

ΠΡΟΧΩΡΗΜΕΝΑ ΘΕΜΑΤΑ
ΤΕΧΝΟΛΟΓΙΑΣ ΚΑΙ ΕΦΑΡΜΟΓΩΝ
ΒΑΣΕΩΝ ΔΕΔΟΜΕΝΩΝ

ΠΡΟΓΡΑΜΜΑΤΙΣΤΙΚΗ ΕΡΓΑΣΙΑ ΓΙΑ
ΤΟ ΑΚΑΔΗΜΑΪΚΟ ΕΤΟΣ 2021-2022

ΟΜΑΔΑ

ΑΝΥΦΑΝΤΑΚΗΣ ΔΗΜΗΤΡΗΣ, 2642

ΤΕΛΙΚΗ ΑΝΑΦΟΡΑ

ΜΑΪΟΣ 2022

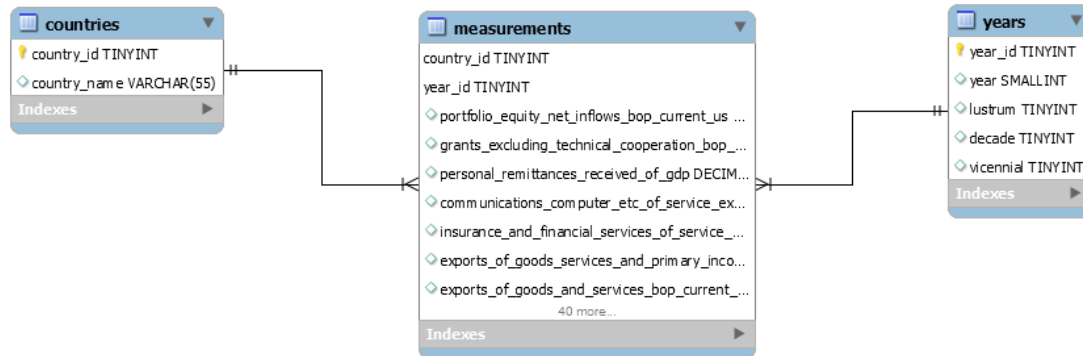
ΙΣΤΟΡΙΚΟ ΠΡΟΗΓΟΥΜΕΝΩΝ ΕΚΔΟΣΕΩΝ

Ημερομηνία	Έκδοση	Περιγραφή	Συγγραφέας
2022/05/15	1.0		Δημήτρης Ανυφαντάκης

1 ΒΑΣΗ ΔΕΔΟΜΕΝΩΝ

Στην παρούσα ενότητα περιγράφονται τα σχήματα της βάσης δεδομένων που χρησιμοποιούνται στο project.

1.1 ΣΧΕΣΙΑΚΟ ΣΧΗΜΑ ΣΕ ΛΟΓΙΚΟ ΕΠΙΠΕΔΟ



Σχήμα 1.1 Σχεσιακό σχήμα της βάσης δεδομένων του συστήματος

Section-break (continuous)

-- MySQL Workbench Forward Engineering

SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0;

SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_CHECKS=0;

SET @OLD_SQL_MODE=@@SQL_MODE,
SQL_MODE='ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLES,NO_ZERO_IN_DATE,NO_ZERO_DATE,ERROR_FOR_DIVISI
ON_BY_ZERO,NO_ENGINE_SUBSTITUTION';

-- -----

-- Schema mydb

-- -----

-- -----

-- Schema worldbankdb

-- -----

-- -----

-- Schema worldbankdb

-- -----

CREATE SCHEMA IF NOT EXISTS `worldbankdb` DEFAULT CHARACTER SET utf8mb4 COLLATE
utf8mb4_0900_ai_ci ;

USE `worldbankdb` ;

```
-- Table `worldbankdb`.`countries`
```

```
CREATE TABLE IF NOT EXISTS `worldbankdb`.`countries` (  
  `country_id` TINYINT NOT NULL,  
  `country_name` VARCHAR(55) NULL DEFAULT NULL,  
  PRIMARY KEY (`country_id`))  
  
ENGINE = InnoDB  
  
DEFAULT CHARACTER SET = utf8mb4  
  
COLLATE = utf8mb4_0900_ai_ci;
```

```
-- Table `worldbankdb`.`years`
```

```
CREATE TABLE IF NOT EXISTS `worldbankdb`.`years` (  
  `year_id` TINYINT NOT NULL,  
  `year` SMALLINT NULL DEFAULT NULL,  
  `lustrum` TINYINT NULL DEFAULT NULL,  
  `decade` TINYINT NULL DEFAULT NULL,  
  `vicennial` TINYINT NULL DEFAULT NULL,  
  PRIMARY KEY (`year_id`))  
  
ENGINE = InnoDB  
  
DEFAULT CHARACTER SET = utf8mb4  
  
COLLATE = utf8mb4_0900_ai_ci;
```

```
-- Table `worldbankdb`.`measurements`
```

```
CREATE TABLE IF NOT EXISTS `worldbankdb`.`measurements` (  
  `country_id` TINYINT NOT NULL,  
  `year_id` TINYINT NOT NULL,  
  `portfolio_equity_net_inflows_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
  `grants_excluding_technical_cooperation_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,
```

```
`personal_remittances_received_of_gdp` DECIMAL(30,15) NULL DEFAULT NULL,  
`communications_computer_etc_of_service_exports_bop` DECIMAL(30,15) NULL DEFAULT NULL,  
`insurance_and_financial_services_of_service_exports_bop` DECIMAL(30,15) NULL DEFAULT NULL,  
`exports_of_goods_services_and_primary_income_bop_current_us` DECIMAL(30,15) NULL DEFAULT  
NULL,  
`exports_of_goods_and_services_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`primary_income_receipts_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`secondary_income_receipts_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`technical_cooperation_grants_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`goods_exports_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`foreign_direct_investment_net_inflows_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`foreign_direct_investment_net_inflows_of_gdp` DECIMAL(30,15) NULL DEFAULT NULL,  
`service_exports_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`transport_services_of_service_exports_bop` DECIMAL(30,15) NULL DEFAULT NULL,  
`charges_for_the_use_of_intellectual_property_receipts_bop_curre` DECIMAL(30,15) NULL  
DEFAULT NULL,  
`personal_remittances_received_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`ict_service_exports_of_service_exports_bop` DECIMAL(30,15) NULL DEFAULT NULL,  
`personal_transfers_receipts_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`ict_service_exports_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`travel_services_of_service_exports_bop` DECIMAL(30,15) NULL DEFAULT NULL,  
`current_account_balance_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`net_primary_income_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`foreign_direct_investment_net_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`net_financial_account_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`current_account_balance_of_gdp` DECIMAL(30,15) NULL DEFAULT NULL,  
`net_trade_in_goods_and_services_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`net_secondary_income_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`net_capital_account_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`net_trade_in_goods_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`portfolio_investment_net_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`net_errors_and_omissions_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`reserves_and_related_items_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`foreign_direct_investment_net_outflows_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`primary_income_payments_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,  
`service_imports_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,
```

```

`communications_computer_etc_of_service_imports_bop` DECIMAL(30,15) NULL DEFAULT NULL,
`foreign_direct_investment_net_outflows_of_gdp` DECIMAL(30,15) NULL DEFAULT NULL,
`imports_of_goods_and_services_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,
`transport_services_of_service_imports_bop` DECIMAL(30,15) NULL DEFAULT NULL,
`travel_services_of_service_imports_bop` DECIMAL(30,15) NULL DEFAULT NULL,
`insurance_and_financial_services_of_service_imports_bop` DECIMAL(30,15) NULL DEFAULT NULL,
`charges_for_the_use_of_intellectual_property_payments_bop_curre` DECIMAL(30,15) NULL
DEFAULT NULL,
`goods_imports_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,
`personal_remittances_paid_current_us` DECIMAL(30,15) NULL DEFAULT NULL,
`secondary_income_other_sectors_payments_bop_current_us` DECIMAL(30,15) NULL DEFAULT NULL,
`imports_of_goods_services_and_primary_income_bop_current_us` DECIMAL(30,15) NULL DEFAULT
NULL,
PRIMARY KEY (`country_id`, `year_id`),
INDEX `year_id` (`year_id` ASC) VISIBLE,
CONSTRAINT `measurements_ibfk_1`
    FOREIGN KEY (`country_id`)
    REFERENCES `worldbankdb`.`countries` (`country_id`)
    ON DELETE CASCADE
    ON UPDATE CASCADE,
CONSTRAINT `measurements_ibfk_2`
    FOREIGN KEY (`year_id`)
    REFERENCES `worldbankdb`.`years` (`year_id`)
    ON DELETE CASCADE
    ON UPDATE CASCADE)
ENGINE = InnoDB
DEFAULT CHARACTER SET = utf8mb4
COLLATE = utf8mb4_0900_ai_ci;

```

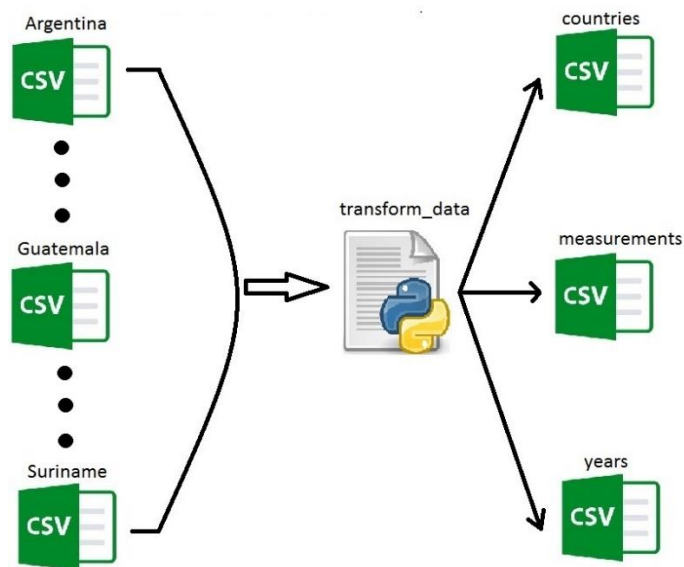
1.2 ΣΧΕΣΙΑΚΟ ΣΧΗΜΑ ΣΕ ΦΥΣΙΚΟ ΕΠΙΠΕΔΟ

1.2.1 ΡΥΘΜΙΣΗ ΤΩΝ ΠΑΡΑΜΕΤΡΩΝ ΤΟΥ DBMS

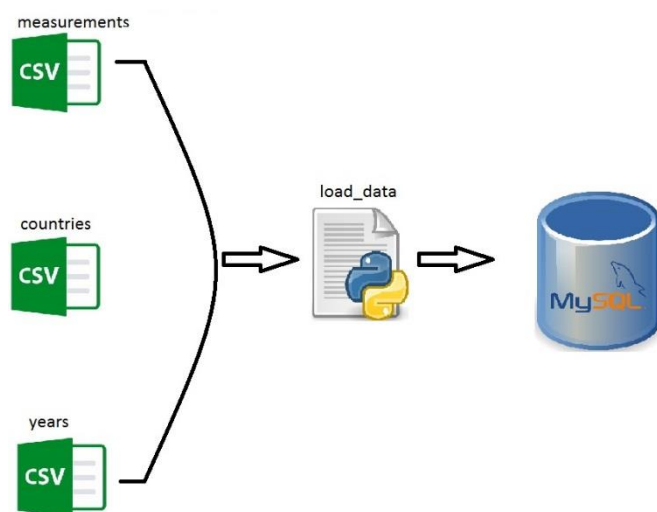
storage engine InnoDB, memory allocation of buffer pool = 3221225472 bytes (~70-80% of RAM)

2 ΑΡΧΙΤΕΚΤΟΝΙΚΗ ΛΟΓΙΣΜΙΚΟΥ

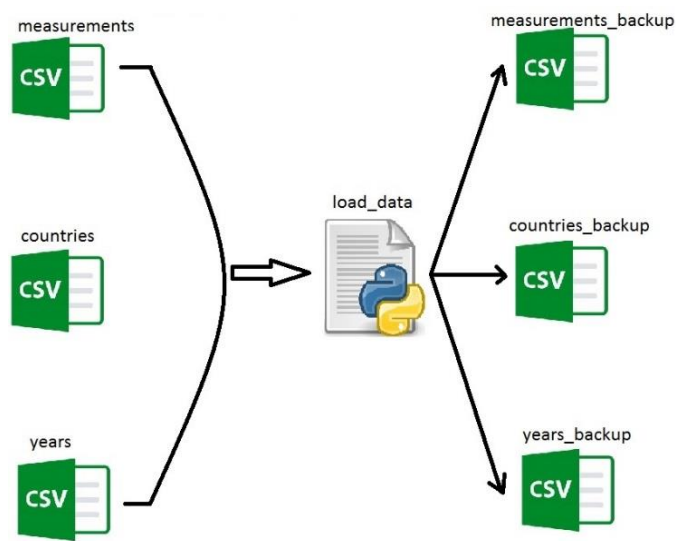
2.1 ΑΡΧΙΤΕΚΤΟΝΙΚΗ ΚΑΙ ΔΟΜΗ ETL



Σχήμα 2.1 Προεπεξεργασία των δεδομένων από το transform_data script

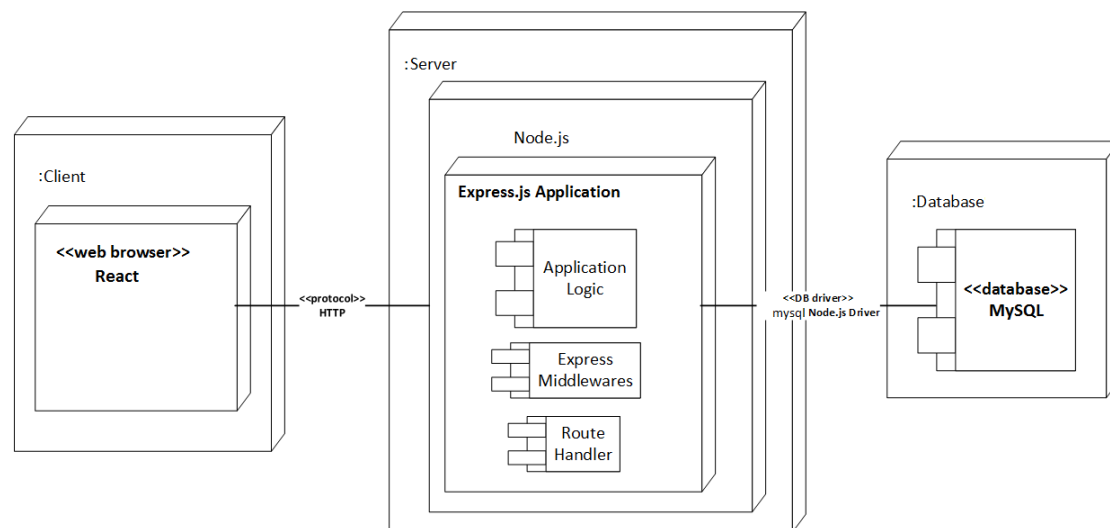


Σχήμα 2.2 Φόρτωση των δεδομένων από το load_data script



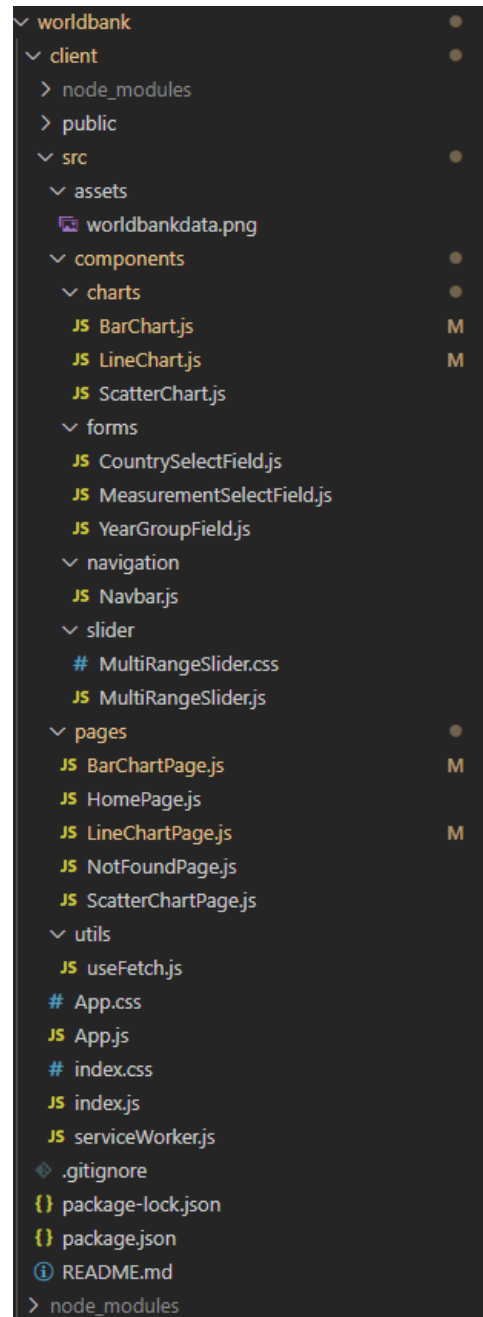
Σχήμα 2.3 Δημιουργία των backup αρχείων από το load_data script

2.2 ΔΙΑΓΡΑΜΜΑΤΑ ΠΑΚΕΤΩΝ / ΥΠΟΣΥΣΤΗΜΑΤΩΝ ΚΕΝΤΡΙΚΗΣ ΕΦΑΡΜΟΓΗΣ



Σχήμα 2.4 Deployment diagram of the system

2.3 ΔΙΑΓΡΑΜΜΑ(ΤΑ) ΚΛΑΣΕΩΝ ΚΕΝΤΡΙΚΗΣ ΕΦΑΡΜΟΓΗΣ



Σχήμα 2.5 Structure of the React application

3 ΥΠΟΔΕΙΓΜΑΤΑ ΕΡΩΤΗΣΕΩΝ ΚΑΙ ΑΠΑΝΤΗΣΕΩΝ

```

app.get('/getMeasurement', (req, res) => {
  let yearsIds = "(";
  db.query(
    "SELECT year_id FROM years WHERE year >= ? AND year <= ?;",
    [req.query.minYear, req.query.maxYear],
    (err, response) => {
      if (err) {
        throw err;
      }
      response.forEach(e => yearsIds += e.year_id + ", ");
      yearsIds = yearsIds.slice(0, -2);
      yearsIds += ")";
      db.query(
        "SELECT country_id from countries WHERE country_name = ?;",
        req.query.countryName,
        (err, response) => {
          if (err) {
            throw(err);
          }
          db.query(
            "SELECT " + req.query.measurementName + " FROM measurements WHERE country_id = " + response[0].country_id + " and year_id IN " + yearsIds + ";",
            (err, response) => {
              if (err) {
                throw(err);
              }
              let groups = [];
              let measurements = response.map((value) => parseInt(value[req.query.measurementName]));
              while (measurements.length) {
                groups.push(measurements.splice(0, req.query.yearGroup));
              }
              res.send(groups.map(group => group.reduce((a, b) => a + b) / group.length));
            })
          })
        })
      })
    })
  );
});

```

Σχήμα 2.5 Server get request

```

const useFetch = (url) => {
  const [data, setData] = useState(null);
  useEffect(() => {
    const cancelToken = axios.CancelToken;
    const source = cancelToken.source();
    setTimeout(() => {
      axios.get(url, {
        cancelToken: source.token,
      })
        .then((response) => {
          setData(response.data);
        })
        .catch(e => {
          console.log(e);
        })
    }, 1000);
    return () => {
      source.cancel();
    }
  }, [url])

  return { data };
}

```

Σχήμα 2.6 Client fetch data

```
const handleSubmit = (e) => {
  setComparativeMeasurements([measurementXAxis.replace(/_/g, ' ')]);
  e.preventDefault();
  axios.get('http://localhost:3001/getMeasurement', {
    params: {
      measurementName: measurementXAxis,
      countryName: country,
      minYear: minSliderValue,
      maxYear: maxSliderValue,
      yearGroup: dataYearGroup
    }
  })
  .then((response) => {
    setBarChartData(
      {
        labels: getYears(),
        datasets: [{
          label: country,
          data: response.data,
          backgroundColor: 'rgba(255, 99, 132, 0.5)',
          borderColor: "black",
          borderWidth: 1
        }]
      }
    );
  })
  .then(() => {
    setComparisonsCounter(0);
    setDataSubmitted(true);
  })
  .catch(e => {
    console.log(e);
  });
}
```

Σχήμα 2.7 Client get request barchart