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Extending Open edX to Support Integration with Enterprise Systems

Jason Goodell
Software Engineer
Global Knowledge Training LLC.

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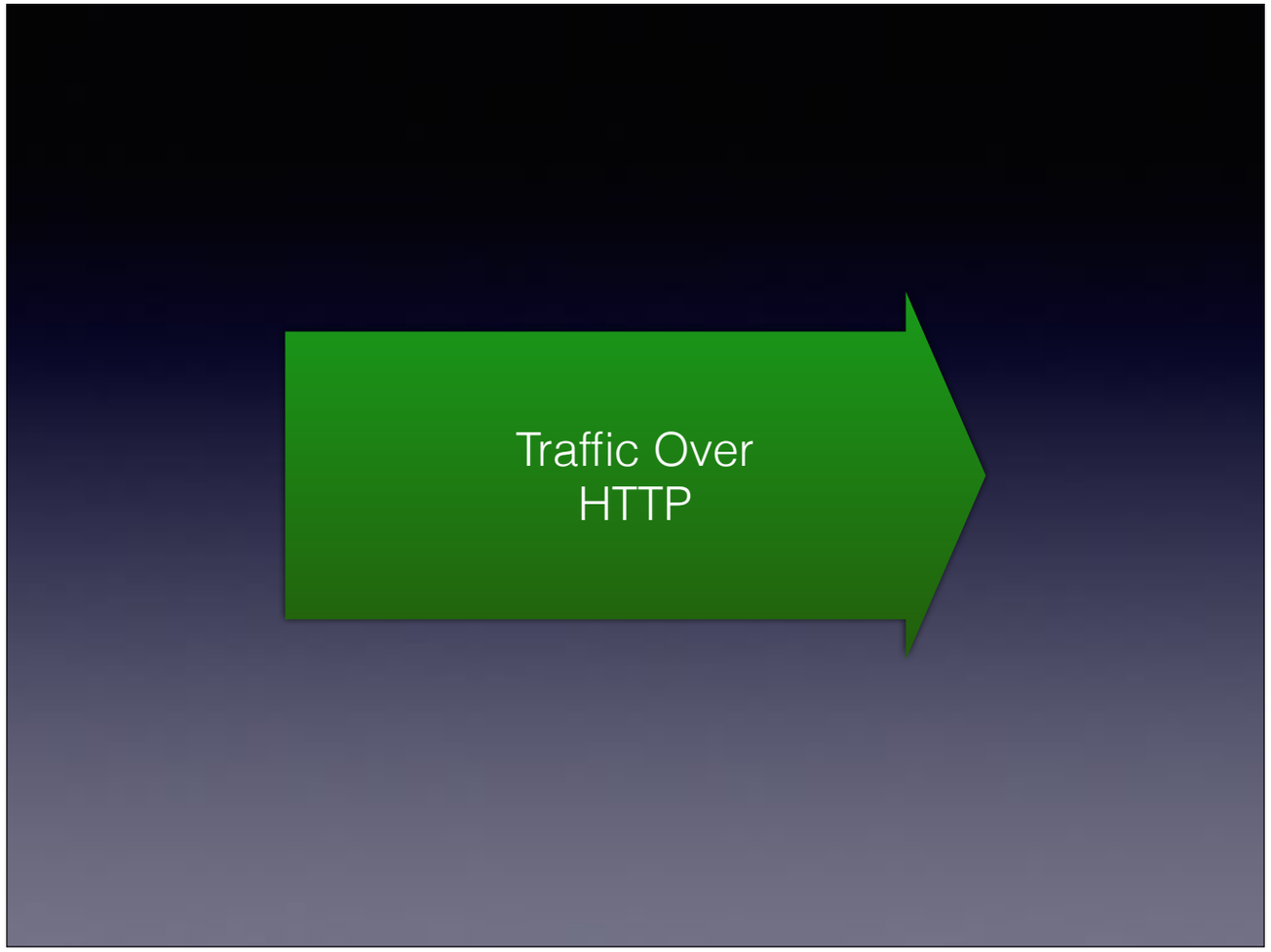

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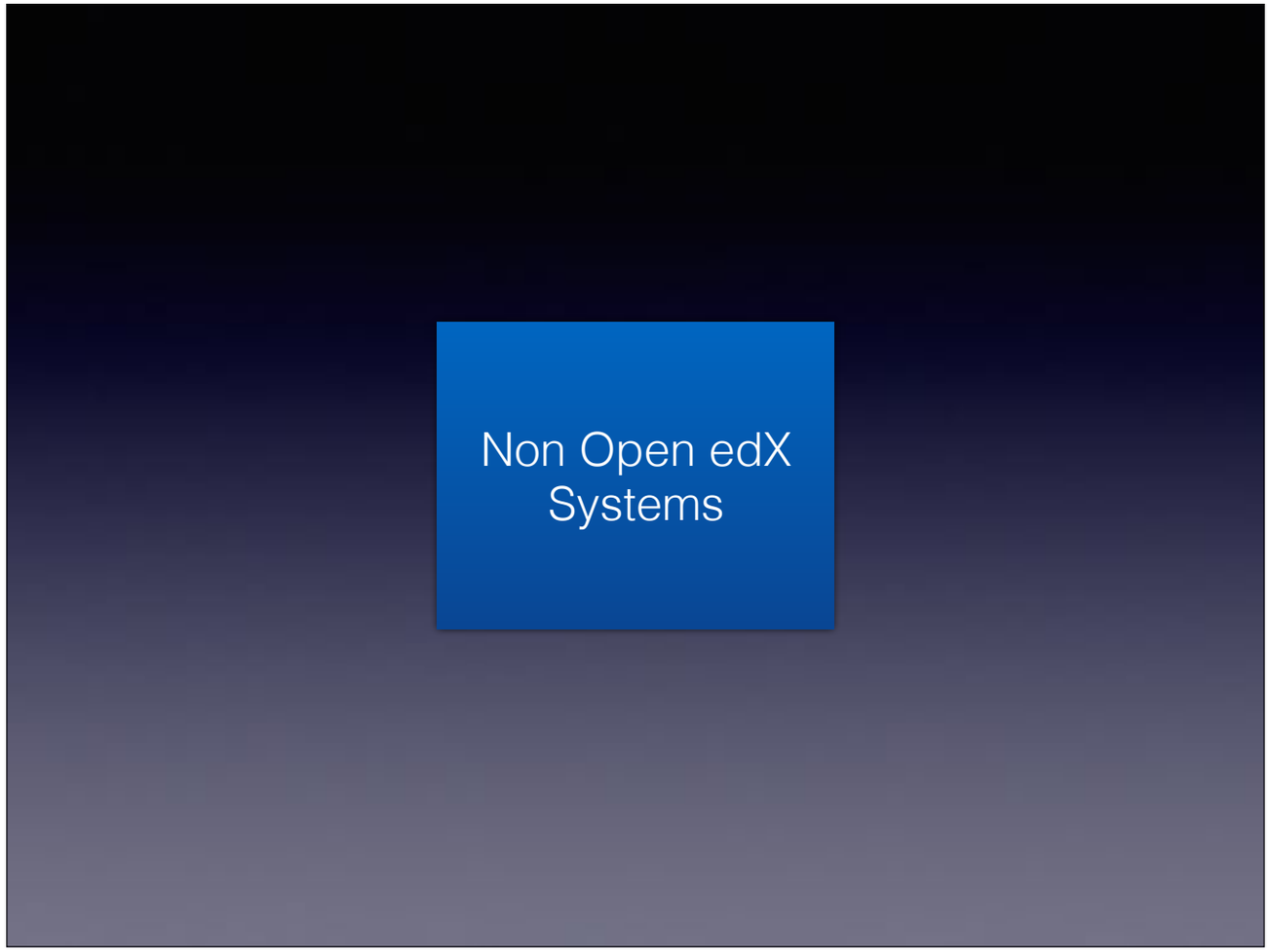

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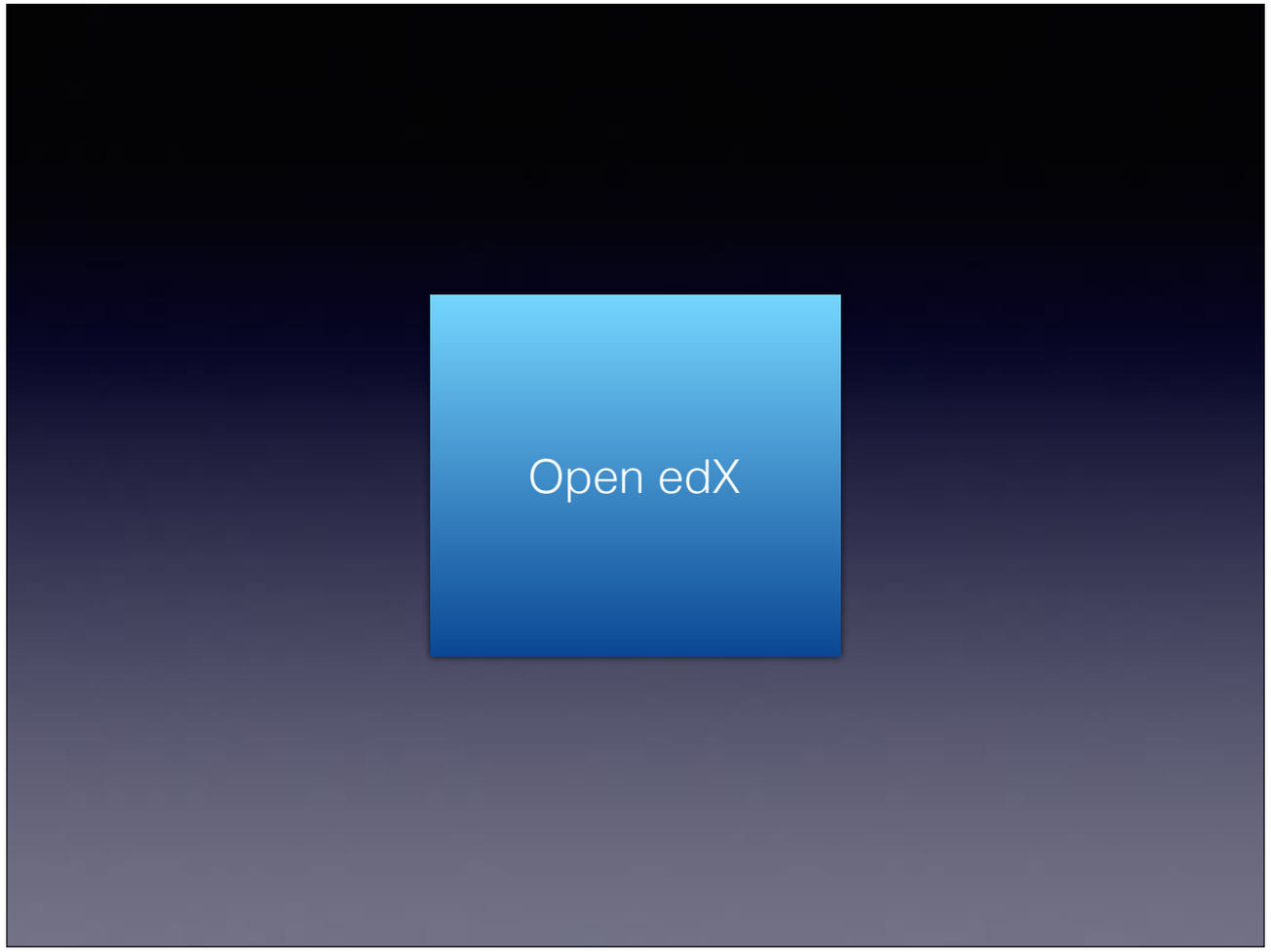

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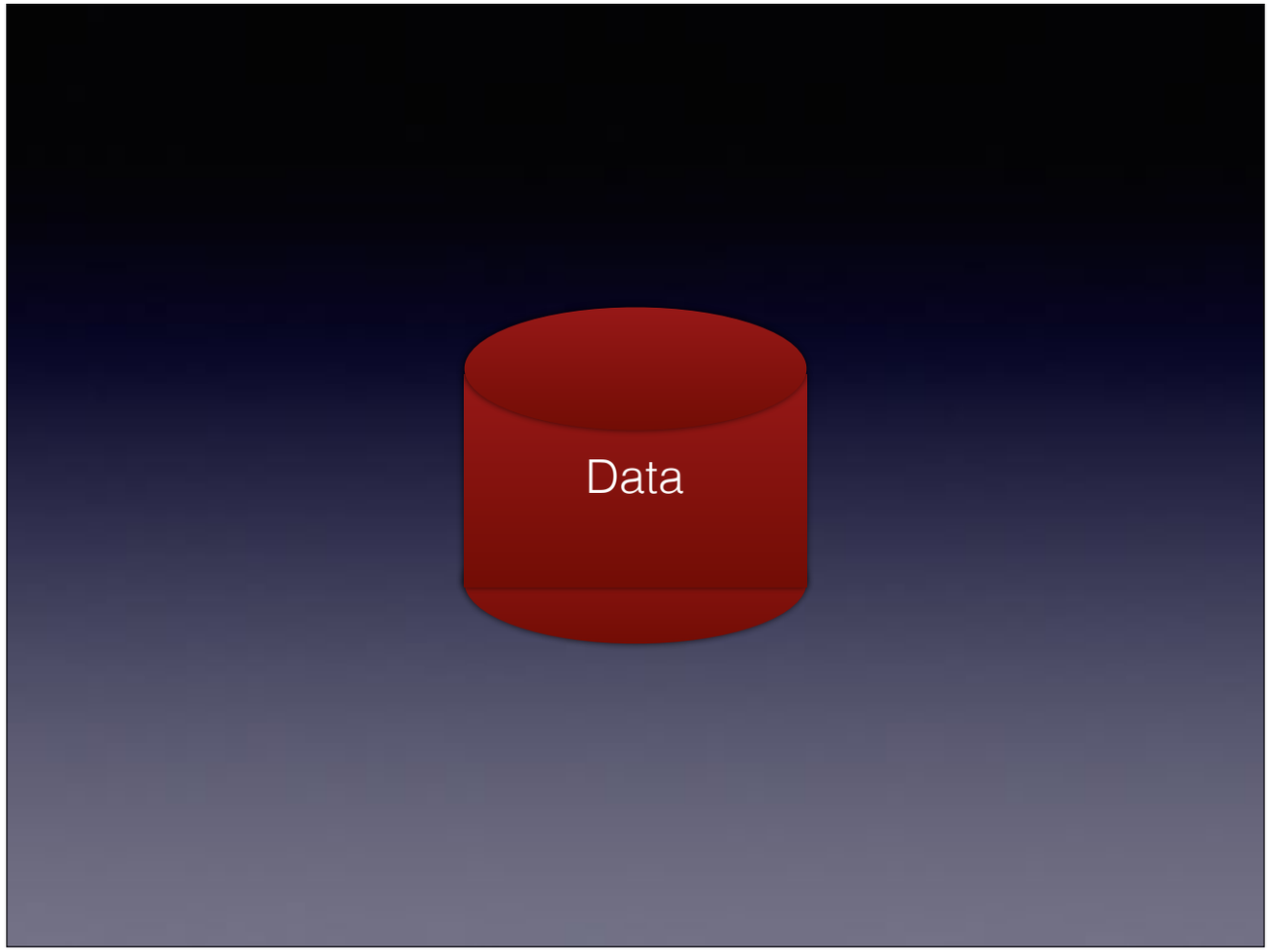

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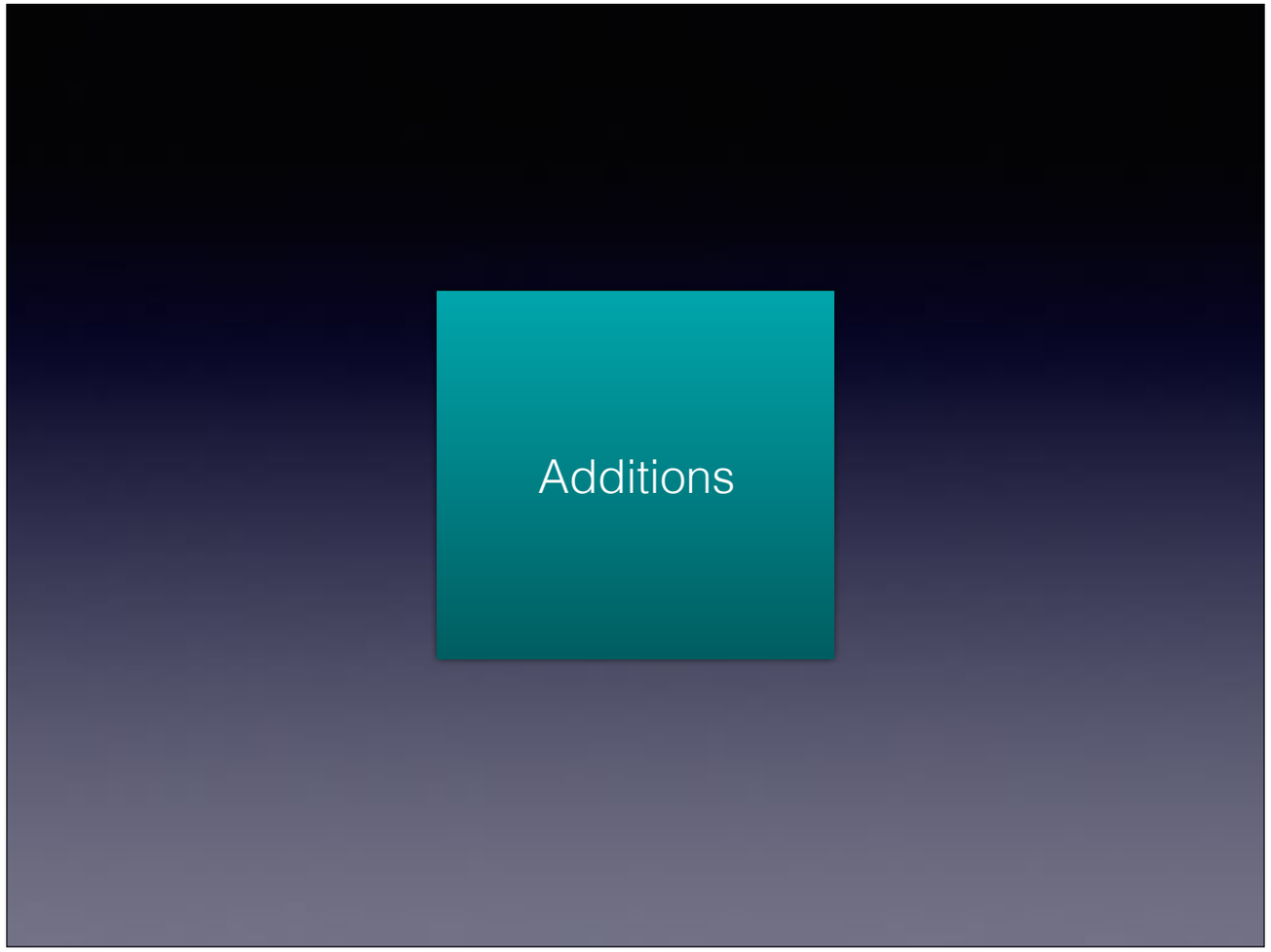

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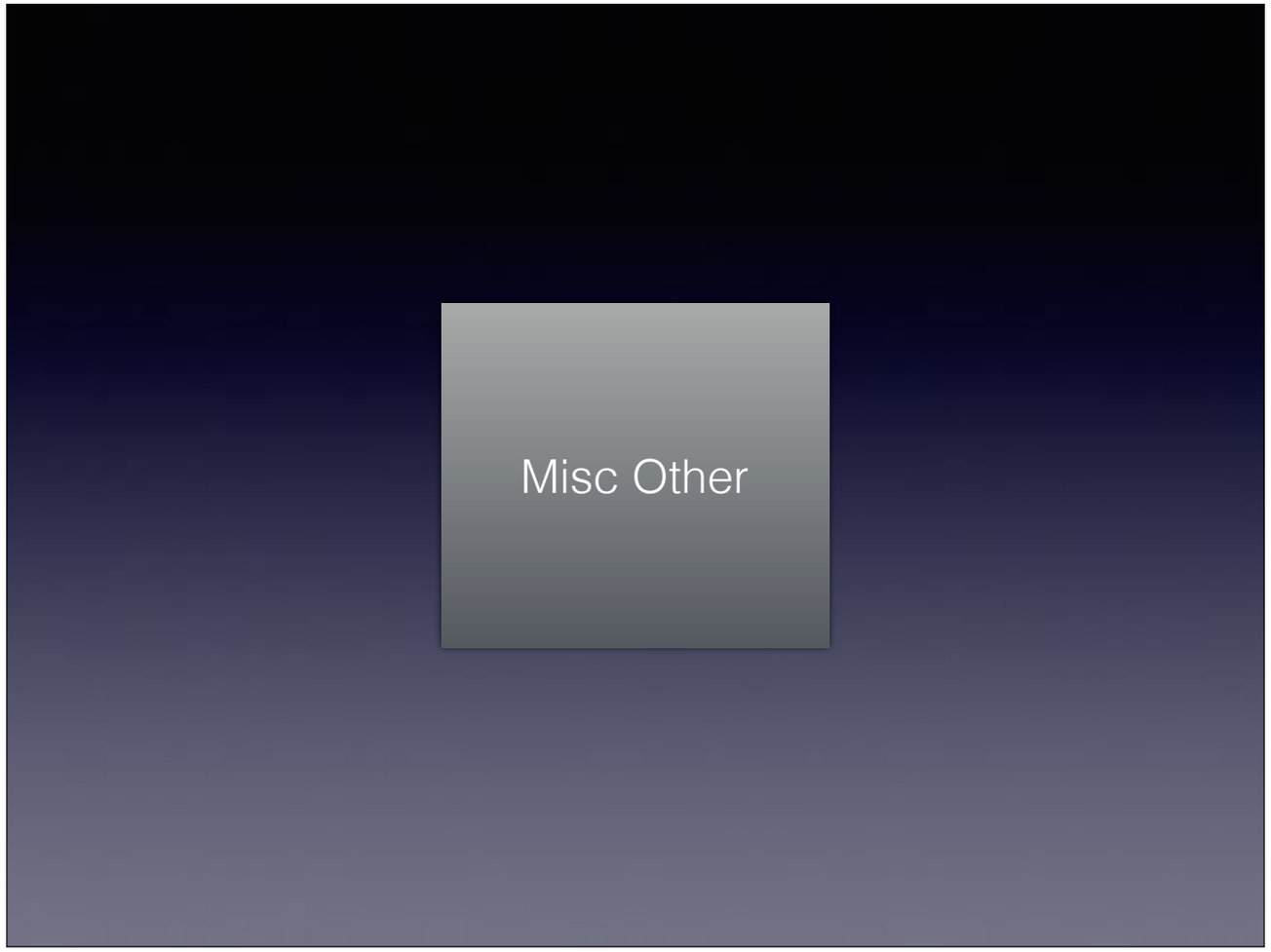

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To appreciate the approach to integrating Open edX at Global Knowledge, there are key characteristics to our approach to understand. [click] Open edX is a delegate system to Global Knowledge's existing back office processes and systems. [click] User and enrollment records migrate to Open edX from Global Knowledge's back office systems. For Global Knowledge user's and enrollments will not be created in Open edX. Instead these records will be created in Global Knowledge's back office systems. [click] Integrations are designed to mitigating risk from changes to the Open edX platform. We create additional functionality by adding Django apps as plugins. With our plugins depending on Open edX core code instead of modifying Open edX. [click] Global Knowledge records are pushed to Open edX through custom web APIs, and placed on Open edX's relational database management system in a set of landing tables. Global Knowledge's existing environment of back office systems, which manage purchasing, student account management and course enrollment are the systems of truth for Global Knowledge's business. These back office systems not only support self-paced courses within Open edX, but also support Global Knowledge's other course modalities; instructor lead and virtual instructor lead.

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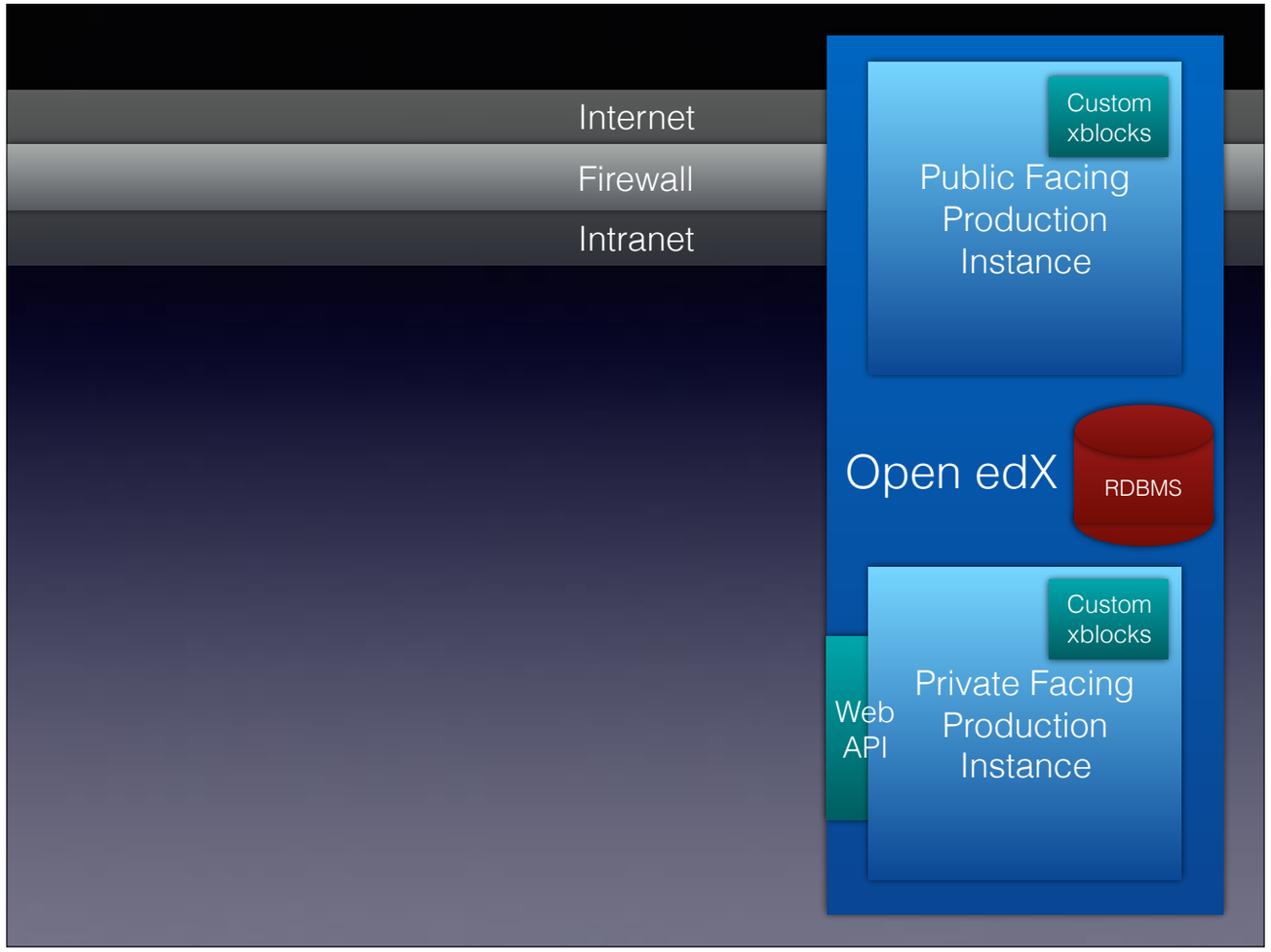

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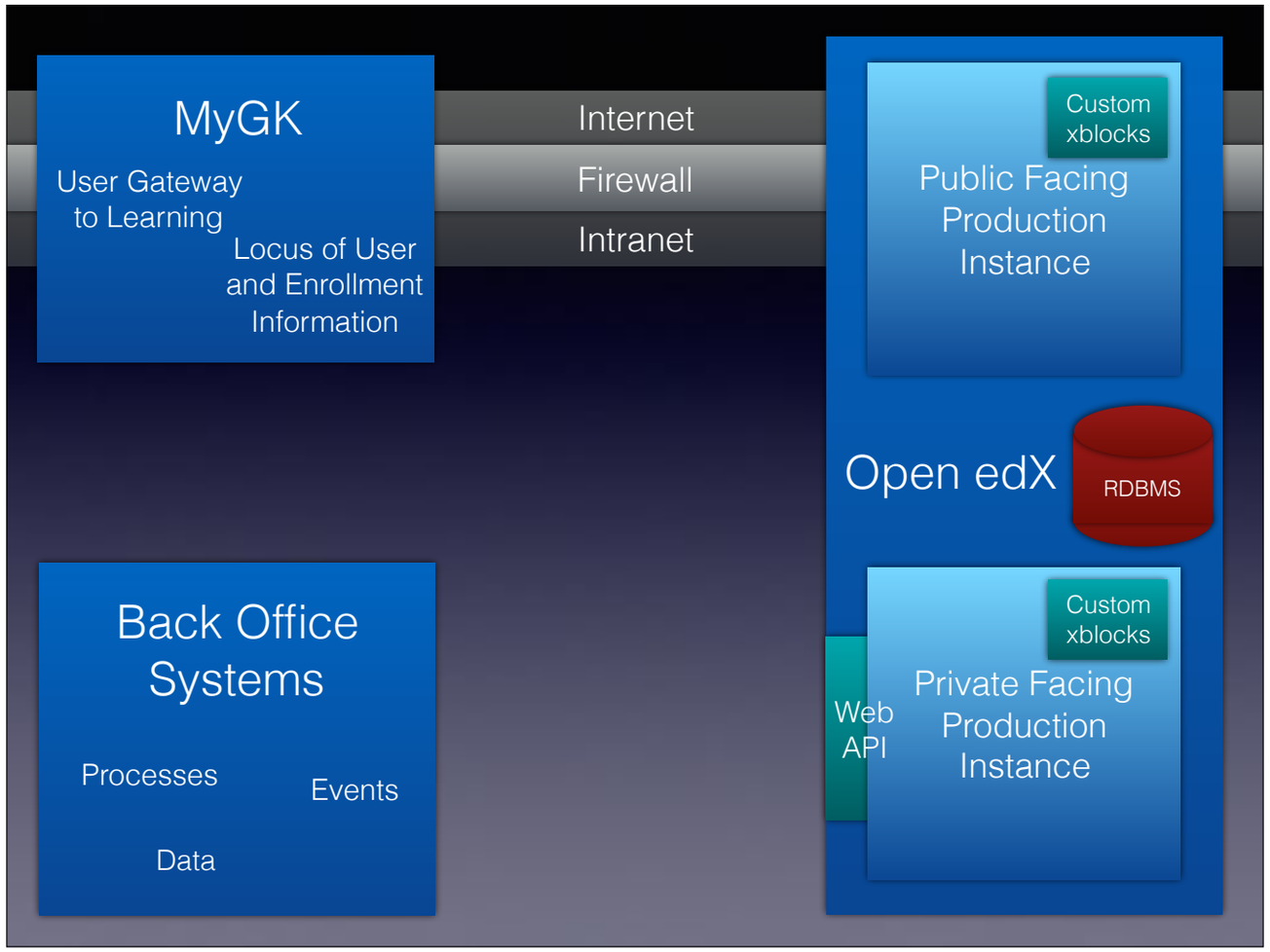

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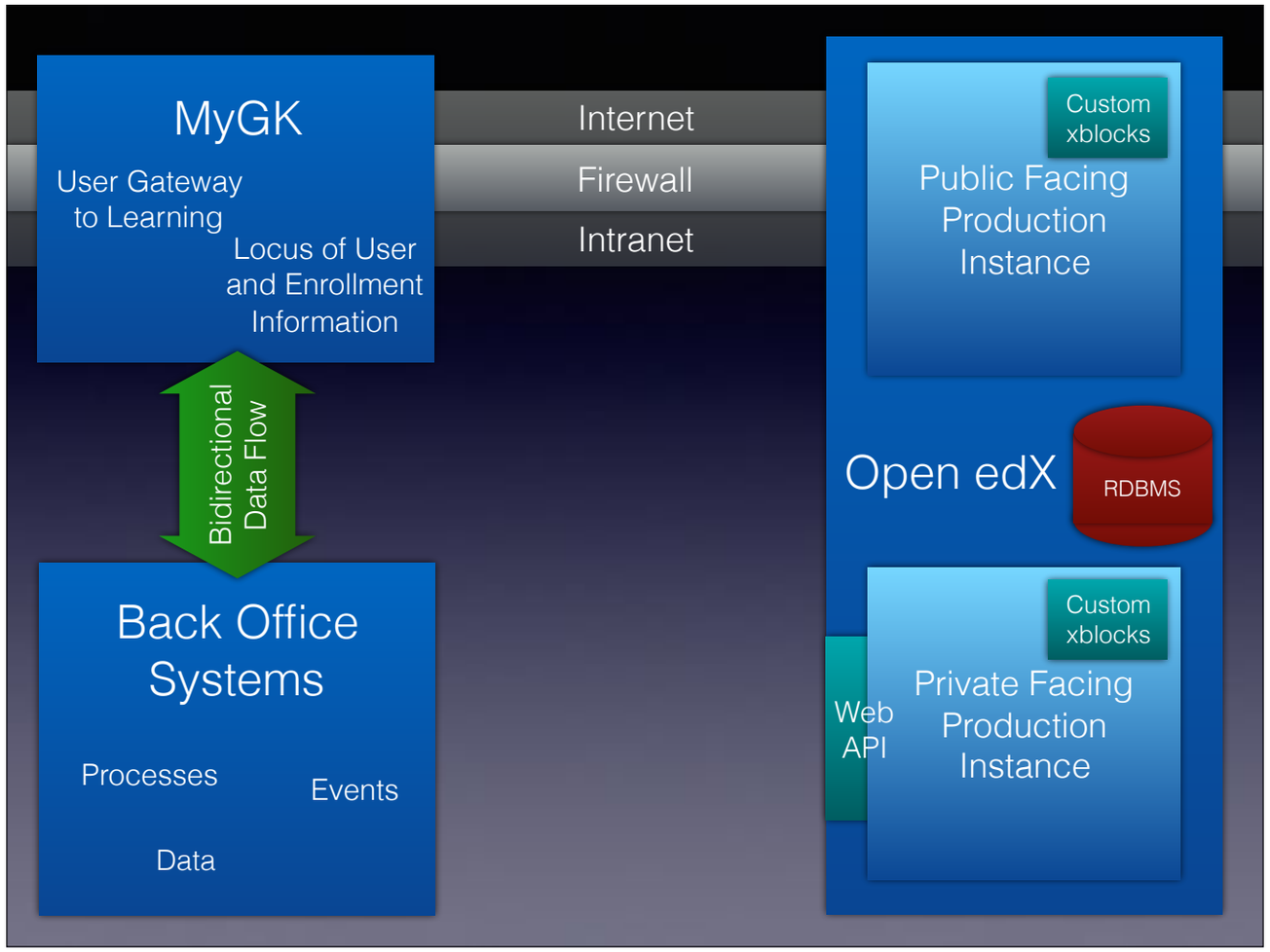

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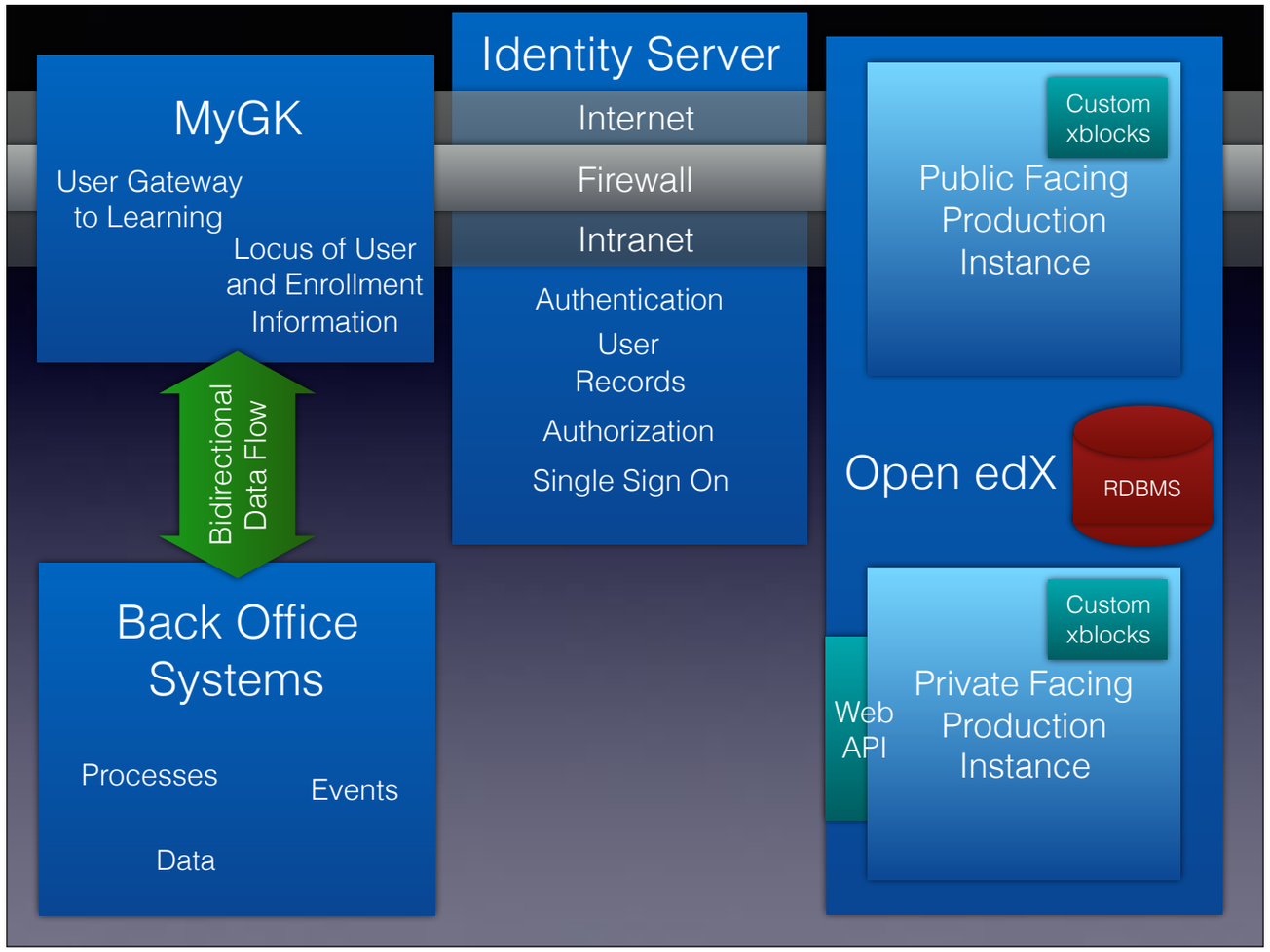

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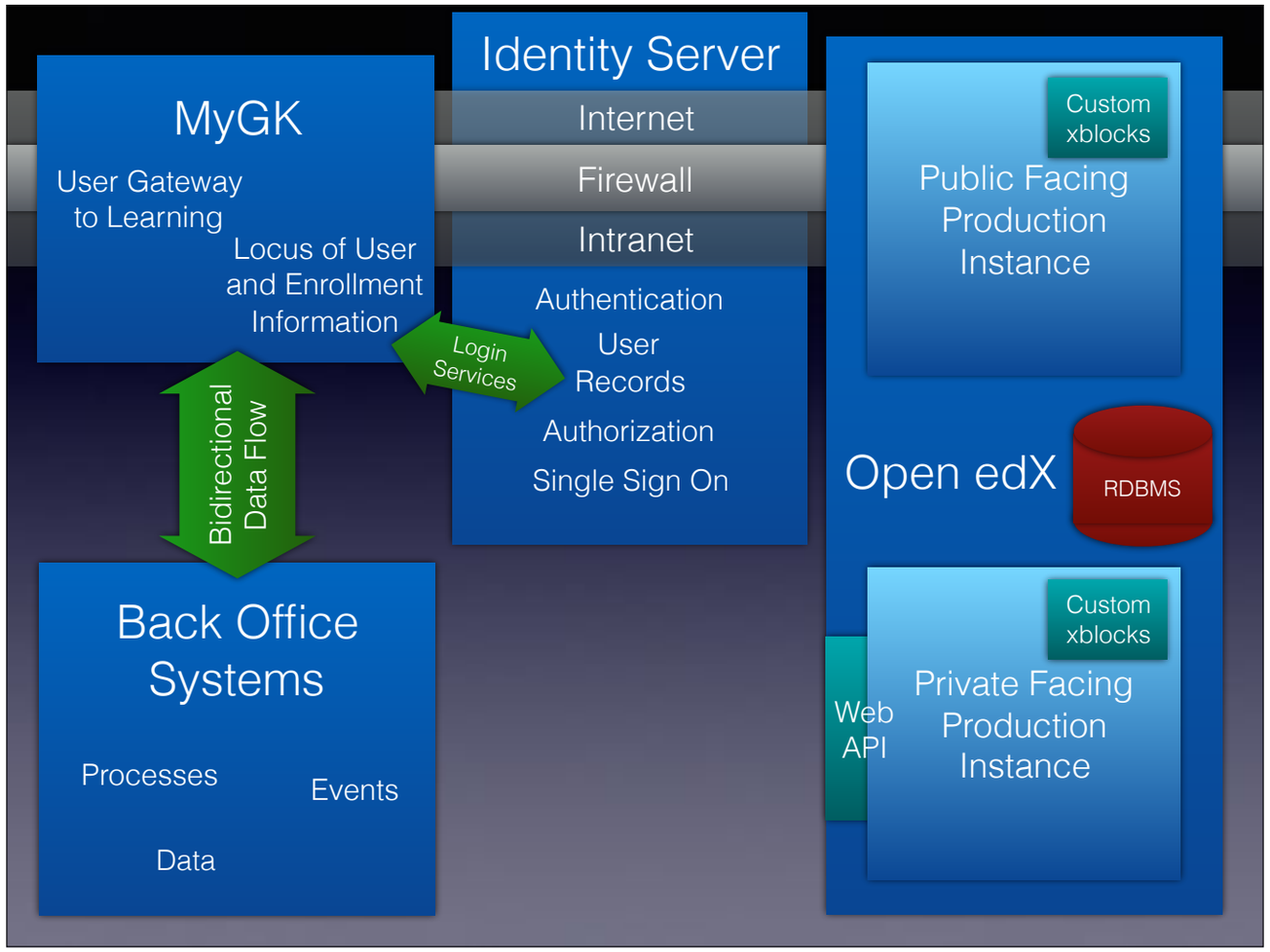

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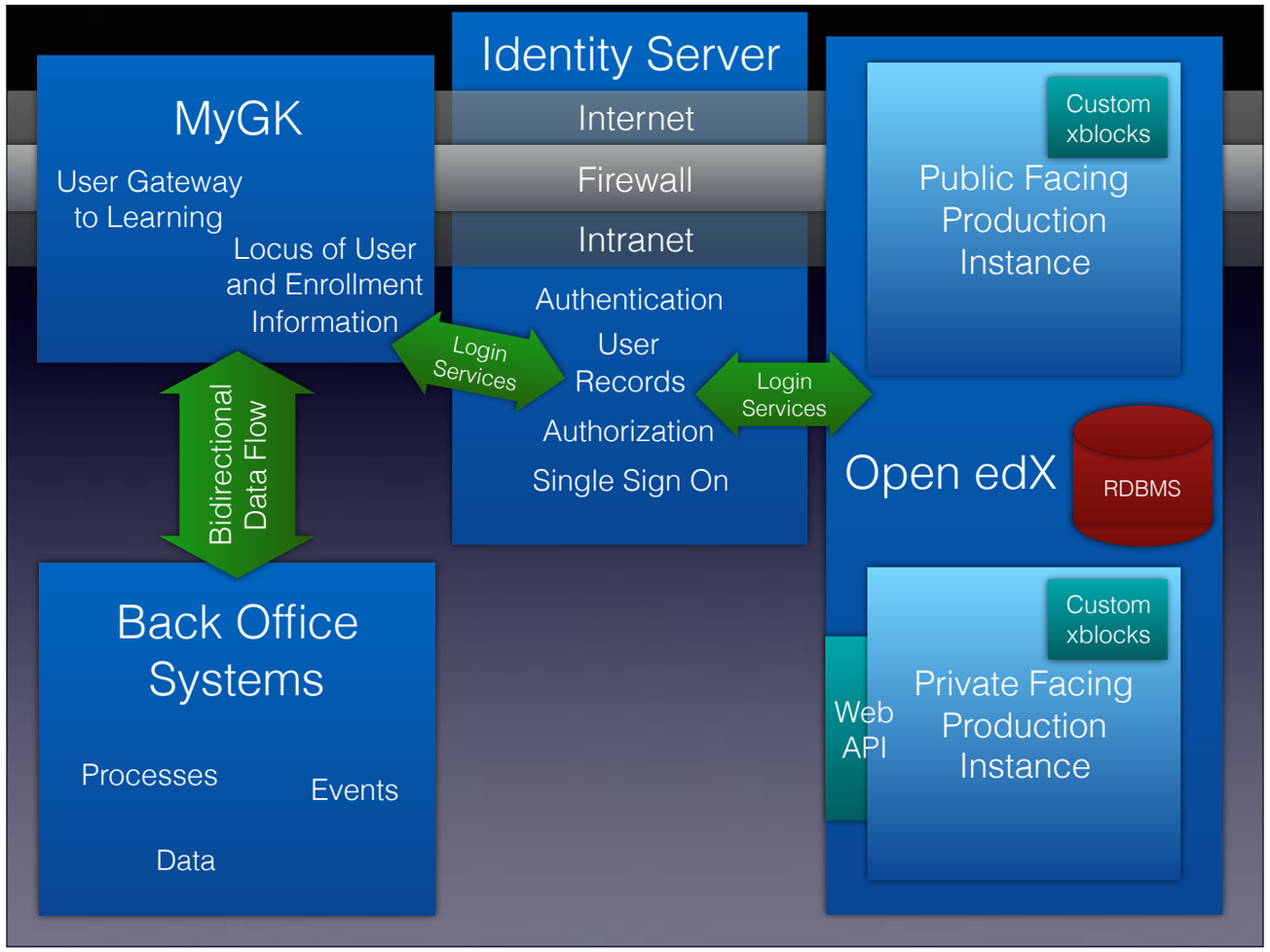

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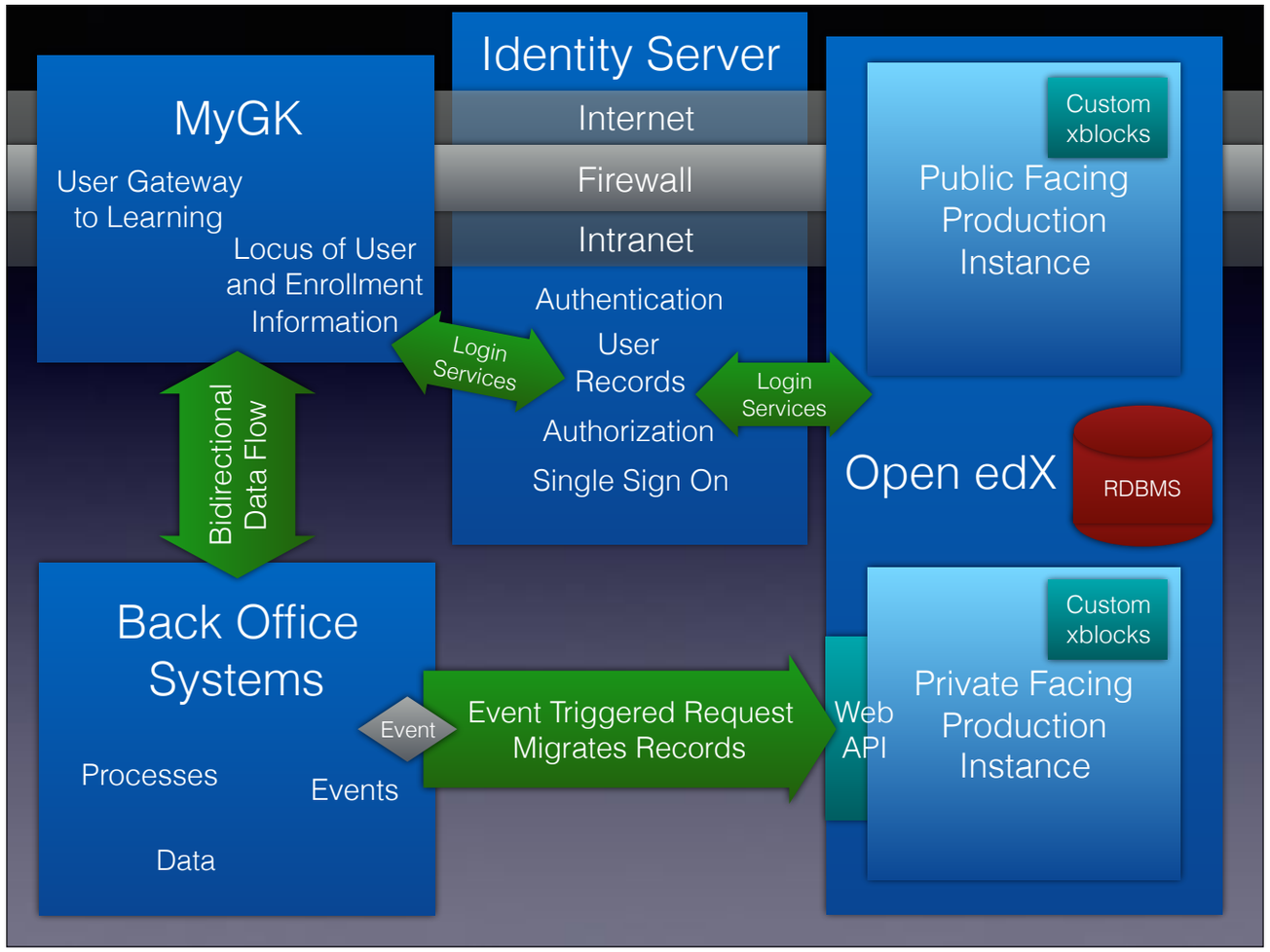

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Resource Document Definition

The migrated enrollment records are defined as a web resource for portability and cross platform compatibility. [click] The records are defined as JSON and adhere to an agreement between the different teams responsible for the different Global Knowledge systems involved. [click] The record is coarse by intention, containing both student/contact data and course enrollment data in the same JSON object definition. [click] The record is complete in its representation of the state of the student and enrollment resource, [click] containing all information to create, update or replace a record in the landing tables on Open edX.

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```
{
    "Contact": {
        "ContactID": "XXX123",
        "FirstName": "Joe",
        "LastName": "Smith",
        "Email": "joe.smith@acme.com",
        "Enrollments": [
            {
                "CourseCode": "1234A",
                "AccessStartDate": "2017-10-01",
                "AccessEndDate": "2018-09-30"
            },
            {
                "CourseCode": "1235A",
                "AccessStartDate": "2017-10-01",
                "AccessEndDate": "2018-09-30"
            },
            {
                "CourseCode": "1236A",
                "AccessStartDate": "2017-10-01",
                "AccessEndDate": "2018-09-30"
            },
        ]
    }
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Web API Definition

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- Constrains Resources by Content-Type: ***application/json***
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Web API Implementation

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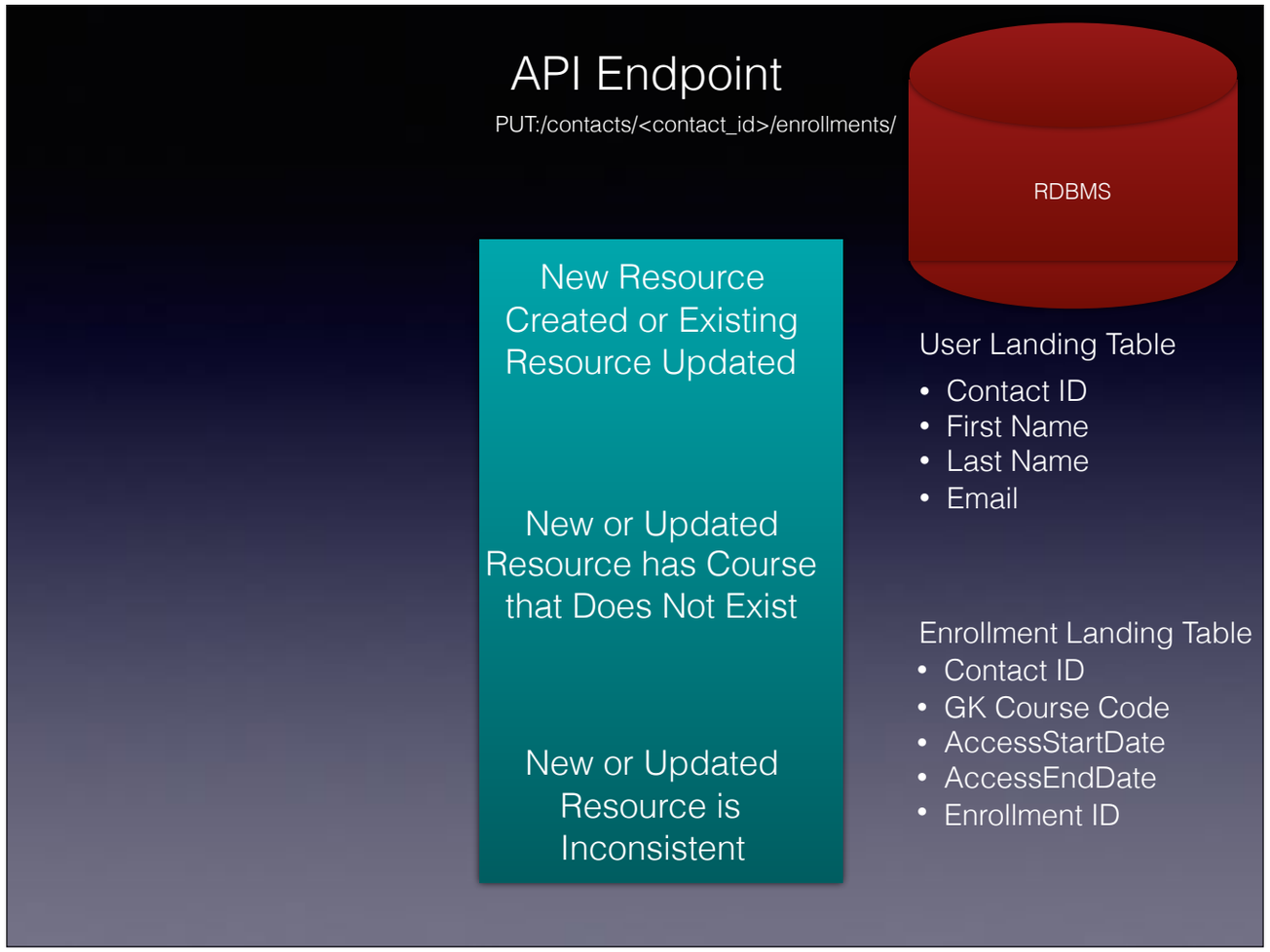

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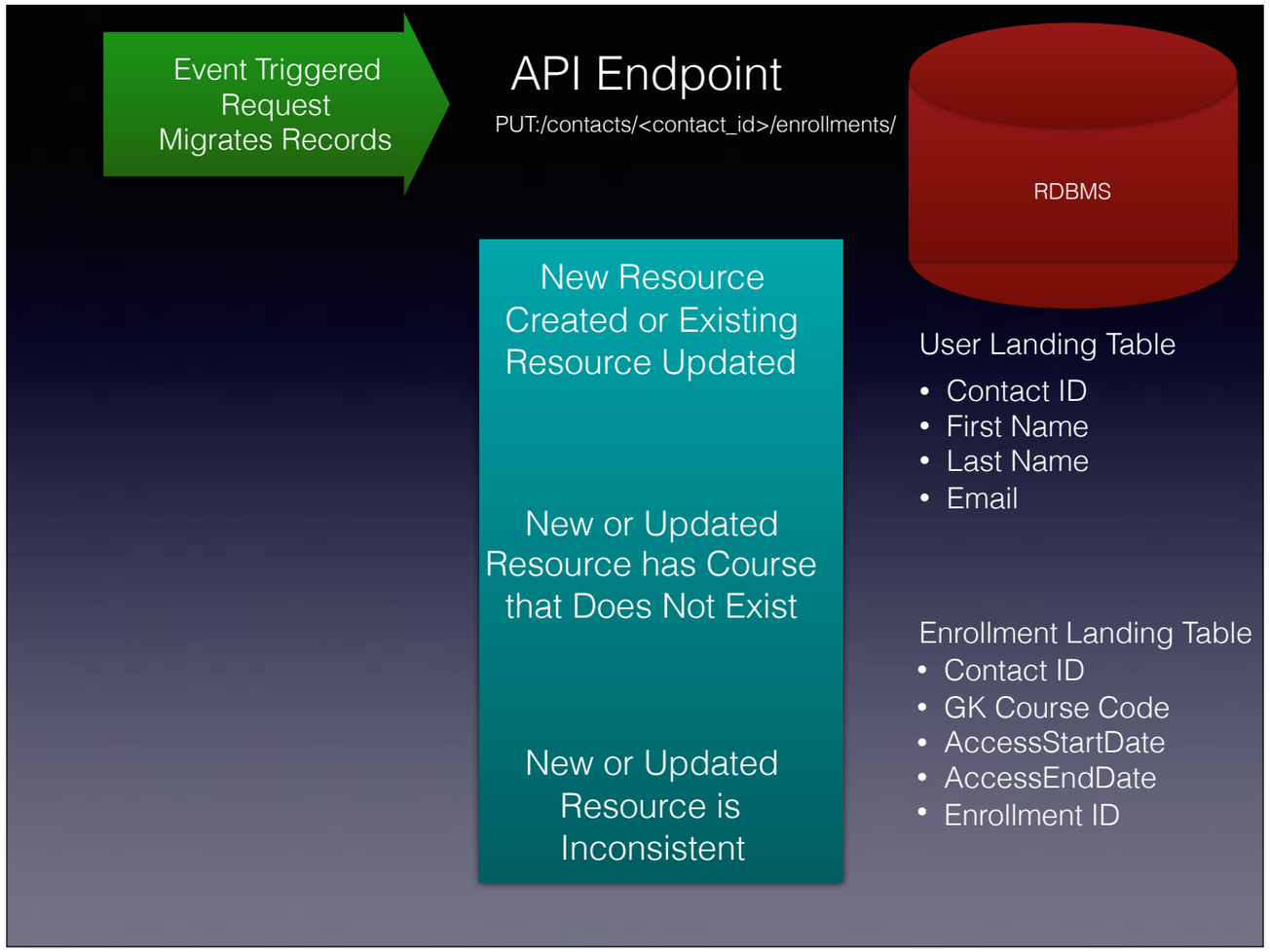

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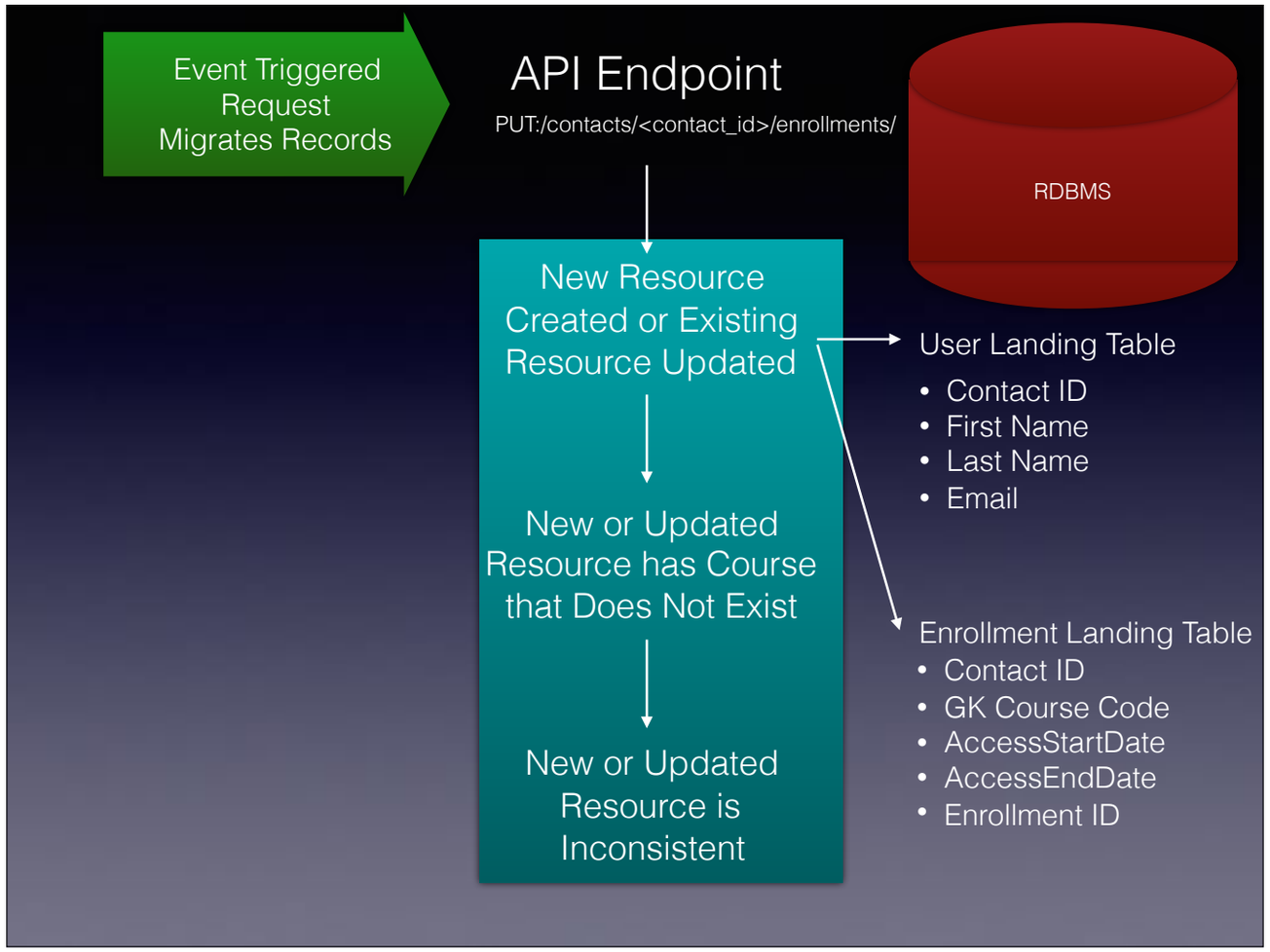

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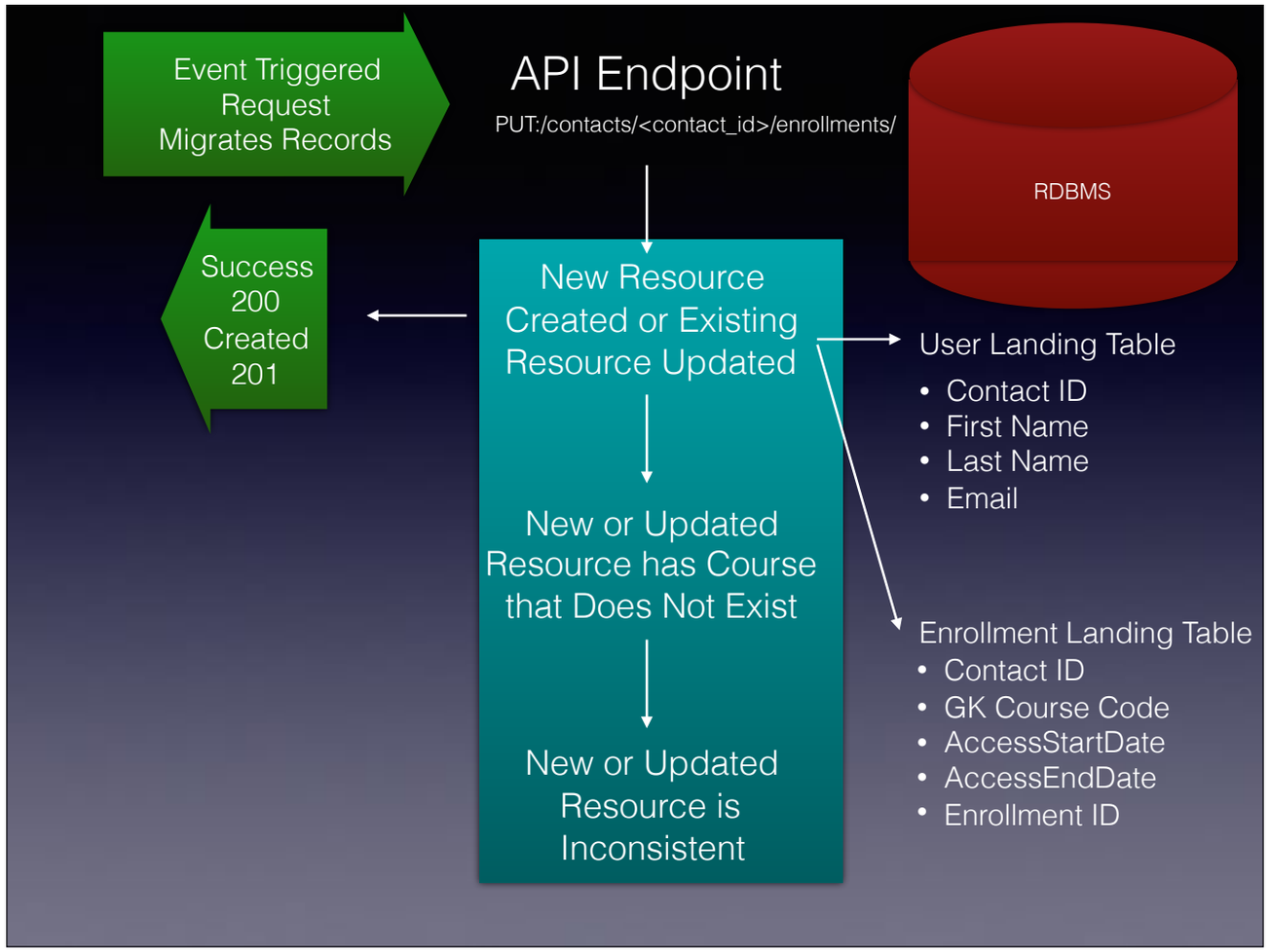

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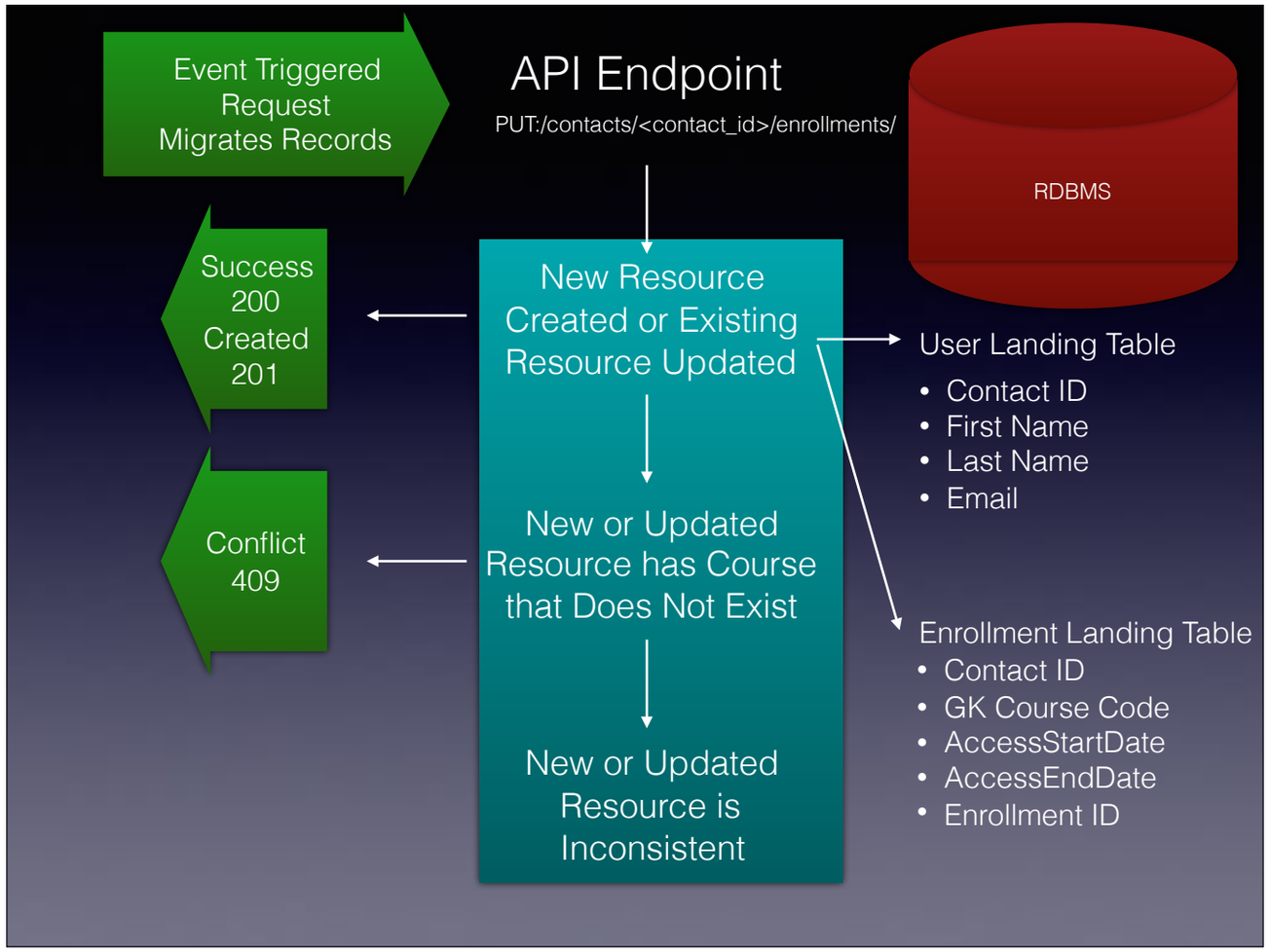

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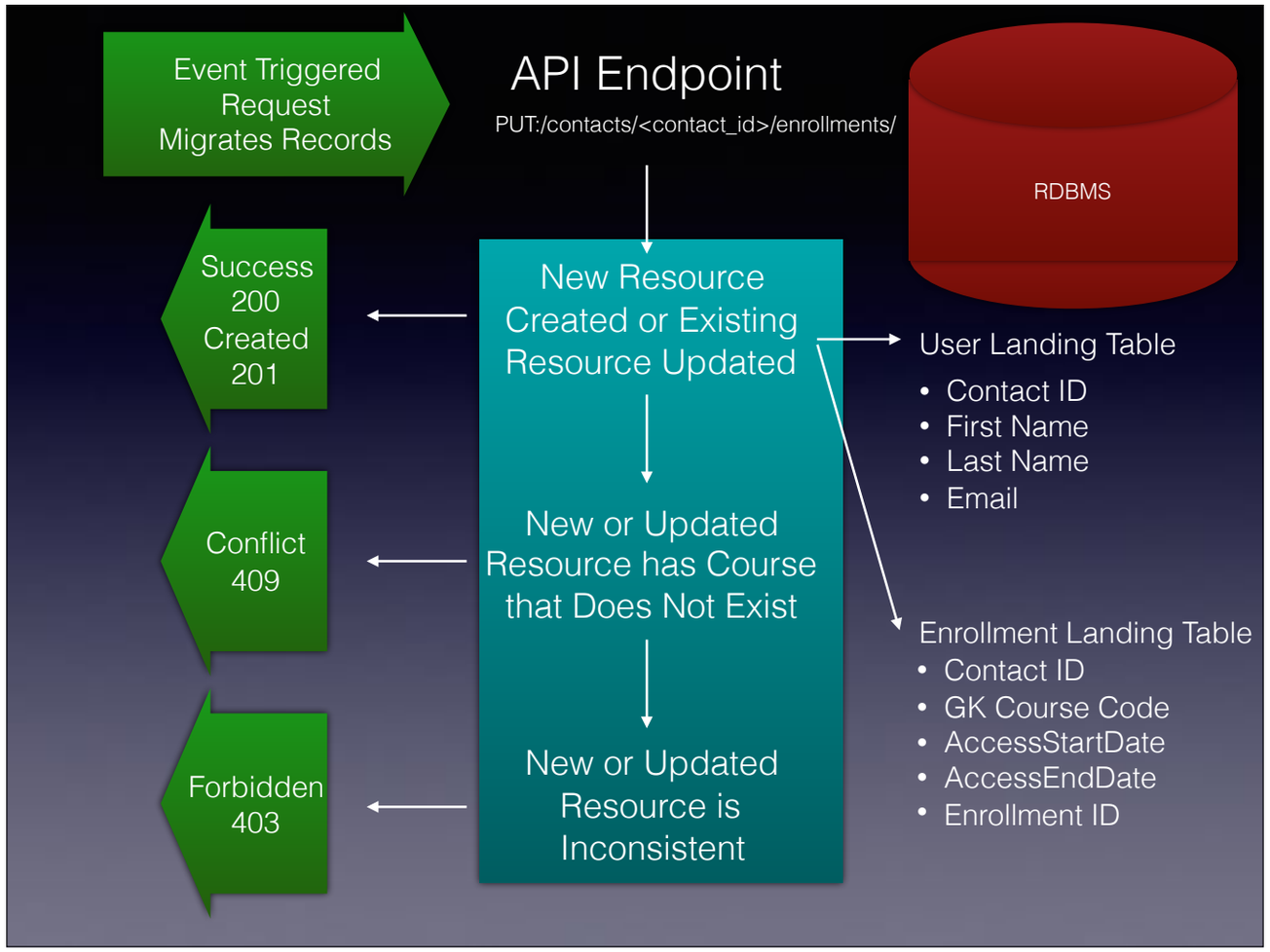

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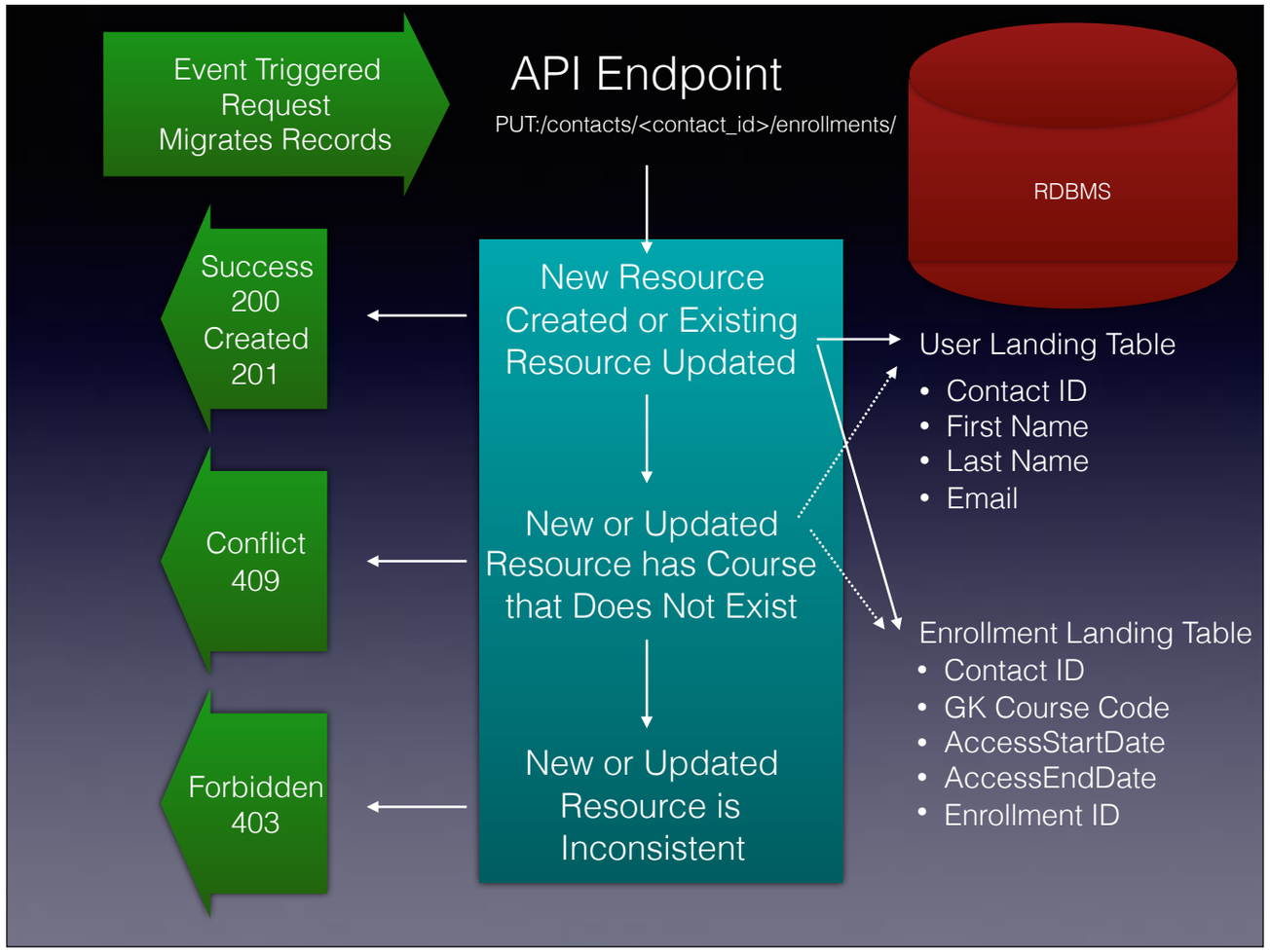

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Creating & Updating Open edX Students & Enrollments

With the migration of the resources from the Global Knowledge back office to the landing tables in Open edX complete, we'll turn our attention to how we integrated the creation of the native student and enrollment records in Open edX.

Web API App

The Web API as a Django web app, contains URL routing and view components [click], with Global Knowledge business logic [click] encapsulated away from web request and response management. The Open edX core libraries [click] are a dependency at the view and controller level. The processing or attempted processing of the resource determines the response status and how the upstream services will manage the response. The landing tables create a record on Open edX for implementing custom business logic for Global Knowledge, but Open edX native records still need to be created and updated in Open edX's tables. The controllers orchestrate the creation of the Open edX native user and enrollment records.

Web API App

URL Routing

```
from django.contrib.auth.models import User
from django.core.exceptions import ValidationError

from social_apps.django_app.default.models import UserSocialAuth

from rest_framework.views import APIView

from student.roles import GlobalStaff
from student.auth import user_has_role
from student.views import create_account_with_params, AccountValidationError
from openedx.core.lib.exceptions import CourseNotFoundError
from openedx.core.djangoapps.user_api.accounts.api import check_account_exists
from openedx.core.djangoapps.content.course_overviews.models import CourseOverview


def process_resource(request):
    '''Process resource
    [...
    ...


class WebAuthViewAPIView(
    APIView):

    def put(self, request, contact_id, format=None):
        '''Handle requests to migrate records from the back office.
        ...
        ...

        process_request(request.data)
```

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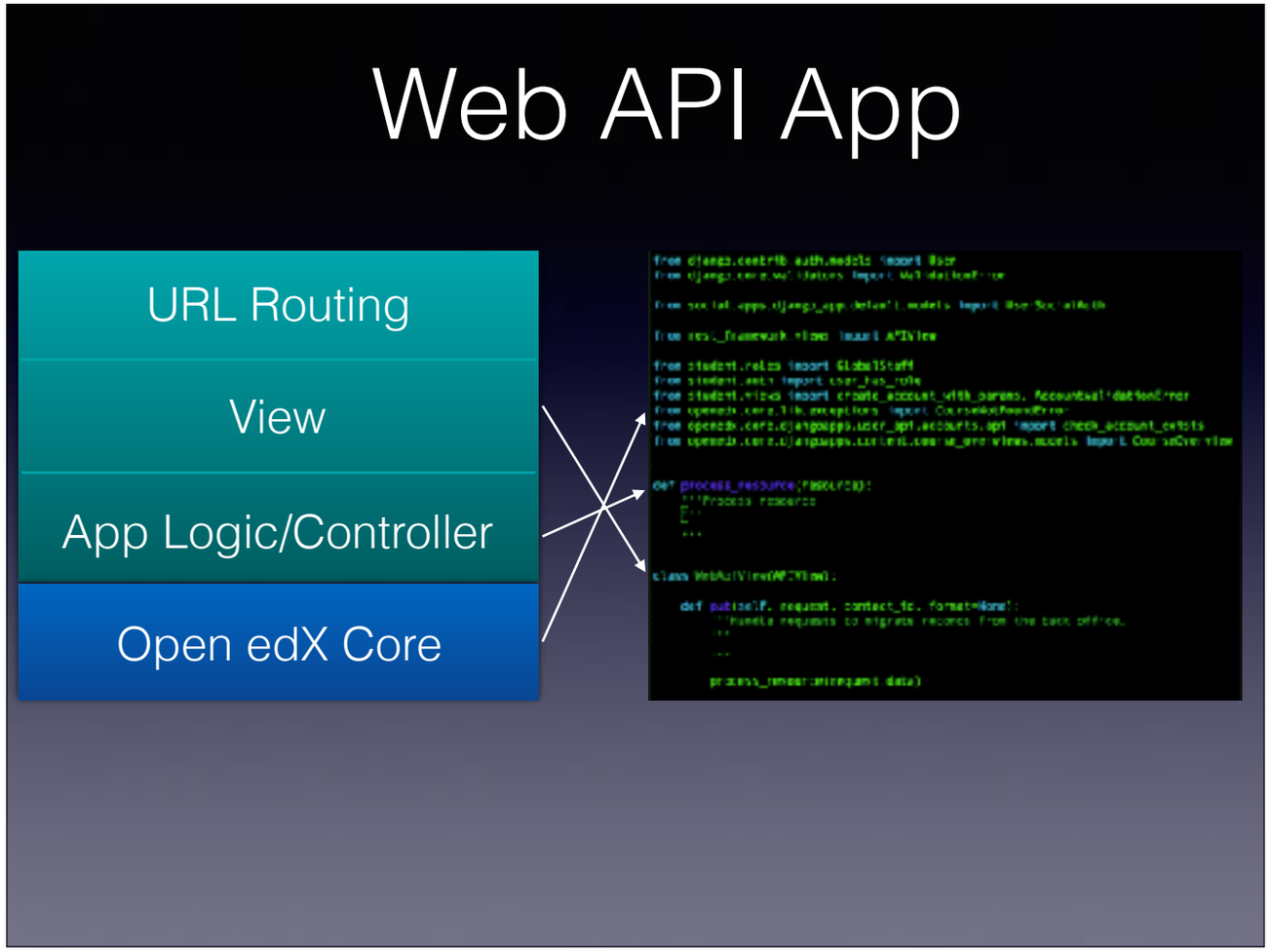

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For two Global Knowledge features we realized that we needed to extend the functionality of existing Open edX pages. We found the best way to go about doing this was to add the necessary data to the pages by adding Javascript to the edX theming templates to make Ajax calls to custom web APIs. [click]

APIs for Ajax Functionality

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Similar to the web API for users and enrollments we have book markable URLs [click], request data is constrained to JSON [click], and we made idiomatic use of HTTP methods and status codes [click]. A theme is emerging, the extensibility's available through the development of Django apps for the server, and the ability to add functionality on the client side with Open edX's theming drive a lot of Open edX integrations at Global Knowledge.

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The mentor data to drive this feature is entered and managed through the Django admin interface. Mentor information is entered per course through the Django admin. Allowing non-developers to change the mentor data as needed through a role audited and password protected interface. Each message sent through the mentor relay is logged via the creation of a MentorMessage instance which is persisted to the Open edX datastore.

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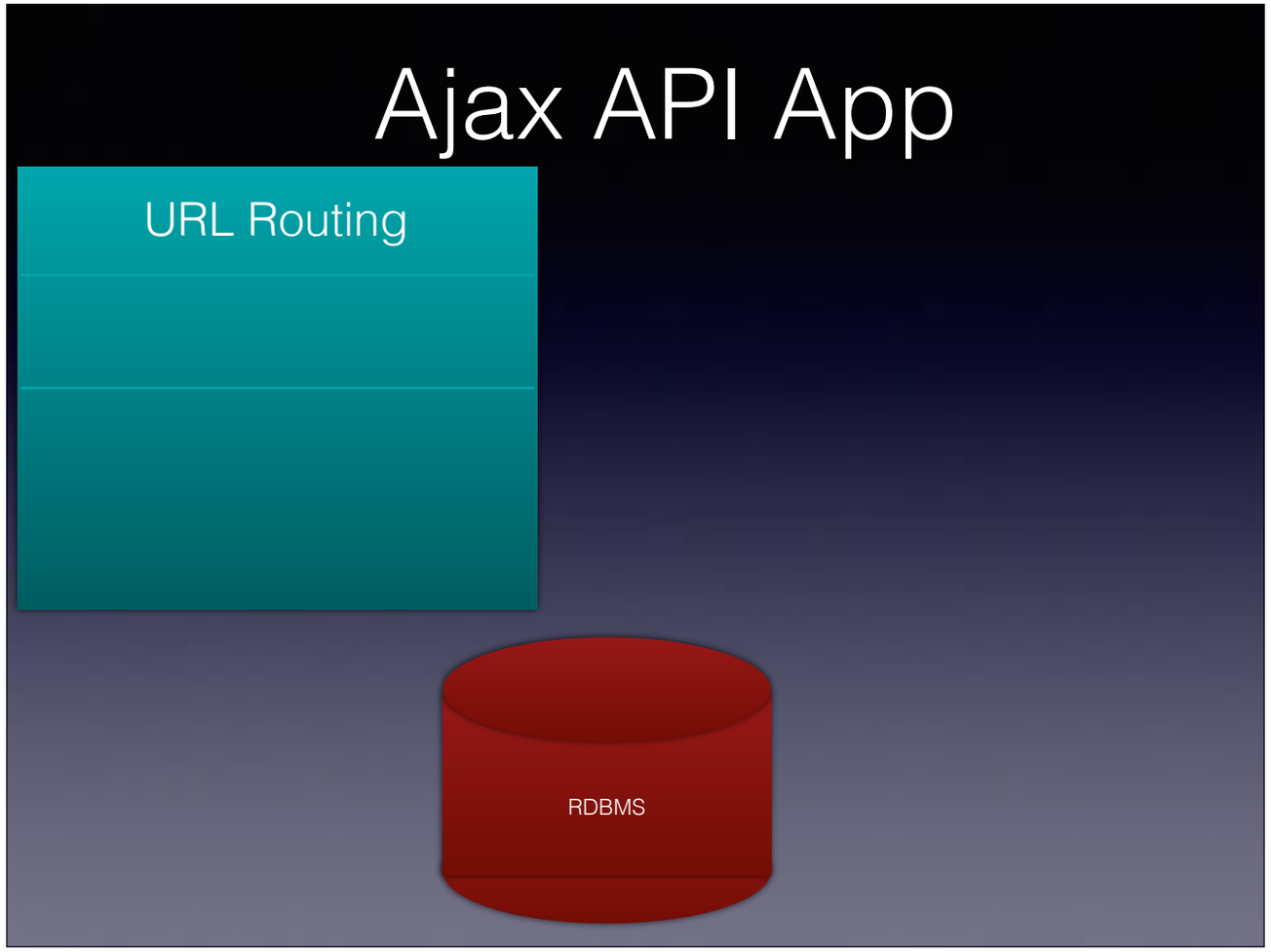

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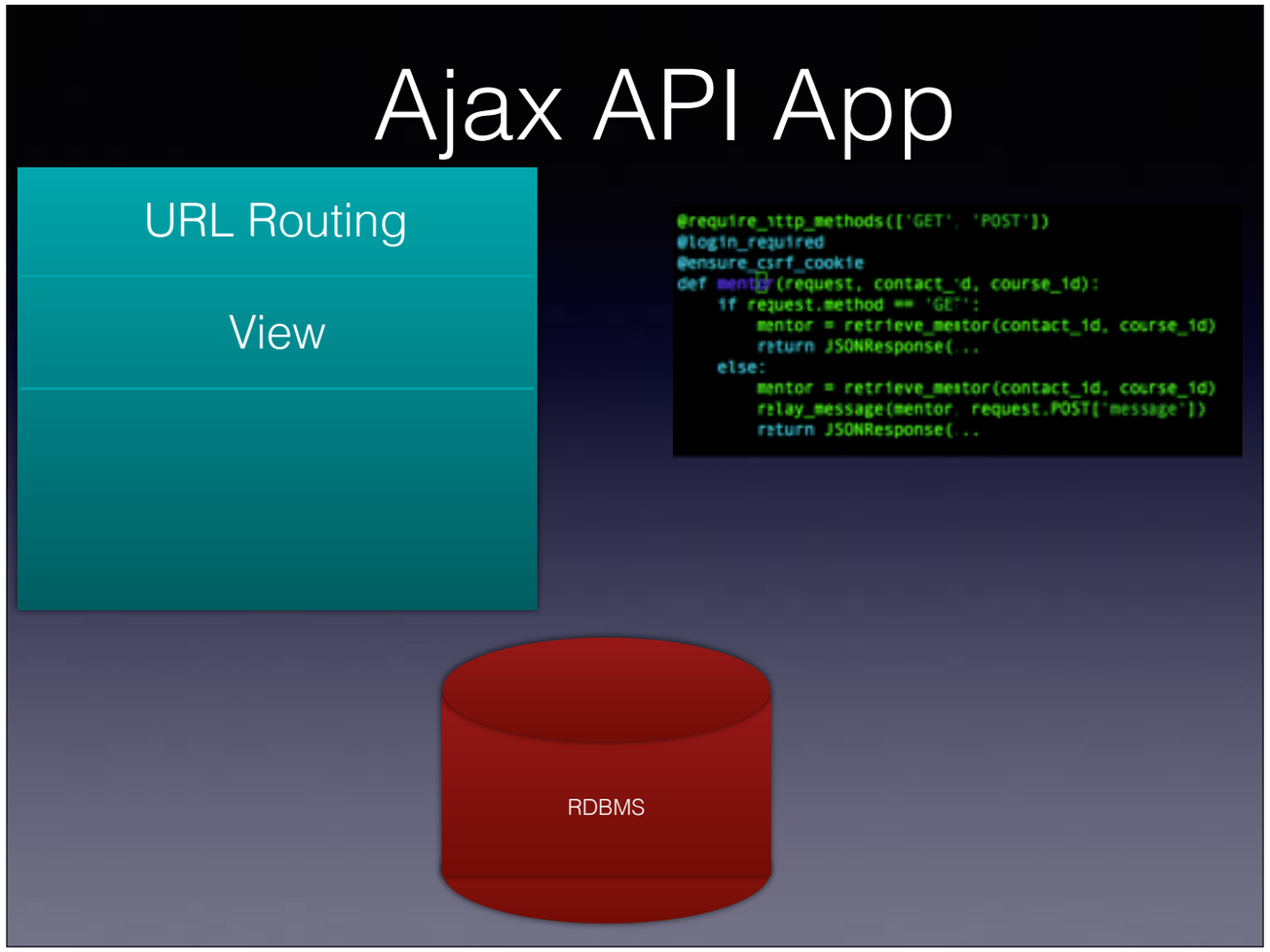

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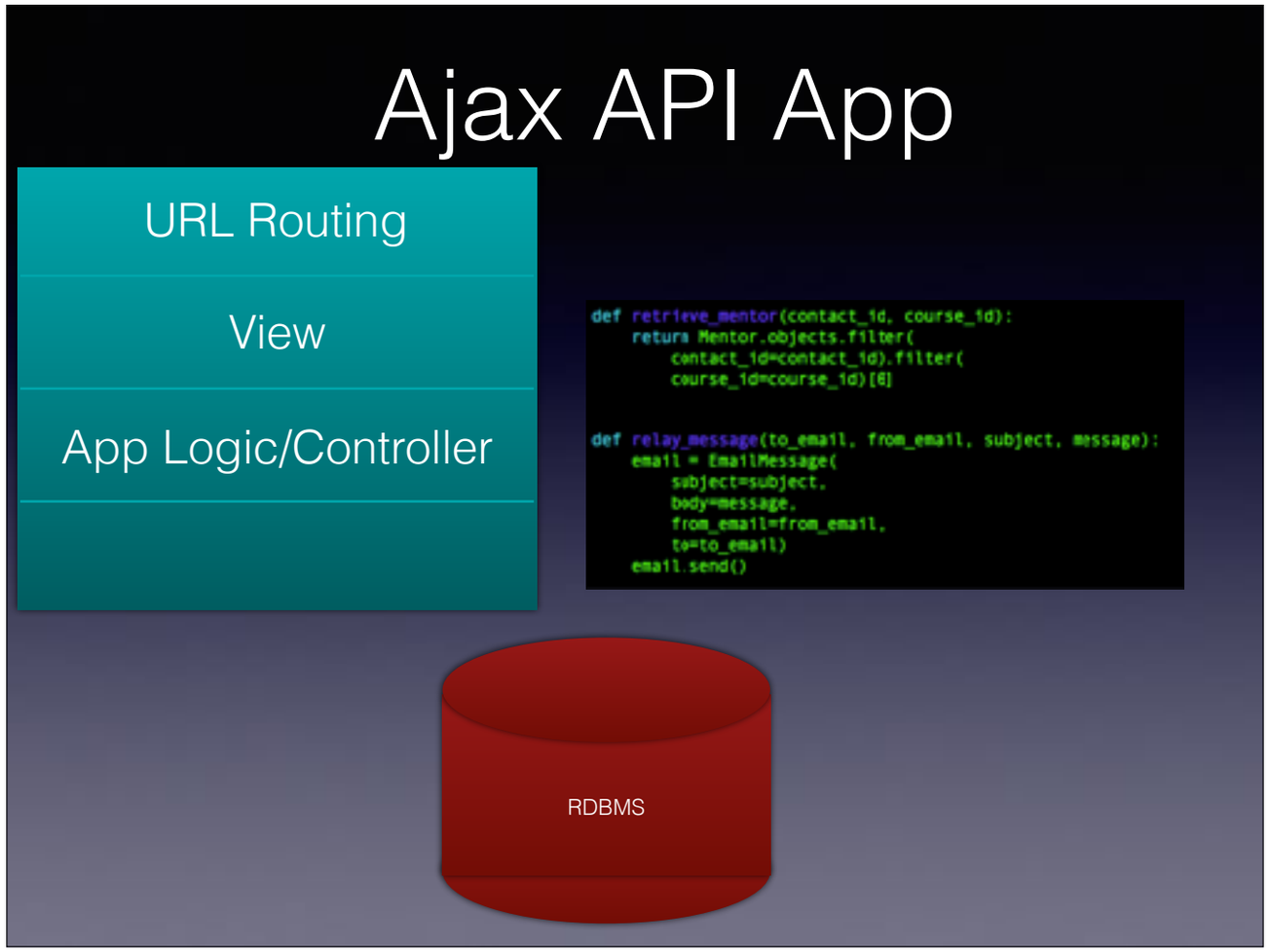

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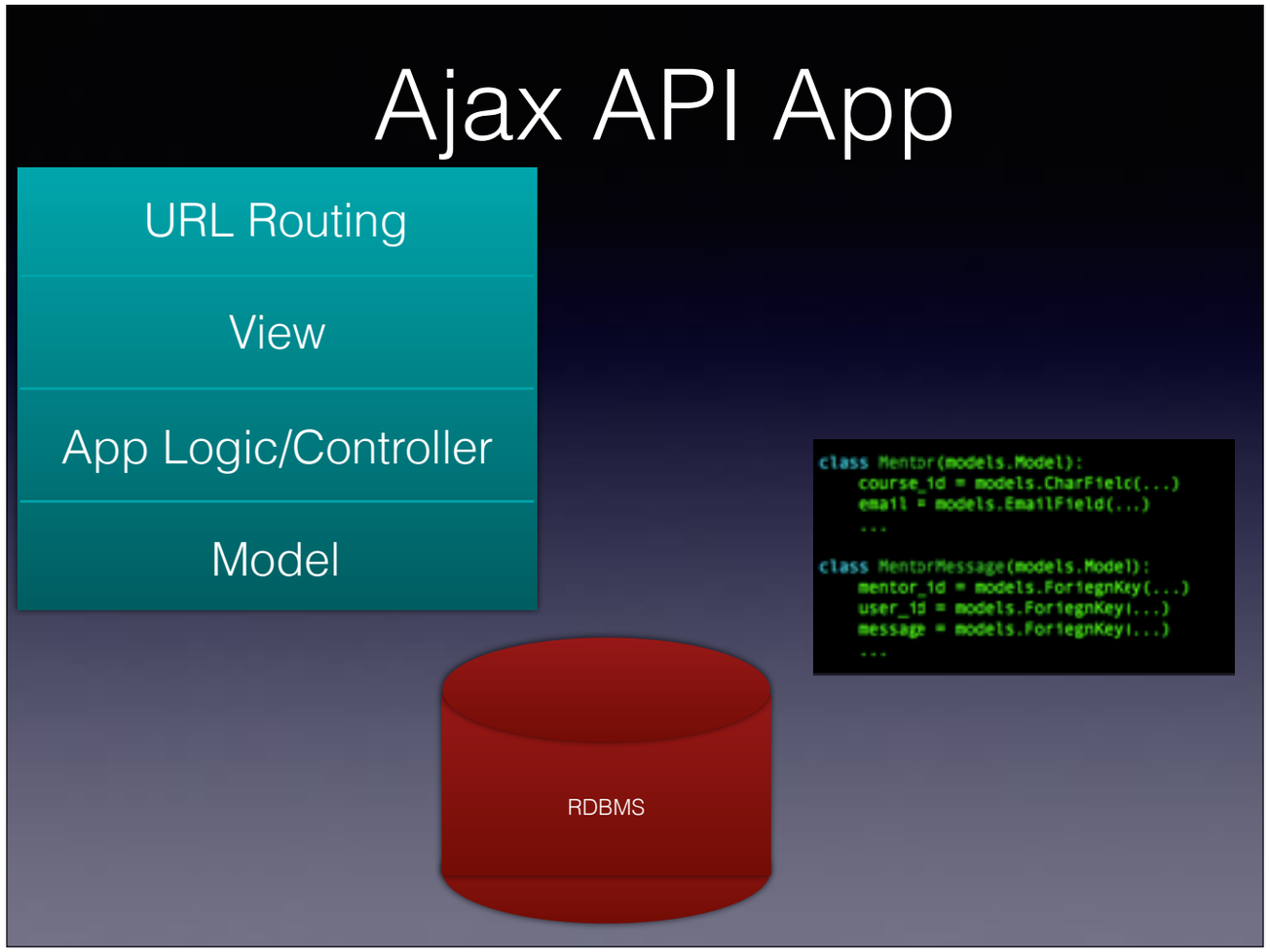

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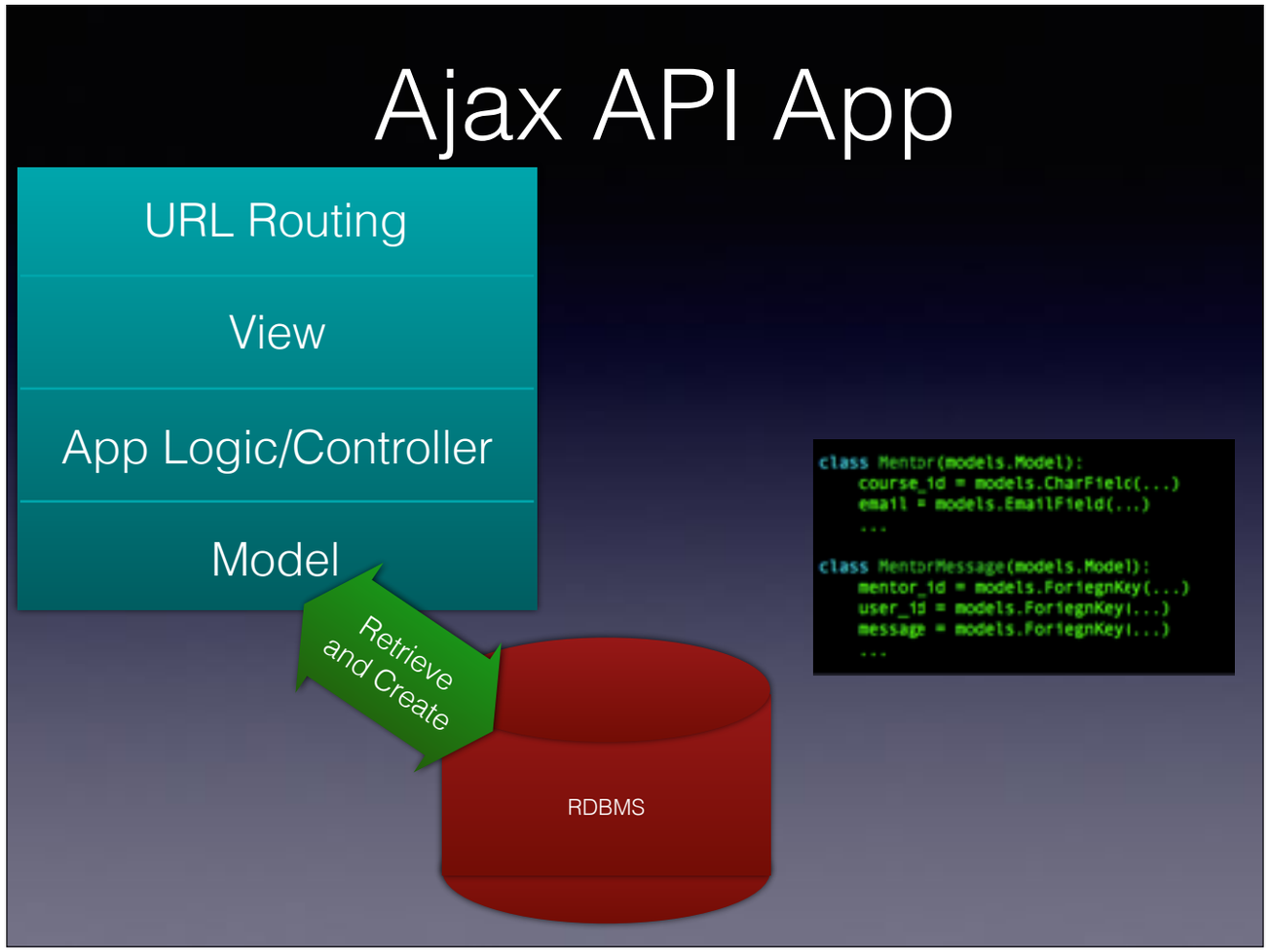

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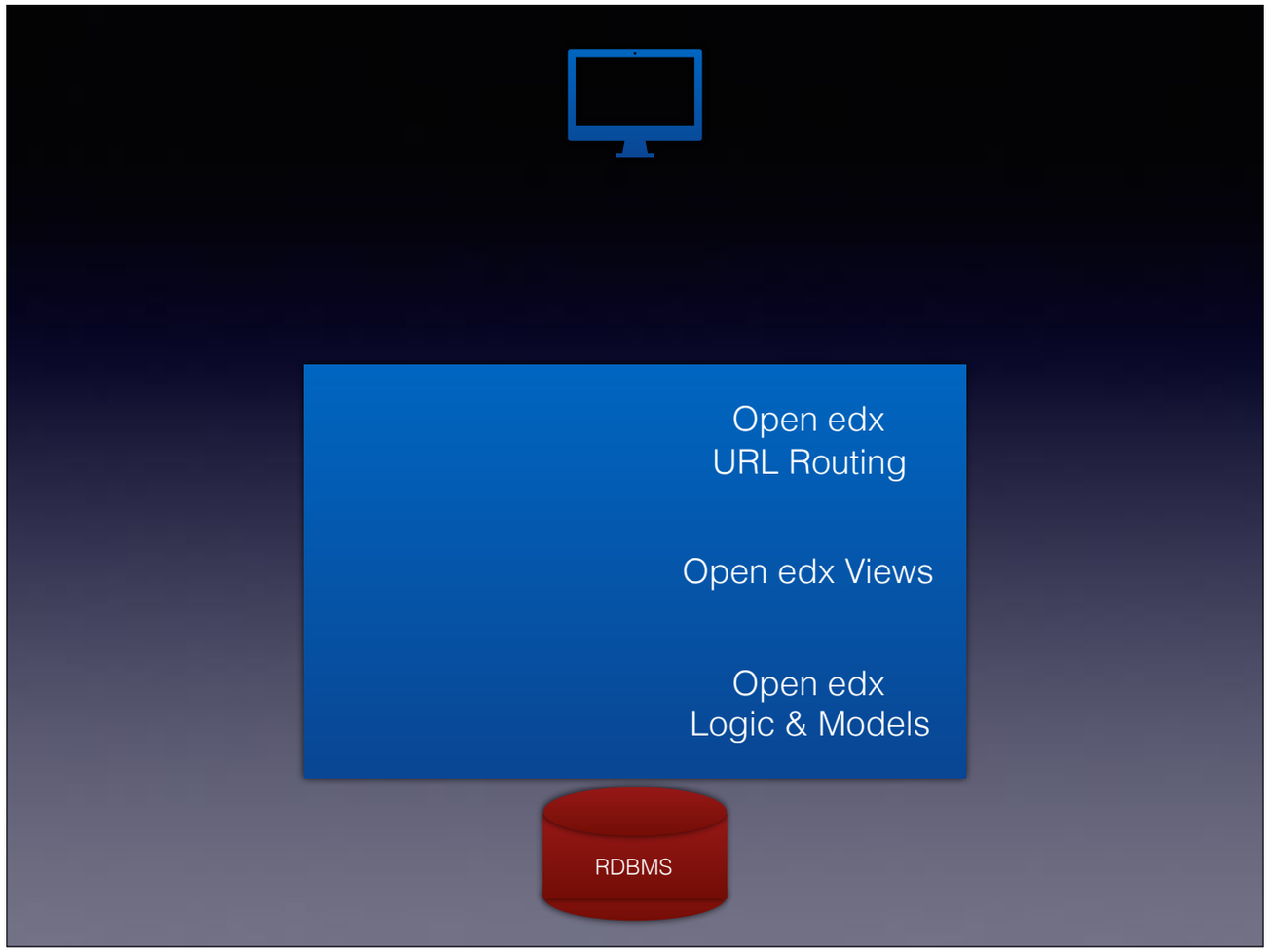

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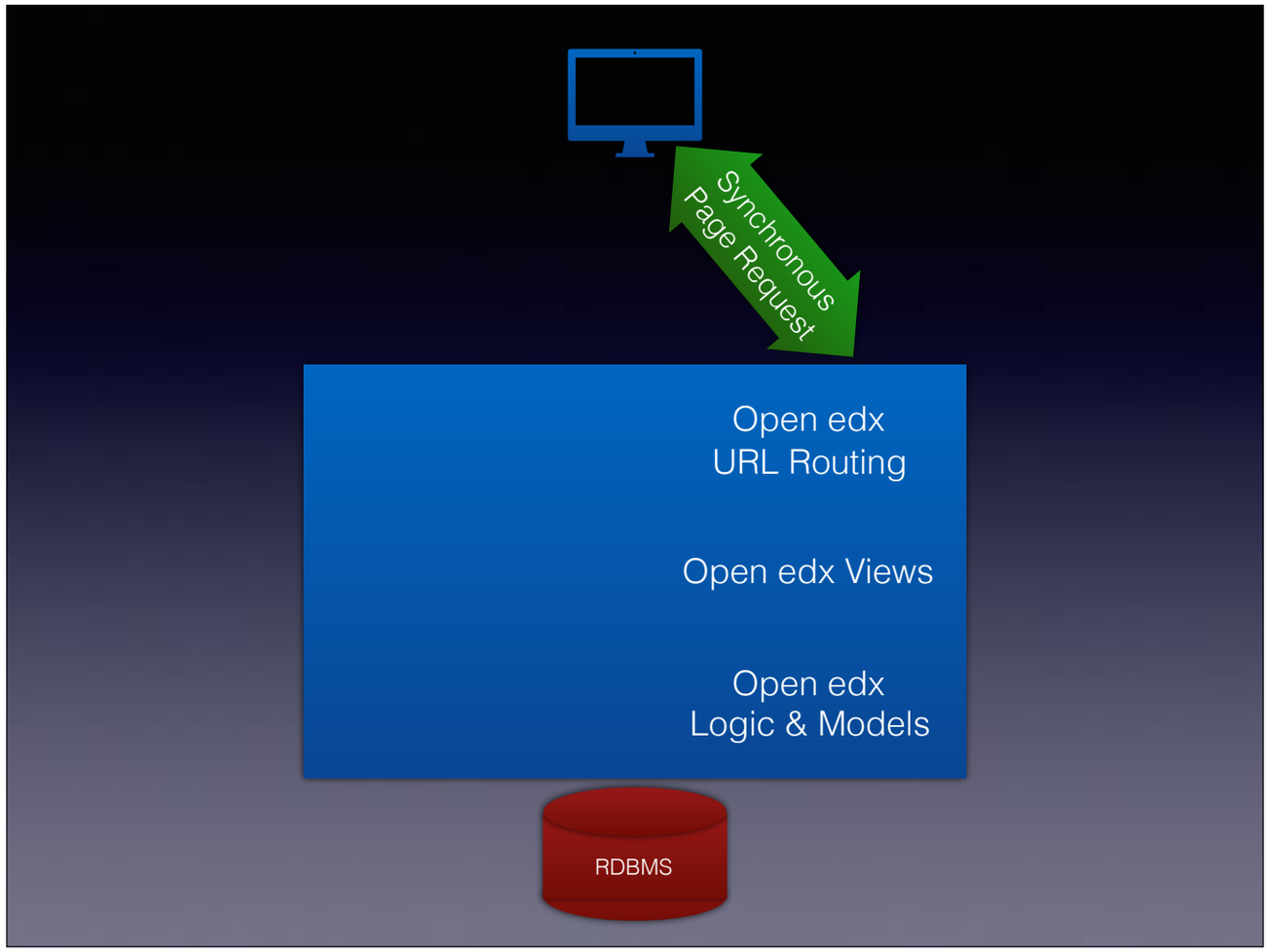

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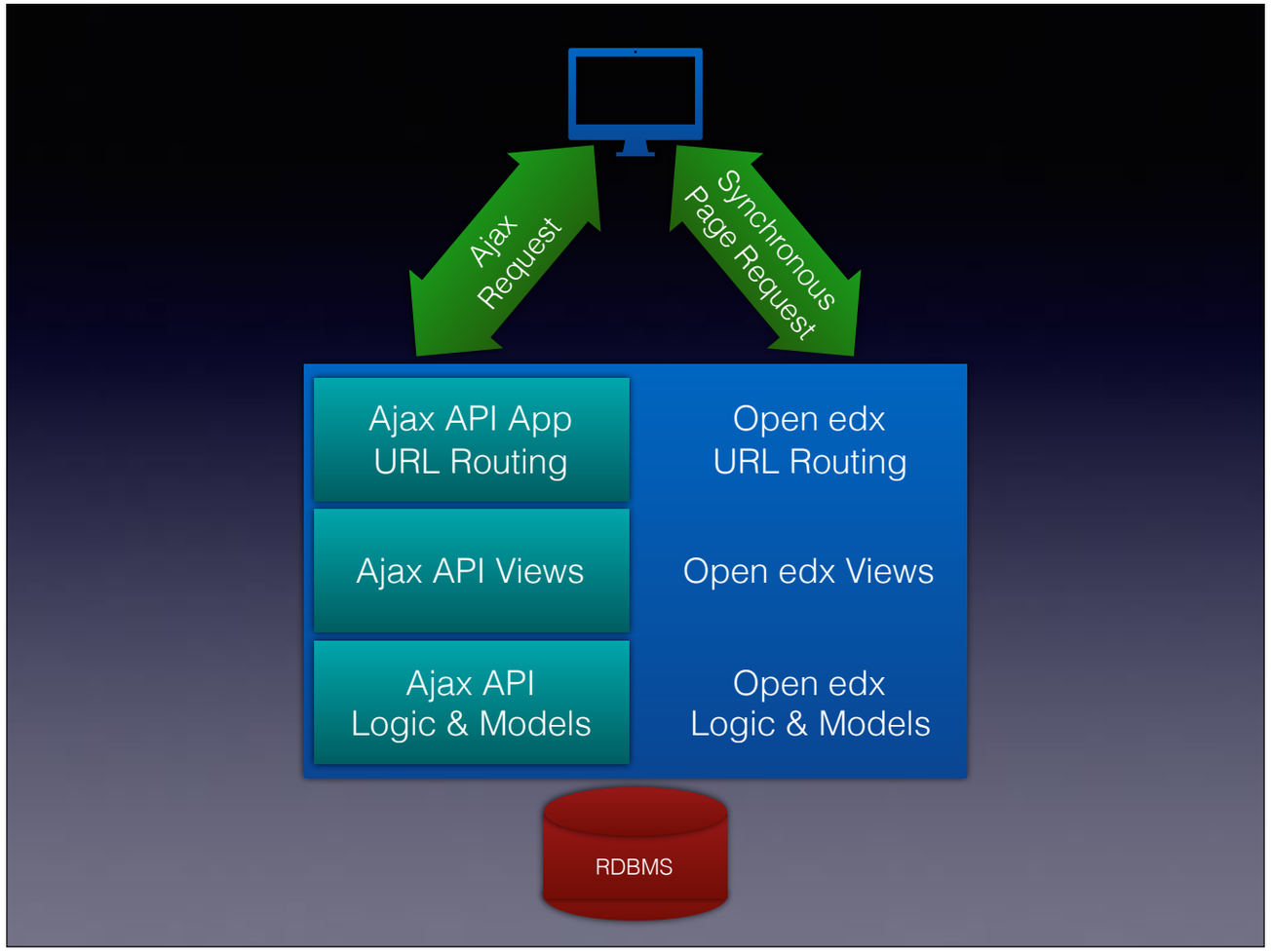

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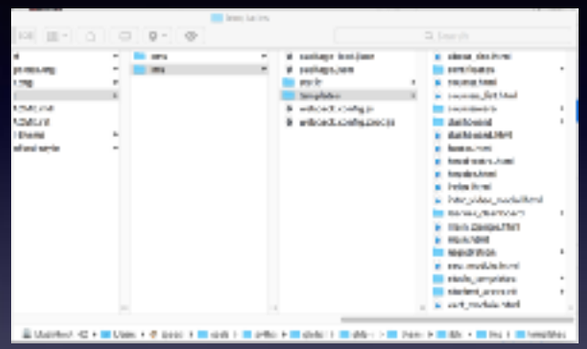
Open edX Theme

- Find Template in Theme to Edit



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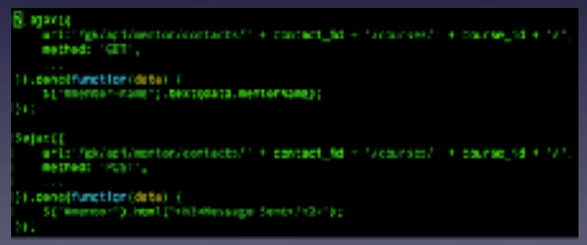

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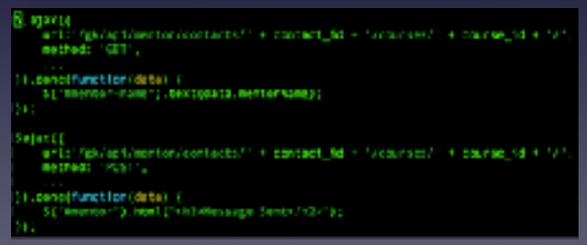

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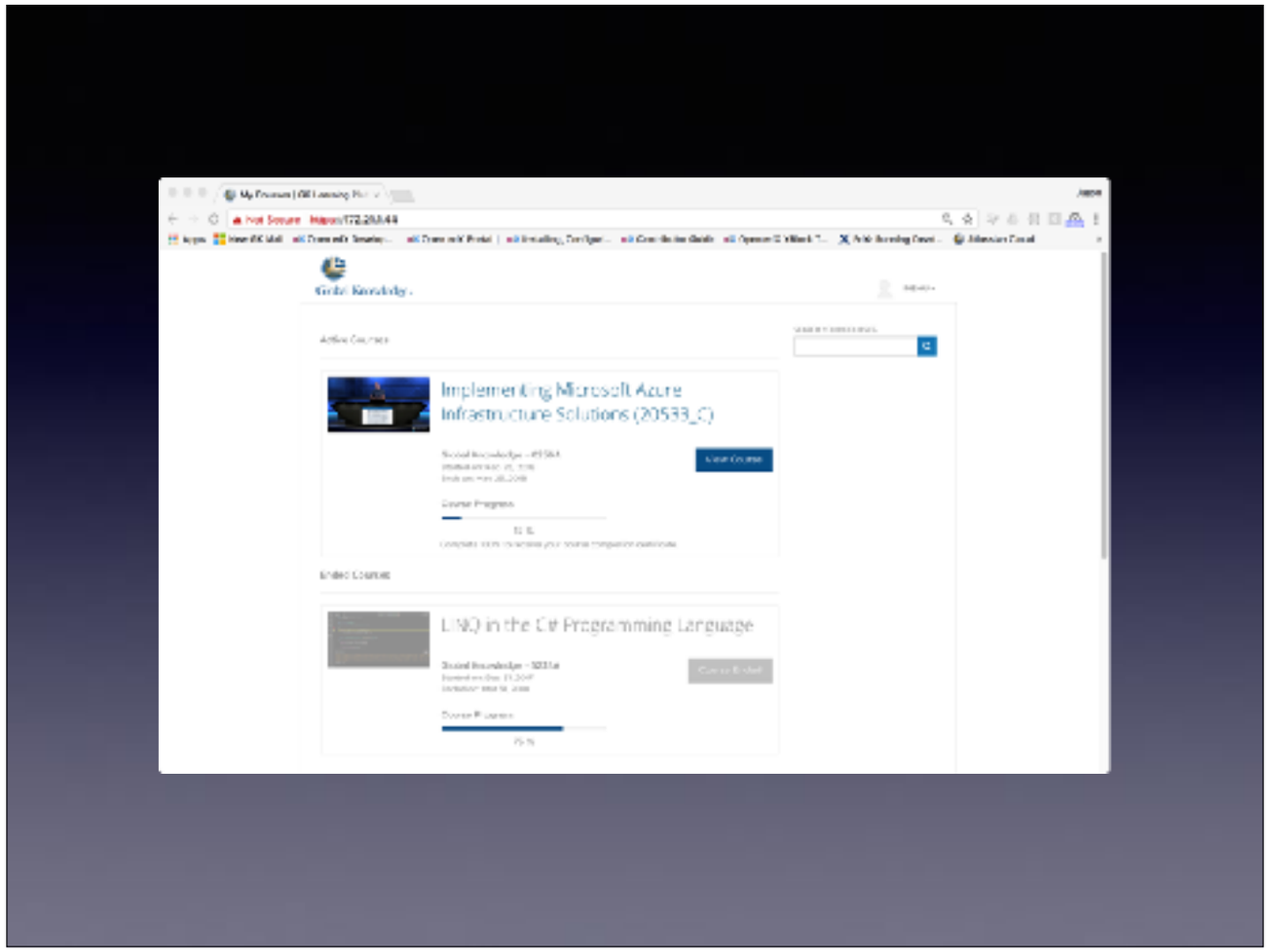

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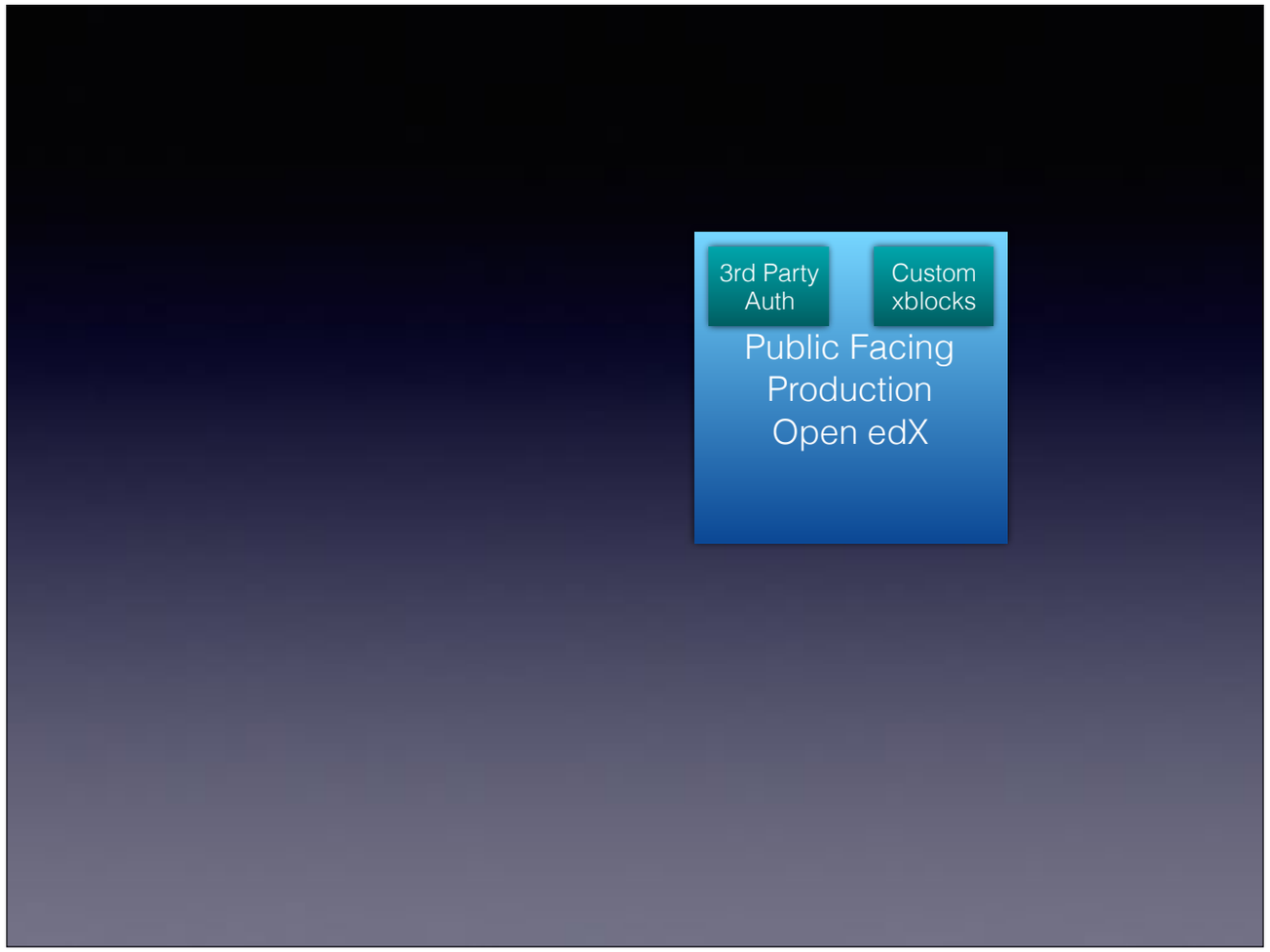

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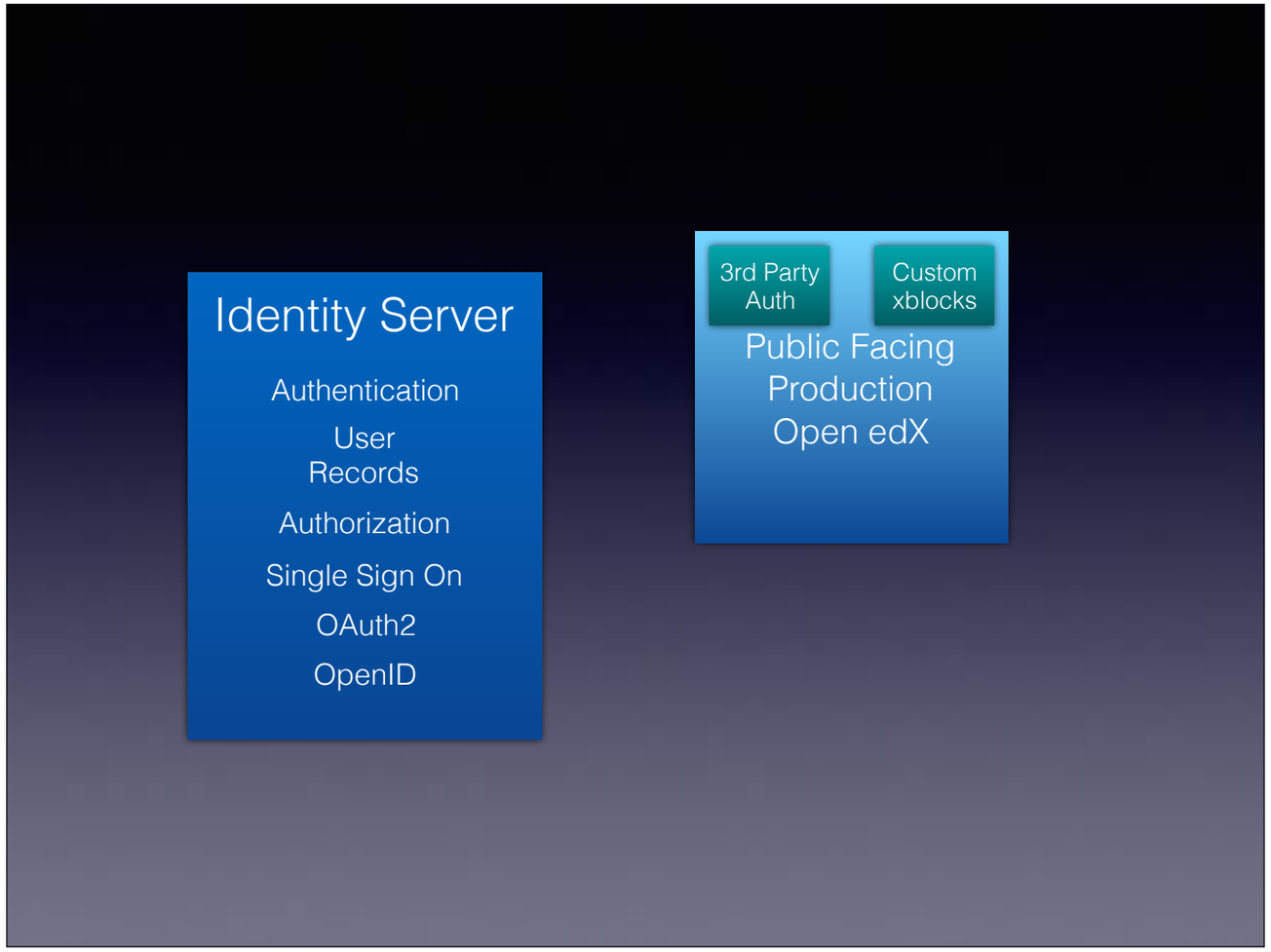

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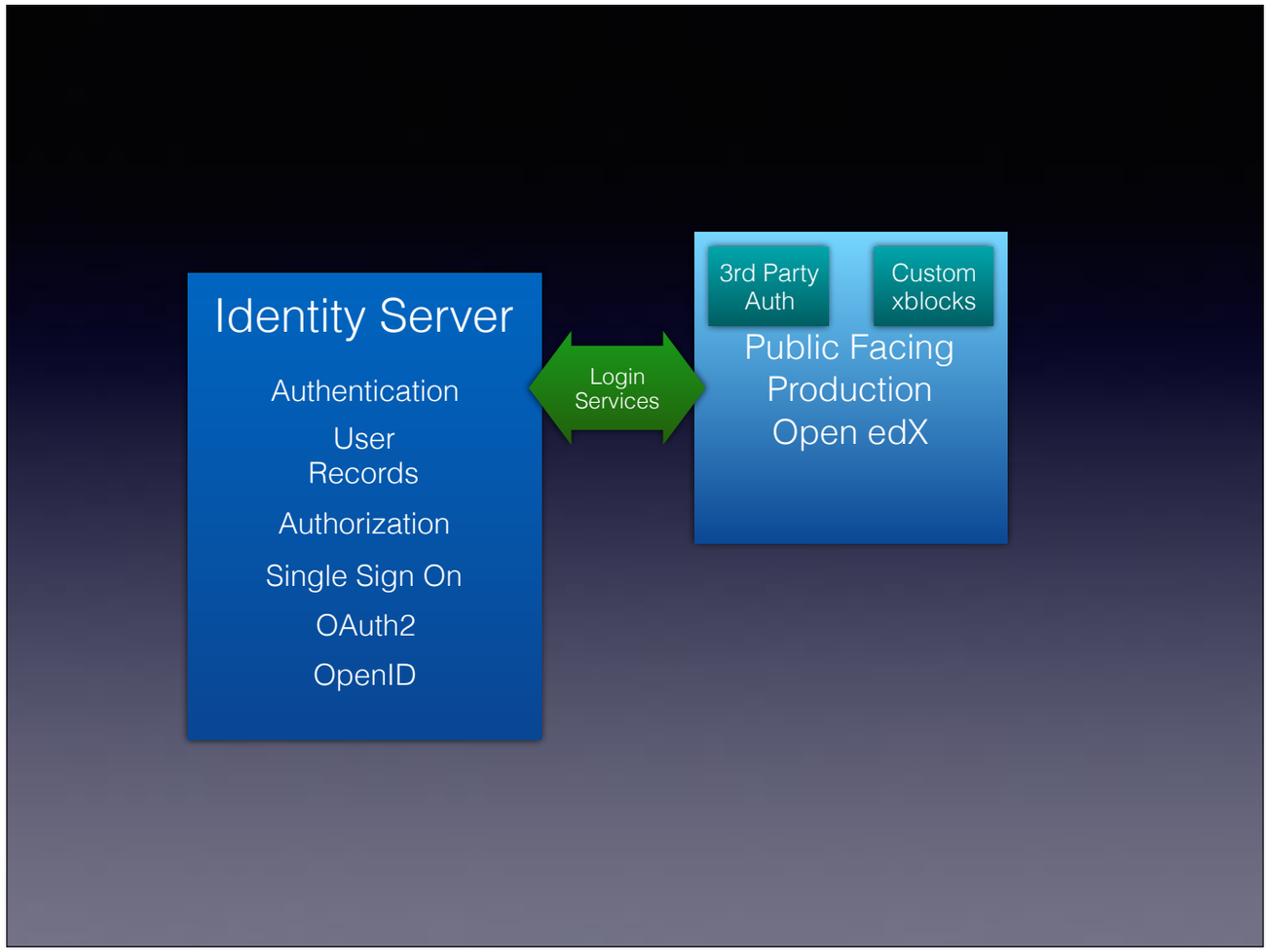

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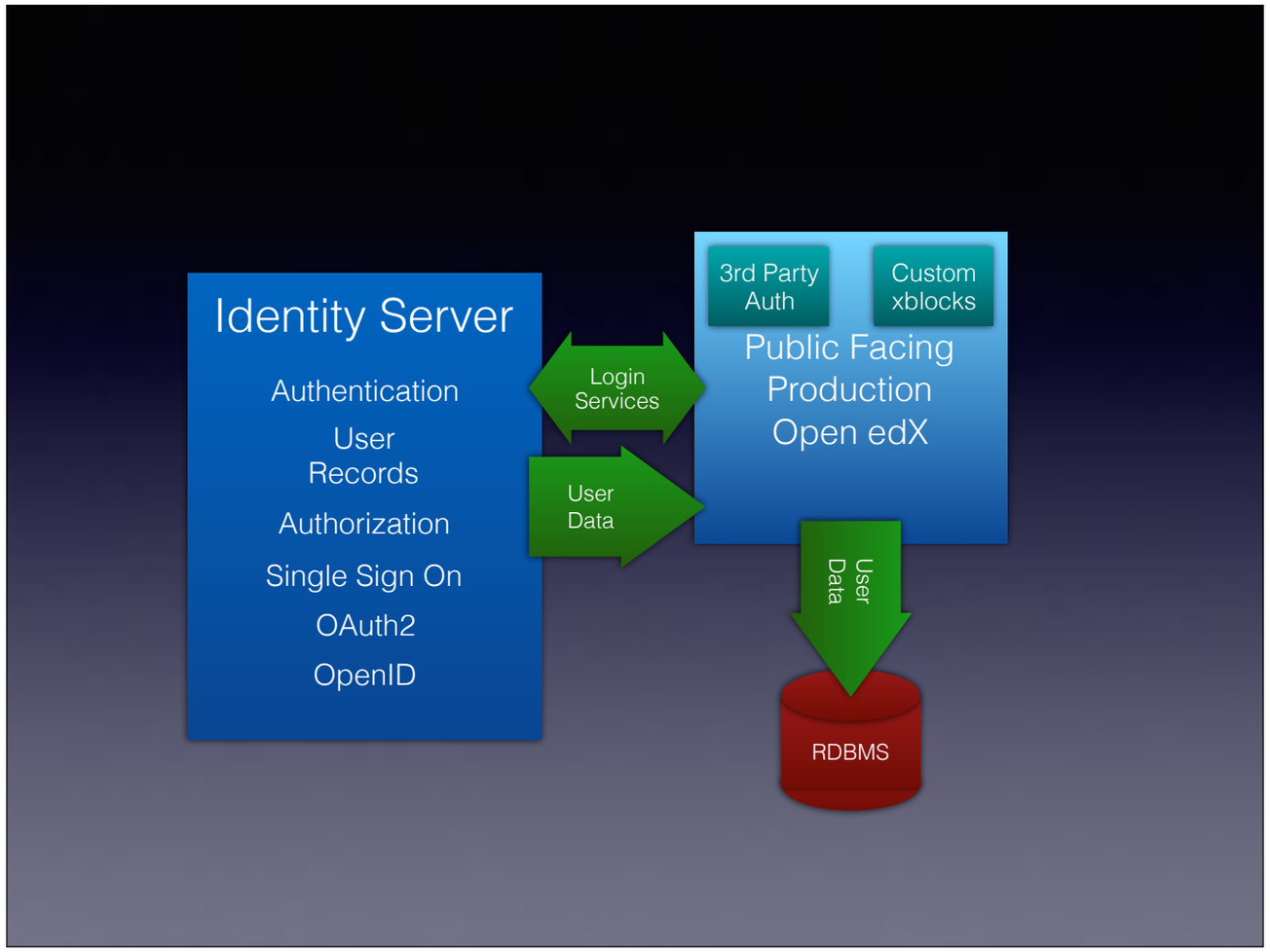

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Single Sign On

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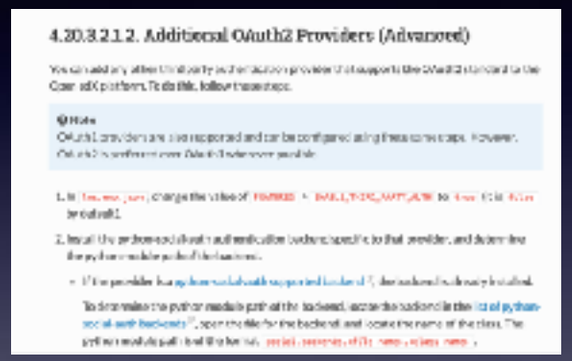

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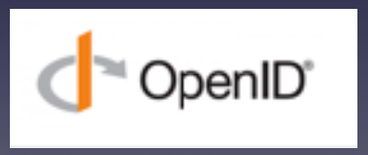
- Leverage the OpenID Standard for Transferring User Data During Account Linking and Auth



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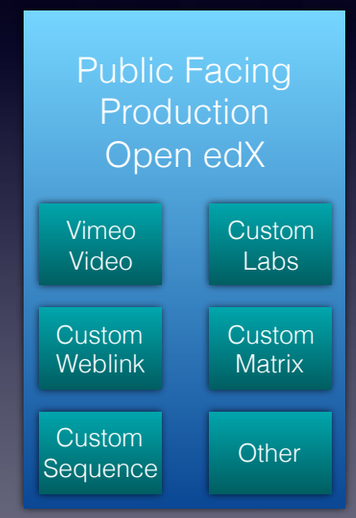

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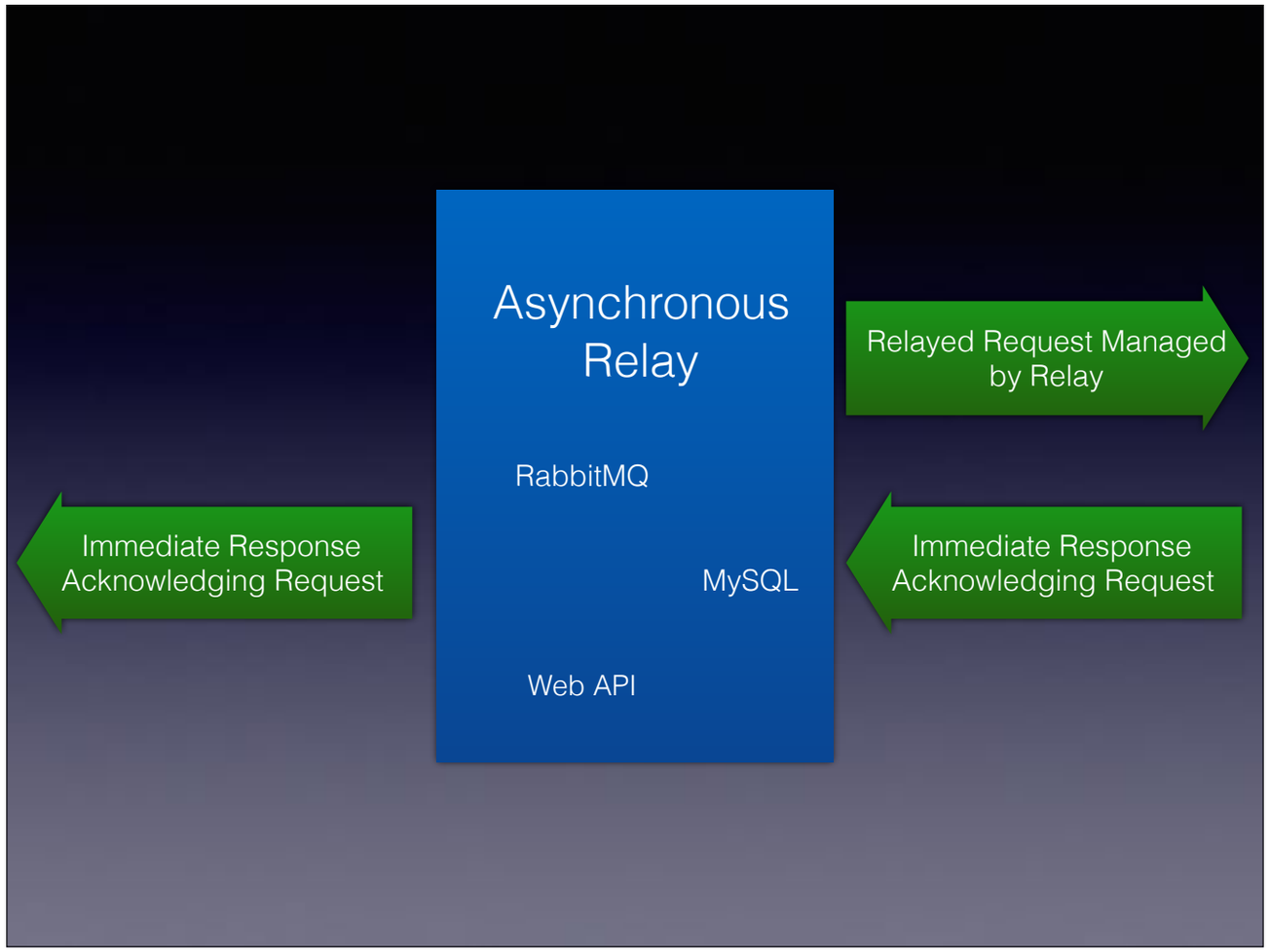
Questions
&
Comments

Thank you for your time and the opportunity to present here at Open edX 2018. I'll now open up the session for questions and comments..

Additional Slides



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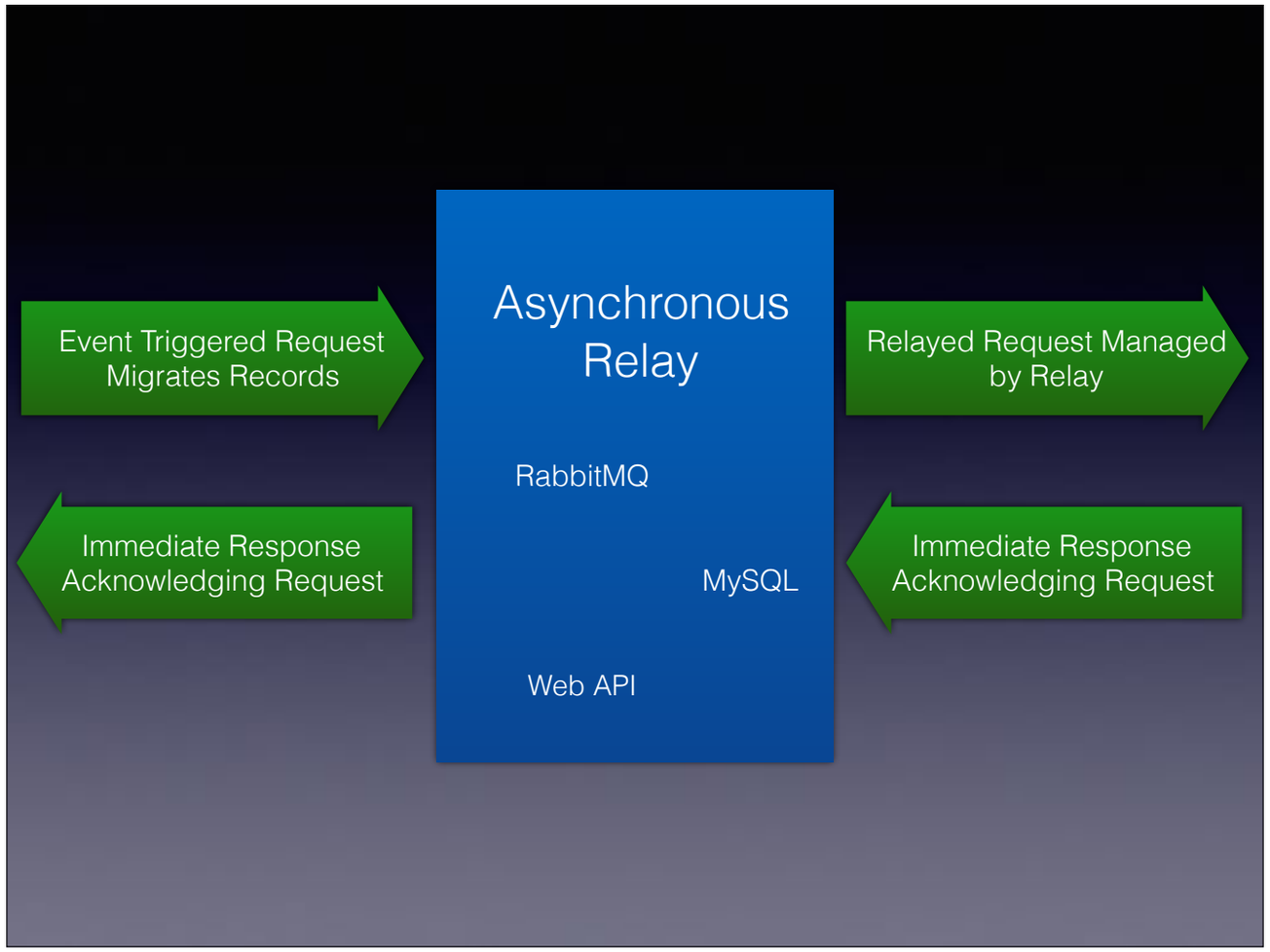

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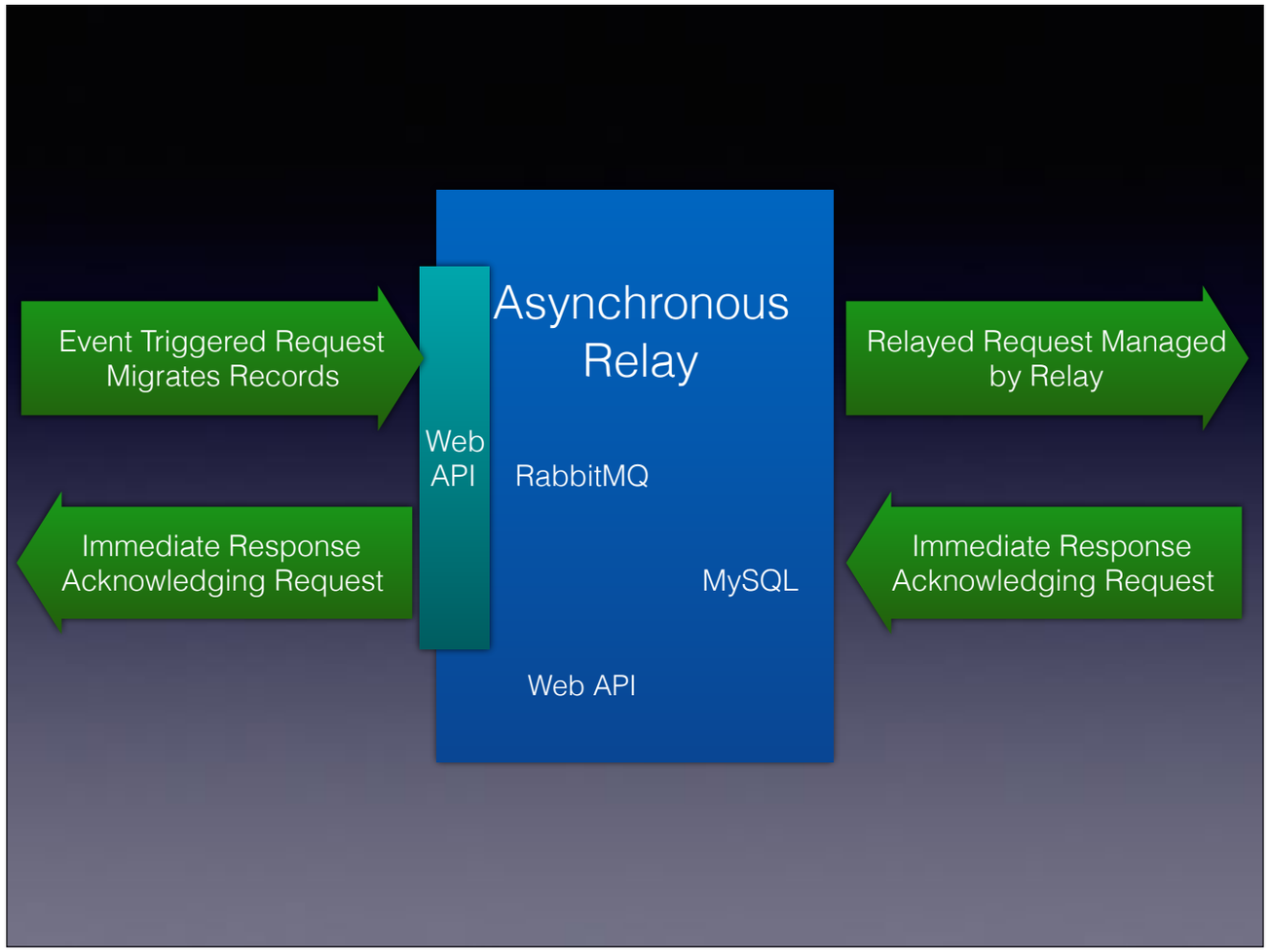

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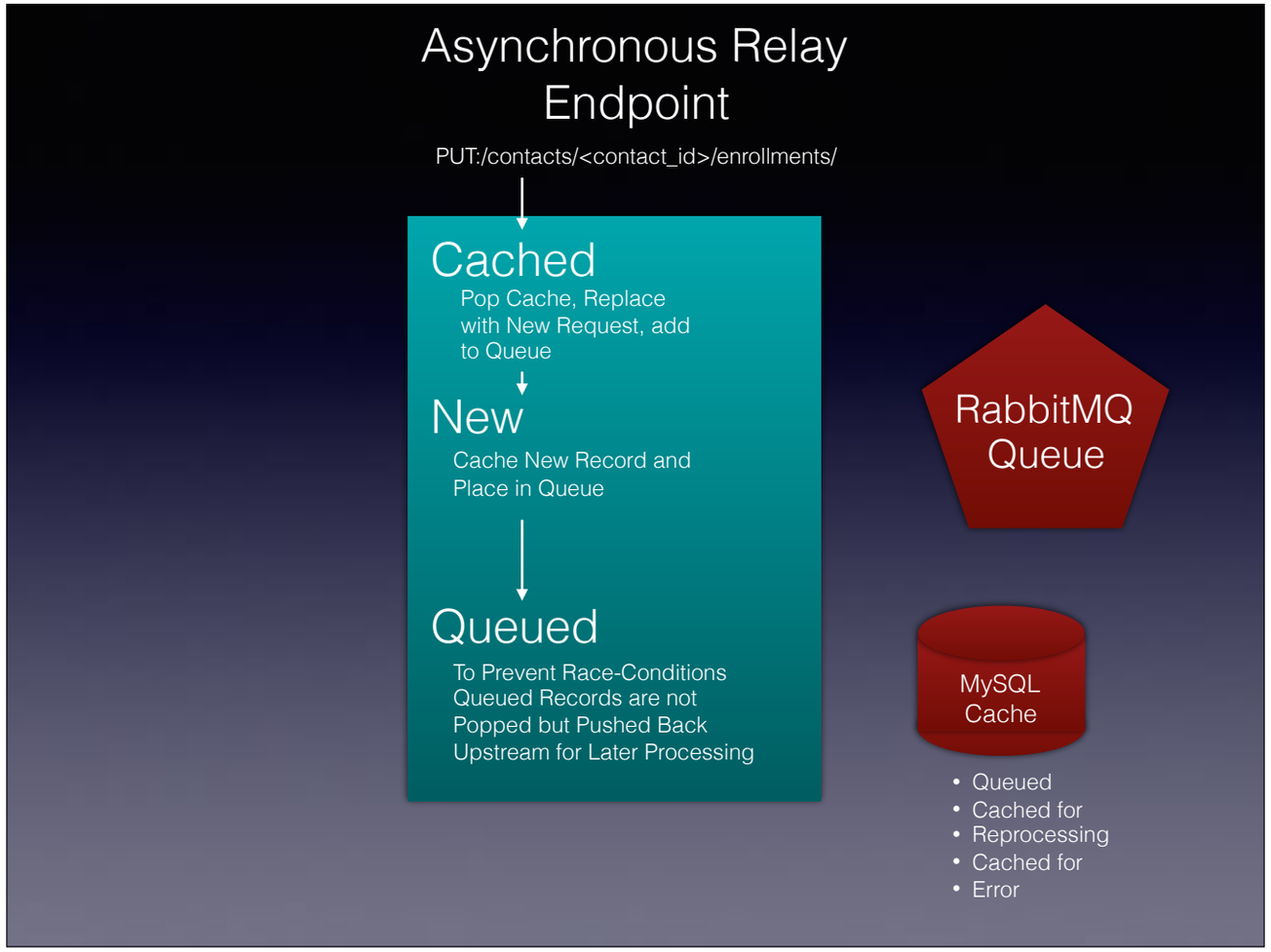

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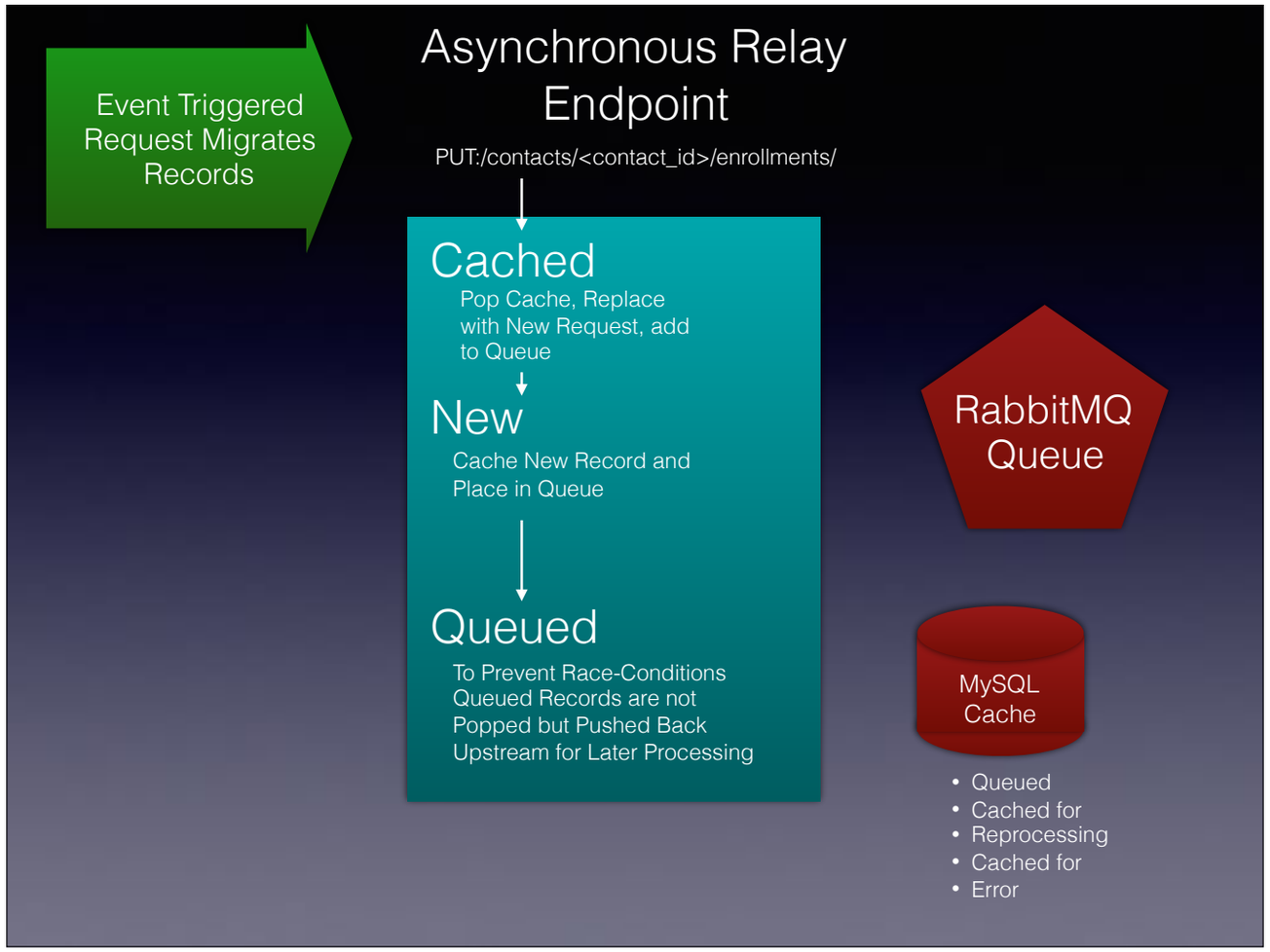

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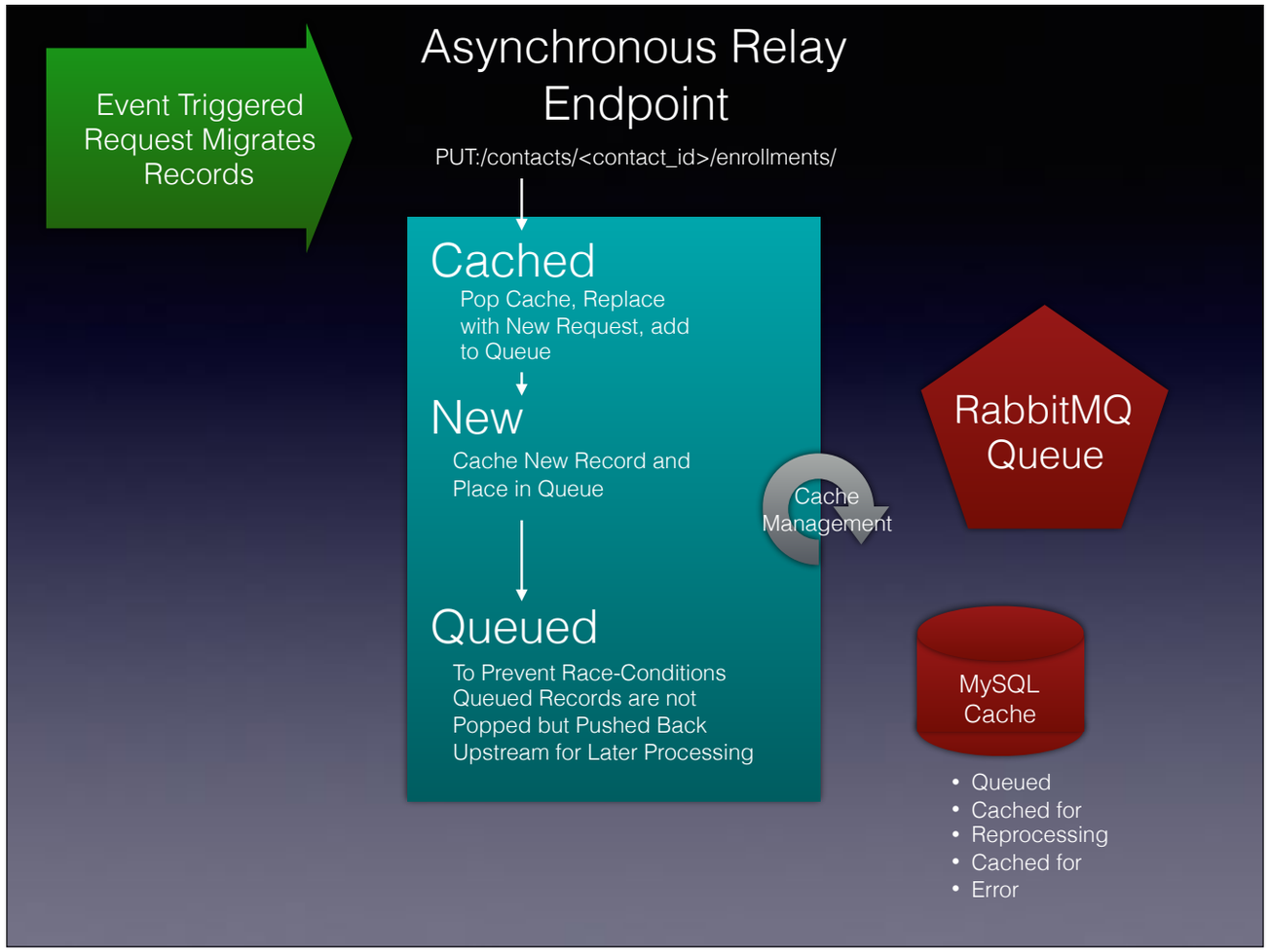

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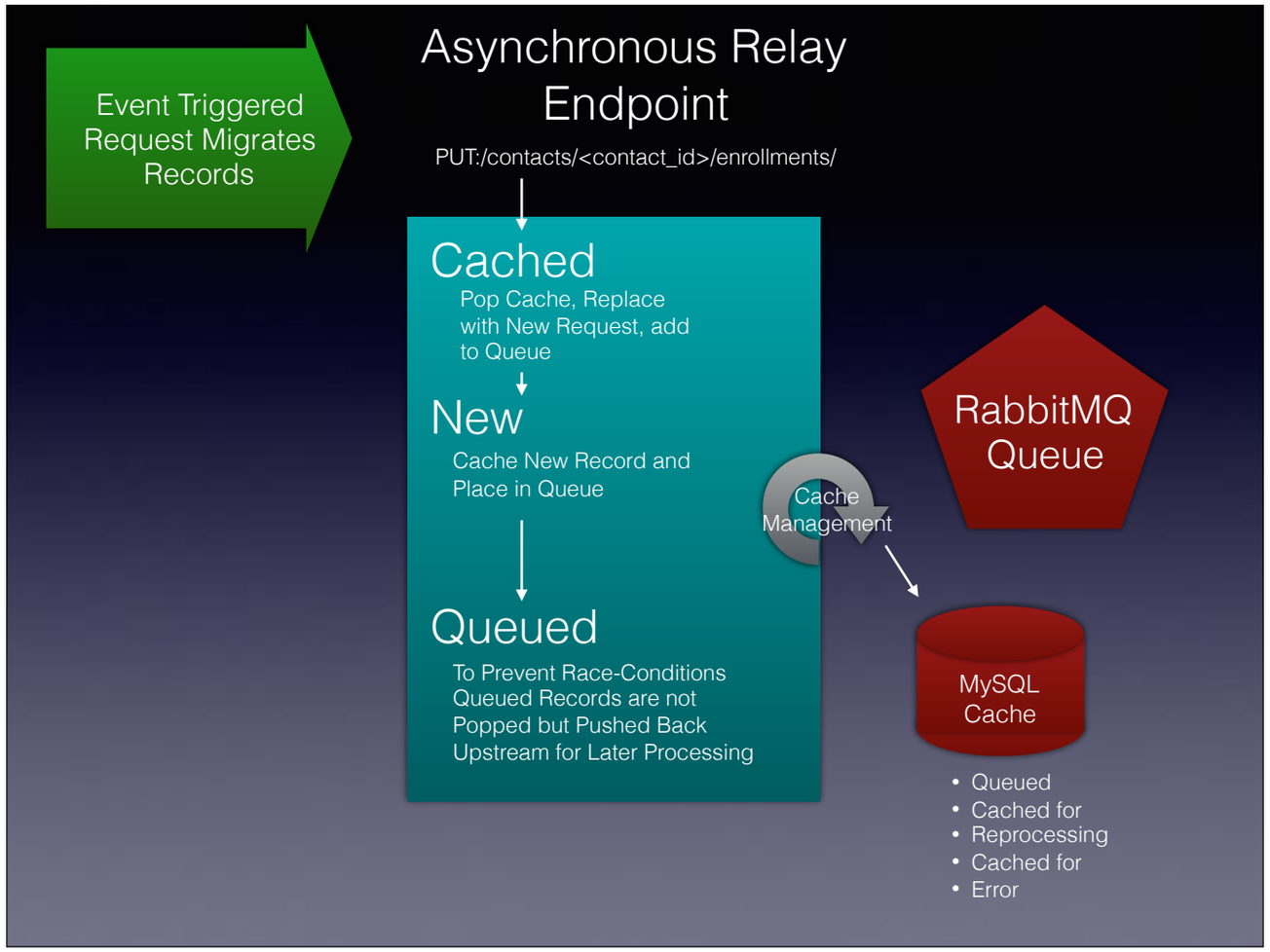

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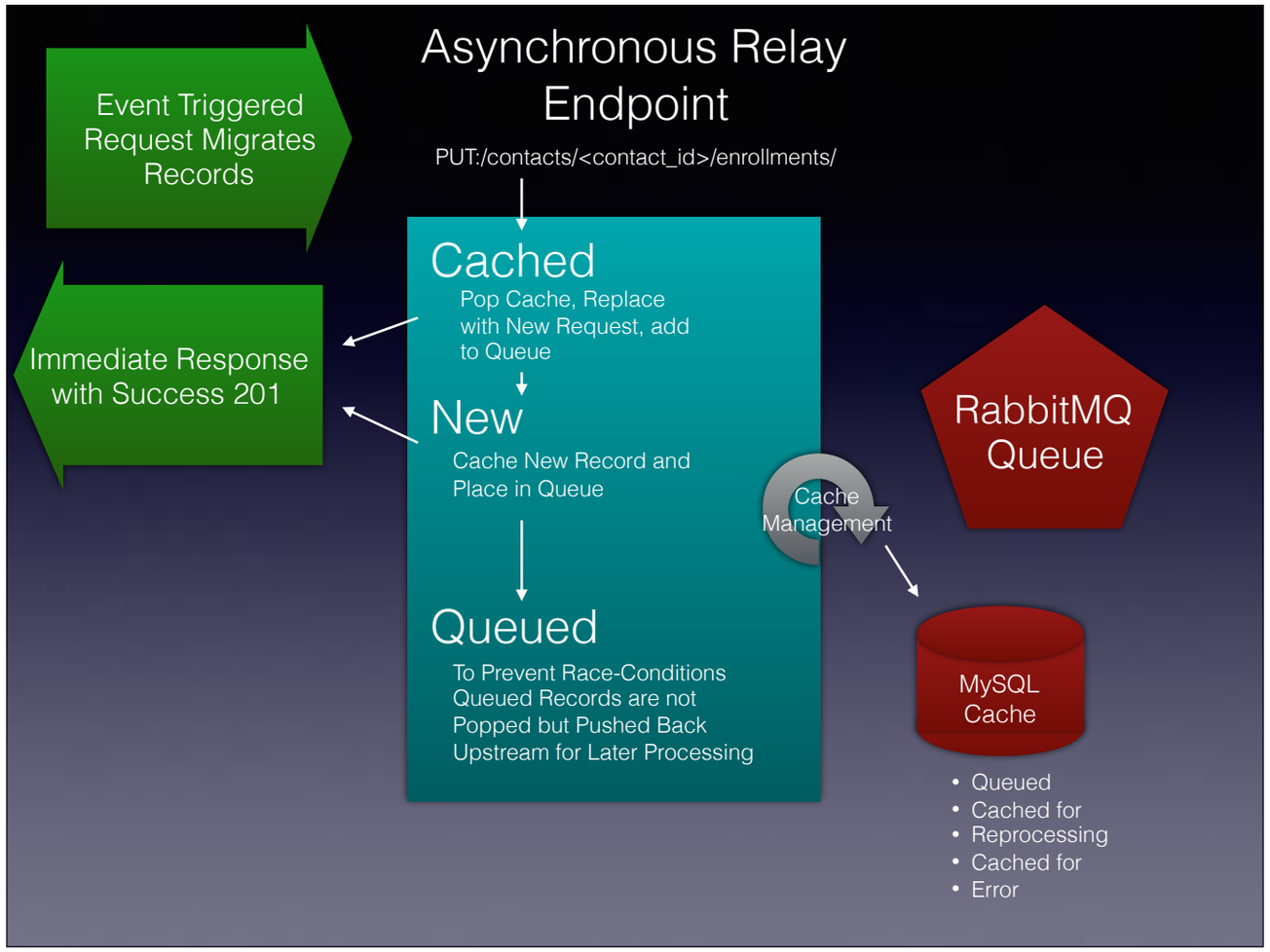

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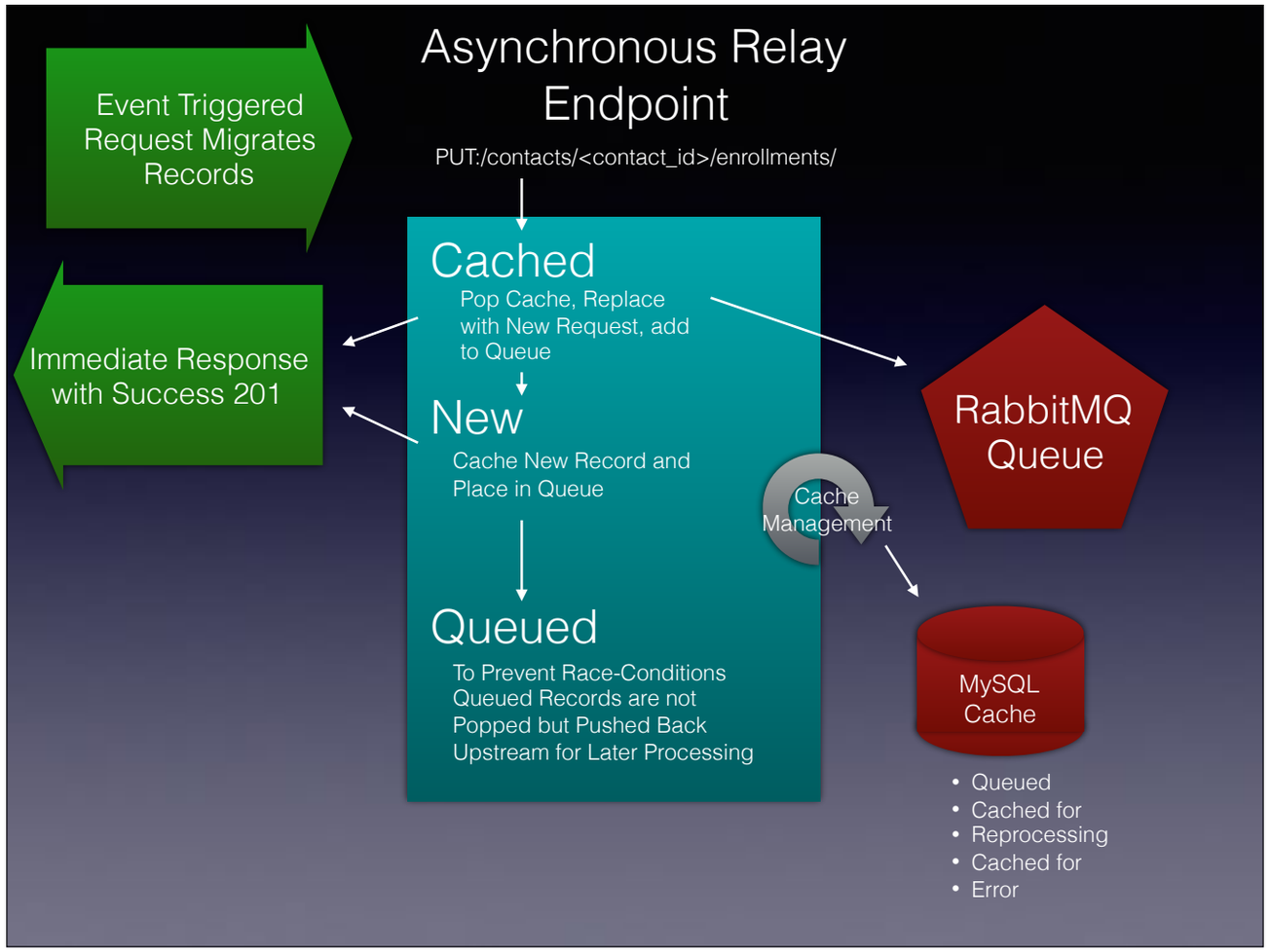

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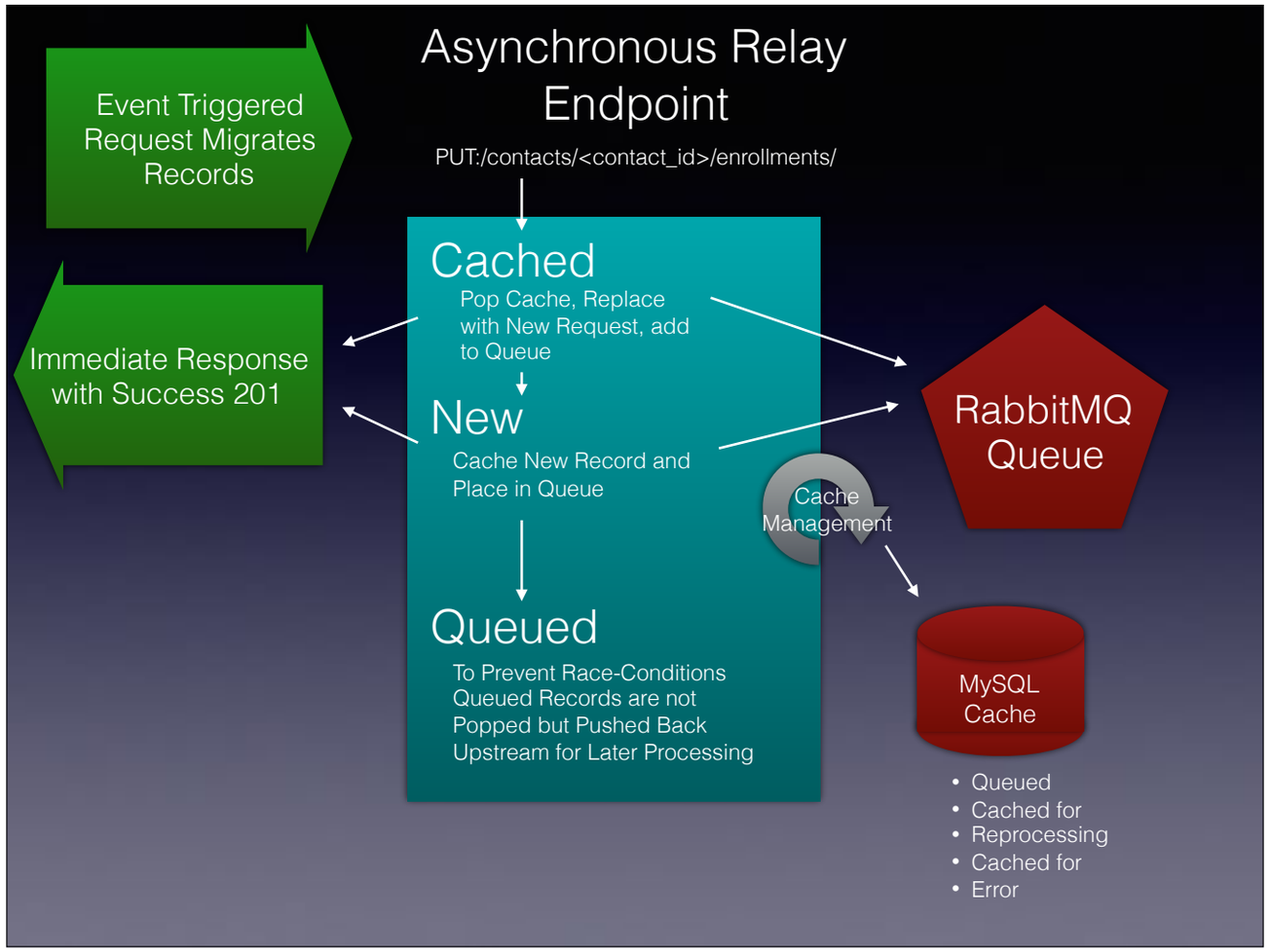

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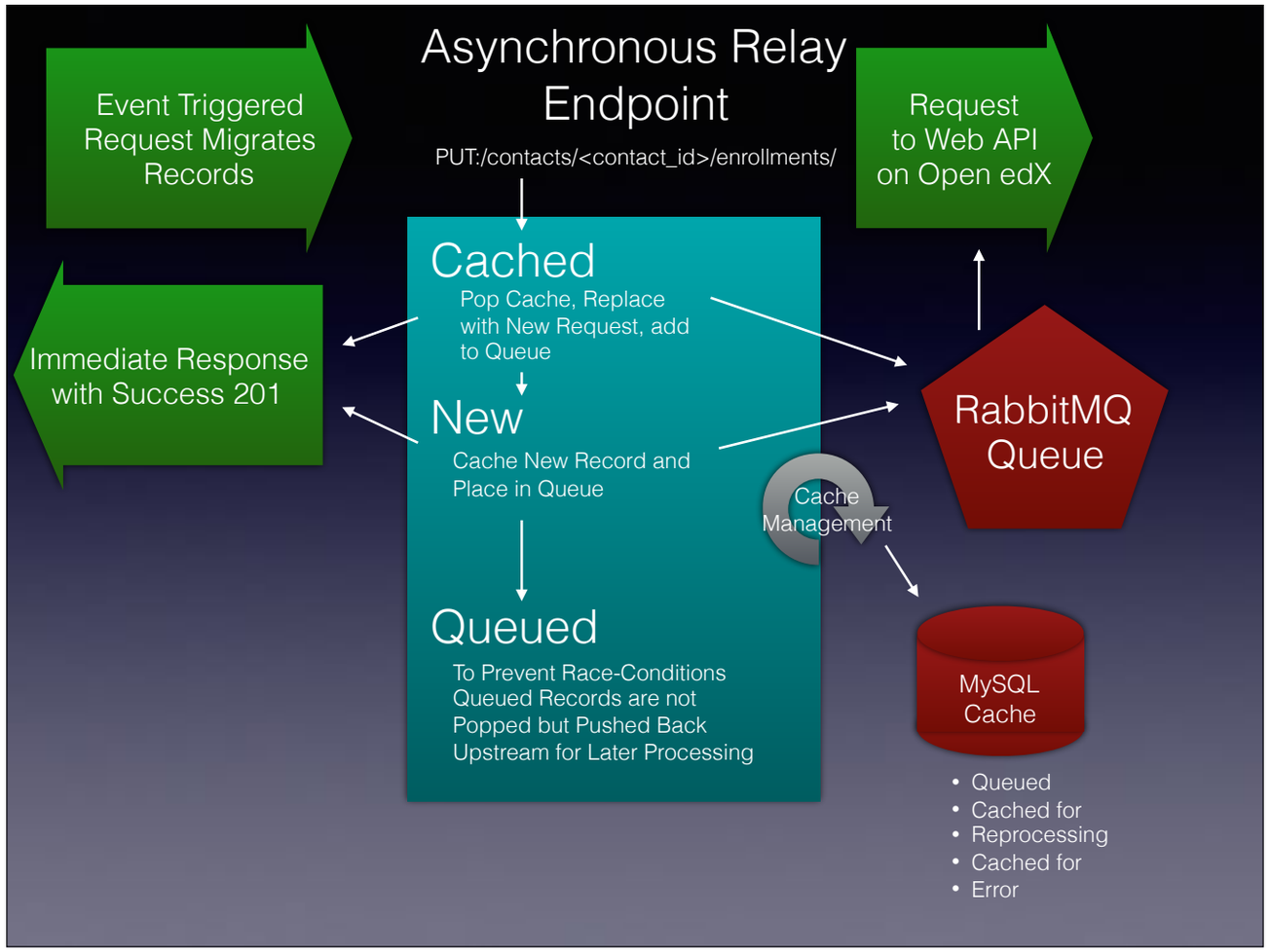

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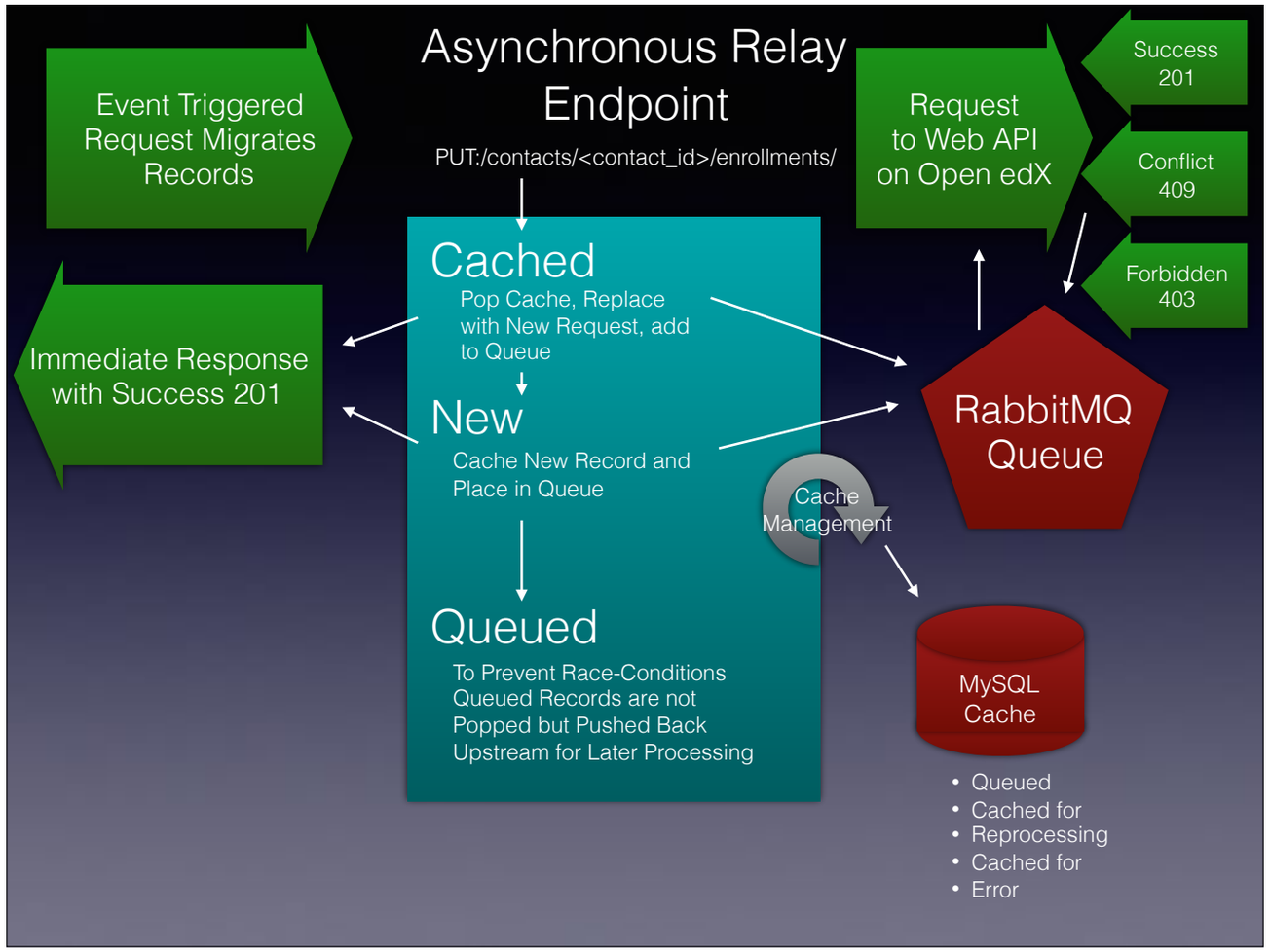

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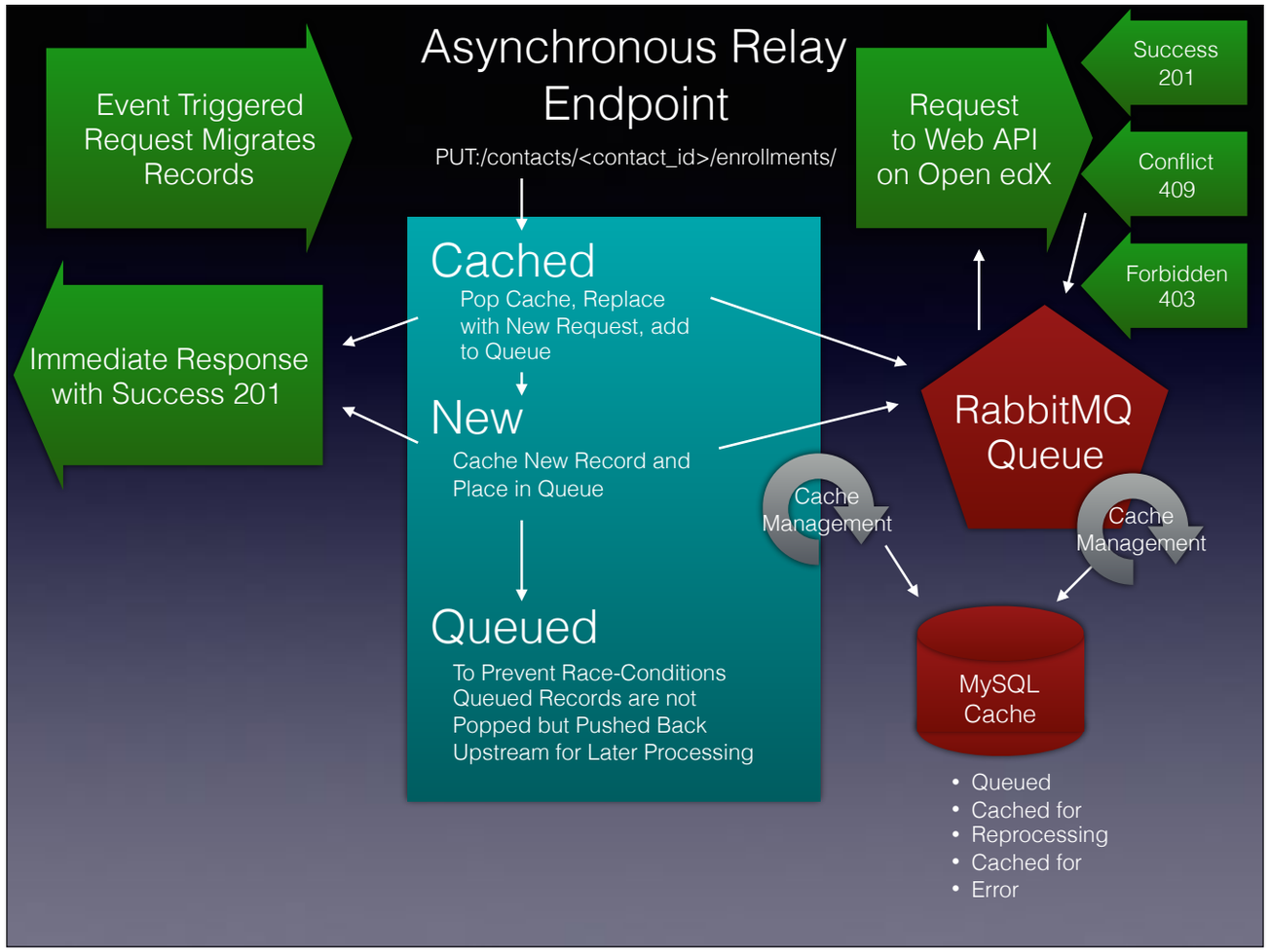

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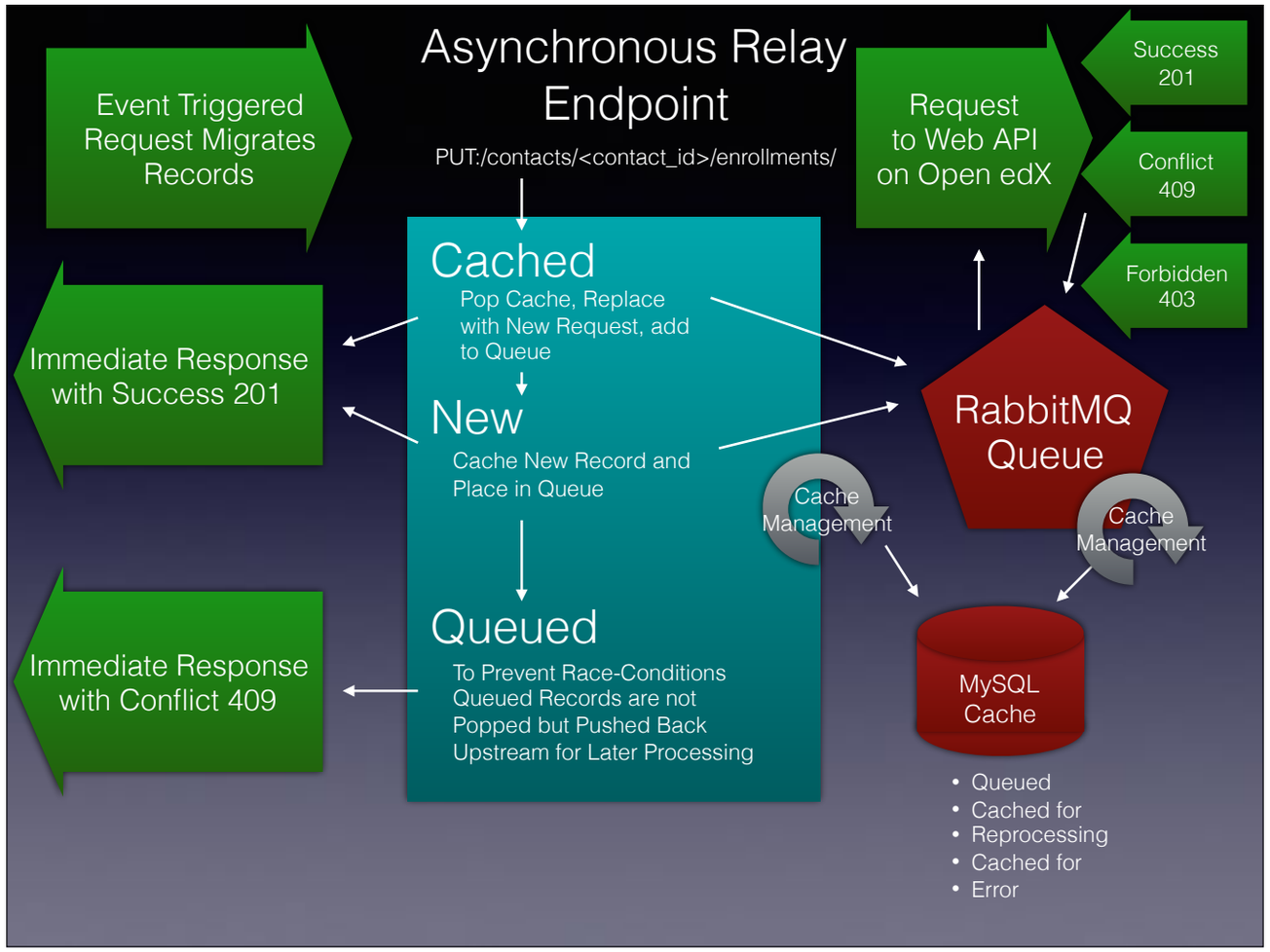

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Environment

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Environment

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MySQL

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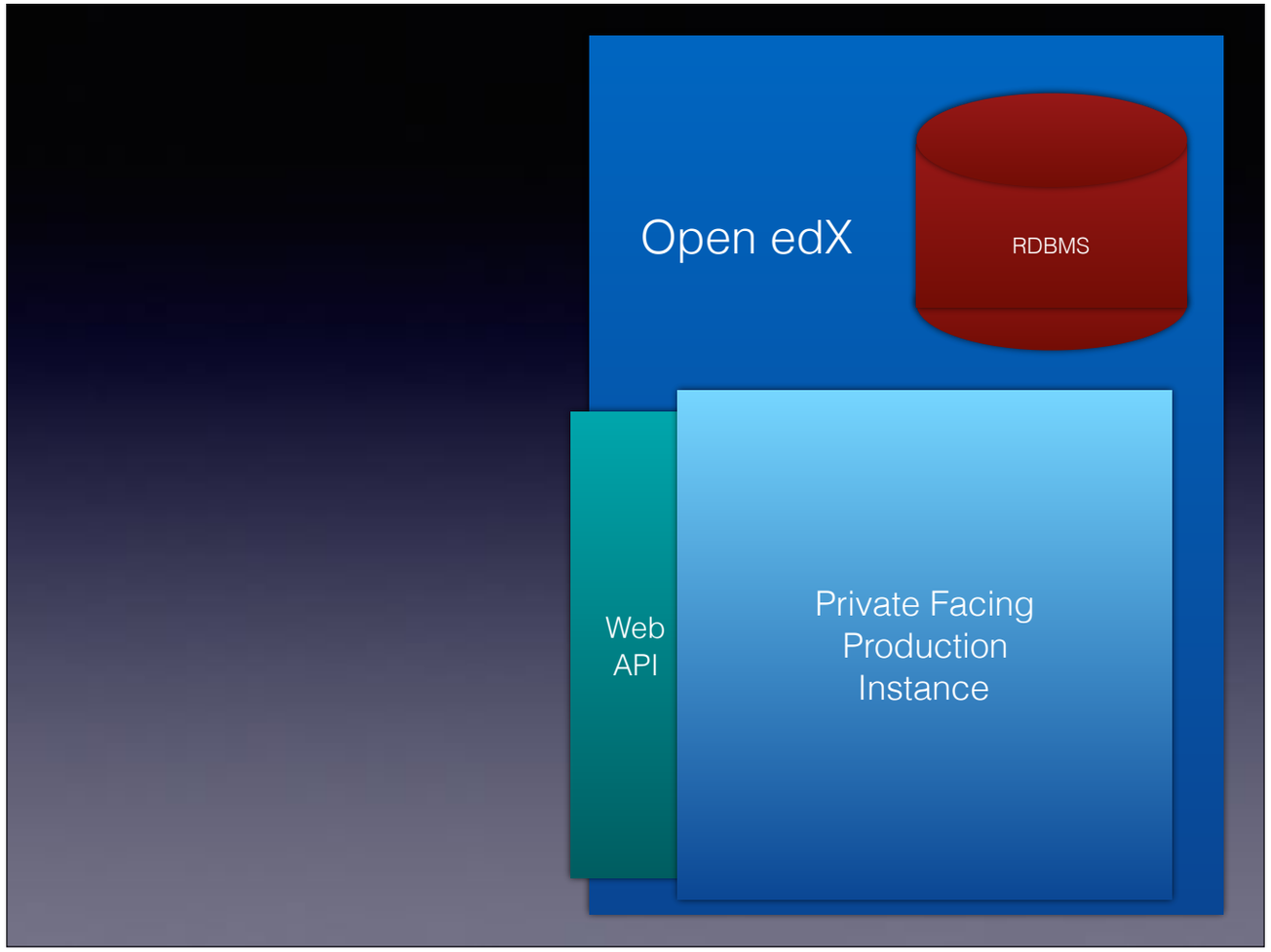

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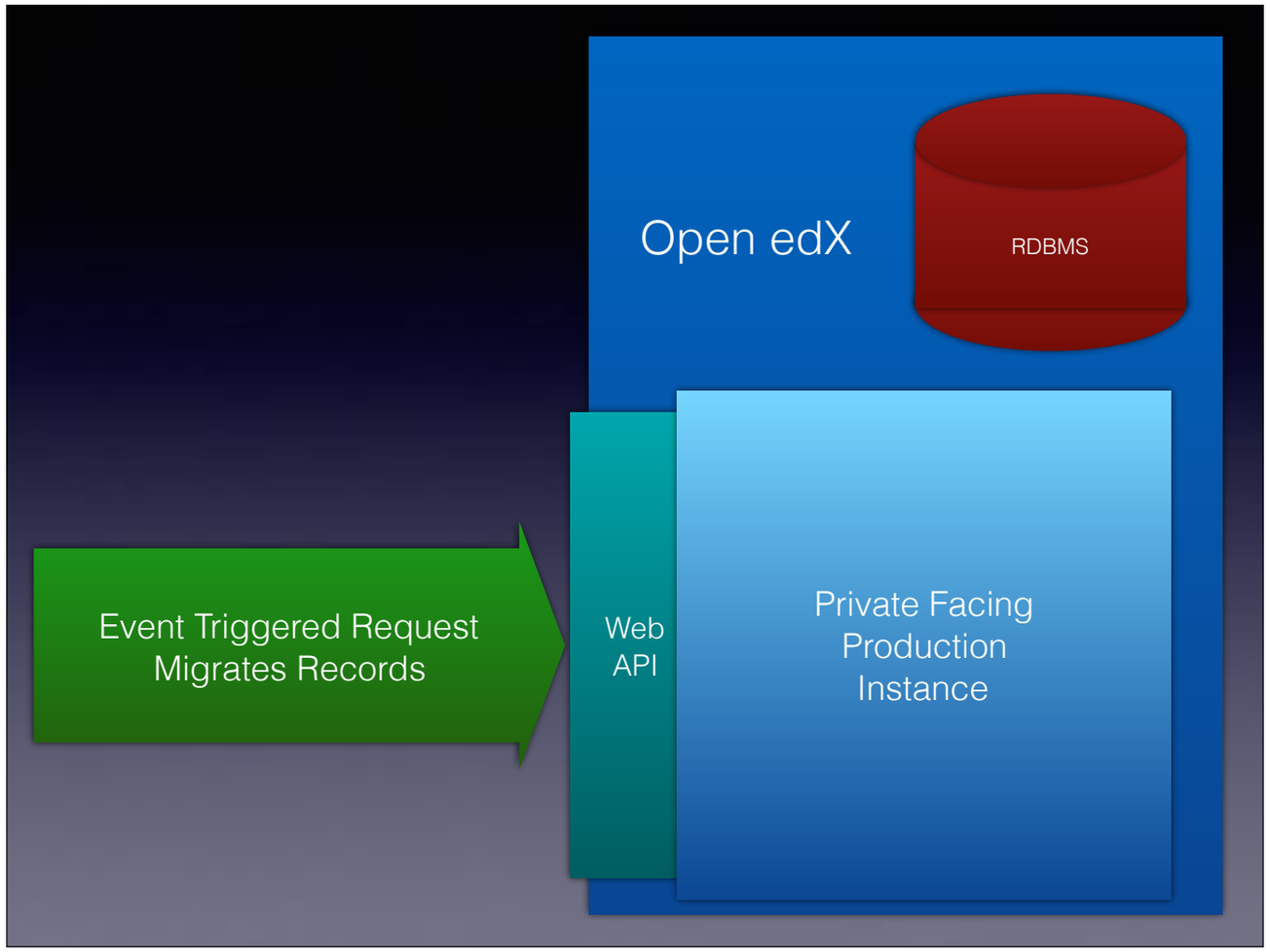

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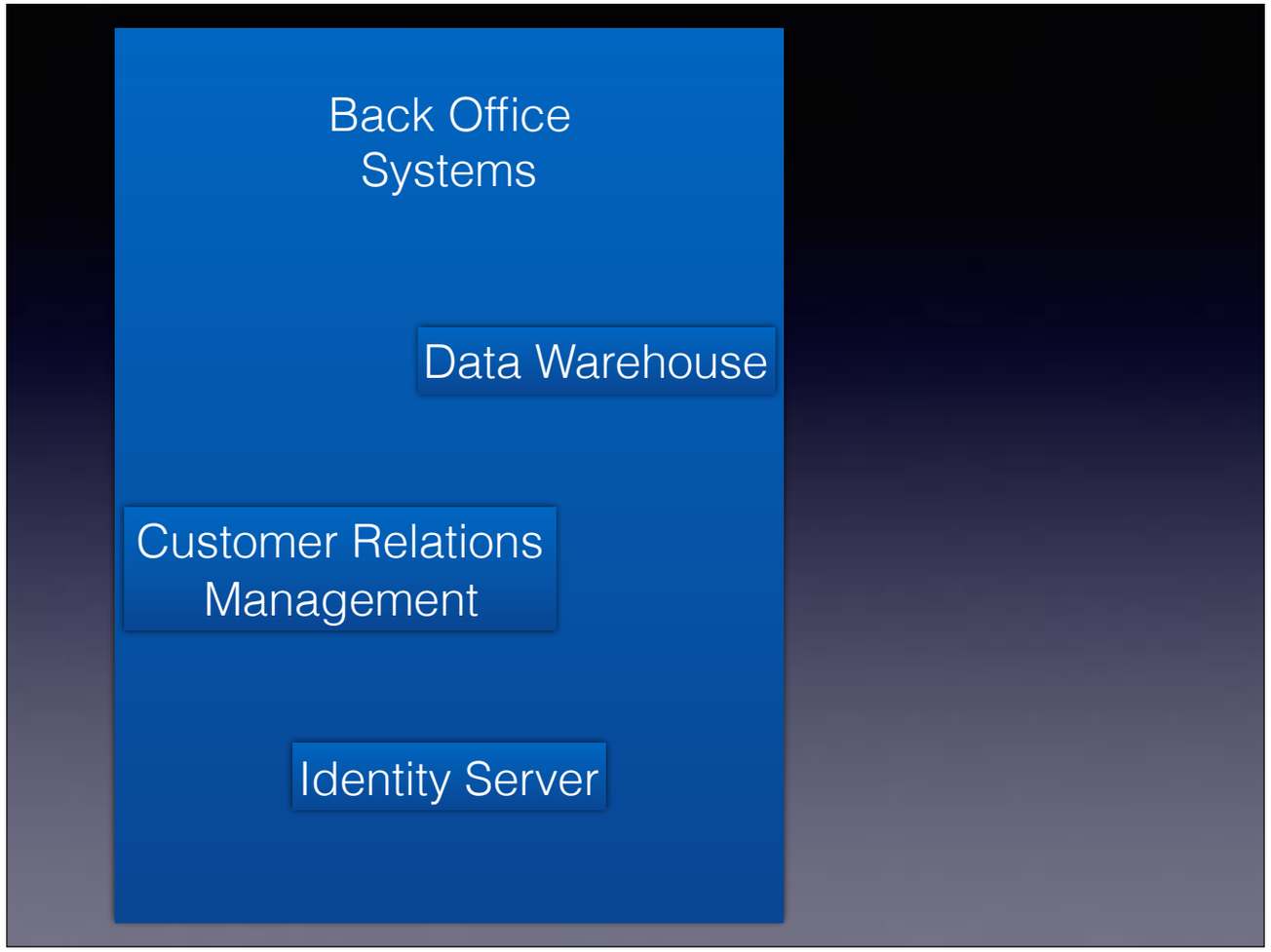

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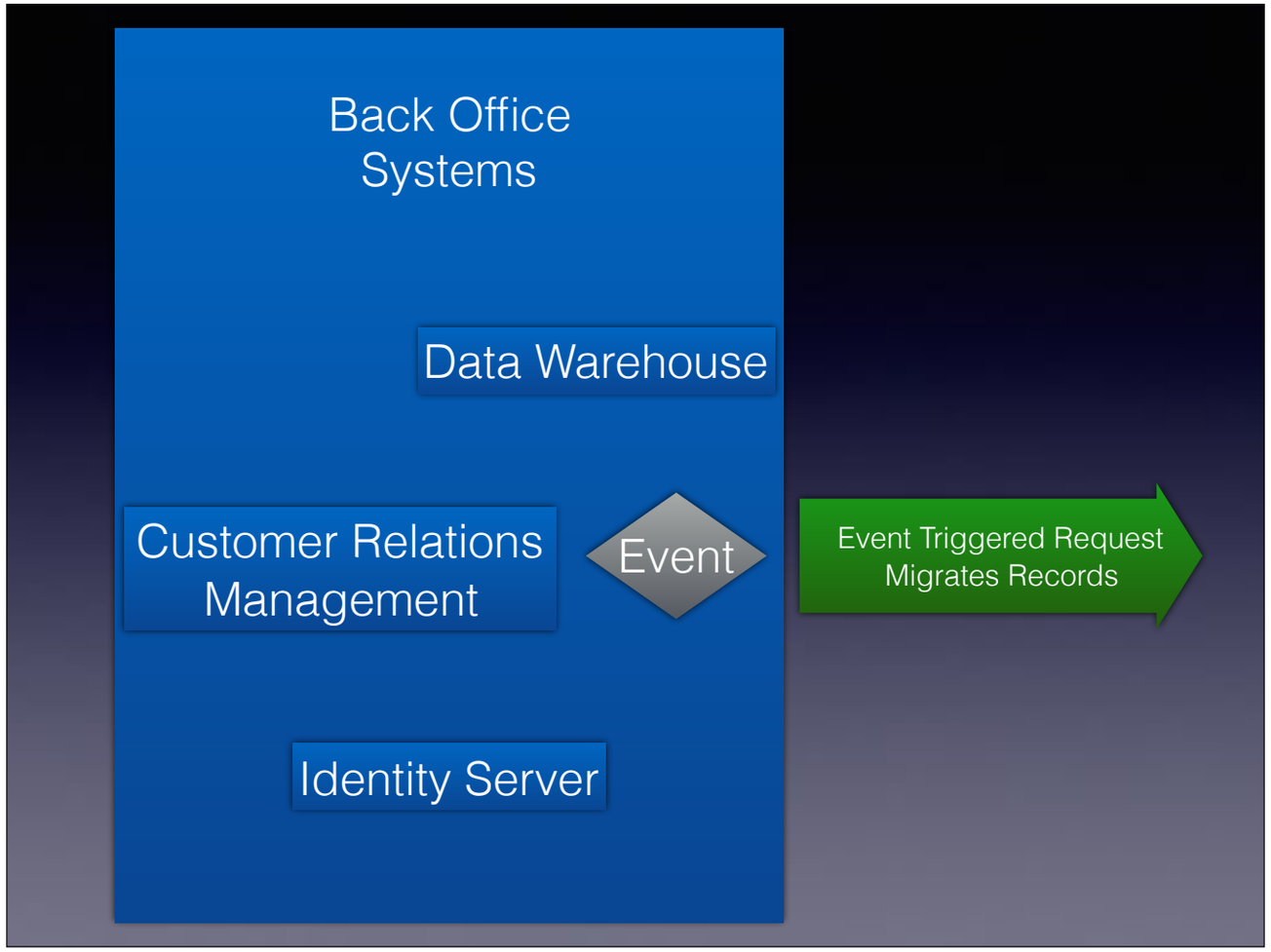

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