
ORACLE®

Oracle Digital Assistant
The Complete Training

Oracle Digital Assistant Security Overview

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Topic agenda

1. Concerns
2. Security architecture
3. Channel security
4. OCI Security
5. Application security
6. Coding practices

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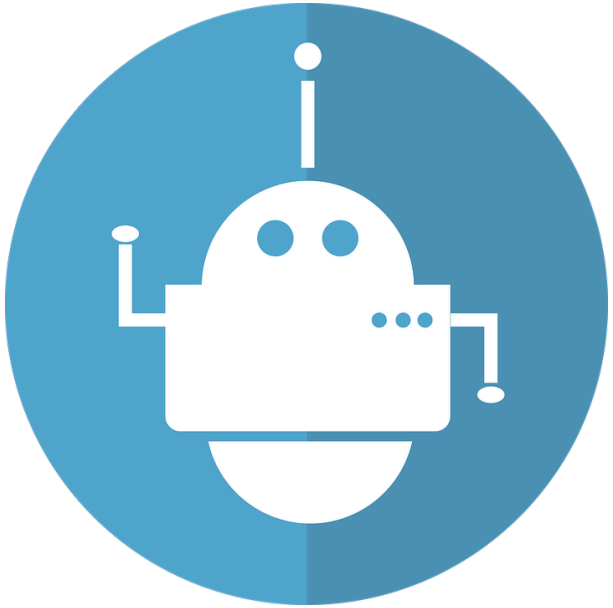
Security concerns with social media messengers

- Data privacy is at the discretion of the provider
  - Social media companies make money with targeted advertising
  - Protection on data transit, but not clear who else has access
- Identity theft and impersonation

Security concerns with chatbots

- Trusting messenger applications
  - Channel implementation may involve 3rd party messaging servers
- Sensitive data stored in logs
- Denial-of-service attacks
  - How to throttle number of bot requests
- Insufficient incident monitoring



Web application threats that apply to chatbots

- "Shoulder surfing”
- Script injection
- Broken access control
- Sensitive data exposure
- Security misconfiguration
- Message replaying
- Insufficient logging

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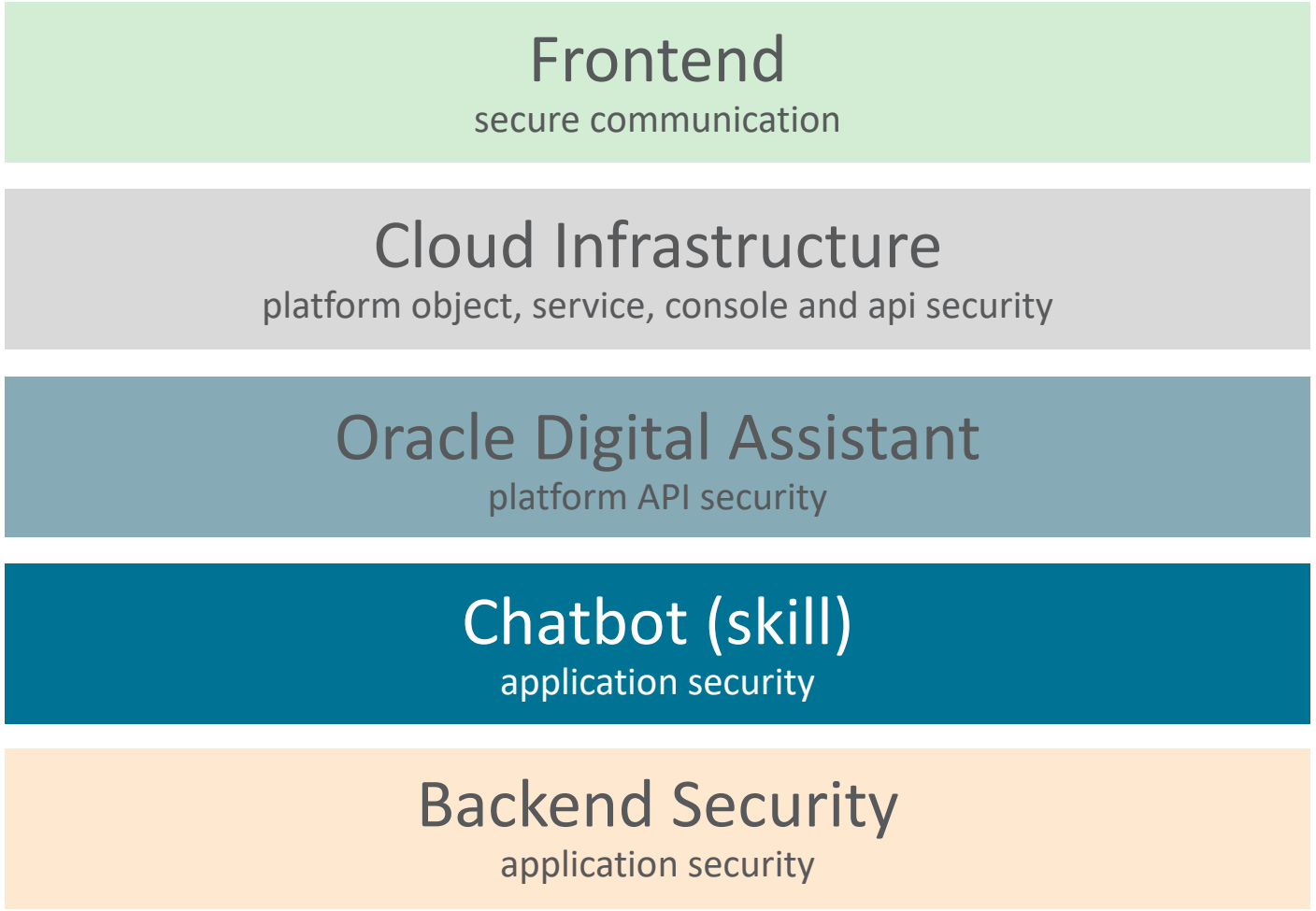
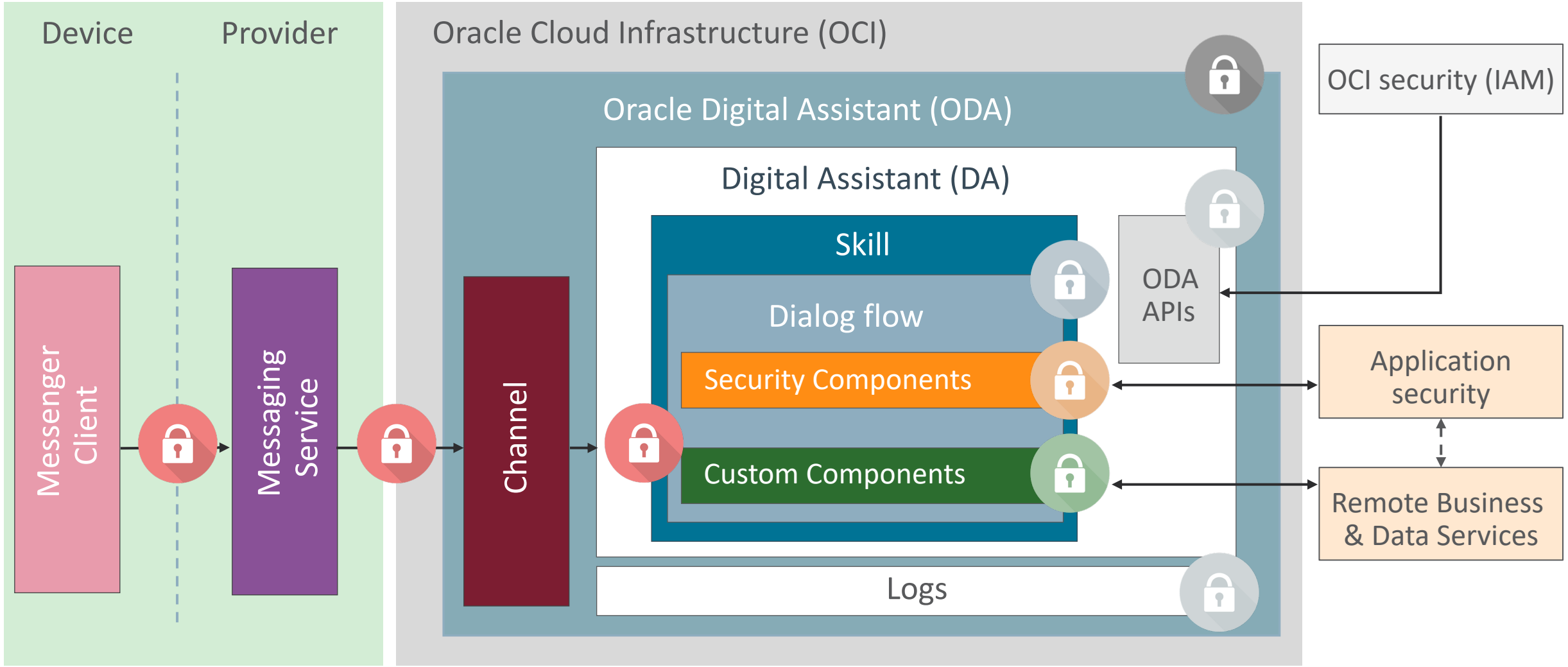
Multi layer chatbot security



Oracle Digital Assistant multi layer security architecture



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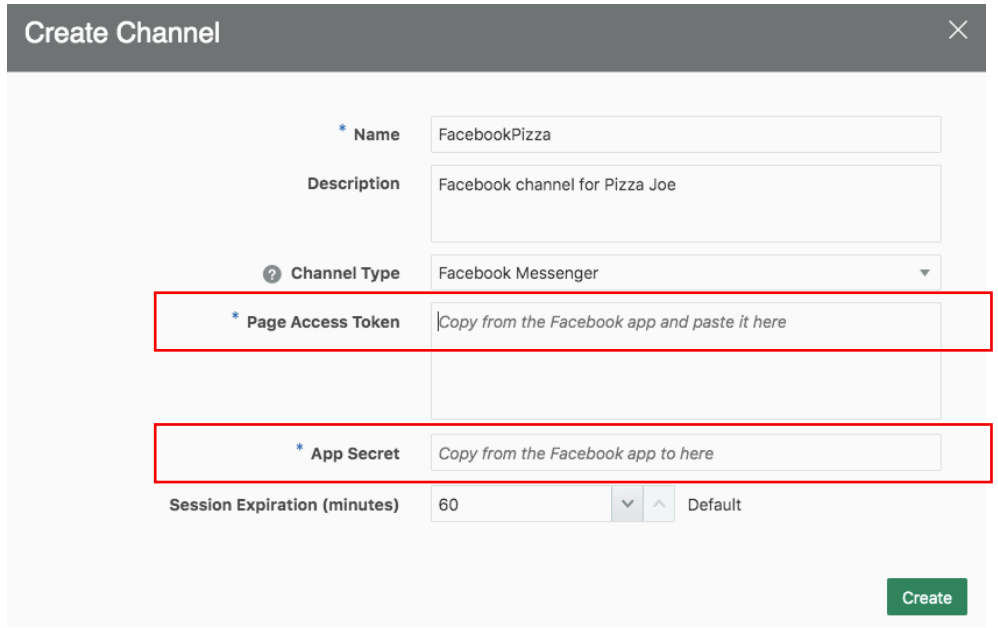
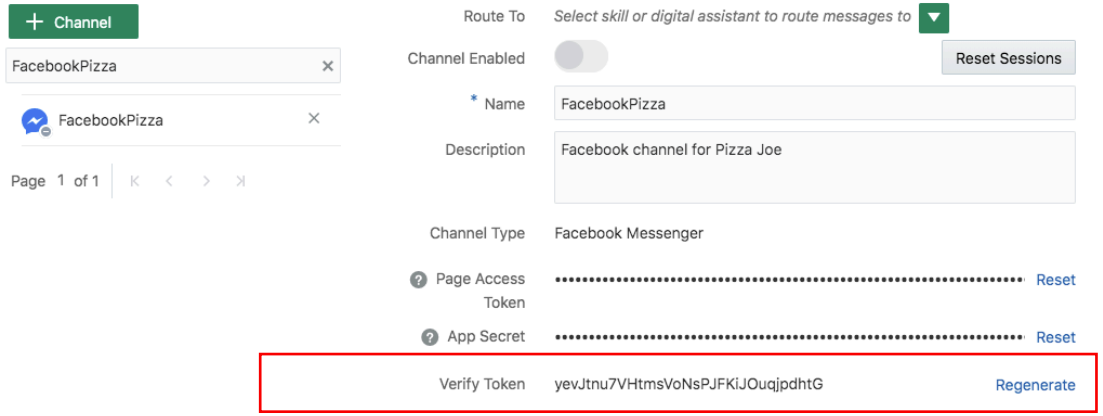
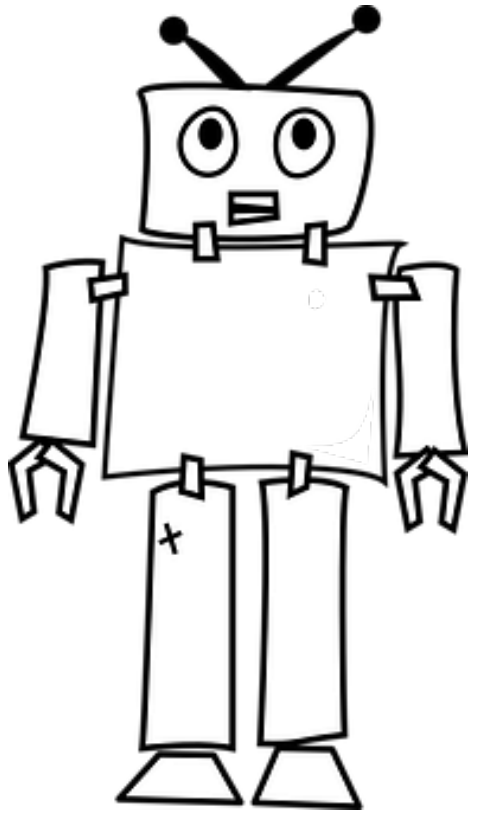
Common channel security

- HTTPS for protecting messages in transit
- SHA 256 signature prevents messages to be changed on transit
- Different messengers have different security configuration
  - Channels in Oracle Digital assistant assist you in creating messenger specific secrets





The security between the user device and the message server is the responsibility of the message channel provider



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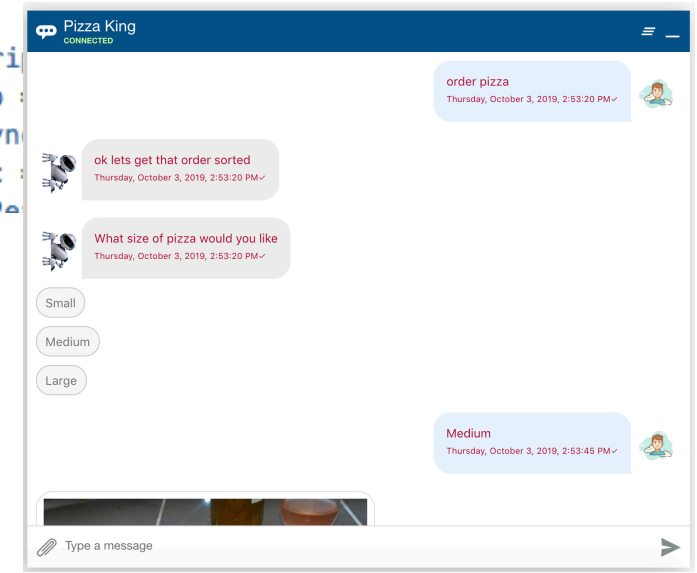
Oracle web SDK

- Oracle owned JavaScript library to add digital assistant to web applications and web pages
- Uses Oracle own chat server
  - No Smooch
- Highly customizable web messenger
- State of the art messenger features
  - timestamp display, typing indicator
  - Document and image upload
  - Security

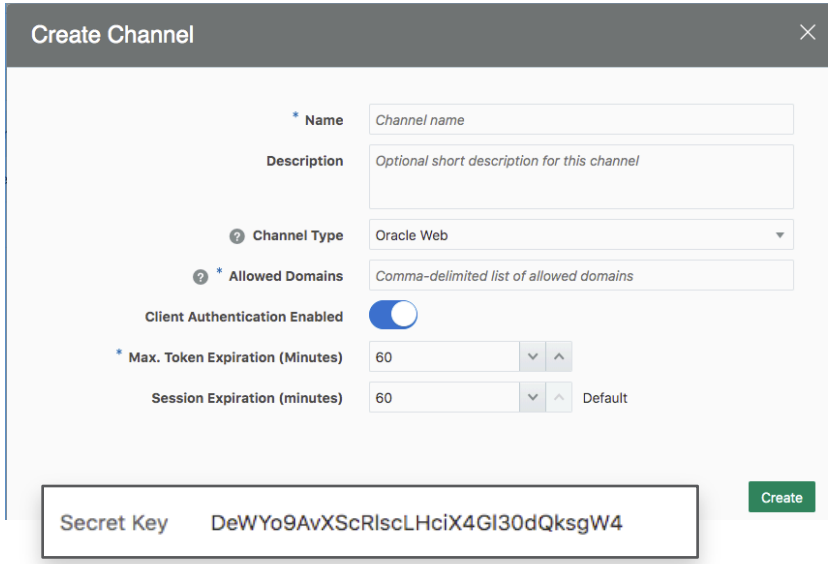
```
<script>
    var chatWidgetWebSettings = {
        URI: '<Chat server URI>',
        channelId: '<Channel ID>',
        userId: '<User ID>'
    };
    !function(globalObj, doc, library, name) {
        function initiateSDK() {
            setTimeout(function() {
                globalObj[name] = Object.assign(WebSDK);
                globalObj[name] = new globalObj[name](chatWidg
                globalObj[name].connect();  // Connect to chat
            }, 2000);
        }
        try {
            var scri
                lib :
            lib.asyn
            lib.src :
            lib.onRe
```



Oracle web messenger client security

- Client authentication using signed JSON Web Tokens (JWT)
  - Generate signed JWT token on custom server
    - Web channel secret as signing key
  - Signed JWT token added as 'Bearer' token in Authorization header for each request
  - ODA validates information in token body
- Domain whitelisting
  - Restricts domains allowed to access channel
  - Works with and without client authentication

```
<script>
    var chatWidgetWebSettings = {
        URI: '<Chat server URI>',
        clientAuthEnabled: true
    };
    var generateToken = function() {
        return new Promise((resolve) => {
            fetch('https://yourbackend.com/endpointToGenerateJWTToken').then((token) => {
                resolve(token);
            })
        });
    }
    !function(globalObj, doc, library, name) {
        function initiateSDK() {
            setTimeout(function() {
                globalObj[name] = Object.assign(WebSDK);
                globalObj[name] = new globalObj[name](chatWidgetWebSettings, generateToken);
                globalObj[name].connect();  // Connect to chat server
            }, 2000);
        }
```



Hiding / exposing information based on channels

- Some channels may be more trusted than others
  - Customize ODA based on channel type and channel name
- Expression
  - `${system.message.channelConversation.type}`
  - `${system.message.channelConversation.channelName}`
- System Common Response Component
  - channel include | exclude property to determine visibility
- Custom component:
  - `conversation.channelType()`
    `Converation.request().message.channelConversation.channelName`

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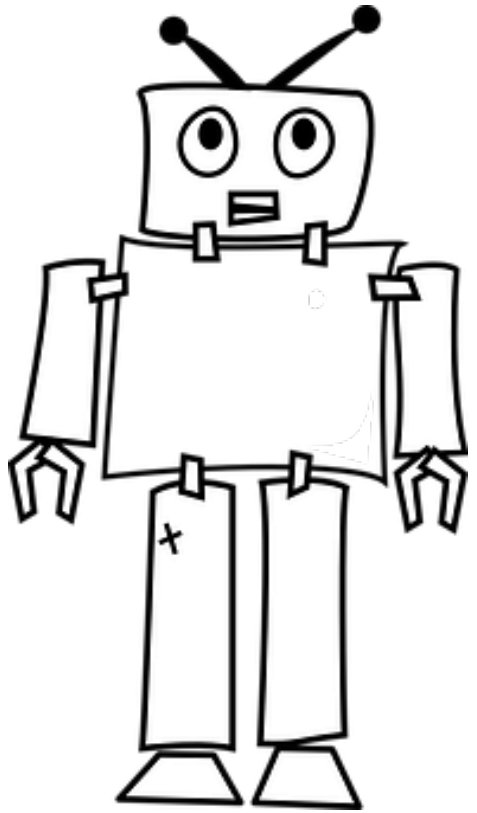
HTTP Request Security

- TLS 1.2
  - Transport layer security
- Basic & Bearer authentication
  - HTTP endpoint protection
- OAuth2
  - Token based authorization
- Cryptographic signature
  - Message integrity protection

OCI Security

- Oracle cloud infrastructure security
  - Secures APIs, cloud objects (e.g. storage) and services
  - Perimeter security of data centers
- OCI Identity and Access Management (IAM)
  - Manages users, user groups, resource groups (compartments), policies
  - Security for network-, compute-, storage-, console- and APIs
  - Users are platform users like admins, developers, business analysts
- Authorization requires cryptographic signatures

OCI security protects cloud APIs and resources. It separates custom application security from cloud security.



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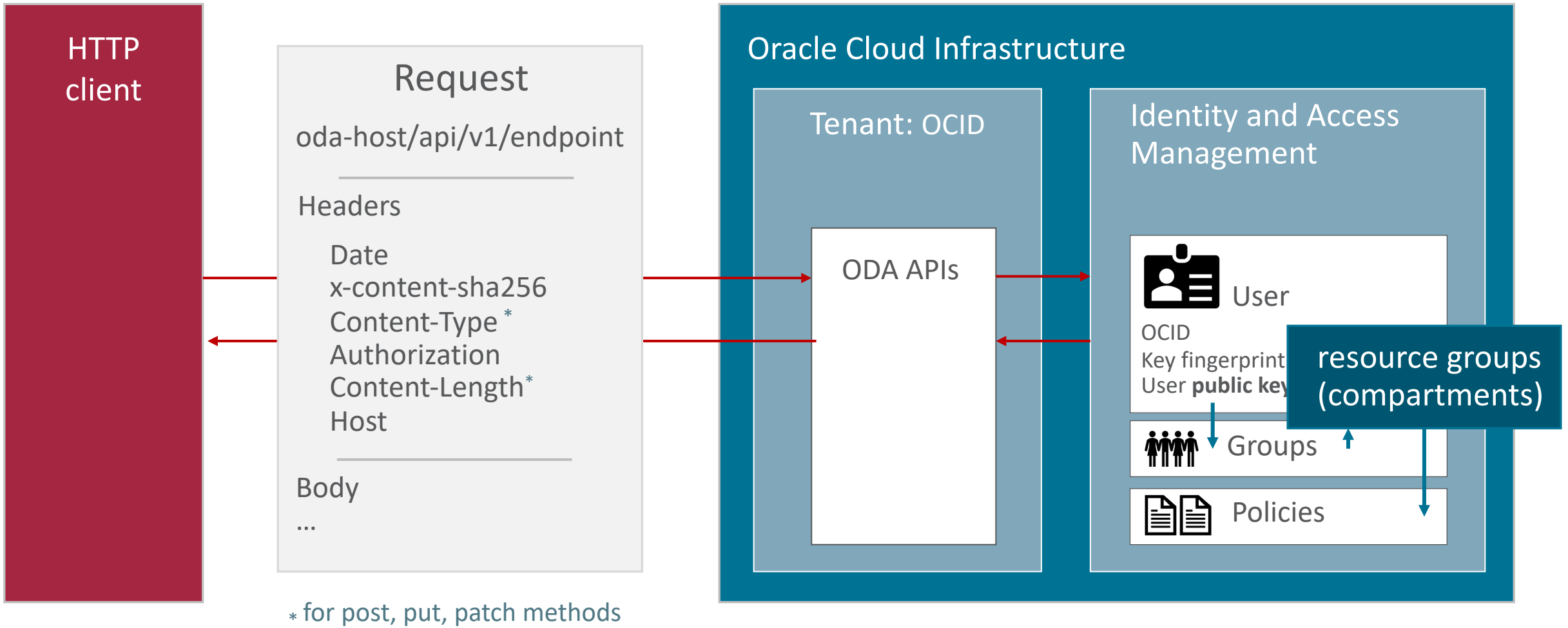
Anatomy of an API request in OCI



* for post, put, patch methods

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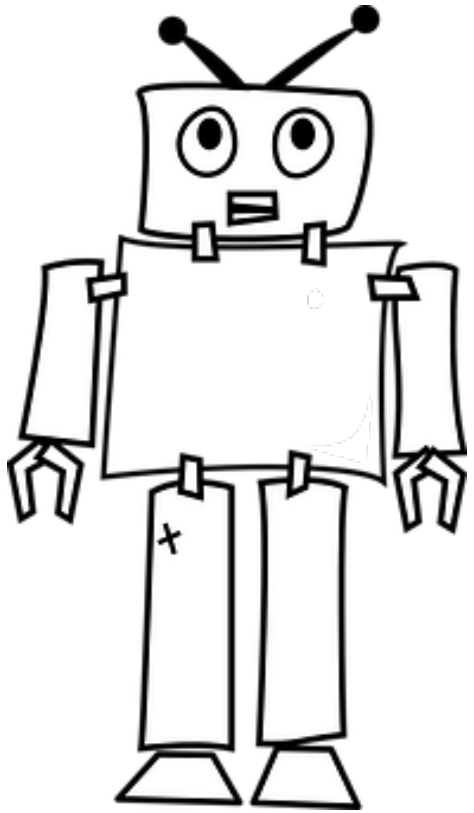
Application **security** today **is less about who the user is**. It's about whether a client is authorized to access a protected resource.



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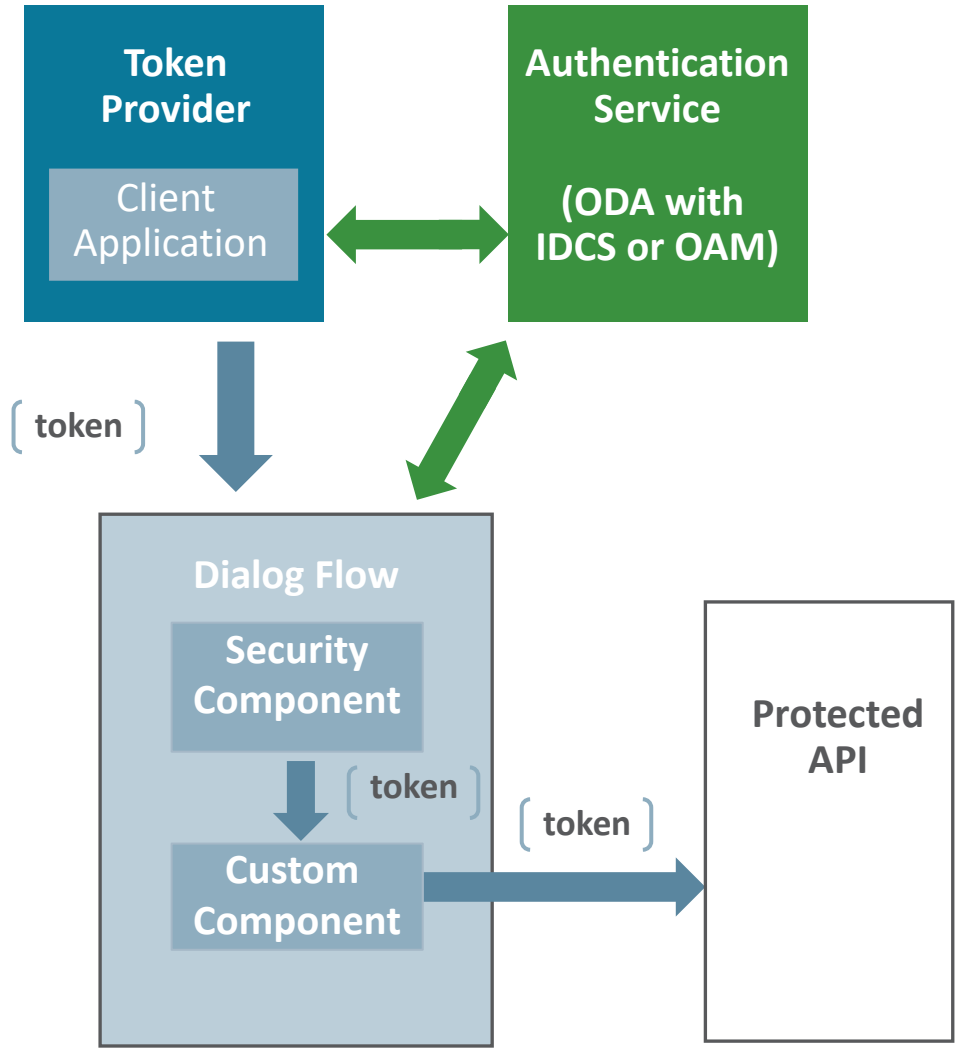
OAuth2 Authorization

- Industry standard for token based authorization
  - Widely used (including in social media)
- Commonly used authorization types
  - Authorization code flow
    - Client accesses resource API on behalf of a user
    - User authenticates to authorization provider to obtain access token
    - Client uses access token to access remote service APIs
  - Client credential flow
    - Resource API is accessed on behalf of a system
    - Uses shared client ID and client secret to obtain access token
    - Client uses access token to access remote service APIs

OAuth2 authorization in ODA skills

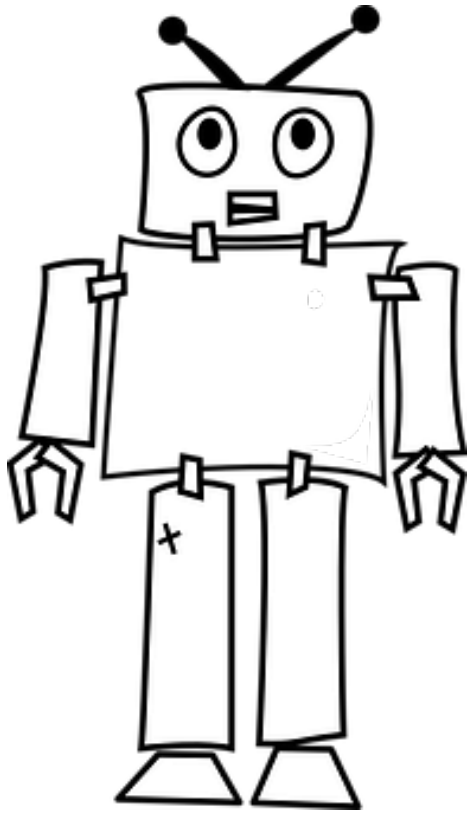
- ODA supports authorization code- and client credential grant flows
- Declarative support for OAuth2 with Oracle IDCS and OAM through
  - Authentication service
  - OAuth2 security components
- Support for 3rd party providers
  - 2-legged authorization
- Protected resources accessed from custom components



Built-in OAuth2 security components

- System.OAuth2AccountLink
  - 3-legged authorization
  - Obtains access token from Oracle Identity Cloud Service
  - Supports refresh tokens
- System.OAuthAccountLink
  - 2-legged authorization
  - Obtains authorization token from 3rd party OAuth2 authorization provider
  - Requires custom component to obtain access token
- System.OAuth2Client
  - Obtains access token based on client credentials

Request authorization in ODA is not limited to OAuth2



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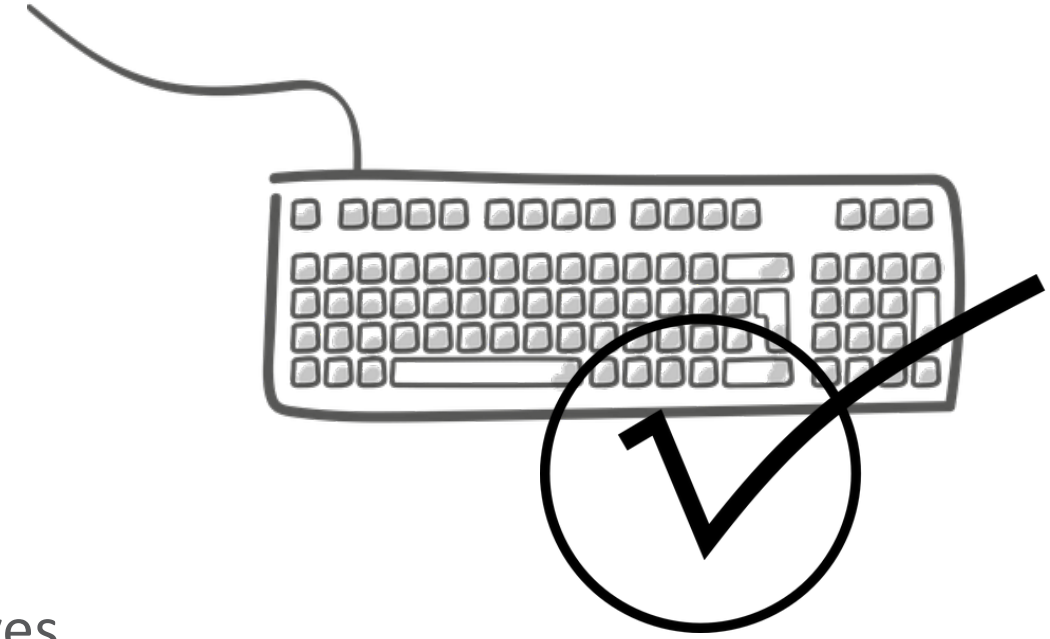
Validate user input

- Dialog flow
  - Apache FreeMarker
  - Entity validation
    - System.MatchEntity
    - Using entity type variables on input components
- Custom Components
  - Use and validate input parameters
- Backend systems
  - Backends should know to protect themselves



Keep sensitive information out of the chat history

- Unless you fully control the messenger: Don't use it for any sensitive data input and display
  - Use System.Webview to provide information outside of the messenger
- Truncate or mask sensitive information like credit card numbers or license keys in bot responses
  - Use Apache FreeMarker expressions or custom components

Use out-of-order message handling

- Posting of old action message is referred to as "out-of-order message"
- Out-of-order message handling need to be evaluated for each usecase
  - Default implementation is to allow out-of-order messages
  - Use cases to consider
    - Allow and follow out-of-order messages
    - Suppress out of order messages
    - Ask user what to do
- Don't allow sensitive actions to be executed from the chat history
  - Configure out-of-order message handling to suppress the action or direct to a state informing the user that the requested option is no longer available

Consider restricting content based on the channel

- Social media messengers may be considered less trustworthy
- Optimize skill responses to exclude sensitive information on less trusted channels
- Conversation flows and custom components have access to
  - Channel type (e.g. facebook, web, webhook etc.)
    - ${system.message.channelConversation.channelType}
    - ${system.message.channelConversation.channelName}
    - conversation.channelType()
  - The channel name you defined when configuring a channel

Backend service security

- Remote business and data services must protect themselves
  - Enforce security
  - Do not make assumptions about the security enforced by the client
  - Validate and authorize requests

Integrated Cloud

Applications & Platform Services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