Ballerina
Swan Lake

Handling Data with Ballerina

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Hello!

Gayal Dassanayake

gayald@wso2.com | Senior Software Engineer | **@ballerinalang** | **WSO2**

Introduction

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Key Aspects

- Data Collection
- Data Processing & Transformation
- Data Storage
- Data Transmission
- Data Access & Retrieval
- Data Security

Handling Data with Ballerina

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Modeling data as data

```
import ballerina/io;

enum UserType {
   ADMIN,
   GUEST,
   MEMBER
};

type User record {|
   int id;
   string name;
   UserType userType = GUEST;
|};

public function main() {
   User user = {id: 1, name: "John Doe"};
   io:println(string `User '${user.name}' with id '${user.id}' as '${user.userType
                      }' created successfully`);
}
```

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Unions

```
import ballerina/io;

type Circle record {|
  float radius;
|};

type Rectangle record {|
  float width;
  float height;
|};

type Shape Circle|Rectangle;

function calculateArea (Shape shape) returns float {
  if shape is Circle {
      return float:PI * shape.radius * shape.radius;
  }
  return shape.width * shape.height;
};

public function main() {
  io:println(calculateArea({radius: 10}));
}
```

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Optionality

```
import ballerina/io;

type Person record {|
    int id;
    string name;
    // optional typed field
    int? age;
    // optional field
    string email?;
|};

public function main() returns error? {
    json jsonInput = { id: 1, "name": "John Doe", "age": null};
    Person person = check jsonInput.fromJsonWithType();

    io:println(person.age.toBalString()); // output: ()

    // optional field access
    io:println(person.hasKey("email")); // output: false
    string email = person.email ?: "Email is not provided";
    io:println(email); // output: Email is not provided
}
```

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Declarative data processing

```
Order[] orders = [
   {orderId: 1, itemName: "A", price: 23.4, quantity: 2},
   {orderId: 1, itemName: "A", price: 20.4, quantity: 1},
   {orderId: 2, itemName: "B", price: 21.5, quantity: 3},
   {orderId: 1, itemName: "B", price: 21.5, quantity: 3}
];

float income = from var {price, quantity} in orders
   let var totPrice = price * quantity
   collect sum(totPrice);

var quantities = from var {itemName, quantity} in orders
   group by itemName
   select {itemName, quantity: sum(quantity)};
```

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Pattern Matching

```
import ballerina/io;

const switchStatus = "ON";

function matchValue(anydata value, boolean isObstructed,
               float powerPercentage) returns string {
   match value {
       1 if !isObstructed => { return "Move forward"; }
       2|3 => { return "Turn"; }
       4 if 25.0 < powerPercentage => { return "Increase speed"; }
       "STOP" => { return "STOP"; }
       switchStatus => { return "Switch ON";}
       _ => { return "Invalid instruction"; }
   }
}

public function main() {
   string output = matchValue([-2.516d, 51.409d], false, 0.0);
   io:println(output);
}
```

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Data Validation

```
import ballerina/constraint;
import ballerina/http;
import ballerina/io;

type User record {
   @constraint:String {
       minLength: 1,
       maxLength: 8
   }
   string username;
   @constraint:String {
       pattern: re `^[\S]{4,}$`
   }
   string password;
};

service / on new http:Listener(9090) {
   resource function post user(User user) returns http:Created {
       io:println(string `User ${user.username} signed up successfully`);
       return http:CREATED;
   }
}
```

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`xml` and `json` Data Formats

```
json[] users = [
    {
        user: {
            name: {
                firstName: "John",
                lastname: "Smith"
            },
            age: 24
        }
    },
    null
];

json firstUserName = check users[0].user.name;

string firstName = check firstUserName.firstName;
```

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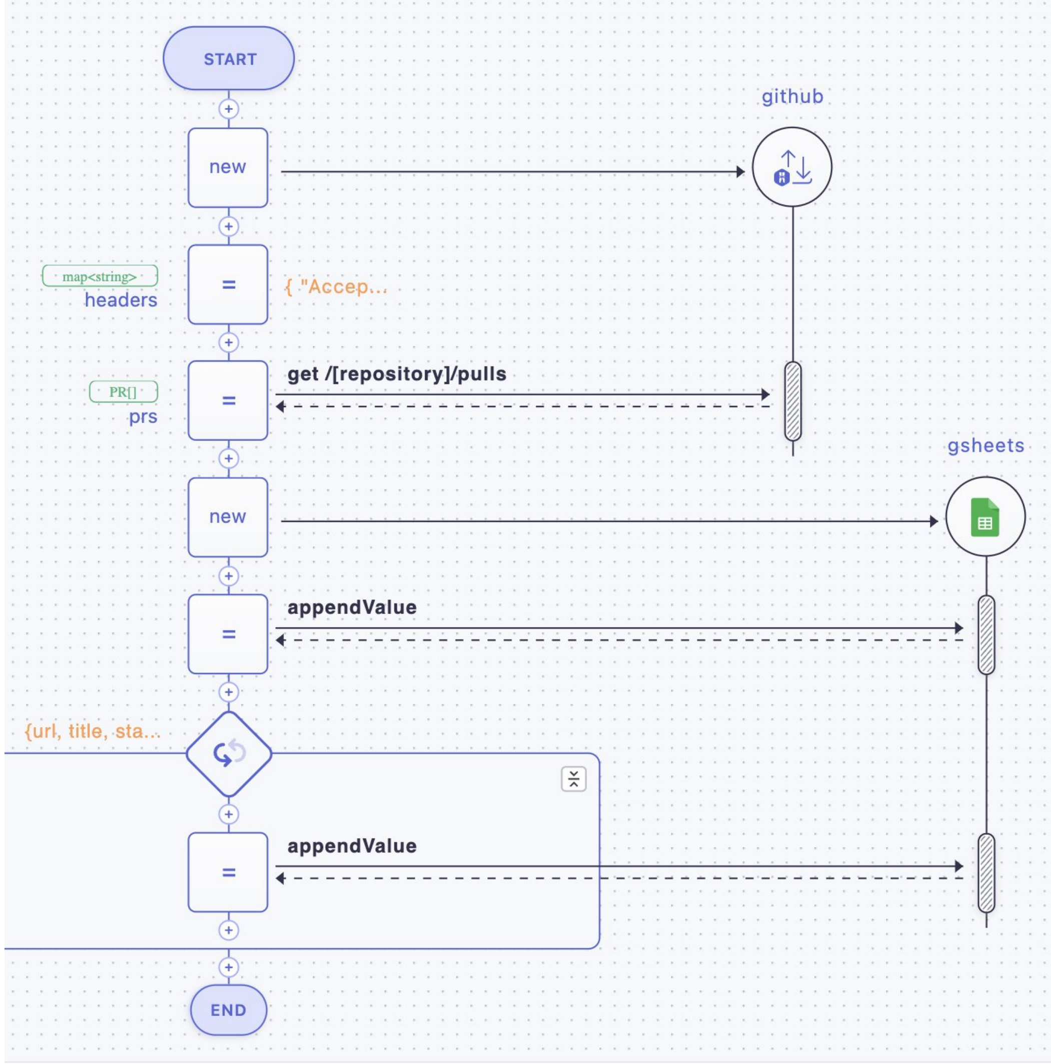
Visual Representations

```
public function main() returns error? {
   http:Client github = check new
("https://api.github.com/repos");
   map<string> headers = {
       "Accept": "application/vnd.github.v3+json",
       "Authorization": "token " + githubPAT
   };
   PR[] prs = check
github->/[repository]/pulls(headers);

   sheets:Client gsheets = check new ({auth: {token:
sheetsAccessToken}});
   _ = check gsheets->appendValue(spreadSheetId,
["Issue", "Title", "State", "Created At", "Updated
At"],
                {sheetName: sheetName});

   foreach var {url, title, state, created_at,
updated_at} in prs {
       _ = check gsheets->appendValue(spreadSheetId,
[url, title, state, created_at, updated_at],
                   {sheetName: sheetName});
   }
}
```



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Data Extraction from APIs

```
// http
http:Client albumClient = check new ("localhost:9090");
Album[] albums = check albumClient->/albums;

// graphql
graphql:Client graphqlClient = check new ("localhost:9090/graphql");
string document = "{ profile { name, age } }";
ProfileResponse response = check graphqlClient->execute(document);

// github
github:Client github = check new (gitHubConfig);
github:Repository[] userRepos = check github->/user/repos(visibility = "private", 'type = ());
```

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SAP

stripe

slack
from Salesforce

docusign™

kafka

twilio

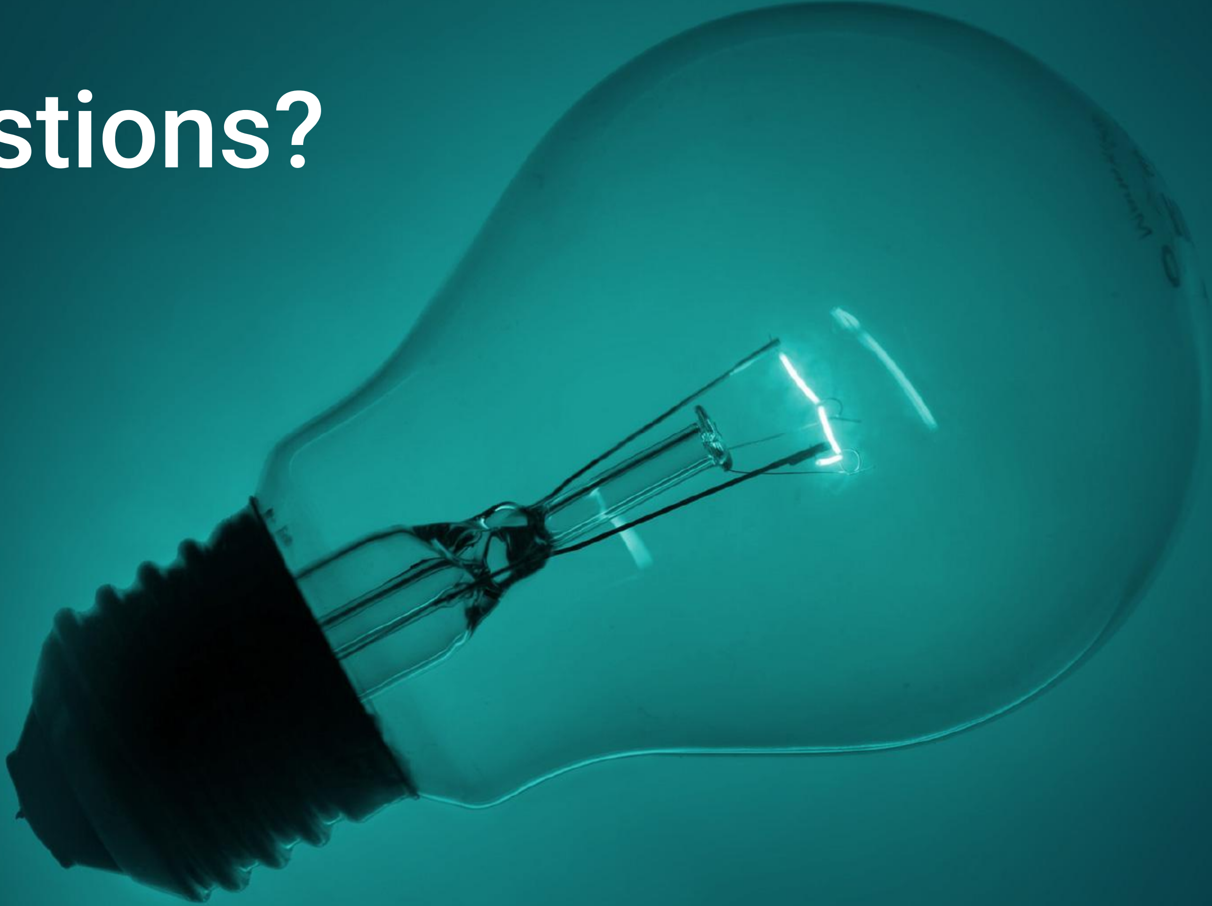
Connectors for SQL and NoSQL databases

Microsoft® SQL Server®

ORACLE

MySQL™

Questions?



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Learning resources

- Ballerina documentation and tutorials
  - Data-oriented programming with Ballerina
    - https://ballerina.io/use-cases/data-oriented-programming/
  - Learn Guide
    - ballerina.io/learn/
  - Ballerina by example
    - ballerina.io/learn/by-example
  - YT Training Series

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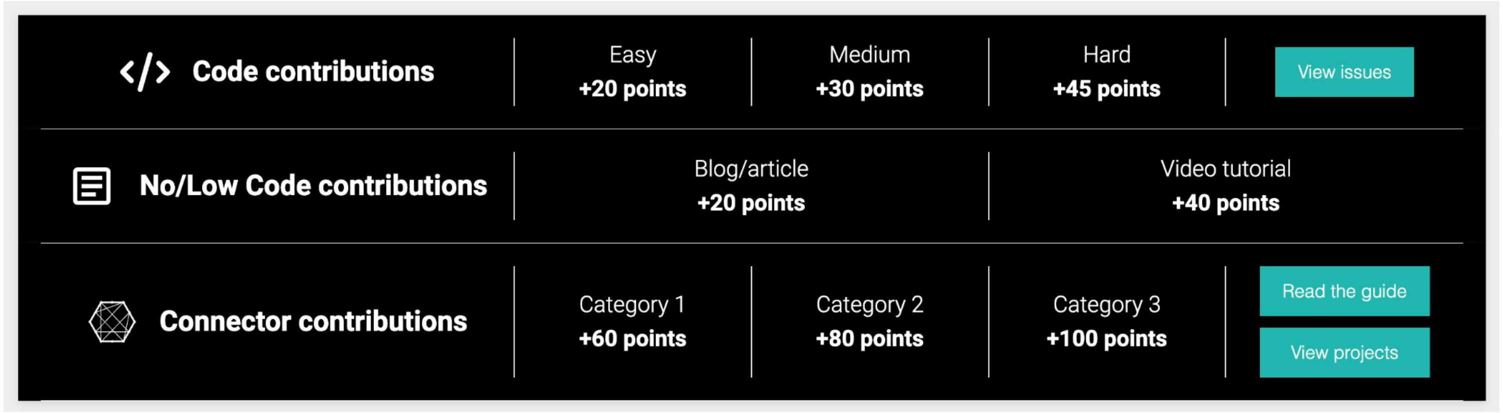
Developer Programs & Contribution Opportunities

- WSO2 Certified Ballerina Developer - Swan Lake
- Contribute and get rewarded



Code contributions	Easy **+20 points**	Medium **+30 points**	Hard **+45 points**	View issues
No/Low Code contributions	Blog/article **+20 points**		Video tutorial **+40 points**	
Connector contributions	Category 1 **+60 points**	Category 2 **+80 points**	Category 3 **+100 points**	Read the guide View projects

- Ballerina - Hacktoberfest - The Ballerina programming language

Ballerina student program

- Ballerina student engagement program
  https://ballerina.io/community/student-program/

- Ballerina ambassador program
  https://ballerina.io/community/ambassadors/

GPS Map Camera
Majitar, Sikkim, India
5GM2+5V5, E Quad Portico, Majitar, Sikkim 737136, India
Lat 27.182913°
Long 88.50181°
14/08/23 06:21 PM GMT +05:30
Google

Community Channels

https://github.com/ballerina-platform/

stackoverflow https://stackoverflow.com/questions/tagged/ballerina

Discord https://discord.com/invite/ballerinalang

https://twitter.com/ballerinalang

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Hands-on Session

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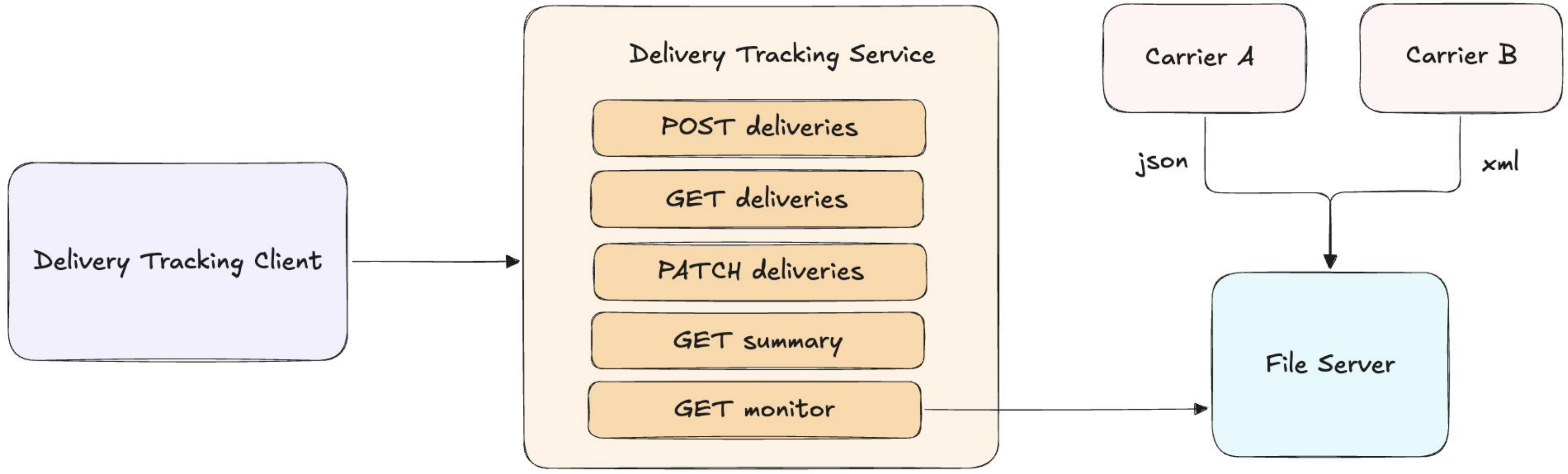
Delivery Tracking System



Source code

https://github.com/gayaldassanayake/data-handling-with-ballerina

Thank you!

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