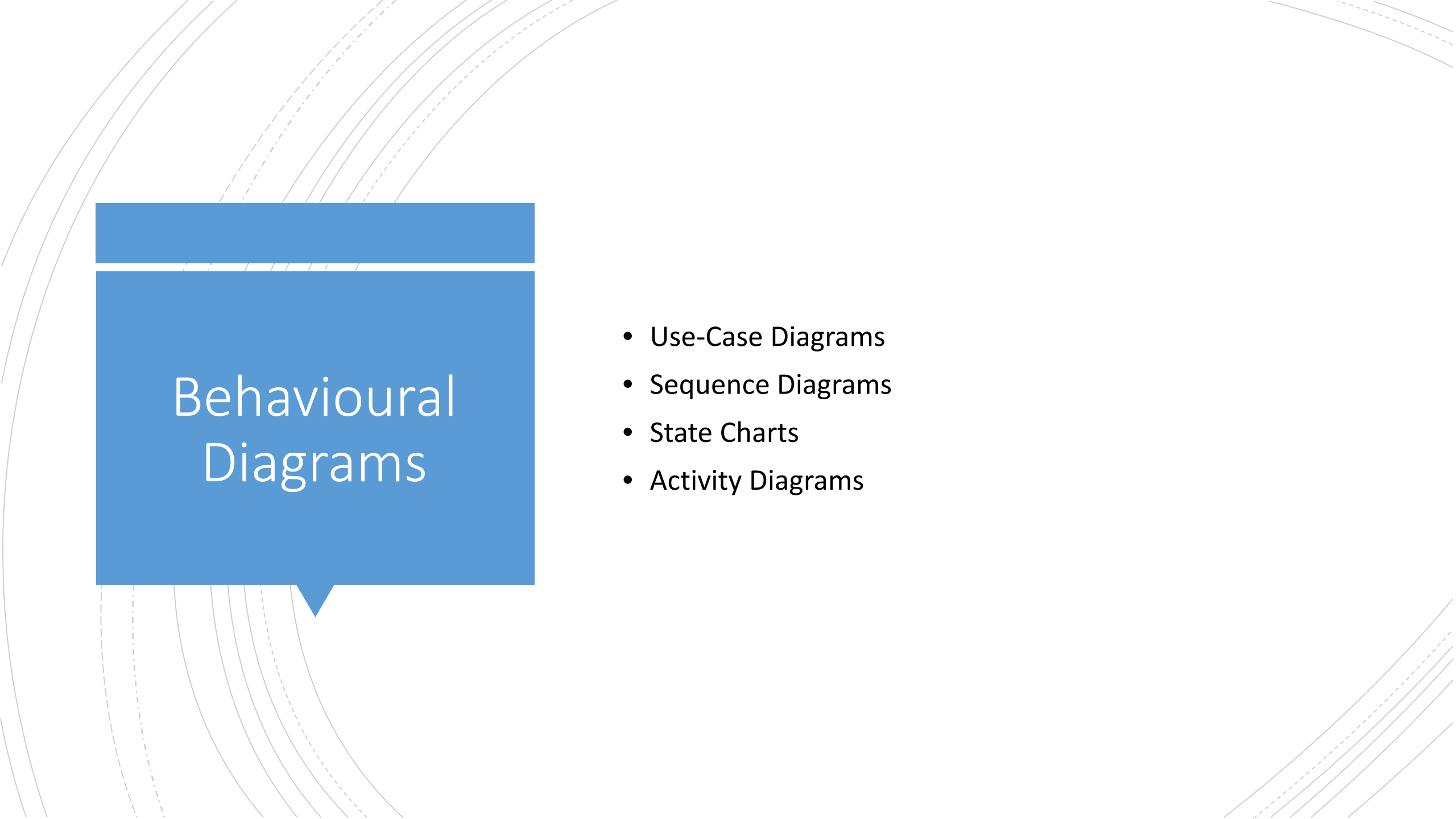


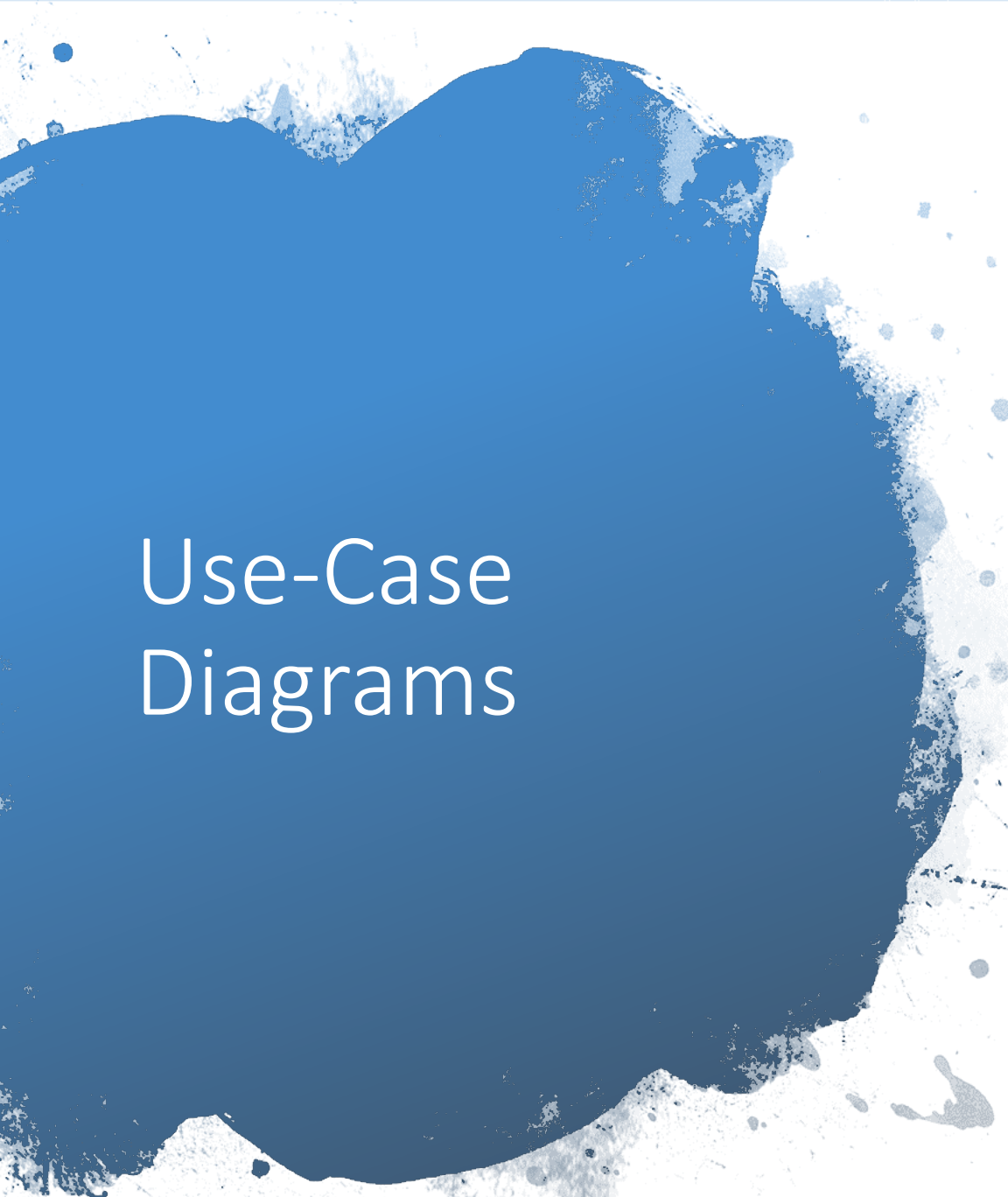
UML

Behavioural Models #2

The background of the slide features a series of thin, curved lines in shades of grey and blue, creating a sense of motion and depth. These lines are concentrated on the left side and fade out towards the right.

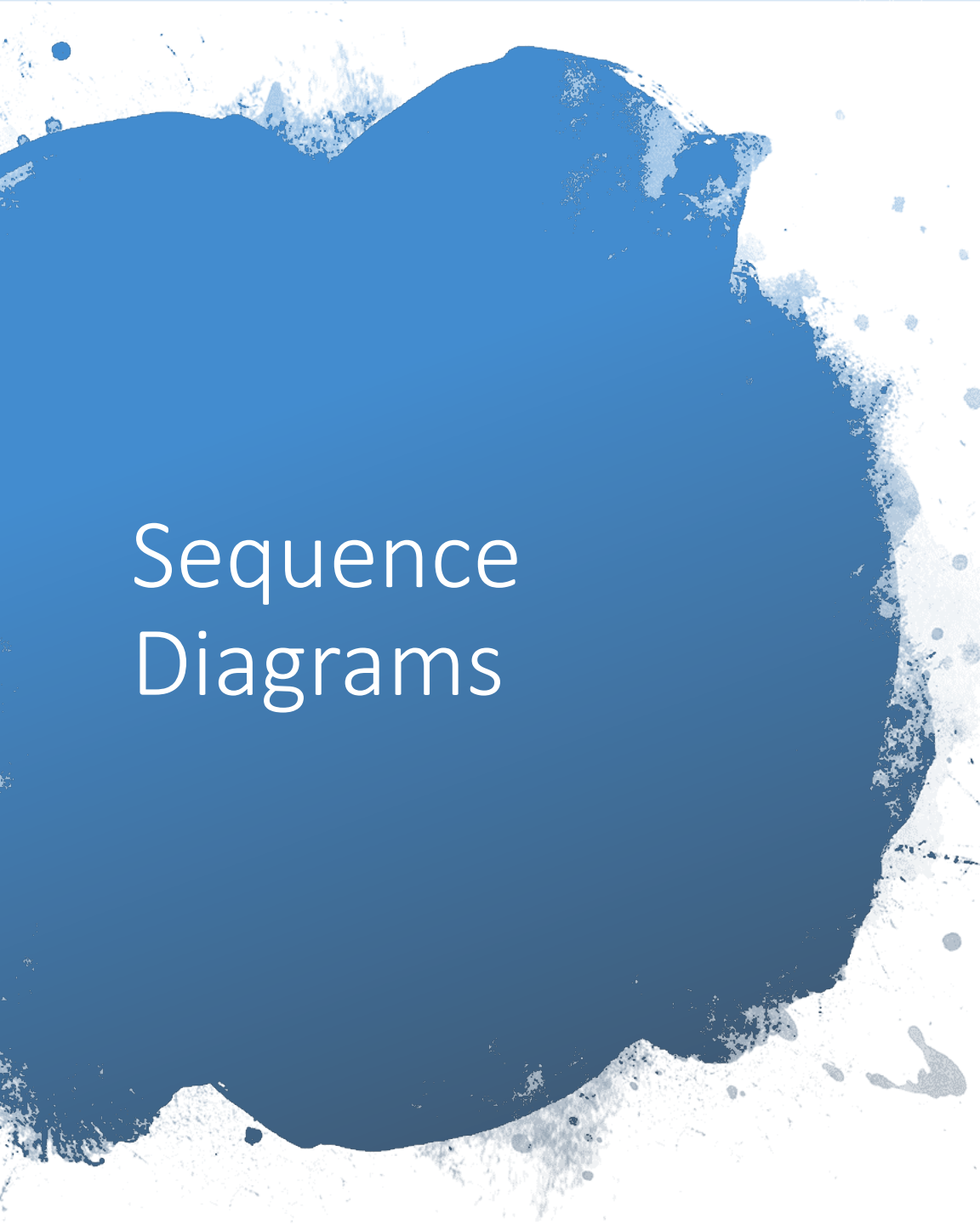
Behavioural Diagrams

- Use-Case Diagrams
- Sequence Diagrams
- State Charts
- Activity Diagrams



Use-Case Diagrams

- Represent the processes within the system
- Highlight the functional components of a process
- Show the dependency between functions in the system

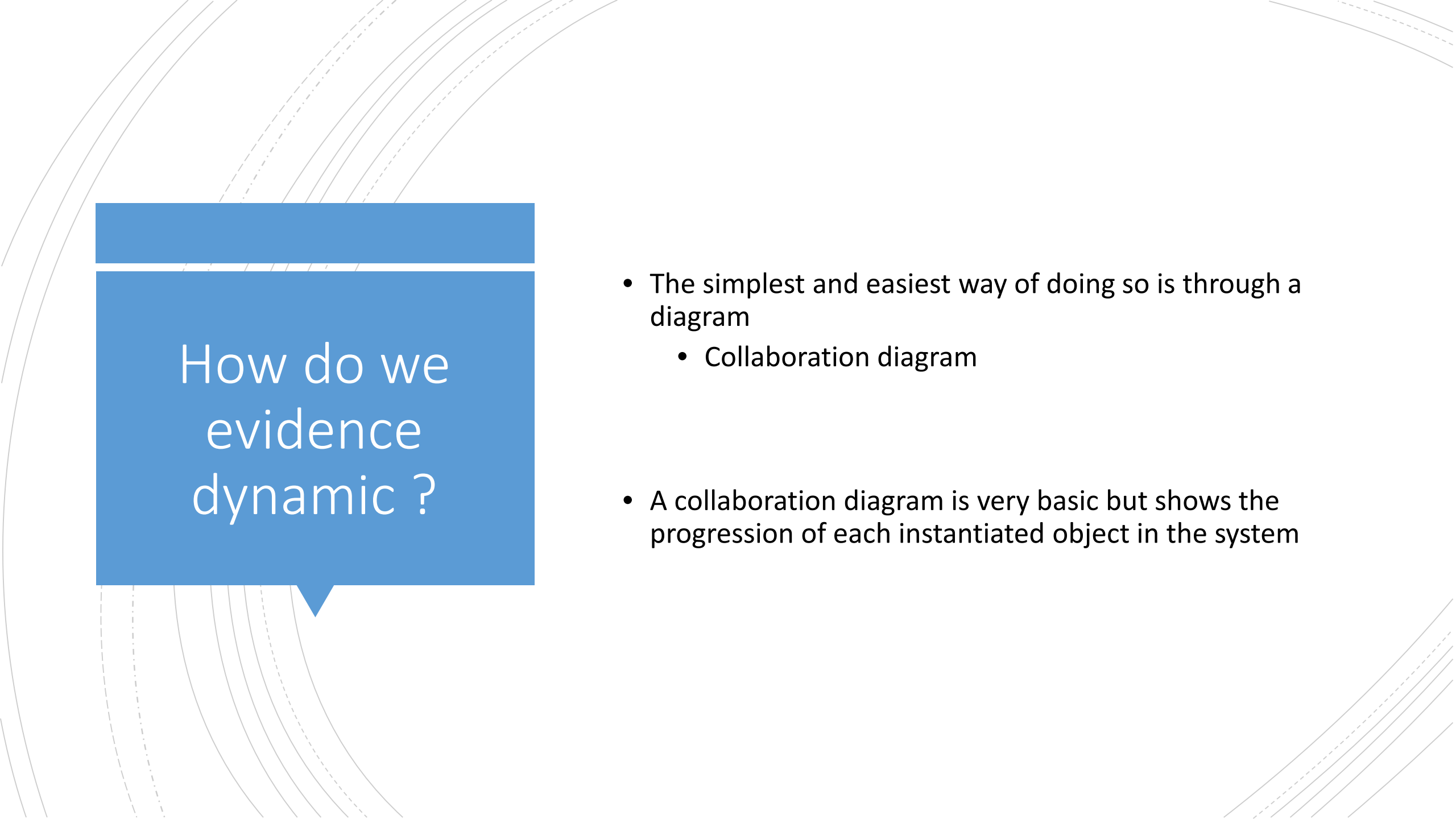


Sequence Diagrams

- Show sequence of events throughout a given process in a system
- Outline in some granularity communication between different entities within the system.
- Provide a greater level of detail, outlining alternative, optional and loop flows through sub-frames

Okay we have static, what about dynamic

- This far we have represented our system from static perspective
- Whilst this is perfectly sensible, sometimes we may want to utilise representative filler structures
- This represents the fluid nature of the system and its tendency to change

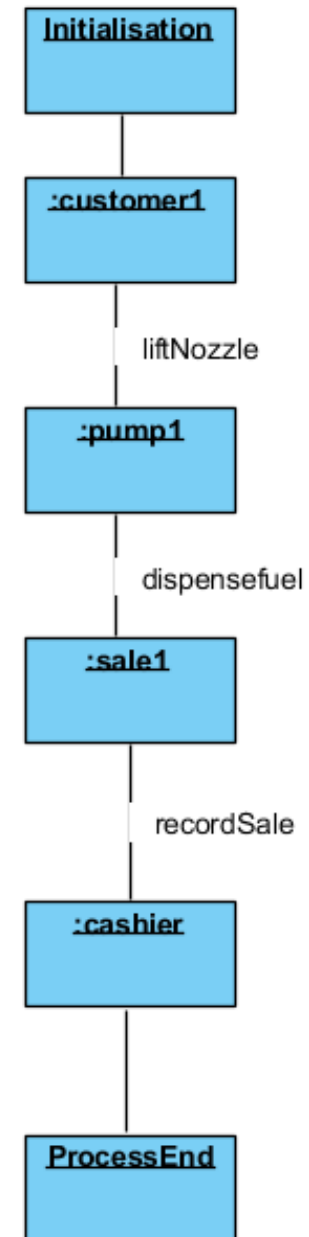
The background of the slide features a series of thin, curved lines in shades of gray, creating a sense of motion and depth. These lines are more prominent on the left side and fade towards the right.

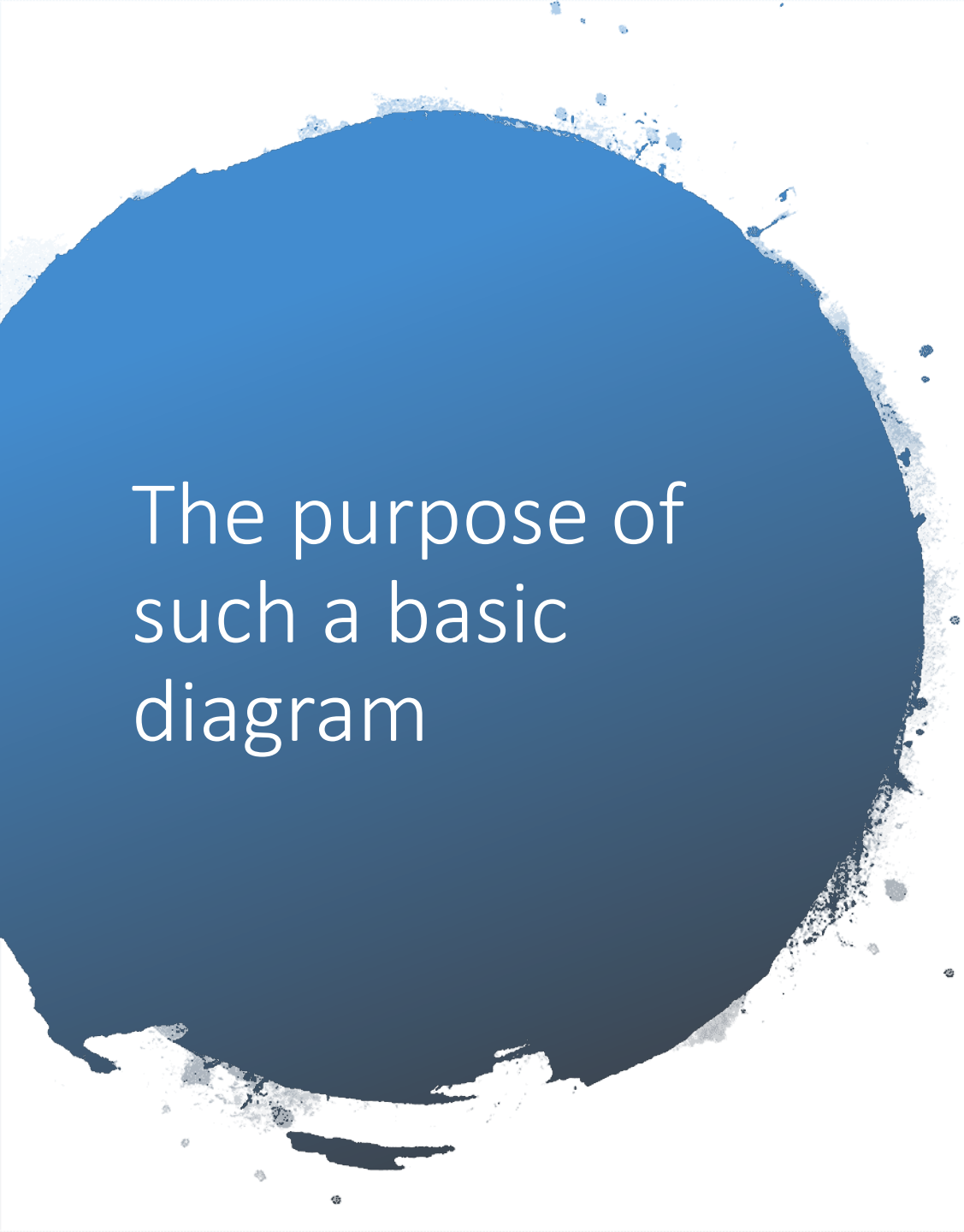
How do we evidence dynamic ?

- The simplest and easiest way of doing so is through a diagram
 - Collaboration diagram
- A collaboration diagram is very basic but shows the progression of each instantiated object in the system

Collaboration Diagram

- Consider the blue elements here, what are they Showing us ?
- Why are they named in the way that they are ?
- What is the purpose of the links between each of The elements ?





The purpose of
such a basic
diagram

Works as a technical equivalent
to a sequence diagram

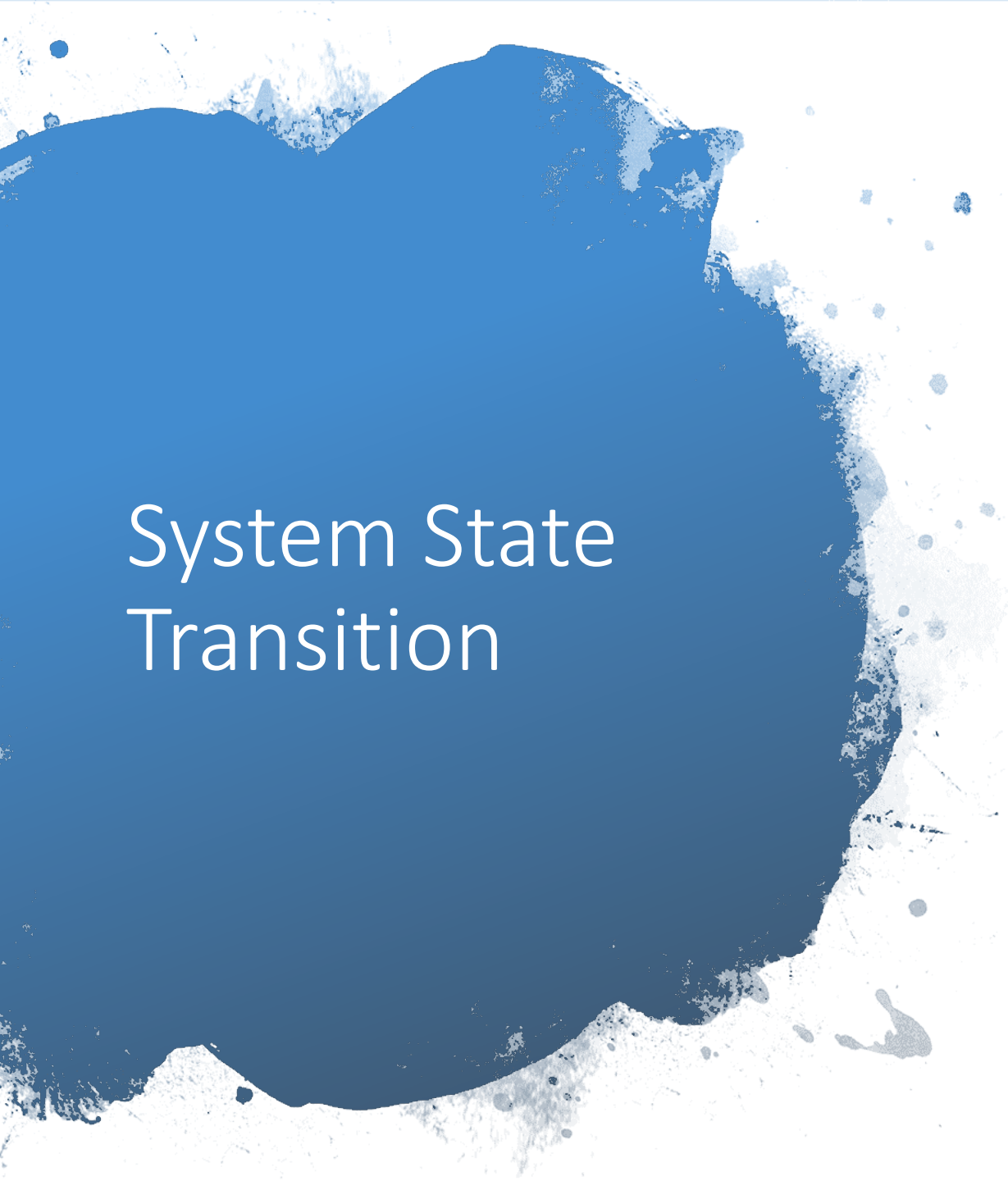
Used in place of the sequence
diagram if the representation of
operation timing is not required

Outlines the organisational
structure if of the objects



Is there another way of representing my system ?

- Sometimes it is necessary to represent a system in a way that exhibits the system's behaviour under certain conditions
- If a system is currently in operation, a snapshot of this operation is often referred to as:
 - A state

A large, abstract blue watercolor splash shape on the left side of the slide, with various shades of blue and some white speckles.

System State Transition

- Start
- Login – Unauthorised
- Login – Authorised
- Enter Data –Data entry
- Confirm Entry – Confirmation State
 - Error Screen – Error State
 - Success screen – Success State
- End

Fuel Pump

- What sort of states do you think occur in a fuel pump ?

Okay so we have an idea of the states in a system....

How do we use this information ?

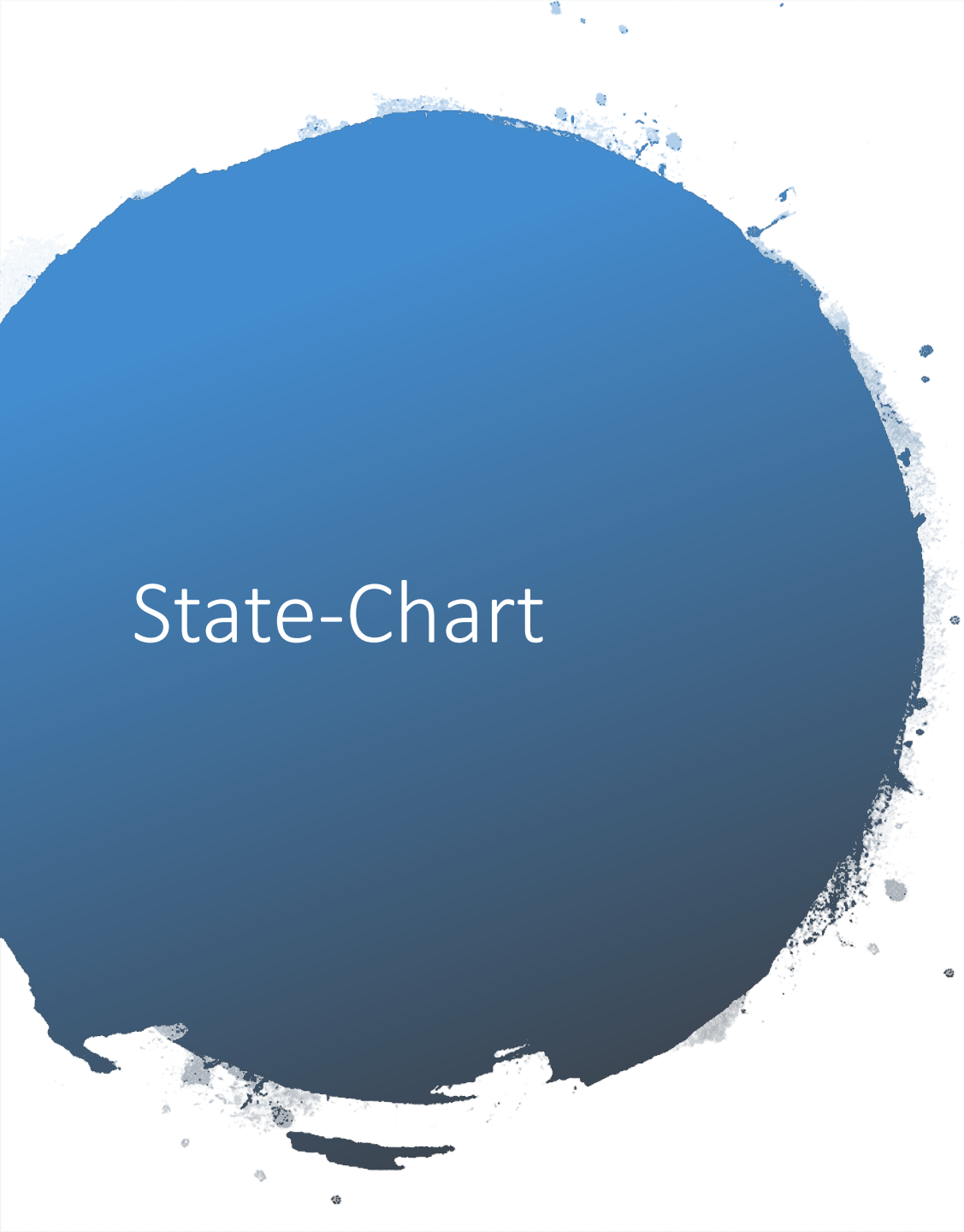
- To show the differences in instances that the system may reside in

How does this link to behaviour ?

- Representation of the system at a given point evidencing the properties of the system at this point

How do we represent this ?

- Yet more diagrams – in this case; state charts



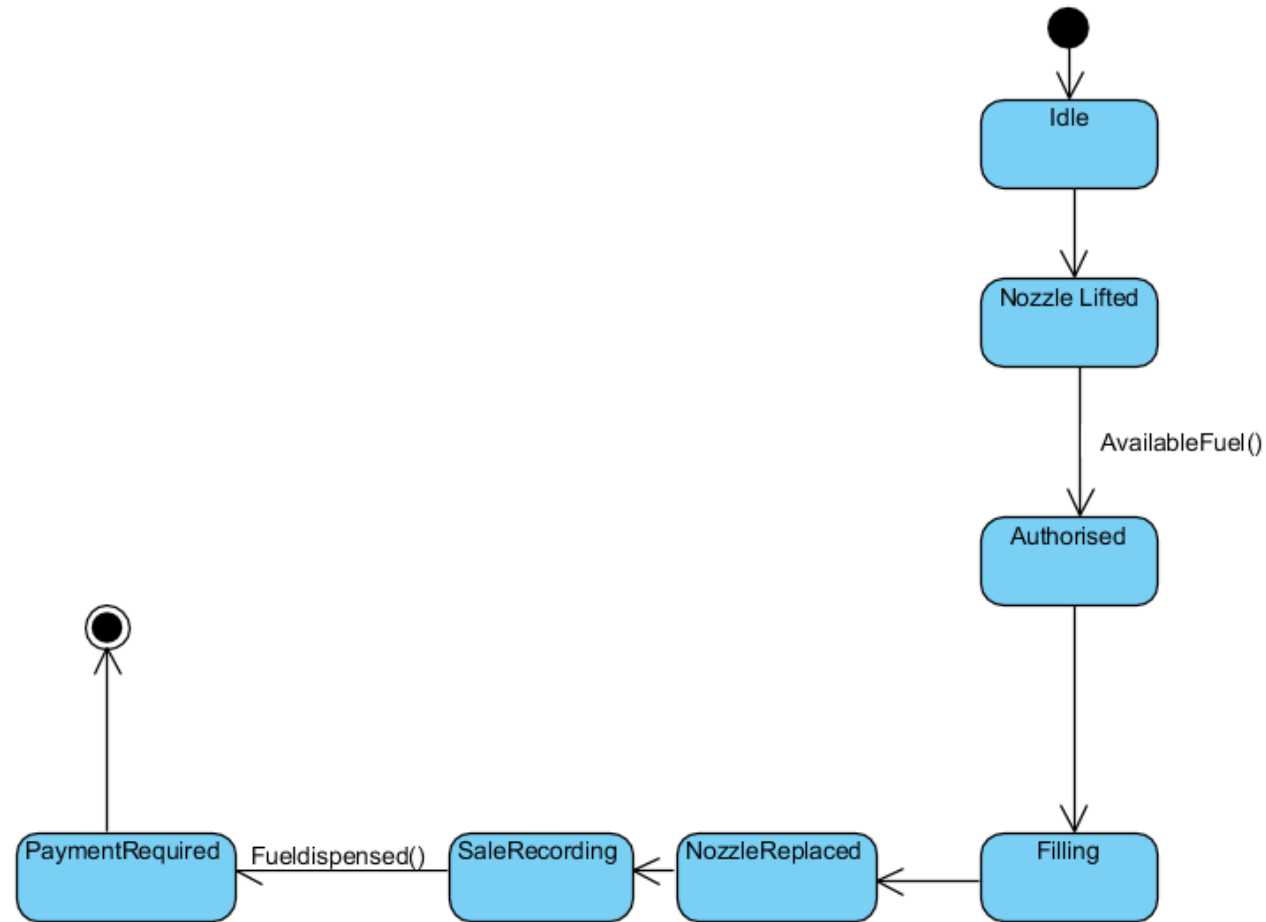
State-Chart

A state-chart allows for the representation of a system whilst in a given state.

What are the benefits of visualising a system in a given state ?

What are the detriments of visualising a system in a given state ?

Fuel Pump State-Chart



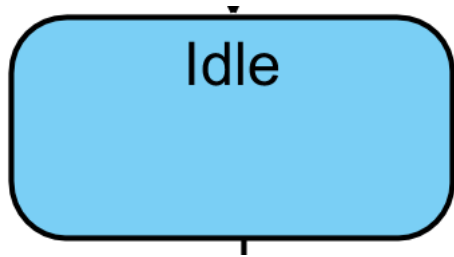
So what does this show us ?

- The fuel pump exists in many states
- This can be represented by the containers that convey each state in much the same way as the use-cases within a use-case diagram
- The transition between each of the states
- The criteria for transition

State-Chart Notation



Initial State



The state itself



Transition

AvailableFuel()

Conditions

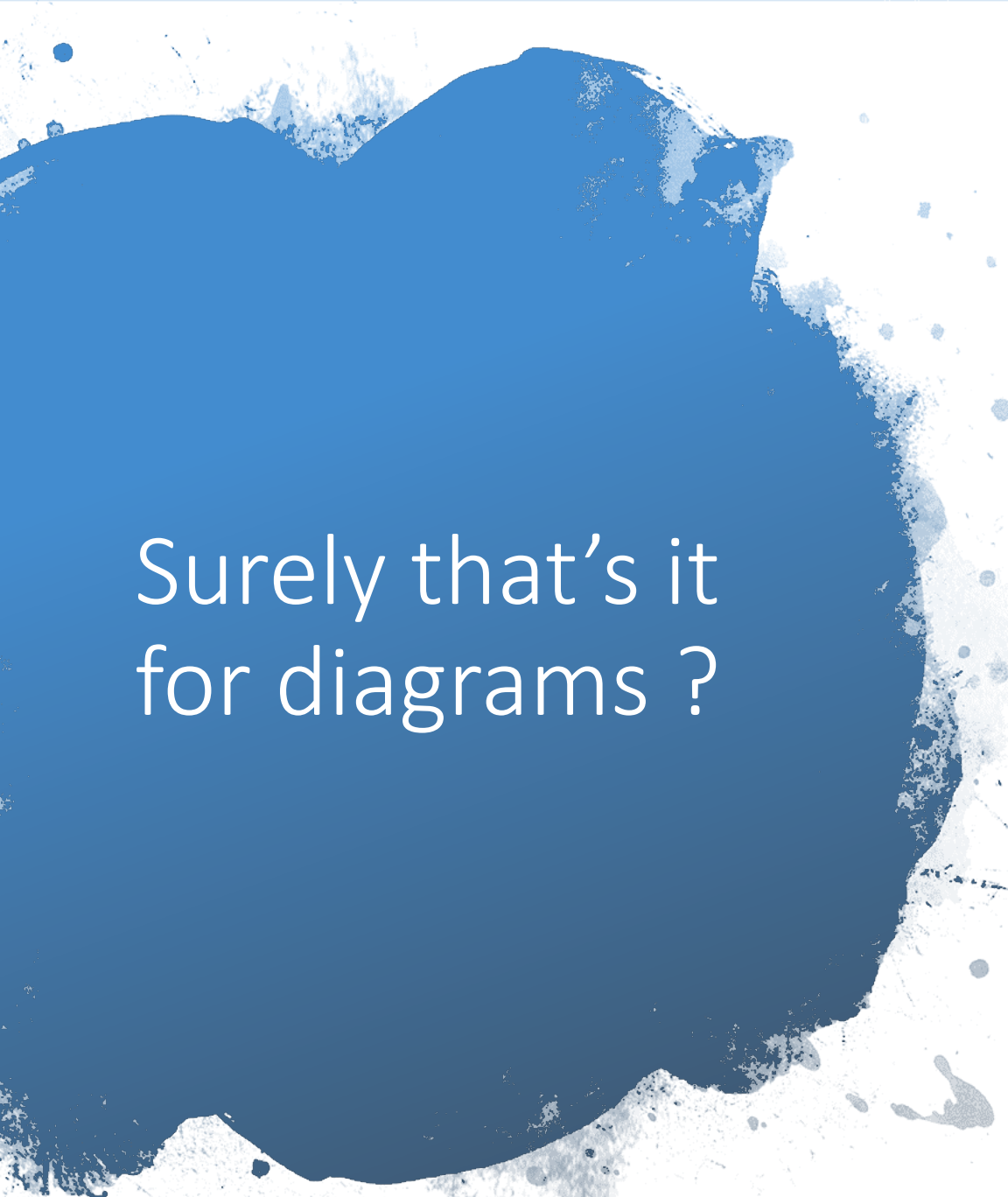


Terminal state



How many states are there ?

- Dependent on interpretation
- Make your states clear – define everything and note the transition conditions and actions



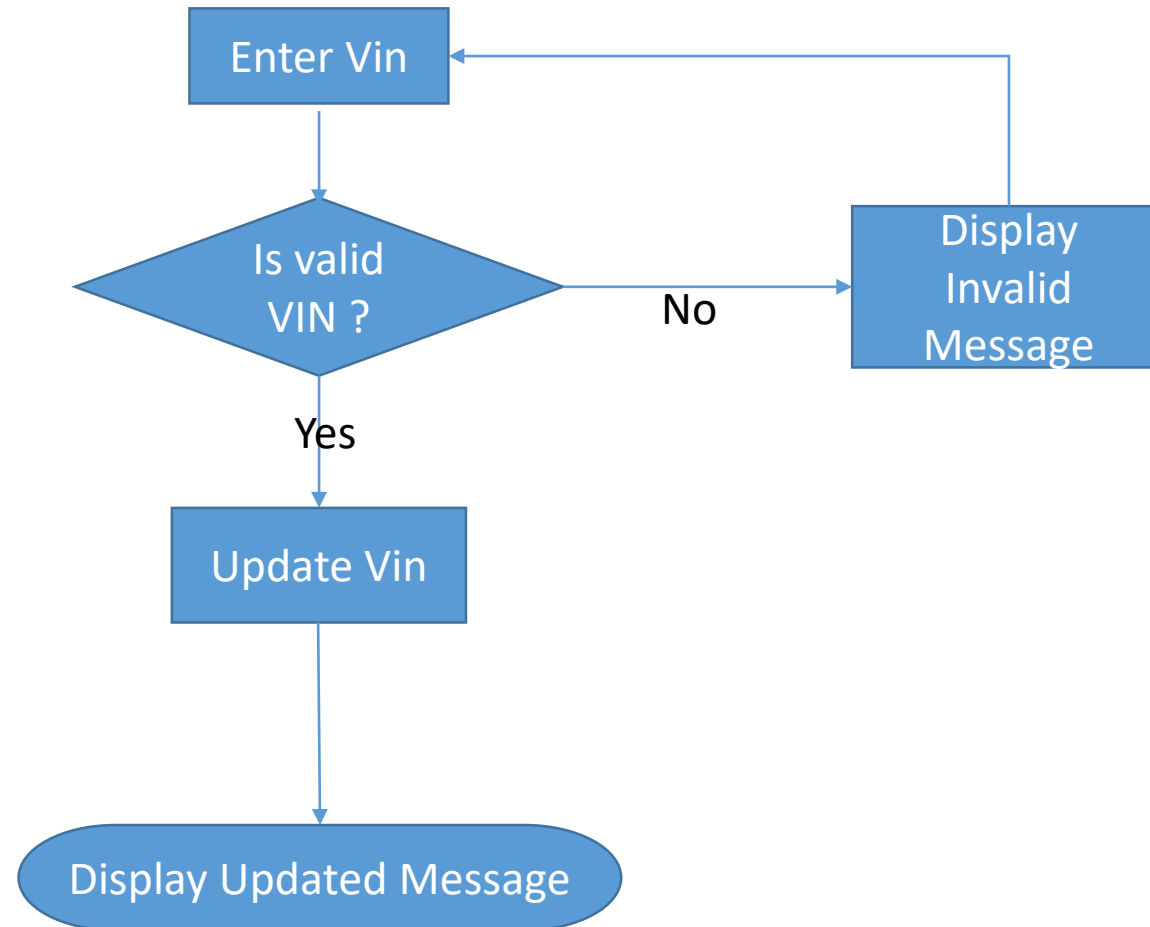
Surely that's it
for diagrams ?

- Sadly No
 - There is one more semi-important diagram
- Luckily we have covered this diagram but in another form

This seems familiar

- Sometimes its necessary to map the actions within the system and not the transition of objects
- Where have we seen this sort of thing before ?

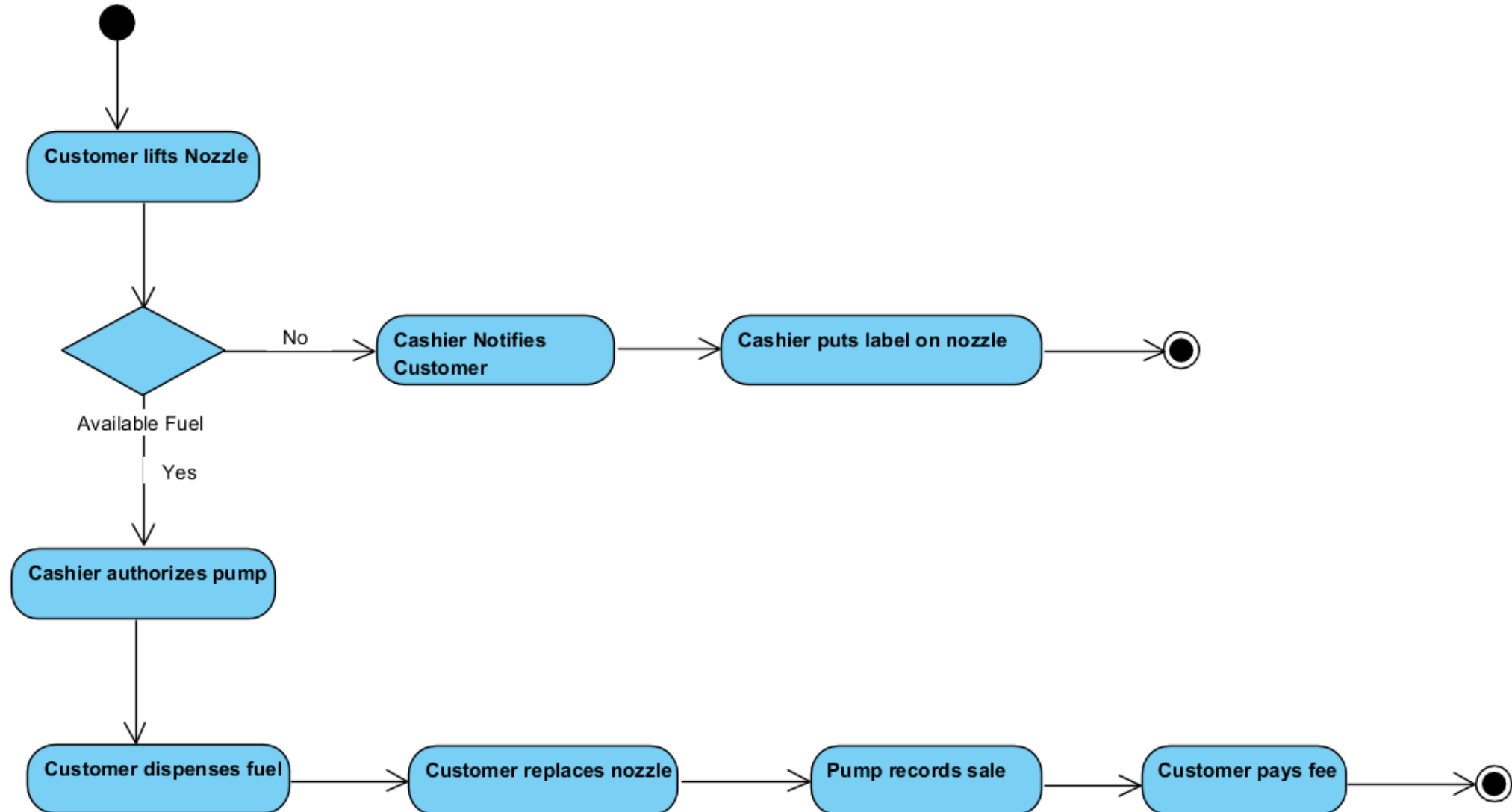
Why is it always flowcharts ?



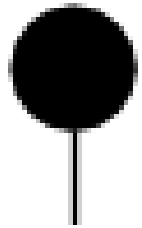
Activity Diagram

- An activity diagram is very similar in nature to a flow chart
- It represents the progression of activity through the system
- This diagram differentiates itself from the others in that it focuses on activity transition not specifically the objects.

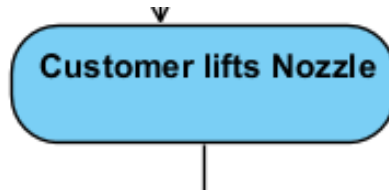
Activity Diagram



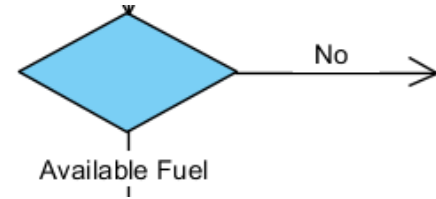
Activity Diagram Notation



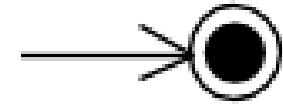
Initial
Node



Activity



Decision



Terminal Node

Contrast to flowcharts

- What are the main differences between an activity diagram and flow chart ?
 - Represents the system's activities, not just a process
- Why is this diagram different to a state chart ?
 - Again represents activities not just transition between state, so provides a differing perspective

Structural vs Behavioural

- What are the main differences between the diagram classifications ?
- What are the purposes of both classifications ?
- How do I know when I need to use structural diagrams or behavioural diagrams ?

When do we use specific diagrams ?

- Structural
 - Modelling the overall system structure
- Behavioural
 - Modelling how the systems components interact with one another and external entities

More detail please ?

- The nature and purpose of the project will always influence the decision of which diagram to choose
- The level of detail you include in each of your diagrams is informed by the scale and depth of the project
- Sometimes diagrams will be utilised specifically because they represent a particular perspective
 - Sequence
 - Collaboration

What is the point in all of these diagrams ?

- Provides a holistic view of the system
- Allows for representation of the system from many perspectives
- Theoretically facilitates communication