4C
- c) UML
- d) Design Patterns
- e) All the above
- f) Other

•• Next Steps

04

Going Further

Download the extra resources:

- <https://beningo.short.gy/25DNCEC-10-Architecture-Resources>

Get Hands-On:

- Analyze an existing projects software architecture
- Draw a new software architecture
- Invest a widget to practice your architecture skills
- Join an Embedded Software Architecture Kata

Downloadable Resources:

- Characteristics Worksheet
- Modern Principles
- Architecture Book List
- ADR Template



Save \$100:

<https://beningo.short.gy/DNCEC2510>

Additional Resources

Please consider the resources below:

- [Jacob's Blogs](#)
- [Jacob's CEC courses](#)
- [Embedded Software Academy](#)

- Embedded Bytes Newsletter
 - <http://bit.ly/1BAHYXm>



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Next Steps

- ✓ What is Software Architecture?
- ✓ Design Philosophies and Principles
- ✓ Modeling with UML and the 4C Model
- ✓ Data-Centric Architecture Design
- ✓ Beyond UML – Data, Isolation, and Security



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Thank You

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