Useful features of the SAP Cloud SDK for any Cloud-native application

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> **“SAP S/4HANA Cloud SDK significantly enhanced the development … we have been able reduce to development by up to 50 percent.”**

[Leonardo De Araujo, CTO, Beyond Technologies]

The Benefits when Connecting to SAP Cloud Platform destination service

Instead of menial, error-prone, low-level code…

```
// 1. Get destination credentials
JsonObject destinationCredentials = EnvironmentValueReader.getDestinationCredentials();
String destinationClientId = destinationCredentials.get("clientid").getAsString();
String destinationClientSecret = destinationCredentials.get("clientsecret").getAsString();
```

Retrieve config

```
// 2. Get jwt token to fetch destination configuration
UaaContextFactory destinationUaaContextfactory = UaaContextFactory.factory(xsUaaUrl);
TokenRequest destinationTokenRequest = destinationUaaContextfactory.tokenRequest();
destinationTokenRequest.setGrantType(GrantType.CLIENT_CREDENTIALS);
destinationTokenRequest.setClientId(destinationClientId);
destinationTokenRequest.setClientSecret(destinationClientSecret);
UaaContext destinationXsuaaContext = destinationUaaContextfactory.authenticate(destinationT
CompositeAccessToken destAccessToken = destinationXsuaaContext.getToken();
```

Authenticate

```
// 3. Connecting to the URL to access destination configurations
String destEnv = Constant.DESTINATION_SERVICE_NAME;
URL urlToAccessDestConfig = new URL(destinationCredentials.get("uri").getAsString()
      + "/destination-configuration/v1/subaccountDestinations/" + destEnv);
```

Build request

```
HttpURLConnection urlConnToAccessDestConfig = (HttpURLConnection) urlToAcessDestConfig.openConnection();
urlConnToAccessDestConfig.setConnectTimeout(10000);
urlConnToAccessDestConfig.setReadTimeout(60000);
urlConnToAccessDestConfig.setRequestProperty("Authorization", "Bearer " + destAccessToken);
urlConnToAccessDestConfig.connect();
int status = urlConnToAccessDestConfig.getResponseCode();
```

Connect

```
StringBuilder destSB = new StringBuilder();
// Reading the destination configurations
switch (status) {
case 200:
   BufferedReader br = new BufferedReader(new InputStreamReader(urlConnToAccessDestConfig.getInputStream()));
   String line;
   while ((line = br.readLine()) != null) {
      destSB.append(line + "\n");
   }
   br.close();
}
```

Handle response

Without SDK

```
// Connecting to the destination configurations URL
JSONObject destJSON = new JSONObject(destSB.toString());
String resultUrl = destinationJSONConfiguration.getString("URL");
```

Convert result

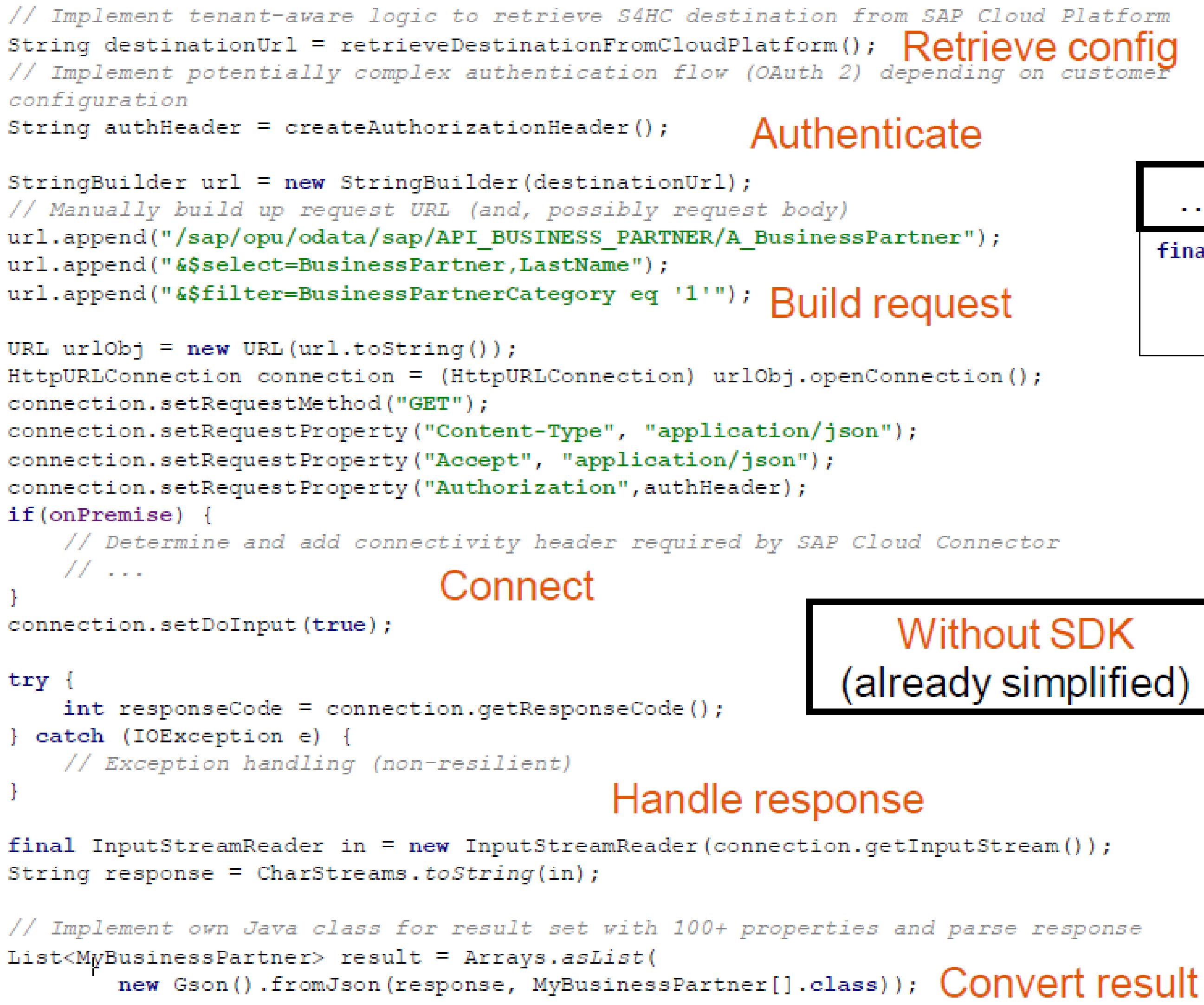
… let developers focus on solving business problems:

```
Destination destination = DestinationAccessor.getDestination(
            Constant.DESTINATION_SVC_MARKETING_CLOUD);
String resultUrl = destination.getUri().toString();
```

With SDK

The Benefits when Connecting to OData Services

Instead of menial, error-prone, low-level code…



```
// Implement tenant-aware logic to retrieve S4HC destination from SAP Cloud Platform
String destinationUrl = retrieveDestinationFromCloudPlatform();
// Implement potentially complex authentication flow (OAuth 2) depending on customer
configuration
String authHeader = createAuthorizationHeader();

StringBuilder url = new StringBuilder(destinationUrl);
// Manually build up request URL (and, possibly request body)
url.append("/sap/opu/odata/sap/API_BUSINESS_PARTNER/A_BusinessPartner");
url.append("&$select=BusinessPartner,LastName");
url.append("&$filter=BusinessPartnerCategory eq '1'");

URL urlObj = new URL(url.toString());
HttpURLConnection connection = (HttpURLConnection) urlObj.openConnection();
connection.setRequestMethod("GET");
connection.setRequestProperty("Content-Type", "application/json");
connection.setRequestProperty("Accept", "application/json");
connection.setRequestProperty("Authorization",authHeader);
if(onPremise) {
    // Determine and add connectivity header required by SAP Cloud Connector
    // ...
}
connection.setDoInput(true);

try {
    int responseCode = connection.getResponseCode();
} catch (IOException e) {
    // Exception handling (non-resilient)
}

final InputStreamReader in = new InputStreamReader(connection.getInputStream());
String response = CharStreams.toString(in);

// Implement own Java class for result set with 100+ properties and parse response
List<MyBusinessPartner> result = Arrays.asList(
        new Gson().fromJson(response, MyBusinessPartner[].class));
```

Retrieve config

Authenticate

Build request

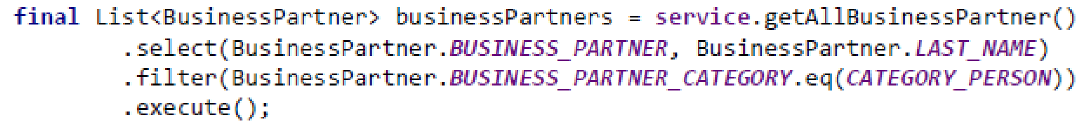
Connect

Handle response

Convert result

Without SDK
(already simplified)

… let developers focus on solving business problems:



```
final List<BusinessPartner> businessPartners = service.getAllBusinessPartner()
        .select(BusinessPartner.BUSINESS_PARTNER, BusinessPartner.LAST_NAME)
        .filter(BusinessPartner.BUSINESS_PARTNER_CATEGORY.eq(CATEGORY_PERSON))
        .execute();
```

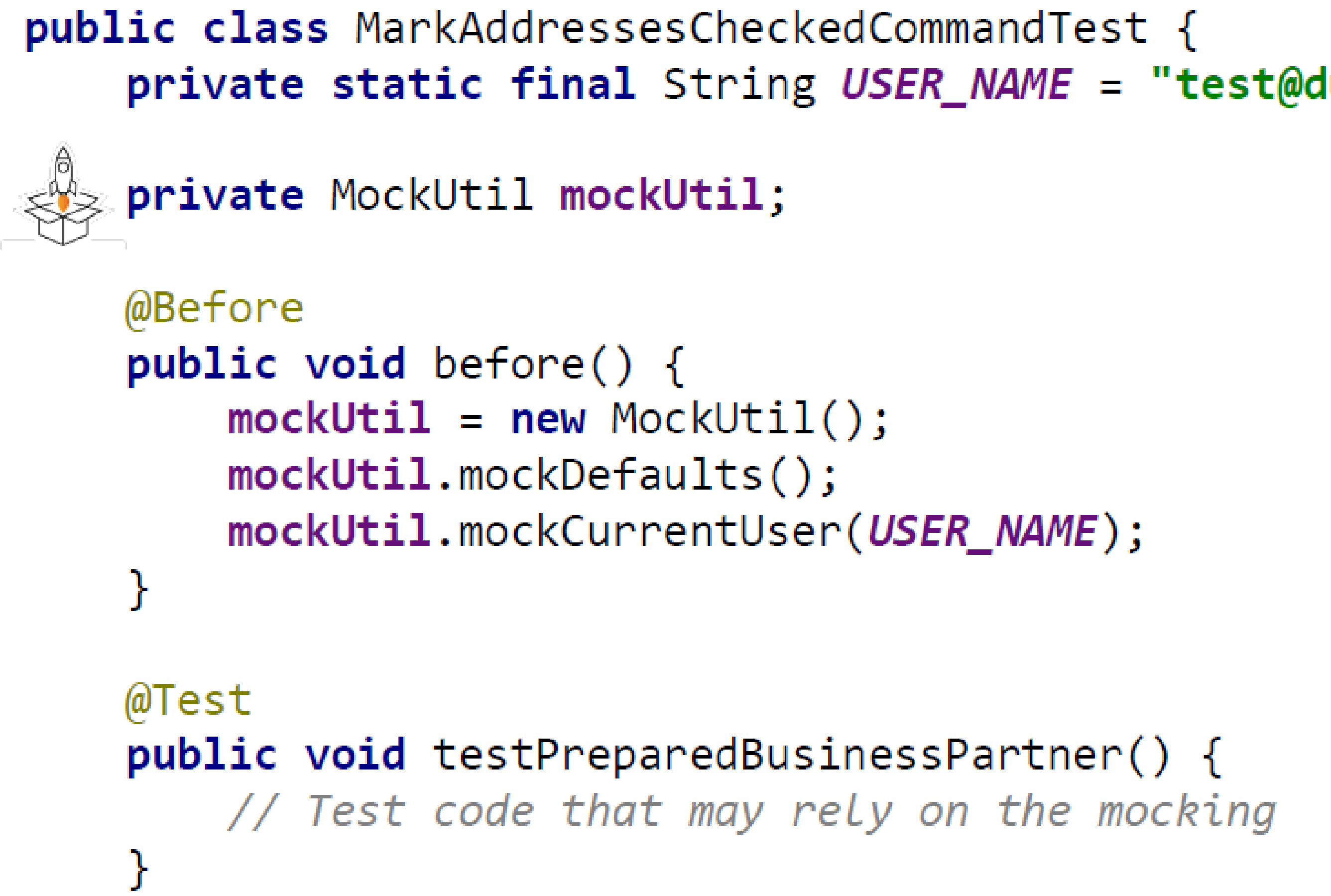
With SDK

Easy, type-safe, and fluent access to CRUD APIs

plus additional advanced features:

- Dependency injection & mocking
- Optimistic concurrency control
- Extensibility
- …

Unit Tests – Basic Setup with the SAP S/4HANA Cloud SDK



```
public class MarkAddressesCheckedCommandTest {
    private static final String USER_NAME = "test@dummy.com";

    private MockUtil mockUtil;

    @Before
    public void before() {
        mockUtil = new MockUtil();
        mockUtil.mockDefaults();
        mockUtil.mockCurrentUser(USER_NAME);
    }

    @Test
    public void testPreparedBusinessPartner() {
        // Test code that may rely on the mocking
    }
```

Unit Tests – Dependencies to External Systems

Mocking the destination service

- SAP S/4HANA Cloud SDK offers extensive support for mocking functionality of the destination service
- MockUtil can be used to return mocked destination that redirects to …
  - Actual test system of external dependency (e.g., test instance of SAP S/4HANA)
  - External mock system that mimics API of external dependency

    ```
    mockUtil.mockErpDestination()
    ```

  - Mock server spun up by test suite (WireMock)

    ```
    mockUtil.mockErpServer()
    ```

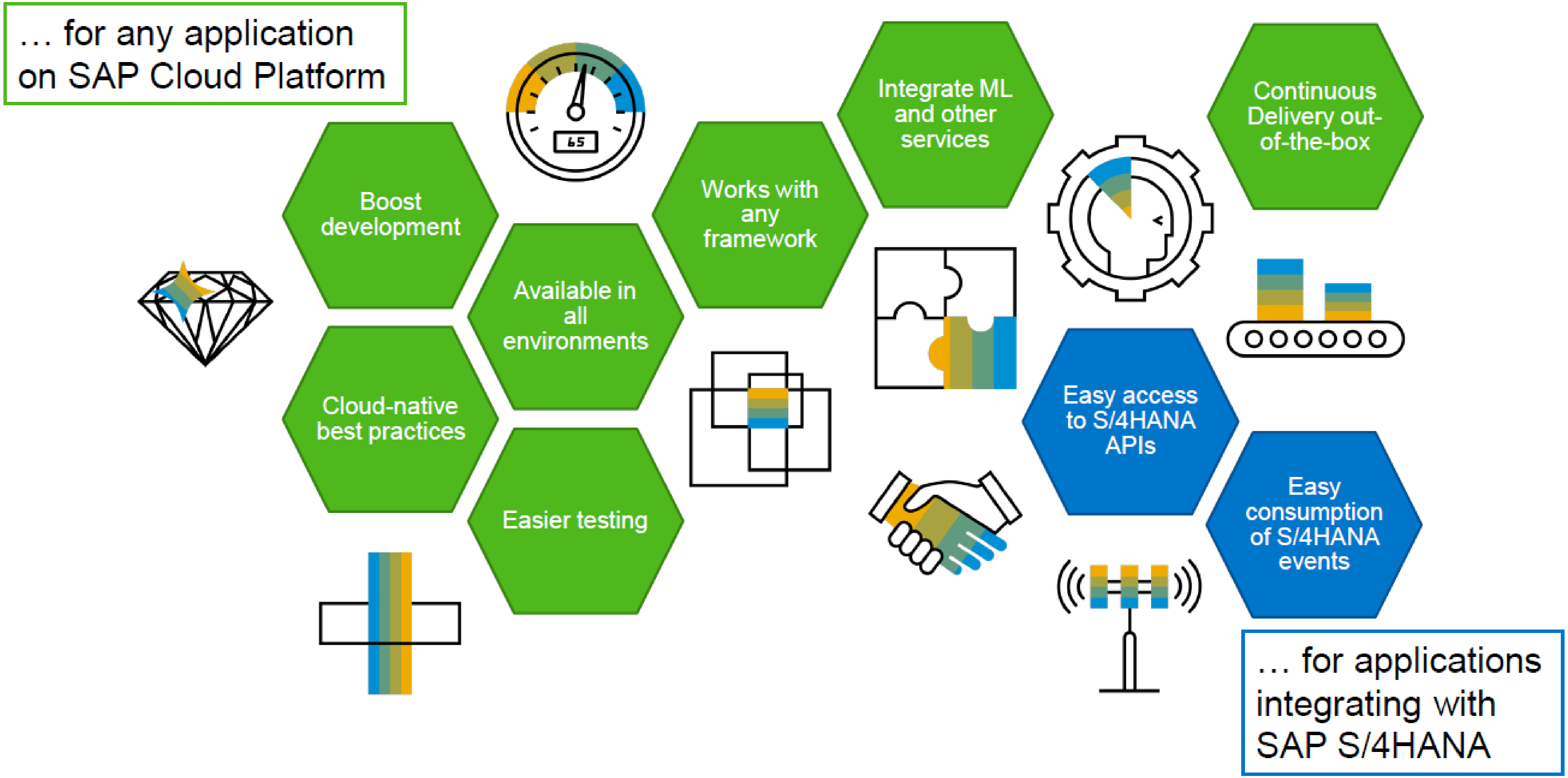
  - No system

    ```
    mockUtil.mockDestination("DestinationName", URI.create(""))
    ```

Mocking the external system

- Independence from an actual SAP system
- Either by pointing the destination service to a test / mock system (see above)
- … or by mocking the calls to the external system itself (easy when using the Java Virtual Data Model of the SAP S/4HANA Cloud SDK)

Benefits of the SAP S/4HANA Cloud SDK



… for any application on SAP Cloud Platform

Boost development

Available in all environments

Cloud-native best practices

Easier testing

Works with any framework

Integrate ML and other services

Continuous Delivery out-of-the-box

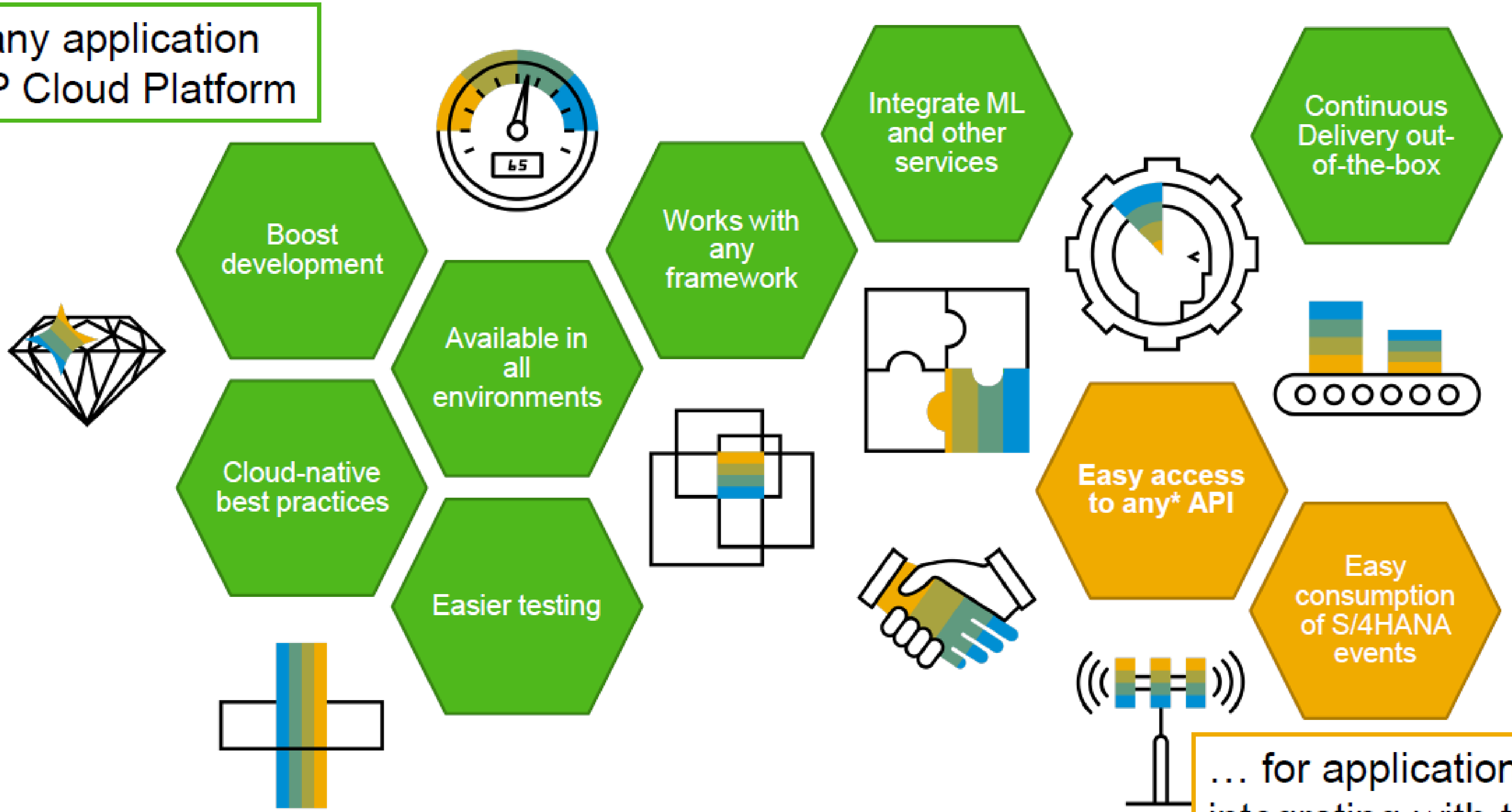
Easy access to S/4HANA APIs

Easy consumption of S/4HANA events

… for applications integrating with SAP S/4HANA

Evolution of the SAP S/4HANA Cloud SDK

… for any application
on SAP Cloud Platform



Boost development

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Easy access to any* API

Easy consumption of S/4HANA events

… for applications
integrating with the
intelligent enterprise

* Any API, e.g. SuccessFactors, C/4HANA, …

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Demo

Questions & answers

Thank you.

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