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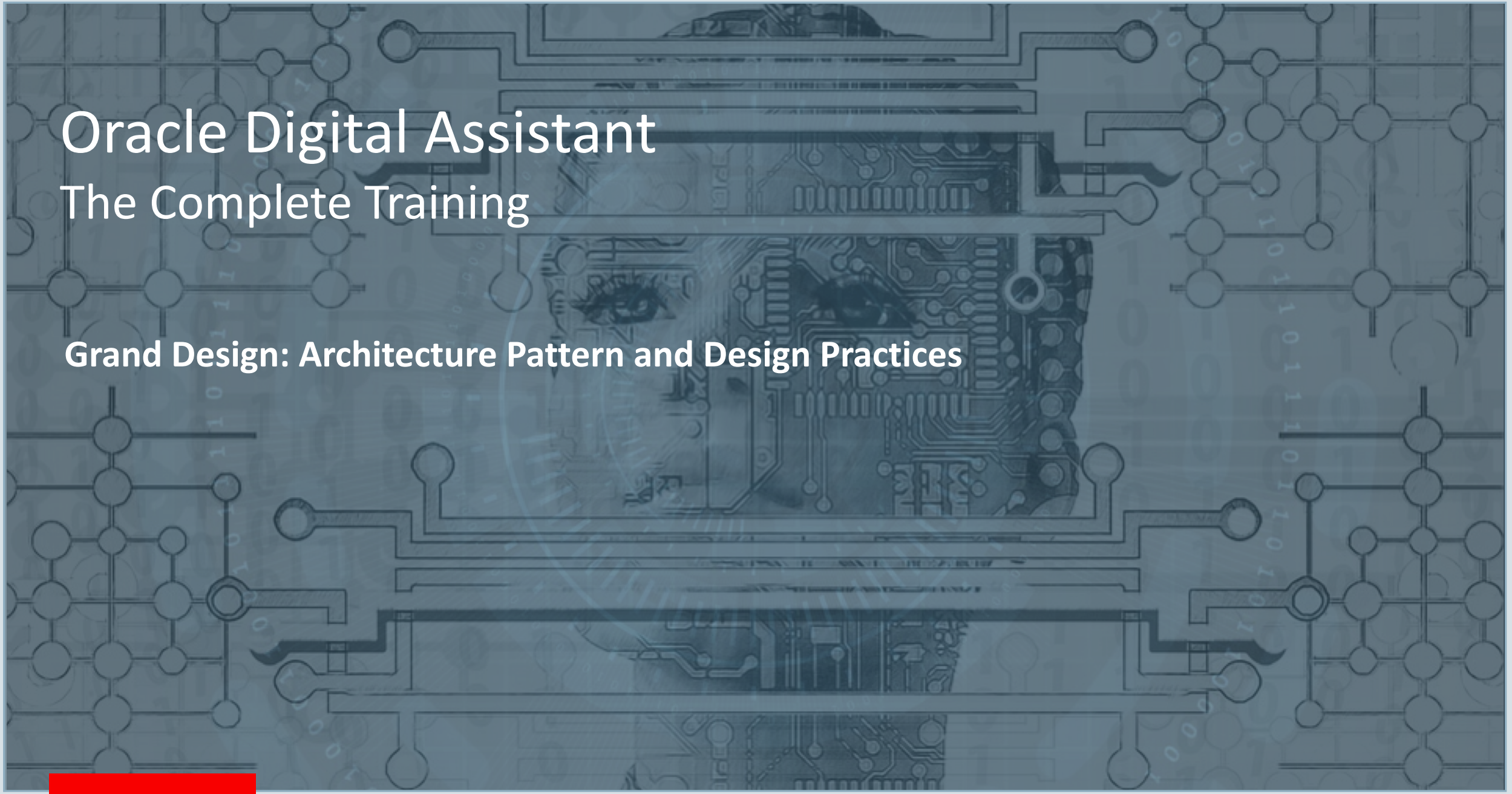
# Oracle Digital Assistant

## The Complete Training

**Grand Design: Architecture Pattern and Design Practices**



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# Topic agenda

1. Architecture matters
2. Skill patterns
3. Digital assistant pattern
4. Skill Parameters
5. QnA

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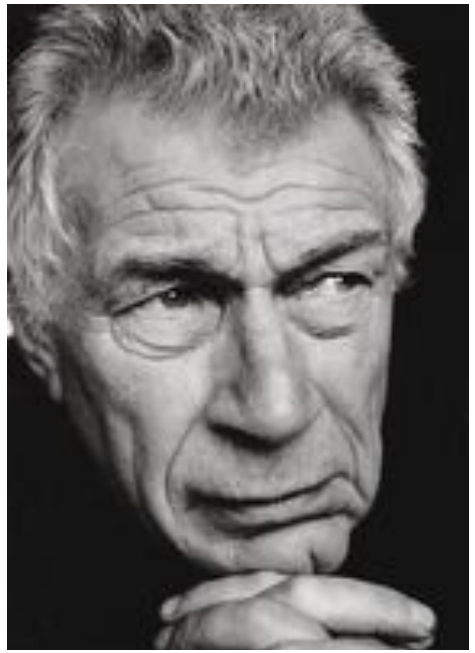
# Artificial intelligence alone doesn't build the bot

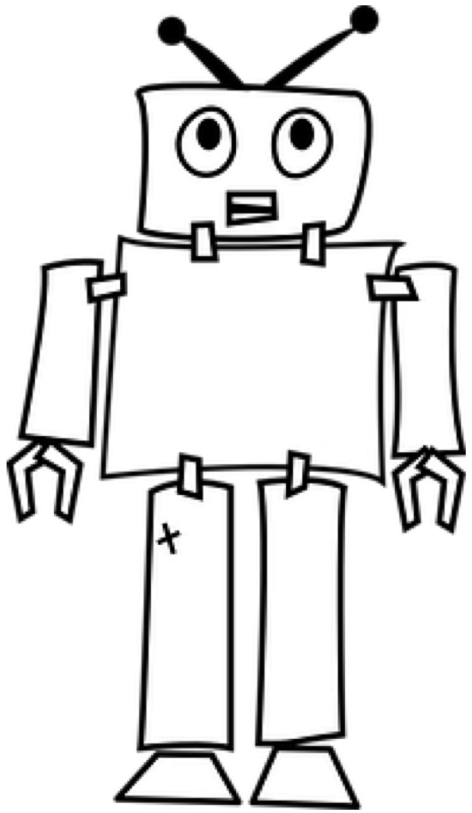
- Chatbots automate user interaction on the conversational channel
  - Requires good conversation design skills
  - Uses a sound mix of conversational AI and dialog flow to assist and guide users
- Building chatbots is a software development project
  - Full development lifecycle
- Artificial intelligence does not replace good design practices
  - It is just a tool for you to use



"The way we see things is affected by what we know or what we believe."

– John Peter Berger, English art critic, novelist and author

The **more** you know, the better you build



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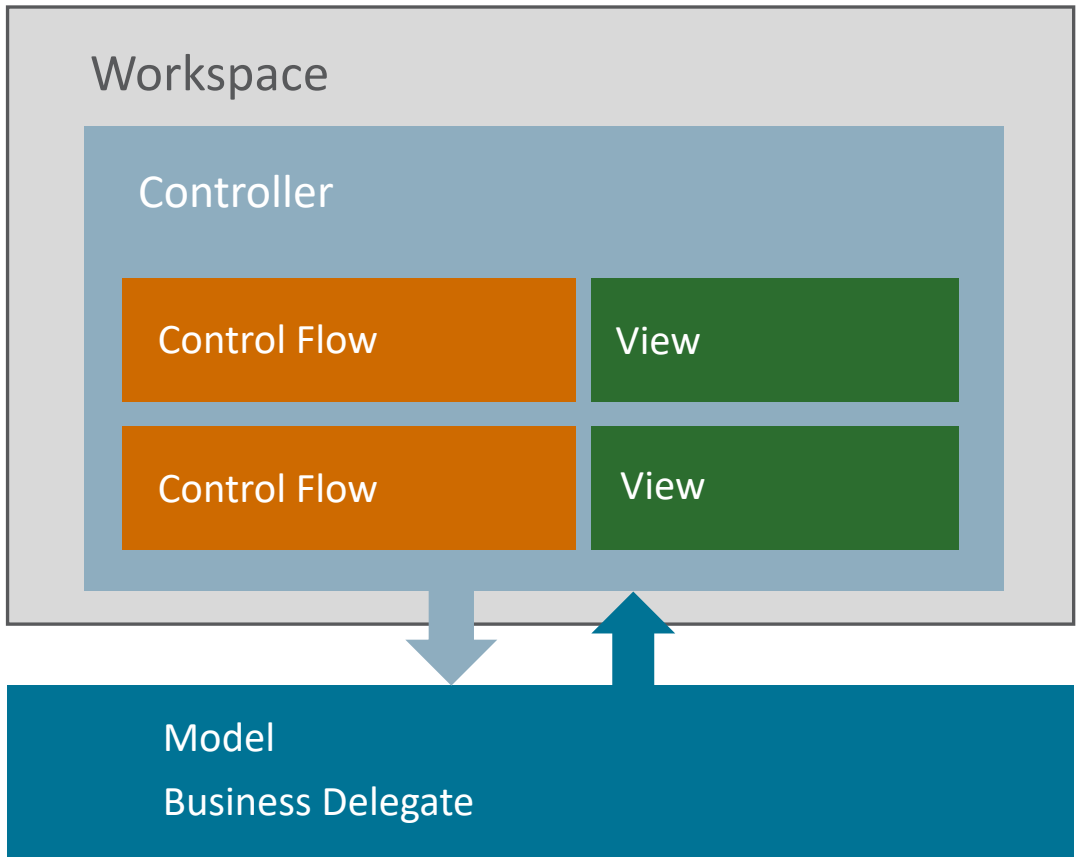
# About skills

- Skills are units of work
  - Assist users in completing a conversational task
  - Access remote services and backends
  - Do not make assumptions about the existence of user scope variables
- Scope of a skill can be
  - single use case
  - multiple use cases
  - complete business solution
- Supports modularization

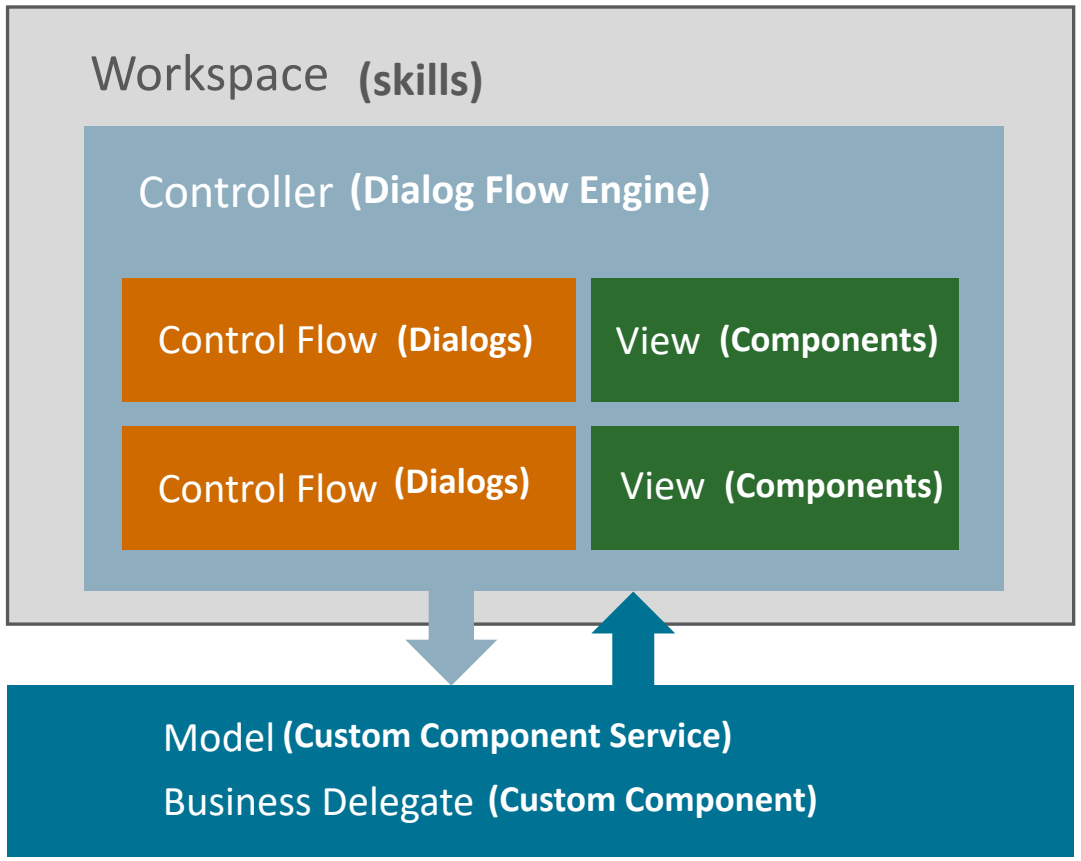
# Thinking in patterns - MVC

- Workspace
  - Holds project code, libraries
- Controller
  - Navigates UI and holds state
- View
  - Renders application response
- Model
  - Data and business service access
- Business delegate

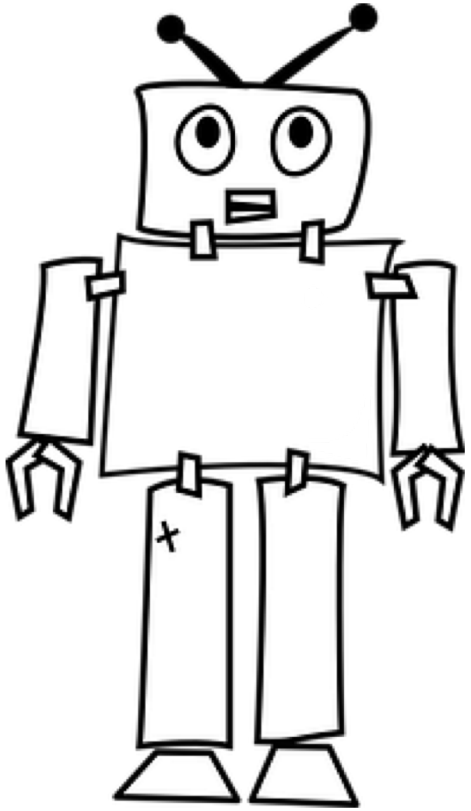


# Thinking in patterns – Oracle Digital Assistant

- Skill (Workspace)
  - Holds conversations, intents, utterances and custom logic
- Dialog Flow Engine (Controller)
  - Navigates between dialogs, holds state
- Components (View)
  - Renders bot responses
- Custom Component Service (Model)
  - Data and business service access
- Custom component (Business delegate)



**Good design** starts with sound decisions



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# Architectures

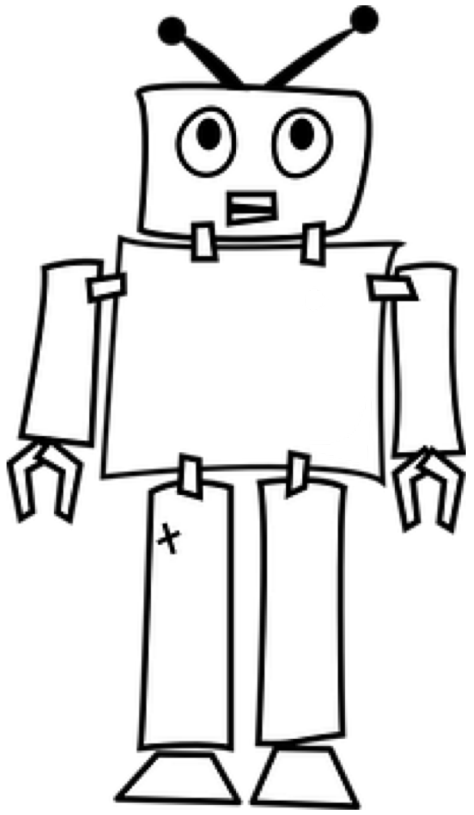
## All-in-one

- Skill as complete business solution
  - Finance, Pizza, Retail
- Skills as stand-alone solutions
- Reusability not a primary concern
- Skills are most likely built by different teams
  - Risk of inconsistent behavior and look

## Part-of-a-whole

- Skill as part of a whole
  - Member registration, course booking, message board, meeting organizer
- Small skills built with reuse in mind
- Very likely built by same team
  - Easier to enforce design principles and guidelines for a consistent appearance

Breaking down a monolithic skill into smaller skills **improves modularity**. It does not eliminate possible ambiguity in the utterances.



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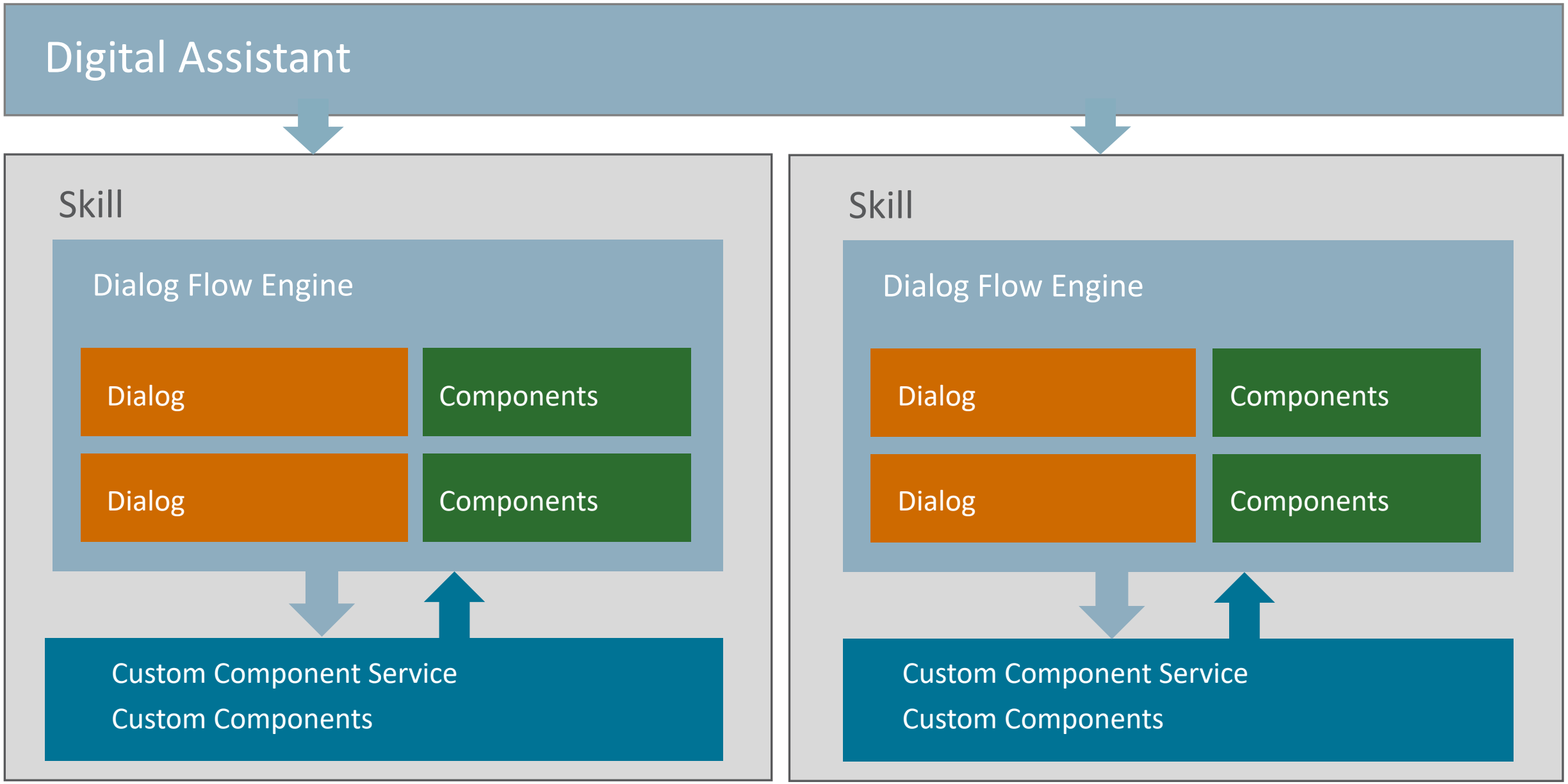
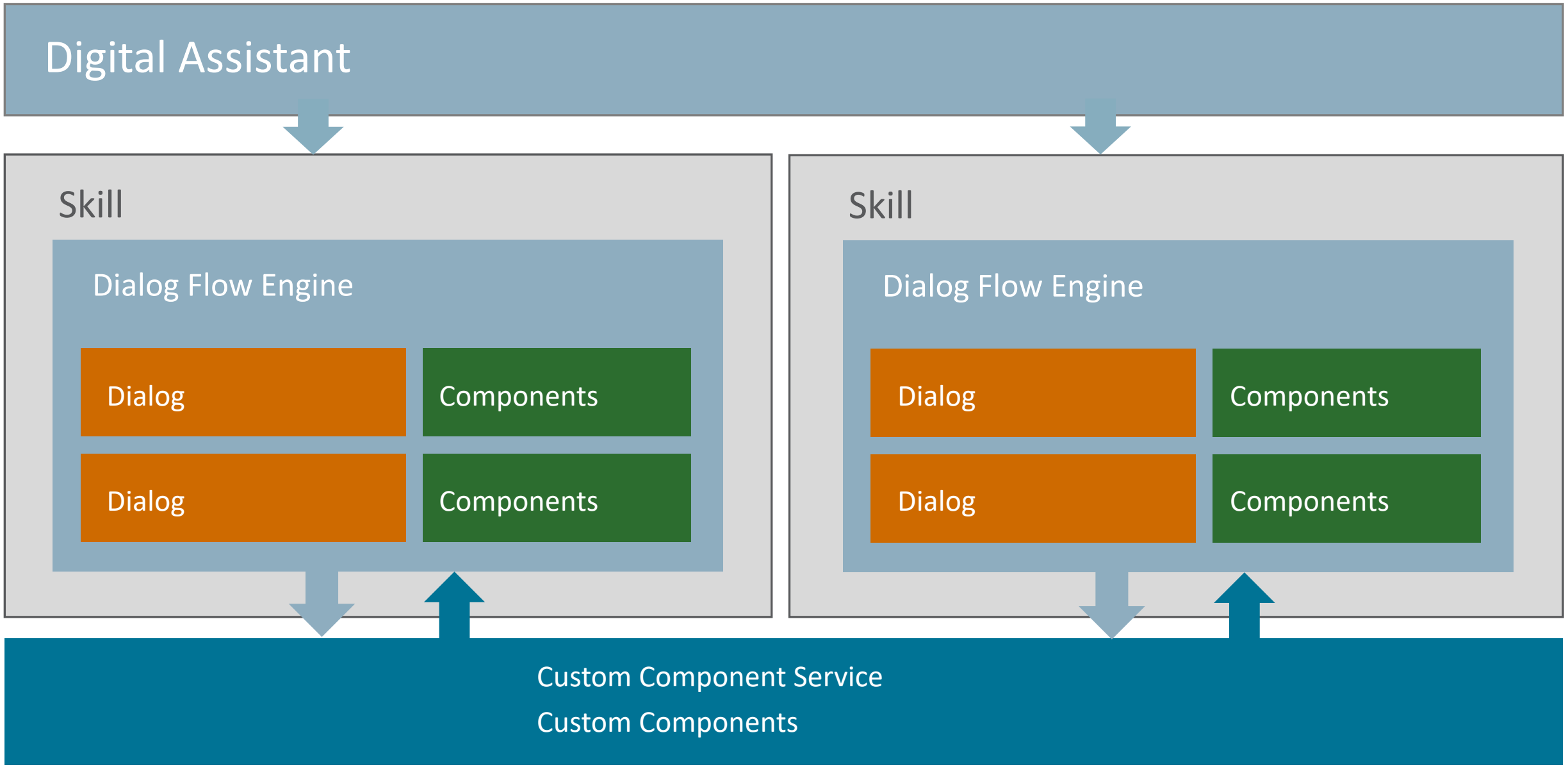
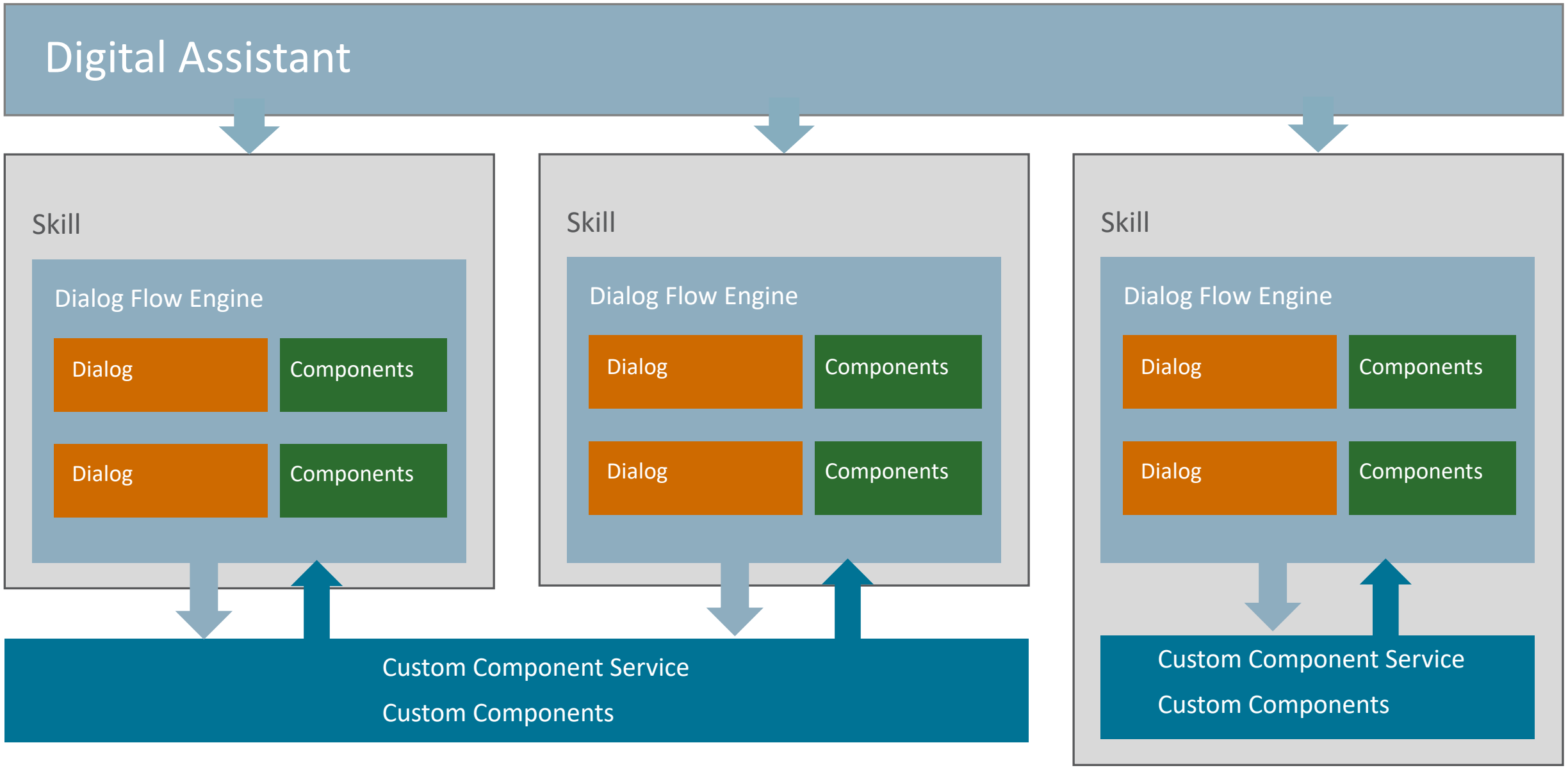
# Design Patterns

## Organizing Skills



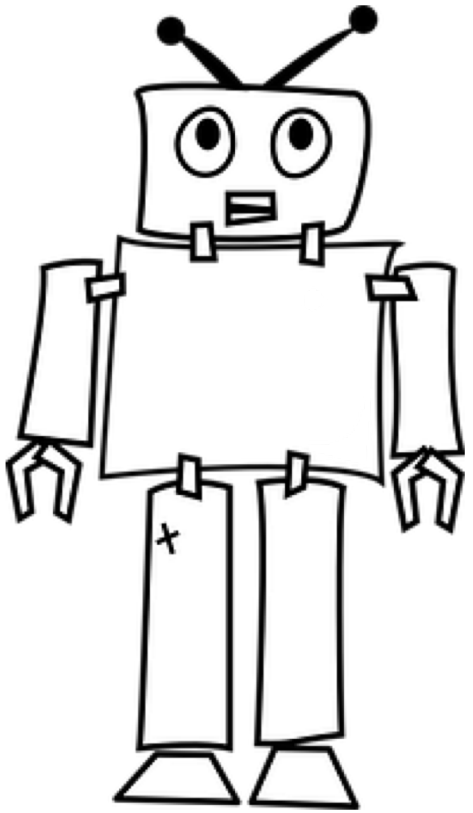




# Design Patterns

## Custom Components

You build custom components for **backend integration** and to implement custom logic.



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# Custom component deployment considerations

## Exclusive Component Service

### Local Component Container

- Skills can run different versions of a component
- Breaking a component in an update does not impact all skills but only those updated to the new version
- Error correction requires updating all deployments

- No credential store
- Component code exported with skill

## Shared Component Services

### Remote Node Servers

- Component source code resides on server
- Option to share code with other applications
- Remote server may act as a data and service integration layer
- Single point of development and maintenance

- Failure may impacts multiple skills

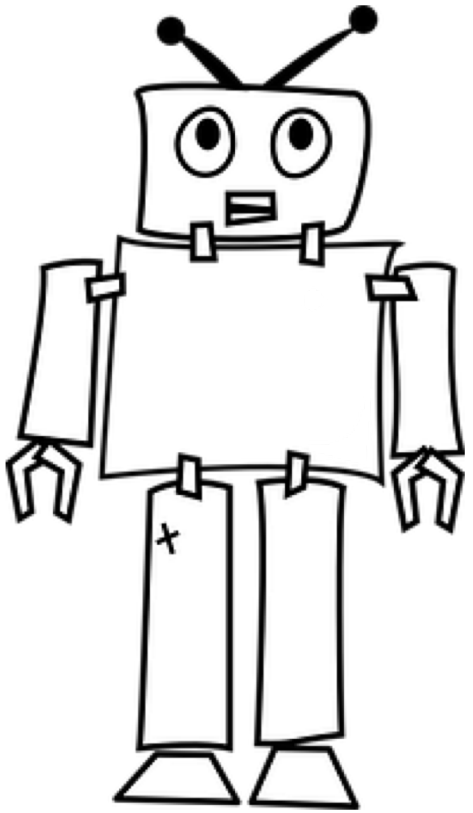
### Mobile Hub

- Multi channel backend service
- Provides platform services and declarative service connectors
- Secure container
- Storage options

### 3rd Party Node Servers

- Allow use of environment variables (configuration)

There is **no limit to the number of custom components** used in a skill. You can even use combinations of locally and remotely deployed components.



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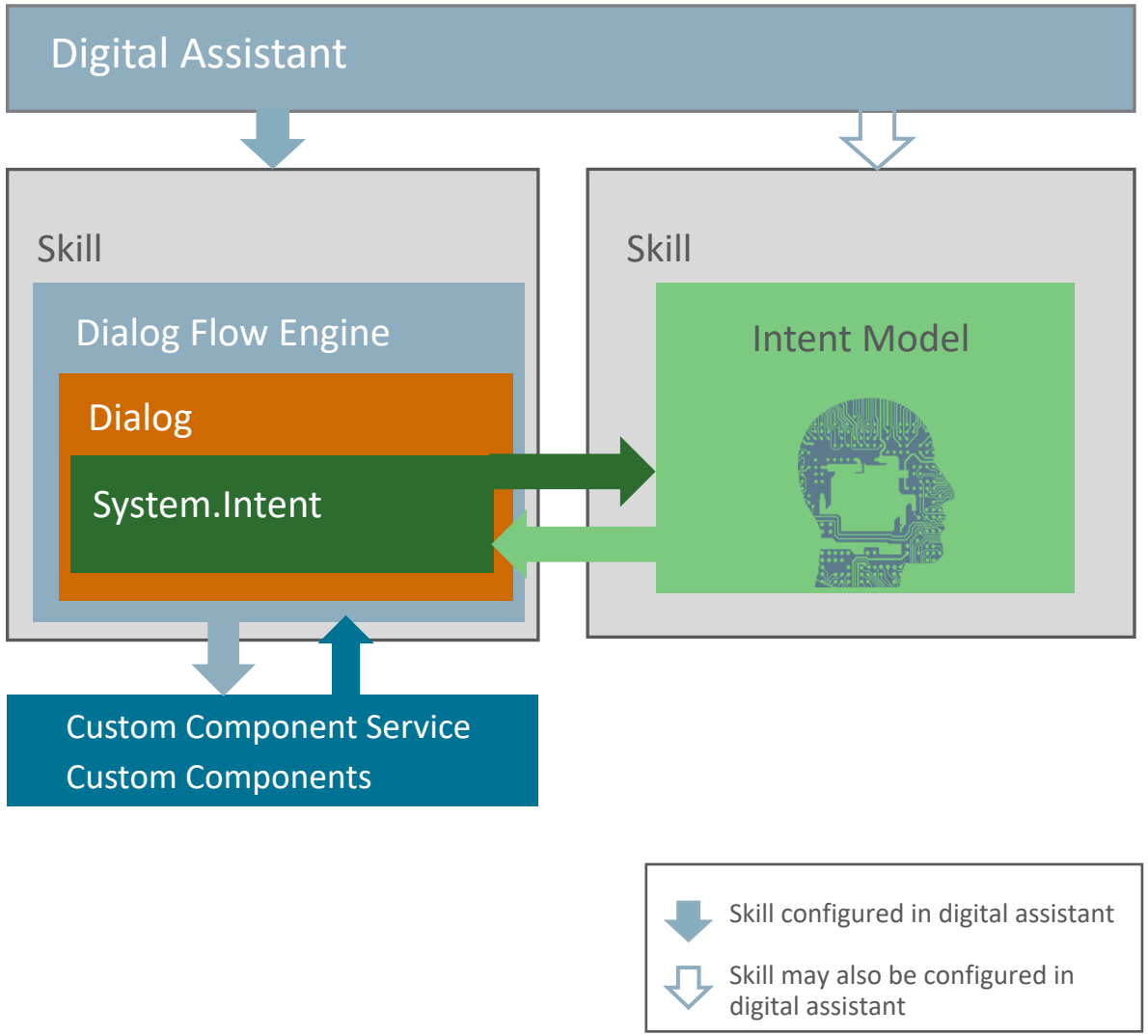
# Design Patterns

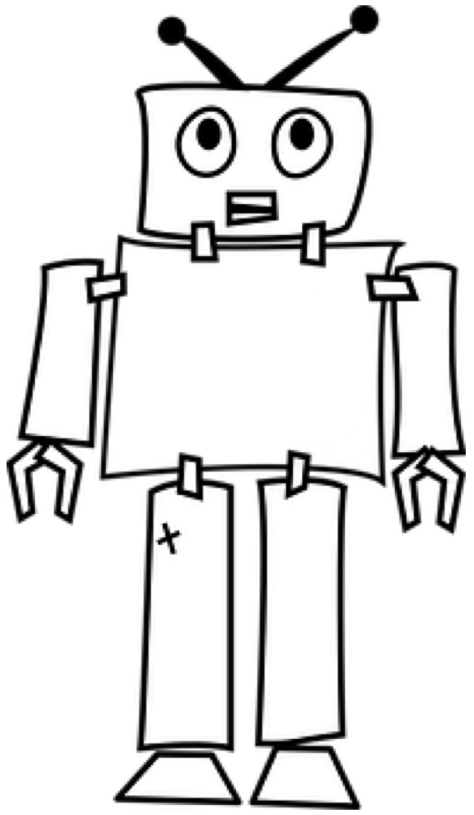
## Referencing Skills From Skills

# Interskill referencing

- A skill's `System.Intent` state may reference another skill's intent model
- Allows one skill to share another skill's intents
- Resolved intent name and entities are returned to calling skill
- Use cases
  - Common intents (train once)
  - Use of different intent engine



Interskill referencing does not execute the referenced skill's dialog flow. All intent handling happens in the skill that references the intent model of another skill.



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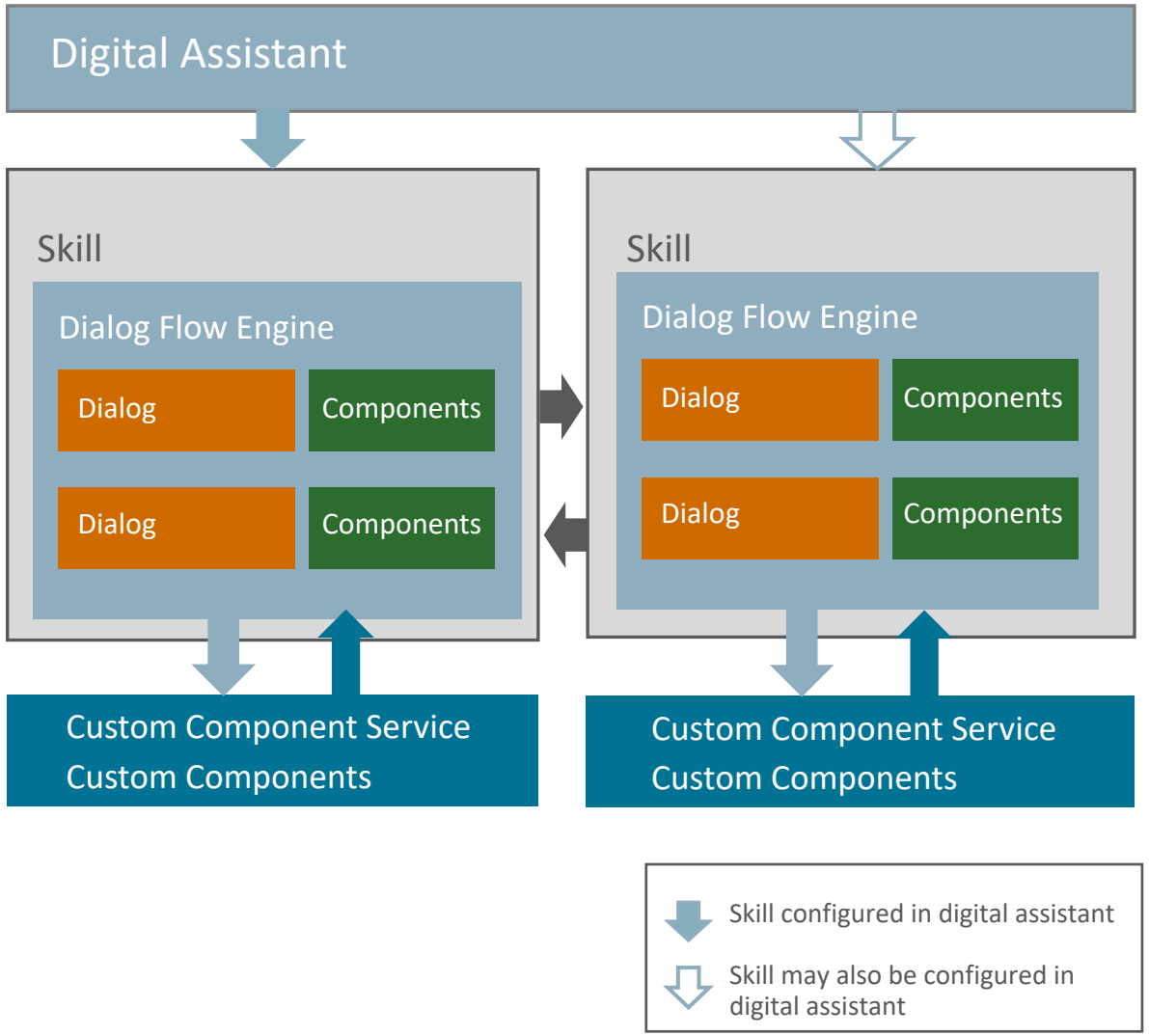
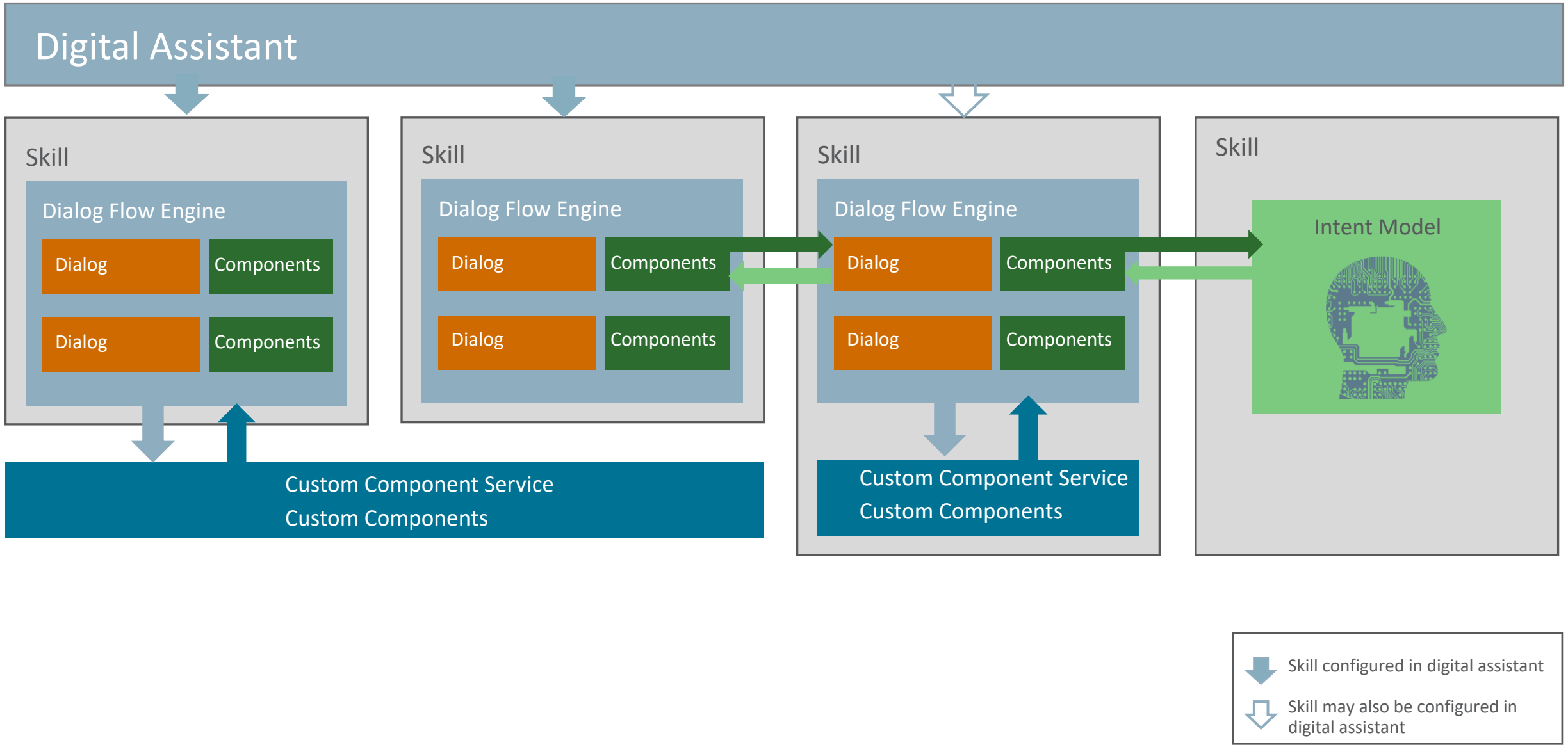
# Skill calling skill

- Calling skill
  - Uses `System.InvokeBot` component
  - Passes input parameters
  - Defines dialog flow state to call
  - Can receives return values and action
- Called skill
  - Optionally has input parameters defined and mapped to variables
  - May return action string



# Skill calling skill vs. skill exposure in digital assistant

- Skill-calling-skill
  - Weakly implementation of encapsulation
  - Intents and utterances not classified in digital assistant intelligent router
  - Allows skill chaining
    - Skills can be called in specific order based on use case requirement
    - E.g. skill A calls skill B calls skill C
  - Promotes modularization
- Skill exposed on digital assistant
  - Skill directly accessed through digital assistant routing
  - Skill intents and utterances classified by digital assistant router



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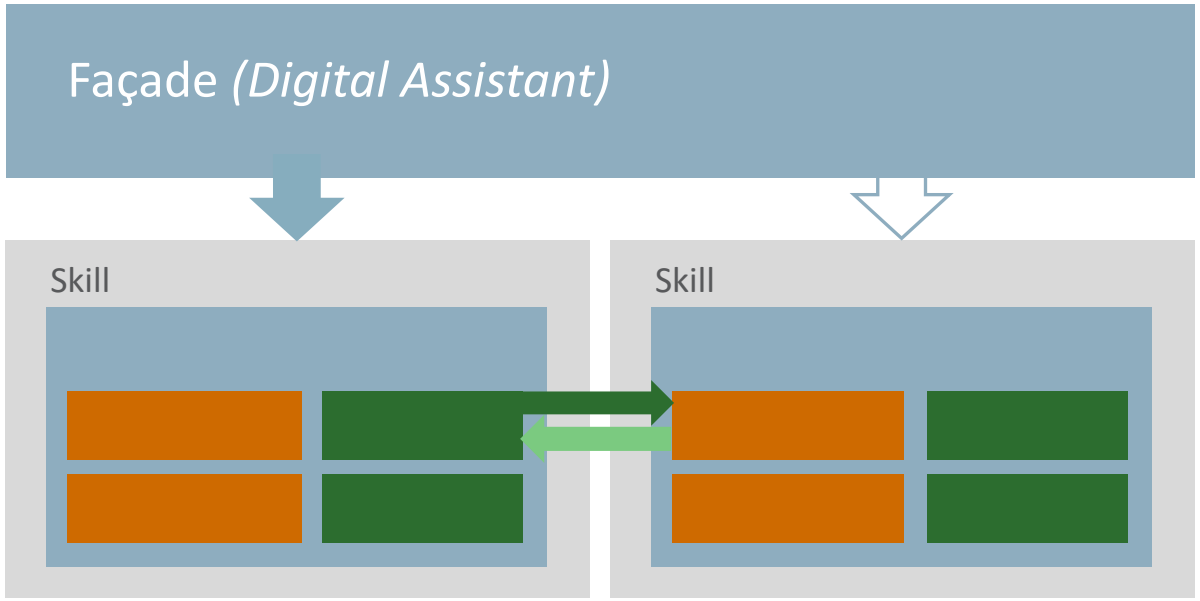
# About digital assistant

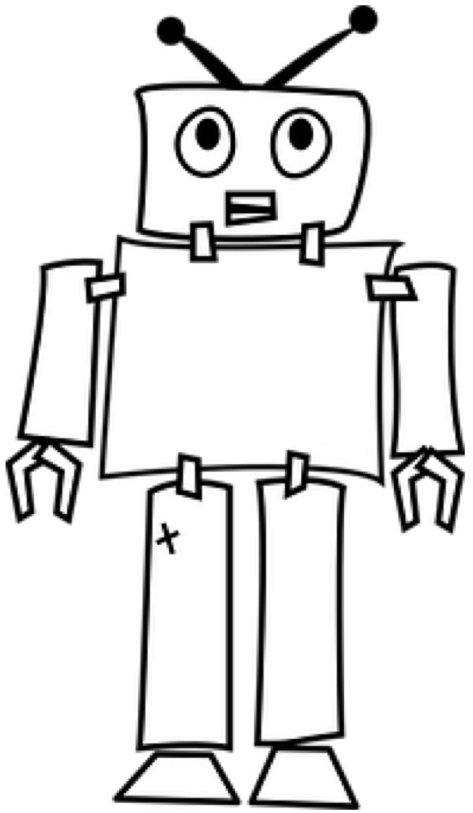
- Front-end bot that redirects user messages to one of its configured skills
  - Routing is based on intents and utterances, context and direct addressing
- Disambiguates user messages if required
- Exposed on one or many messenger channels
  - Messenger payload differences handled by configured channel connector
- Design time for digital assistant designers
  - Create chatbots by orchestrating individual skills
    - Configuration only (no coding)
  - Digital assistant designers may or may not be the skill developer

# Thinking in patterns: Digital Assistant

- Façade
  - Single entry point for a bot
  - Skills "hidden" from user view
  - Skills can be added, removed or updated without re-deployment



**Define a clear goal for your digital assistant** that is different from "all you can eat".



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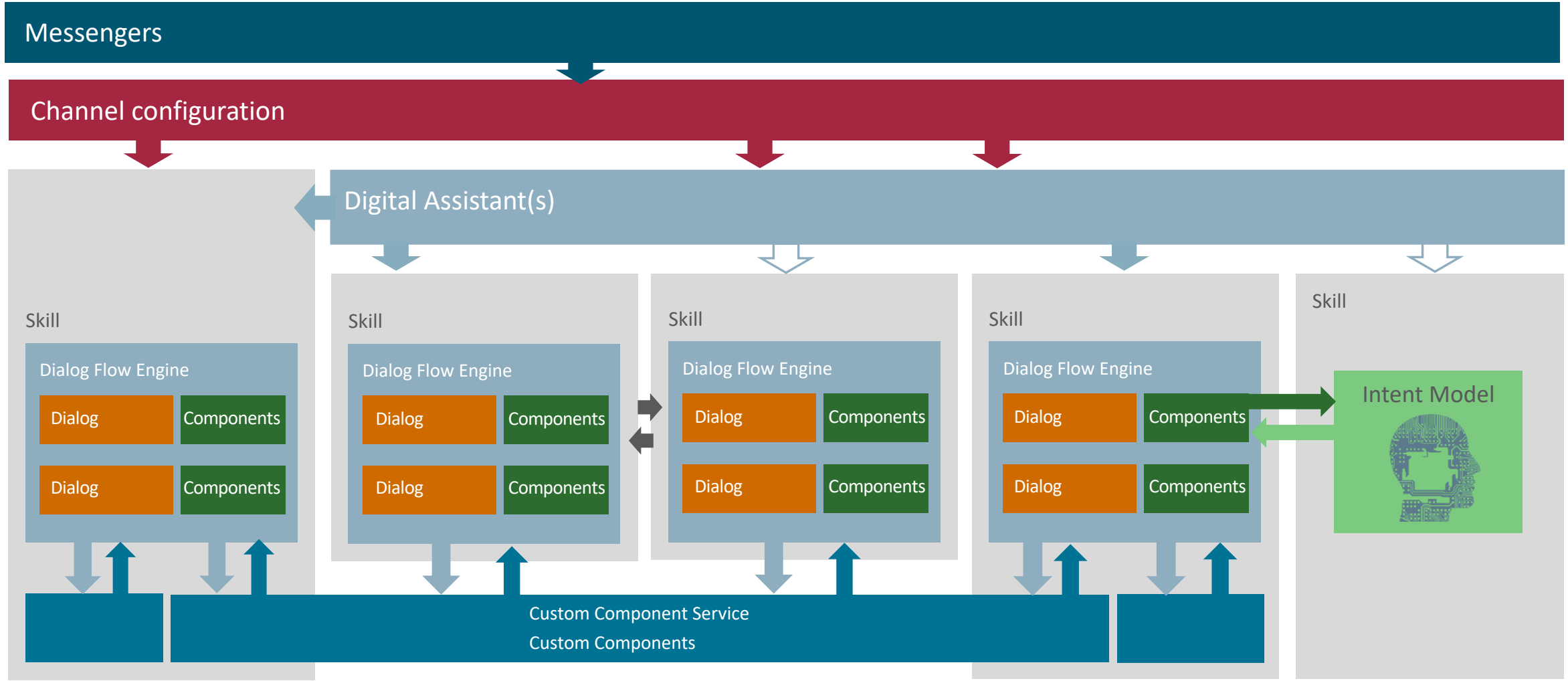
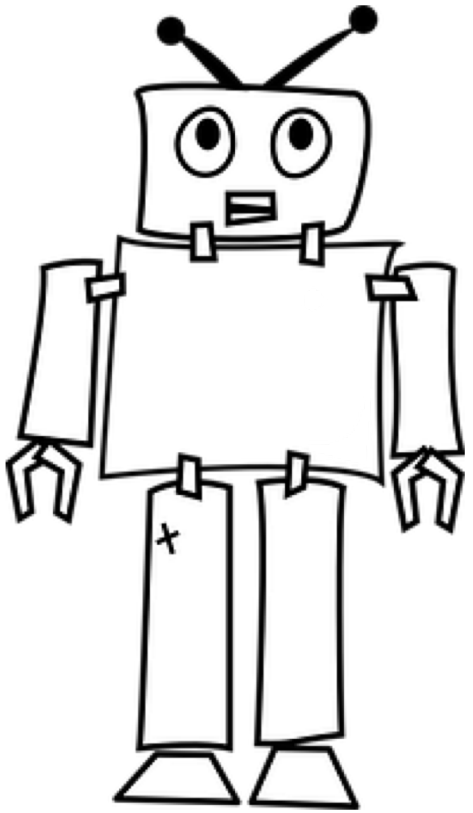
# Oracle Digital Assistant architecture possibilities



Identify an architecture that best suits the usecase to be implemented.



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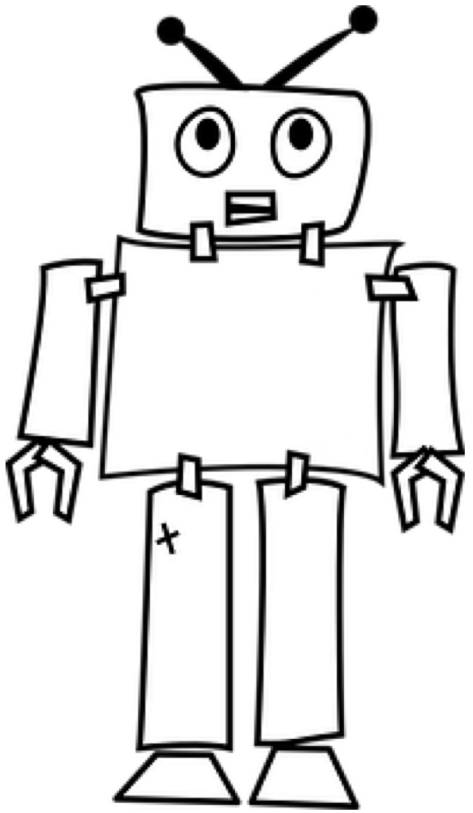
You can "**remote control**" **skills** through skill parameters



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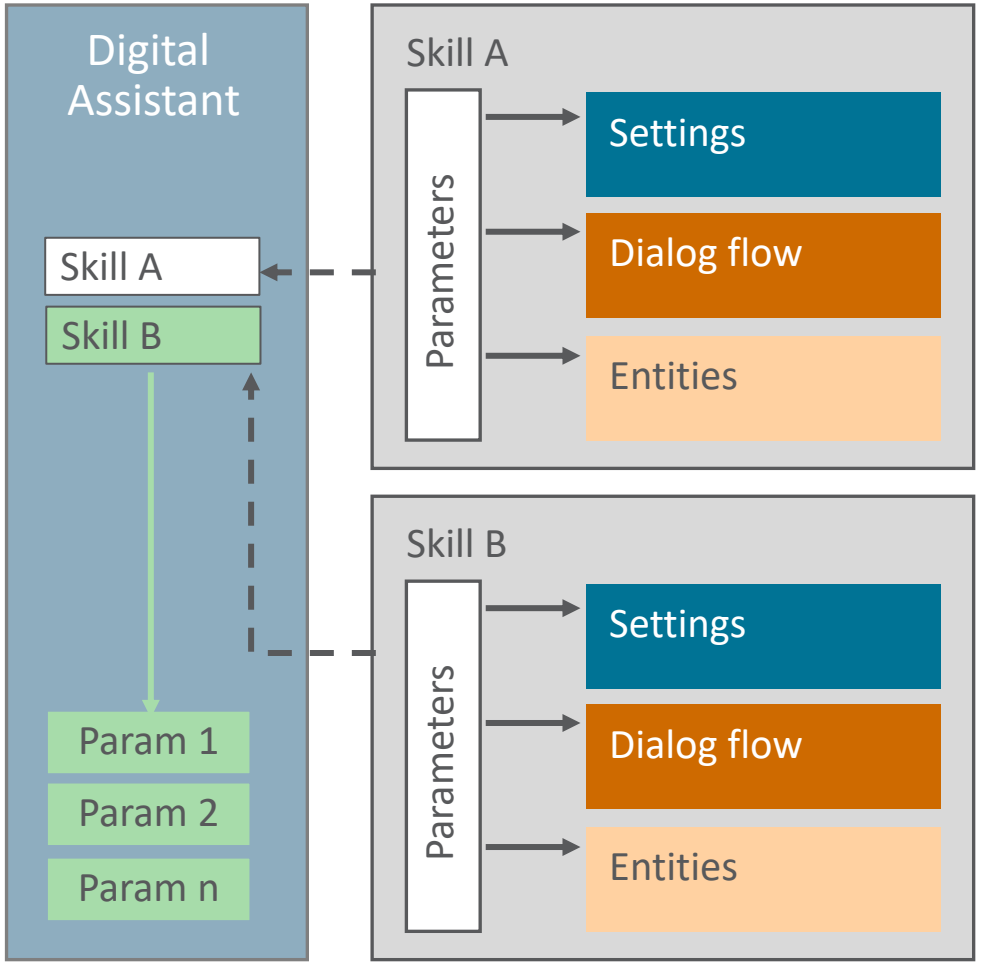
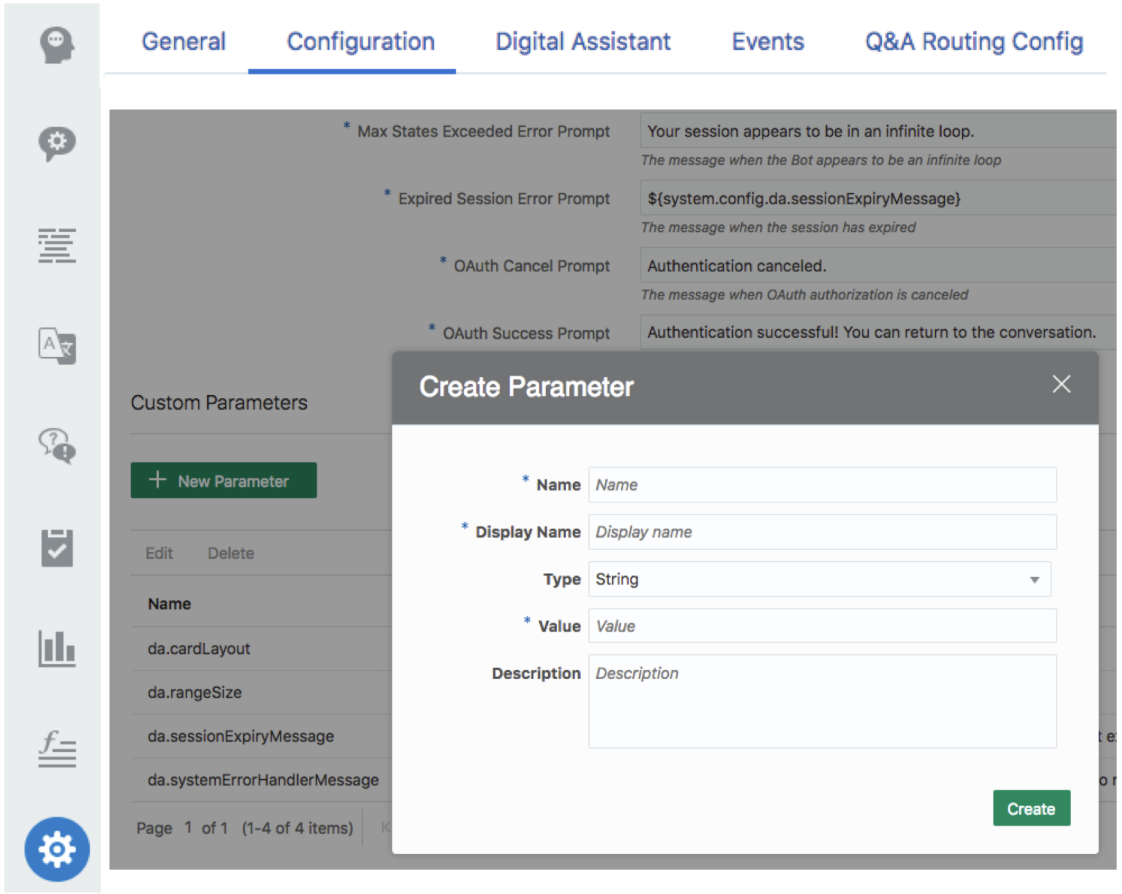
# Exposing skill parameters to digital assistant

- Improves user experience through consistency
  - Consistent messages
  - Similar behaviors and looks
- Defines a contract between a skill and the digital assistant
  - Improves reusability



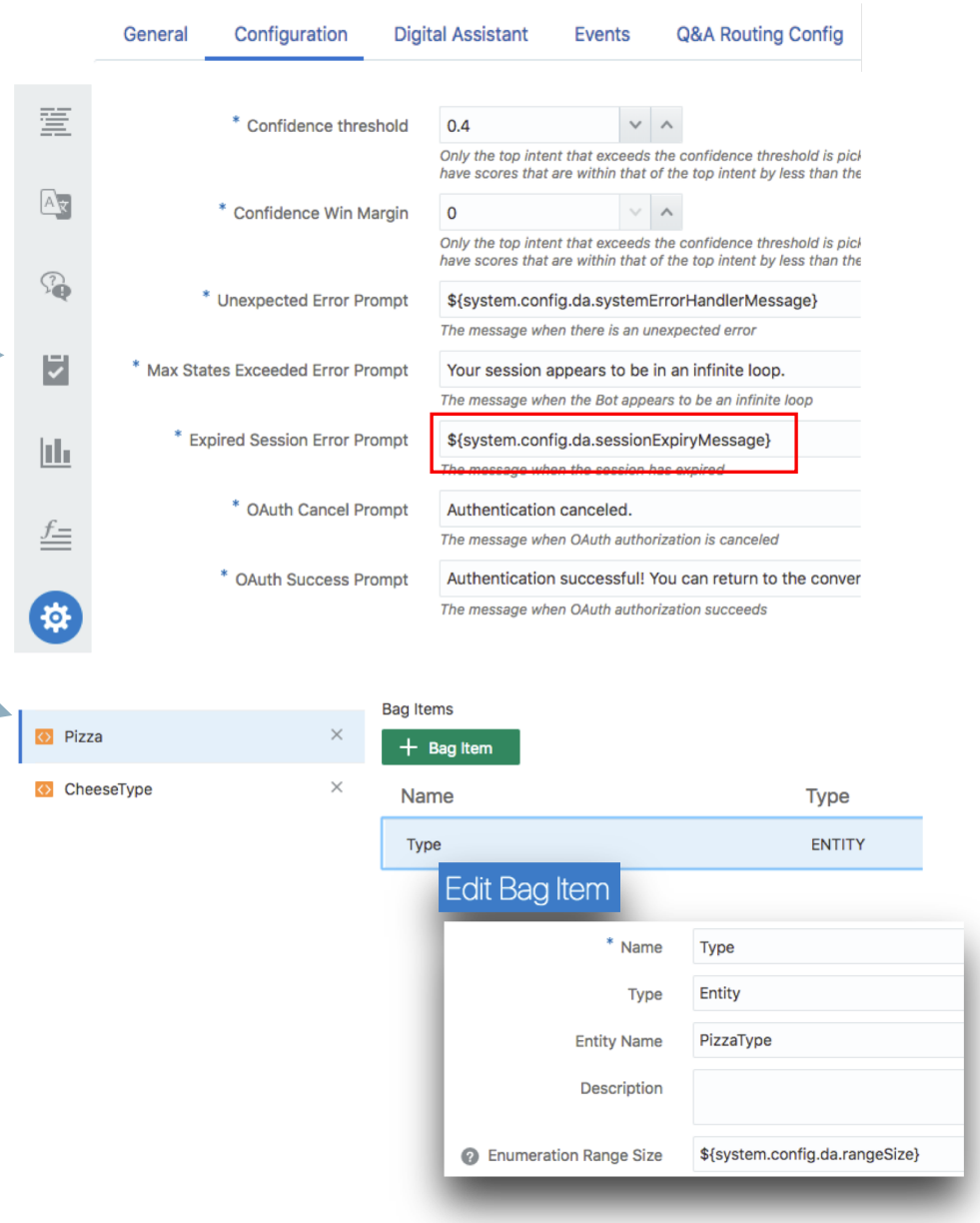
# Defining custom parameters for a skill

- Custom parameters are created in the *Settings* panel of a skill
- Supported data types are string, integer, float and boolean
- Parameter name must start with "*da.*" prefix to be visible in digital assistant
- Digital assistant exposes parameters in skill configuration panel



# Accessing parameters in skill

- Skill parameters are accessible from
  - Skill's settings panel
  - In Entities
  - In dialog flow
- Read access
  - `${system.config.<name>}`
- Write access
  - `System.SetVariable`
    - variable: "system.config.<name>



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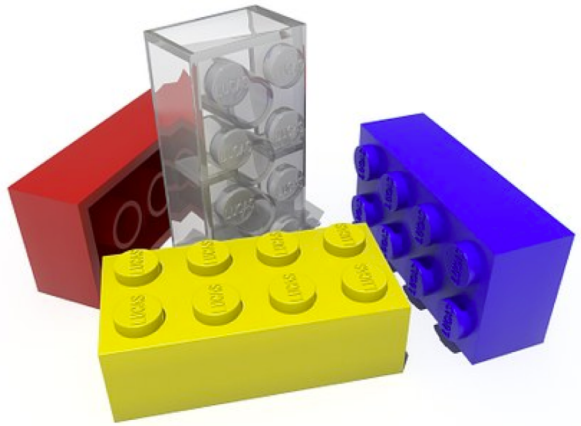
# Options for using QnA

- Each skill has its on QnA as required
  - Modular and simplest option
- Interskill QnA referencing
  - Calling QnA defined in a different skill
    - E.g. route to a specific QnA based on conversation context
  - Using `System.Intent` and `System.Qna` properties botName, botVersion, qnaBotVersion and qnaBotName
- Separate QnA only skill used by digital assistant
  - FAQ (QnA skill) may be shown upfront in welcome message
  - QnA maintained in single place without impacting other skills

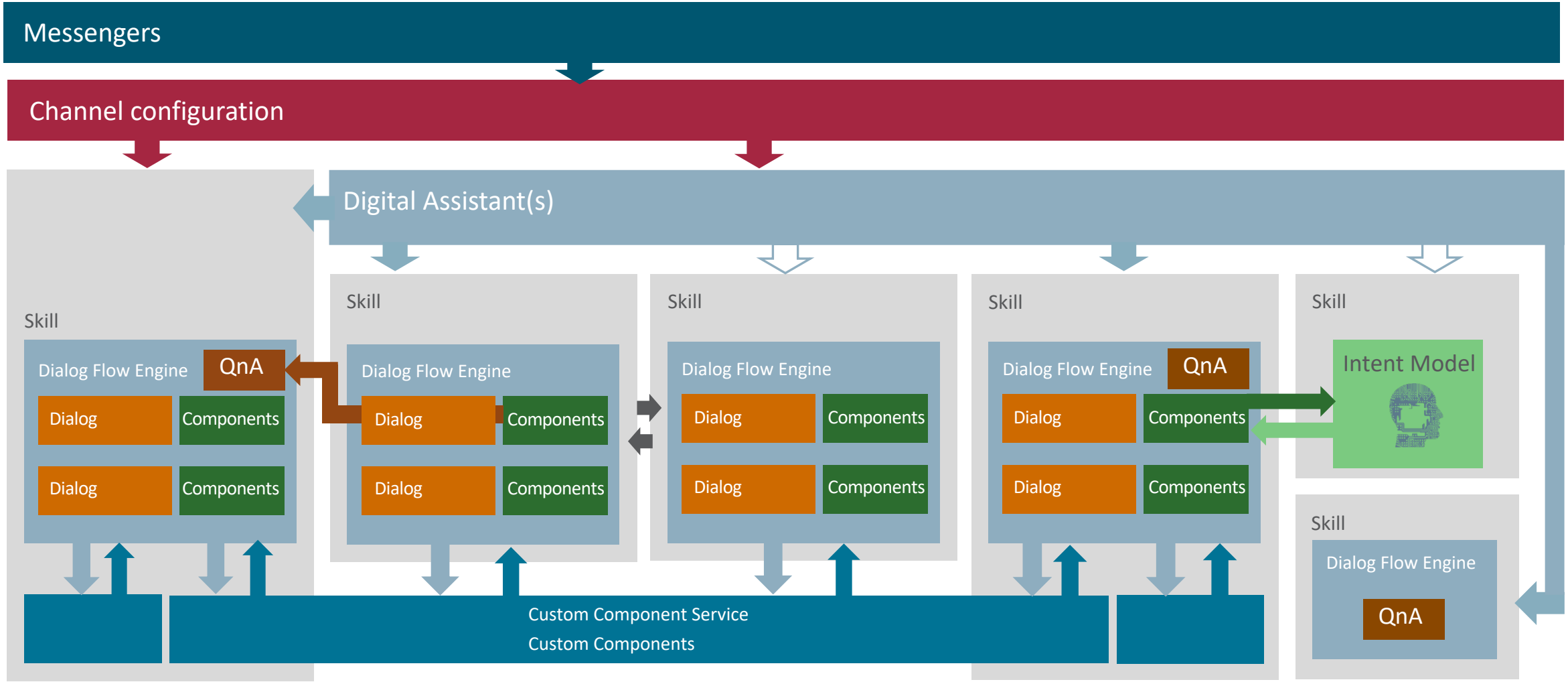


# Comparison of approaches

- QnA defined in each skill
  - QnA content considered in digital assistant routing
- Interskill QnA referencing
  - More control to the user the way he/she wants to invoke QnA
  - Ability to show different QnA for different users
  - QnA content not considered in digital assistant routing

- Creating separate QnA only skill and consuming in DA
  - QnA skill will be shown upfront in welcome message!
  - No additional code required since the routing will be managed by DA
  - QnA questions and answers contribute to classification in routing

# Oracle Digital Assistant: the completed image



# Integrated Cloud

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