

ISBN :



# CONFERENCE PROGRAMS AND ABSTRACT

**ADVANCING SUSTAINABLE SCIENCE AND TECHNOLOGY  
THROUGH EFFECTIVE COLLABORATION**

**OCTOBER 20-21, 2021**

**Palembang, Province of South Sumatera  
Indonesia**

Organized By :



## FOREWORD FROM GENERAL CHAIR 5<sup>th</sup> FIRST 2021 INTERNATIONAL CONFERENCE



Assalamu'alaikum wr wb,

Alhamdulillahirrobbil 'alamin, Thank to the God, almighty, due to His bless and love, we are granted good health and opportunity so that we can meet here in the event of the 5<sup>th</sup> FIRST and the 3<sup>rd</sup> SNAPTEKMAS 2021.

The honorable keynote speakers of the 5<sup>th</sup> FIRST and the 3<sup>rd</sup> SNAPTEKMAS 2021

Dra. Nana Yuliana, MA., Ph.D., as The Indonesian LBBP Ambassador for the Republic of Cuba, concurrently with the Commonwealth of the Bahamas, Jamaica, the Dominican Republic and Haiti

Prof. Ramaraj Boopathy. from U Alcee Fortier Distinguished Service Professor of Biological Sciences At the Nicholls State University, USA

Dr. Ing. Ahmad Taqwa, the Director of State Polytechnic of Sriwijaya.

The honourable keynote speakers, distinguished guests, all participants, ladies and gentlemen,

For the beginning of my speech, let me welcome all of you with my great warm hug. It is a great honor for me that you choose the 5<sup>th</sup> FIRST and the 3<sup>rd</sup> SNAPTEKMAS 2021 as your conference. I am so proud that the authors still become enthusiastic to develop the knowledge although in this pandemic situation. Let us still work hard to support the development of the world through the research, science, and technology in many parts of the knowledge, as what has been purposed by the FIRST conference itself.

In this occasion, I would like proudly to inform you that the 5<sup>th</sup> FIRST and the 3<sup>rd</sup> SNAPTEKMAS 2021 as the forum to share knowledge, to search, to find, and to enlarge the link with other industries and universities has attracted so many authors from abroad, such as from: Politeknik Tun Syed Nasir Syed Ismail; MARA University; Politeknik Mukah Sarawak; University Sultan Zainal Abidin, Terengganu, Malaysia; Politeknik Melaka (PMK) Malaysia; Iloilo Science and Technology University (ISAT-U) Philipina; Politeknik Kota Kinabalu; Universiti Teknologi Malaysia; The National University of Malaysia; National Chin-Yi University of Technology (NCUT); Accounting Research Institute UiTM-Malaysia; Management and Science University Malaysia; AlBaha University, KSA, Saudi Arabia; Politeknik Melaka (PMK), Malaysia; Kuantan Community College, Pahang, Malaysia; Universiti Brunei Darussalam; and Ferdowsi University of Mashhad, Iran.

Welcome to all of the researchers that become the collaborators in our research and community service. It is our great honour to have you as our collaborators and participants in the 5<sup>th</sup> FIRST and the 3<sup>rd</sup> SNAPTEKMAS 2021.

The honourable keynote speakers, distinguished guests, all participants, ladies and gentlemen,

In this chance, I would like to say thank you very much to the Director of State Polytechnic of Sriwijaya for his full support in the development of the Research and Service Community programs. Due to his hard work and his belief to all of the committee so that this event can be held.

In this occasion, I also would like to convey my big thank to all of the keynote speakers, invited guests, all the participants, all reviewers, and all committee of the 5<sup>th</sup> FIRST and the 3<sup>rd</sup> SNAPTEKMAS 2021. Without you all, this event will be nothing. May Allah SWT gives His reward for your sincerity. As the time goes by, it is hoped that our cooperation and coordination in the FIRST and SNAPTEKMAS can be maintained and improved. I hope that you can enjoy this conference and can get a big benefit from this event. I also wish that we can meet again in the forthcoming FISRT ad SNAPTEKMAS

Wassalamu'alaikumwaraahmatullahi wabarakatuh

## FOREWORD FROM DIRECTOR OF STATE POLYTECHNIC OF SRIWIJAYA



The honorable, FIRST 2021 and SNAPTEKMAS 2021 keynote speakers,

Dra. Nana Yuliana, MA., Ph.D., as The Indonesian LBBP Ambassador for the Republic of Cuba, accredited to the Bahamas, Republic of Dominican, Republic of Haiti and Jamaica

Prof. Ramaraj Boopathy., from U Alcee Fortier Distinguished Service Professor of biological sciences at the Nicholls State University, USA

Dr. Ing. Ahmad Taqwa, MT., as Director of Politeknik Negeri Sriwijaya

Assalamualaikum wr wb,

Let us extend our gratitude to Allah SWT, the most gracious, the most merciful. Due to His bless, we can gather here, at the Opening Ceremony of the FIRST 2021 and SNAPTEKMAS 2021

First of all, Please let me deliver my warm welcome to all keynote speakers and all participant of FIRST 2021 and SNAPTEKMAS 2021. It is my great pleasure to meet and see you in this event.

Although, there are so many obstacles that should be faced in the pandemic situation, however, as young generation, we should be optimistic, stay strong and be active in searching and finding the solution. The FIRST 2021 and SNAPTEKMAS 2021 as the DIES of State Polytechnic of Sriwijaya annual event will become one of the media to support those activities. The researchers could share knowledge, find partners, and enlarge the collaboration through this event.

Based on the change in the model of the teaching learning activity that focuses on the MERDEKA BELAJAR, State Polytechnic of Sriwijaya has a big desire in getting acceleration in the internationalization of the institution. One of them by improving the overseas and industrial collaboration, especially in joint research and joint publication. In the beginning of 2021, the research and community service unit in Politeknik Negeri Sriwijaya has launched new schemes of research and community service, namely the Overseas Collaboration Research and Overseas Collaboration Community Service. Thanks to God, those schemes have attracted researchers not only from Asia but also several other countries outside Asia, such as: research and community service collaboration with Al Baha University from Saudi Arabia, with Ferdowsi University of Mashhad from Iran, and with Princess Sumaya University of Technology from Jordan, as well as several other foreign universities.

In this occasion, I also would like to welcome all the researchers that become the collaborators in our new scheme of research and community service. It is our great honour to have you as our collaborators.

The honourable participants,

At this time, State Polytechnic of Sriwijaya has held 5 times of FIRST. FIRST publications from previous conferences have been successfully indexed not only in SCOPUS, but also in WOS. This 5th FIRST seminar will be conjugated with the 3<sup>rd</sup> National Seminar on Community Service SNAPTEKMAS. (National seminar of applied technology for public). All of these are the efforts to improve the quality of Polsri lecturers which significantly have a positive effect on the learning process of Polsri students.

Before ending my speech, I would like to congratulate the participants of The FIRST 2021 and SNAPTEKMAS 2021. May the noble efforts, support, and cooperation of researchers in this conference will continue. Special thanks to the organizer and co-organizer committee of The FIRST 2021 and SNAPTEKMAS 2021 for the hard work and the commitment in realizing this conference. Do maintain the spirit of working in a team and continue to unite in order to display a culture of excellence in the eyes of the country and the world.

With Bismillahirrahmanirrahim, I officiate The FIRST 2021 and SNAPTEKMAS 2021.  
Wassalamu'alaikum warrahmatullahi Wabarakatu

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## KEYNOTE SPEAKER



**Dra. Nana Yuliana, MA., Ph.D.**

The Indonesian LBBP Ambassador for the Republic of Cuba, concurrently with the Commonwealth of the Bahamas, Jamaica, the Dominican Republic and Haiti

Her Excellency Ambassador Nana Yuliana, Ph.D arrived in Havana, Cuba on December, 23rd, 2020 to serve her duties as the Ambassador Extraordinary and Plenipotentiary of the Republic of Indonesia to Republic of Cuba, Commonwealth of Bahamas, Dominican Republic, Republic of Haiti and Jamaica. She was appointed by the President of the Republic of Indonesia on October 19th, 2020. Prior to her position as Ambassador Extraordinary and Plenipotentiary, she was Consul General of the Republic of Indonesia in Houston, Texas, United States of America from 2017 –2020, after she was the Director of Mid-Career Diplomatic School at the Ministry of Foreign Affairs of Indonesia from 2014 – 2017. Her first diplomatic assignment was as First Secretary of Political Affairs at the Embassy of Indonesia in Manila from 2001-2005. From 2008 to 2012, she was the Counsellor of Economic Affairs of the Embassy of Indonesia in Bangkok and Permanent Representative of Indonesia to the United Nations Economic and Social Commission for Asia and Pacific (UNESCAP). She attended several meetings related to Millennium Development Goals (MDGs) or Sustainable Development Goals (SDGs) issues. Her bachelor's degree was English Education from Institute of Teacher's Training in Jakarta, then she pursued her Master Degree in Applied Linguistics for Macquarie University in Sydney, Australia and also International Relations from University of Indonesia in Jakarta, Indonesia. She completed her Doctoral Degree in Development Studies from the University of Santo Tomas, Manila, Philippines in 2006. While serving as a diplomat since 1995, her passion in teaching and learning encourages her as well to share her knowledge and teaches at the University in Jakarta, Indonesia. During her tenure as Consul General, she was very active in promoting Trade, Tourism, Inbound and Outbound Investments and very keen to engage with Universities for cooperation in human capital development.

## KEYNOTE SPEAKER



### Prof. Ramaraj Boopathy

Alcee Fortier Distinguished Service Professor of biological sciences  
at the Nicholls State University, USA

Fulbright Scholar Fulbright Senior Specialist World Class Professor-Government of Indonesia. Honorary Visiting Professor, ITB, Indonesia Alcee Fortier Distinguished Service Professor John Brady Endowed Professor in Biological Sciences Nicholls State University Business Address: Alcee Fortier Distinguished Service Professor John Brady Endowed Professor in Biological Sciences Department of Biological Sciences Nicholls State University Thibodaux **EDUCATION:** B.Sc. Zoology, University of Madras, India; 1979 M.Sc. Environmental Biology, Tamil Nadu Agricultural University, India; 1981 Ph.D. Environmental Biology, University of Madras, India; 1986 **UNIVERSITY RESPONSIBILITIES:** Responsibilities include Teaching Environmental Biotechnology, a Senior and Graduate level course, Marine and Environmental Biology (Graduate Course), Microbiology and Environmental Biology courses. Research interests include Bioremediation of Hazardous Chemicals and Anaerobic Microbiology. Service includes advising students, participate in Departmental and University committees and serving the local and regional communities. Advisor to Masters Program in Marine and Environmental Biology. **PROFESSIONAL EXPERIENCE:** January 2013 – Present: John Brady Endowed Professor in Biological Sciences, Department of Biological Sciences, Nicholls State University, Thibodaux. Teaching, Research, and Service to the University and Community. August 2012 – Present: Alcee Fortier Distinguished Service Professor, Department of Biological Sciences, Nicholls State University, Thibodaux. Teaching, Research, and Service to the University and Community. August 2004 – Present: Distinguished Service Professor, Department of Biological Sciences, Nicholls State University, Thibodaux. Teaching, Research, and Service to the University and Community. **MAJOR AREAS OF RESEARCH INTERESTS:** Anaerobic digestion, Composting, Biodegradation of hazardous chemicals. Antibiotic resistant bacteria and Antibiotic resistance genes in the aquatic ecosystem. Isolation and identification of novel bacteria. Anaerobic degradation of explosive chemicals with particular reference to sulfate reducing bacteria. Design and development of biological reactor systems. Microbial immobilization of



heavy metals and radionuclides. Alcohol production from agricultural residues. Water quality in the wetlands. Alternative to sugarcane burning, Biological control of termites. Organic ways to control land loss and coastal restoration.

## KEYNOTE SPEAKER



**Dr. Ing. Ahmad Taqwa, MT.**

Director of Politeknik Negeri Sriwijaya Indonesia


Director of State Polytechnic of Sriwijaya, other than that, he is still active at Head of The Research and Publication Commission Forum Director of State Polytechnical In Indonesia, Founder of The Online Journalist Board (IWO) Sumsel, Chairman of The Advisory Board of UKM Nusantara Palembang and Assessor of Higher Accreditation Board. **EDUCATION:** Diplom Ingenieur Electrical Engineering HTL, Ingenieurschule Beider Basel, Switzerland; 1994, Magister (2005) and Doctoral (2010) at Electrical Engineering, Bandung Institute of Technology, Indonesia. **RESEARCH:** Head of Research Assignment “Mini PLTS Periodic Cooling System to Overcome Overheating in Palembang City” (2019), Member of The Research Assignment “Effects of Sea Salt Dust Collection on Output Loss and Solar Panel Output Efficiency” (2020), and Head of Research Assignment “Design and Build of Wireless Sensor Network Prototype Detection Of Landslides Based on IOT and LORA” (2020). **DEDICATION:** “The Design and Evaluation of Virus Scan in The E-Mail System in SMA N 5 Palembang” (2018), Assignment Service “Utilization of WSN Technology in Parking Air Monitoring Foundation SMP Harapan Mulia Palembang” (2019), Development of Teaching Materials with Interactive Multimedia with Education Game for Harapan Mulia Junior High School Students” (2020). **AWARD:** Certificate In Participating In The 200 Hour Advanced Technical Teacher Training awarded by FONTYS and PEDC (1998), Satyalancana Karya Satya X Year 2011 And Satyalancana Karya Satya XX Year 2017 by The President of The Republic of Indonesia. **WORKSHOP:** Seminar and Focus Group Discussion Forum The Rector of Indonesia “Economic Stability In The Vuca Area”, Ujung Pandang (2020), Workshop on Using Integrated Resources Information System Applications For Lecturers of State Polytechnical Polytechnic, Palembang (2019) And Workshop of Learning Methodology of Polsri Lecturers and Outside Education Domicile (PDD) as a Source Person, Palembang (2019).

**RUNDOWN**  
**The 5<sup>th</sup> FIRST 2021 INTERNATIONAL CONFERENCE**  
**(FORUM IN RESEARCH SCIENCE AND TECHNOLOGY)**  
**SNAPTEKMAS (Seminar Nasional Aplikasi Teknologi pada Masyarakat) 2021**  
**Palembang, South Sumatera, Indonesia**  
**Thursday, October 21, 20201**

		Thursday, October 21, 20201		
No.	Session	Person in Charge	Time Allotment (WIB)	Liaison Officer
1.	Registration	Event Section Committee	07.00 – 08.00	Doeslohal Djumrianti, S.E.MIS., Ph.D
2.	The Opening Ceremony			
3.	Do'a			
4.	Indonesian National Anthem			
5.	Chair Report Speech	Event Section Committee	08.00 – 09.00	
6.	Speech and Opening Remarks by Director of State Polytechnic of Srijijaya			
7.	Souvenirs Gift, Group Photos			
PLENARY SESSION				
No.	Keynote Speaker	Affiliation	Time Allotment (WIB)	Moderator
1.	Dra. Nana Yuliana, MA., Ph.D.	The Indonesian LBBP Ambassador for the Republic of Cuba, concurrently with the Commonwealth of the Bahamas, Jamaica, the Dominican Republic and Haiti	09.00 – 10.00	Tiur Simanjuntak M.Pd.
2.	Prof. Ramaraj Boopathy	Alcee Fortier Distinguished Service Professor of biological sciences at the Nicholls State University, USA	10.00 – 11.00	Prof. Hasan Basri
3..	Dr. Ing. Ahmad Taqwa, MT.	Director of Politeknik Negeri Sriwijaya, Indonesia	11.00 – 12.00	Jaksen M. Amin, M.Si.
				Doeslohal Djumrianti, S.E.MIS., Ph.D
				Dr. Nyayu Latifah Husni, M.T.
				Dr. Martha Aznury, S.Pd., M.Si.

**PARALLEL SESSION**

No.	Theme	Room	Time	Moderator	Articles
1.	TRACK 1 (Engineering and Science)	1	13.00 – 16.00	Dr. Eng Tresna Dewi, M.Eng./ Ika Sulianti, ST, MT	15
2.	TRACK 1 (Engineering and Science)	2	13.00 – 16.00	Dr. Martha Aznury, M.Si./ Indah Purnamasari, M.Eng.	14
3.	TRACK 1 (Engineering and Science)	3	13.00 – 16.00	Fatahul Arifin, M.Eng, Ph.d./ Dr. Indrayani, S.T., M.T.	13
4.	TRACK 2 (Computer Science, Computer Engineering, Information System, Informatics Management)	4	13.00 – 16.00	Rika Sadariawati, M.Si./ M.Miftakul Amin, S.Kom., M.Eng	13
5.	TRACK 2 (Computer Science, Computer Engineering, Information System, Informatics Management)	5	13.00 – 16.00	Dr. Nyayu Latifah H, MT./ Lindawati, S.T., M.TI	12
6.	TRACK 3 (Social Science)	6	13.00 – 16.00	Doeslohah Djumrianti, S.E.MIS., Ph.D/ Dr. Marieska Lupikawati	13
7.	TRACK 3 (Social Science)	7	13.00 – 16.00	Dr. Sari Lestari ZR/ Dr. Rita Martini	14
8.	SNAPTEKMAS 1	8	13.00 – 16.00	Yumi Oklarina, ST, MT/ Mouland Irwadi, SE. M.Si.	15
9.	SNAPTEKMAS 2	9	13.00 – 16.00	Leni Novianti, M.Kom./ Maivi Kusnandar, M.Kom	15
10	SNAPTEKMAS 3	10	13.00 – 16.00	M Husni Mubarak, M.Si./ Martinus Mujur, ST, MT	15
11	SNAPTEKMAS 4	10	13.00 – 16.00	Dr. Ade Silvia H, MT./ M. Sopian Soim, ST, MT	13



### CLOSING SESSION

Event	Time	Room
<ul style="list-style-type: none"><li>- Closing Ceremony</li><li>- Announcement of:<ol style="list-style-type: none"><li>1. Best Paper FIRST IC 2021</li><li>2. Best Paper SNAPTEKMAS 2021</li><li>3. Best Presenter FIRST IC 2021</li><li>4. Best Presenter SNAPTEKMAS 2021</li></ol></li><li>- Quiz Online</li></ul>	16.00– 17.00	Main Room

### TRACK 3 (Social Science)

ROOM : 6  
 TIME : Thursday, 21 October, 2021/ 13.00 - 16.30  
 ARTICLES : 13  
 MODERATOR : Doeslohal Djumrianti, S.E.MIS., Ph.D/ Dr. Marieska  
 Lupikawati

NO	Time	ID	AUTHORS	TITLE	AFFILIATION
1	13.00-13.10	3847	Ayu Chotibah, Bainil Yulina, Desi Apriyanty, Evada Dewata, Pridson Mandiangan	THE INNOVATION OF SOUTH SUMATERA TRADITIONAL BATIK E-COMMERCE APPLICATIONS	State Polytechnic of Sriwijaya
2	13.10-13.20	3683	M. Thoyib, Riza Wahyudi, Firmansyah, Darul Amri	THE ANALYSIS OF COST QUALITY ON PRODUCTIVITY OF IRON RAILING PRODUCTS IN SMALL AND MEDIUM BUSINESS IN PALEMBANG	State Polytechnic of Sriwijaya
3	13.20-13.30	3757/3756	Nelly Masnila, Firmansyah, Jovan Febriantoko, Riana Mayasari, Jamaliah Said	Quality of Financial Reporting and Impact of GGG Implementation: Study on Local Government in Indonesia	State Polytechnic of Sriwijaya
4	13.30-13.40	3796	Evi Agustina Sari, Sri Gustiani, Yusri, Tiur Simanjuntak	An Error Analysis of English Sentence Construction in Writing Subject Made by the Students of the English Department at Sriwijaya State Polytechnics	State Polytechnic of Sriwijaya
5	13.40-13.50	3827	Edwin Frymaruwah, Farah Aida Ahmad Nadzri, Periansya, Evada Dewata	DISCLOSURE OF SUSTAINABLE PERFORMANCE IN HIGHER EDUCATION IN INDONESIA	State Polytechnic of Sriwijaya, UiTM
6	13.50-14.00	3976	Hendra Hadiwijaya Febrianty Rezanía Agramanisti Azdy	Improvement of LPKA Class 1 Palembang Electronic Dashboard with Field Performance Monitoring	Palcomtech Polytechnic, STMIK PalComTech
7	14.00-14.10	3853/4034	Neneng Miskiyah, Purwati, Yulia Pebrianti, Keti Purnamasari, Nyimas Miftahul Jannah,	OPTIMIZATION OF INCOME PARAMETERS OF SONGKET CRAFTSMEN ON KOPERASI SONGKET PALEMBANG	State Polytechnic of Sriwijaya

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# Single Page Application for Business Intelligence Dashboard

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## ABSTRACT

This study develops a single page application (SPA) model which is implemented in the business intelligence dashboard at the Sriwijaya State Polytechnic. The technology used in this research is AJAX on the client side, and RESTful web service on the server side. Several HTTP methods such as GET, PUT, POST, and DELETE can be easily implemented in a RESTful web service. Information generated from RESTful web services can be used as a reference in providing information to be displayed in web pages dynamically without having to reload web pages using AJAX. The information obtained from this RESTful web service then can be visualized in the form of tables and graphs on the Business Intelligence application dashboard. The results of this study indicate that the SPA model can provide a variety of information needed in a web page.

**Keywords:** Single Page Application, RESTful Web Service, Business Intelligence

## 1. INTRODUCTION

The use of the internet today as a medium for disseminating information is very widespread. One application that runs on a web network is a web application. With this web application, it is possible to disseminate information in the form of text, links, audio, and video that can be easily accessed. The consequence that arises from implementing web applications is repeated bandwidth usage when loading information on web pages. One type of application that is currently being widely used by organizations is Business Intelligence (BI) [12]. This BI application is used to analyze reports related to business activities carried out.

The concept of Single Page Application (SPA) using Javascript, HTML, and AJAX is one of the features that can be used in developing web applications by minimizing bandwidth usage and processing information in web pages faster. SPA makes the request and response process more efficient as the interaction between the server and client in accessing web pages. Database operations in the form of CRUD (create, read, update, delete) can be performed without having to

reload the web page. This allows it to be done using AJAX technology on the client side and RESTful web services on the server side.

This study aims to build a Business Intelligence (BI) application model that can be used by top management at the Sriwijaya State Polytechnic in the decision-making process and strategic planning. The technology used to support BI application implementation is Single Page Application (SPA) technology using AJAX and RESTful web service technology in providing distributed and cross-domain data sources.

## 2. LITEARUTER REVIEW

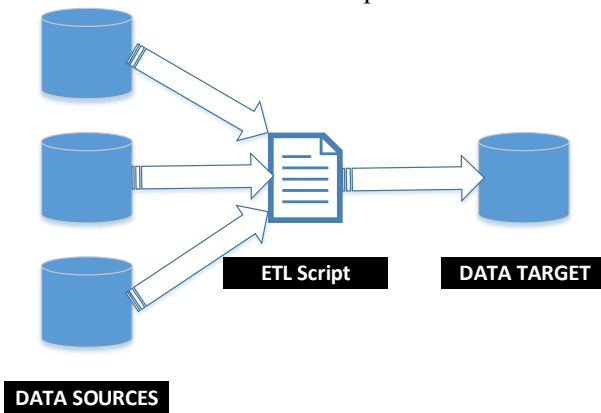
### 2.1. Business Intelligence

Business intelligence (BI) is a system consisting of technical and organizational elements that provides users with historical information for analysis and enables effective decision making and management support for the main goal of improving organizational performance [6]. Business Intelligence (BI) provides historical data, current data, and is able to make predictions from the point of view of business operations, and generally uses data that comes from various data

sources and is collected in a data warehouse. In BI there are also reporting services, informative data analysis, visualization, and can be developed with various data mining algorithms [7].

The main focus of business intelligence (BI) is to support the decision-making process in an organization [8]. In general, data warehouse technology is used as the main component in the development of business intelligence, and the information displayed can be presented in the form of graphs and diagrams [11]. Bar graphs, line graphs, pie charts are types of graphs that are often used in presenting information in Business Intelligence [12].

The main component in the development of Business Intelligence is the ETL (Extract, Transform, Load) process in the data warehouse stage as shown in Figure 1. The Extract stage is taking data from the data source, the Transform stage is an activity to perform cleansing, aggregation, summarization, and the Load stage is the process for storing data in a data warehouse in the form of a multidimensional database. In general, this ETL stage uses a series of scripts or program code that adapts to the type of database management system (DBMS) or other supporting tools in data warehouse development.



**Figure 1** ETL Process adapted From [12]

**2.2 Single Page Application**

The concept of Single Page Application (SPA) refers to a web application that only displays information on one page. This means that even if the user switches to another menu, the URL in the web application does not show the change. The components and content of the web page are loaded dynamically depending on the interaction needs or user requests [1]. In this interaction, the server side simply sends and updates certain sections according to user requests so as to save bandwidth. With the small bandwidth used in this SPA concept, it will

provide a high response and convenience for users [2]. SPA is implemented in an HTML page and some javascript files are loaded in a web page on demand [3].

**2.3 AJAX Technology**

AJAX (Asynchronous Java Script and XML) is a technology that uses the HTTP protocol to communicate between the server and client sides in web application development. In contrast to conventional technology in web application development which requires the user to wait for information to be loaded on a web page, using AJAX allows a web page to update its information, without having to reload the web page [4].

**2.4 RESTful Web Service**

RESTful web service is a client/server communication protocol using resources in the form of URIs. RESTful web services use HTTP methods such as GET, PUT, POST, and DELETE for data operations [5]. There are 2 protocols used in web service development, namely SOAP and REST protocols. Meanwhile, in terms of data formats that are exchanged can be in the form of XML and JSON [9]. In its implementation, RESTful web services can be accessed through desktop applications, web applications and mobile applications [10].

**3. IMPLEMENTATION AND RESULTS**

The Business Intelligence application model was developed using a Single Page Application and implemented in a business intelligence application at the Sriwijaya State Polytechnic. AJAX technology and RESTful web services are used in the interaction between the client and server sides. Some of the results of this study can be explained as follows.

**3.1 Display of Dashboard Page**

Figure 2 is a business intelligence dashboard page displaying data in graphical form. The data presented is obtained by sending a request to the server via AJAX from the client side, then the server responds in the form of JSON data through a RESTful web service application which is then sent to the client and loaded on a web page. It can be seen in Figure 1 on the left side of the bar graph information on the number of departments by level, while on the right side there is a pie graph showing department by level accreditation information.

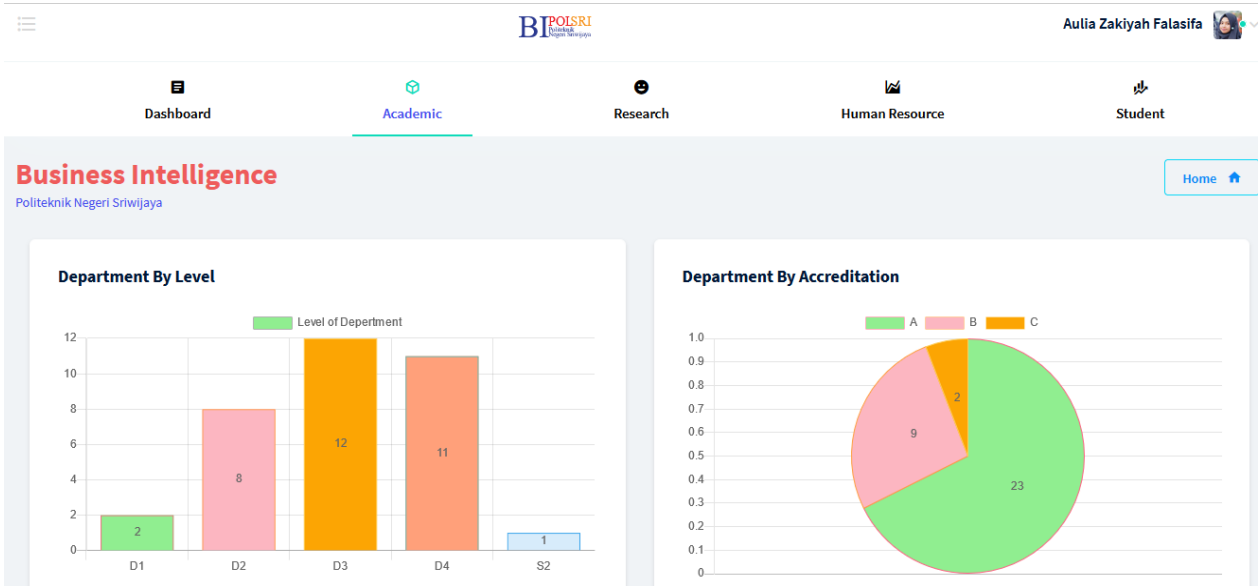


Figure 2 Department Page Display in Graphical Form

Furthermore, Figure 3 displays a web page containing information on lecturer data in tabular form. In this page, JSON data is also sent by the server via a RESTful web service and through the AJAX mechanism the data is loaded in tabular

form, which includes sorting, searching, and paging facilities. This data is important to provide information regarding the total number of lecturer data, and initial information in providing master data.

**List Of Lecturer**

Show  entries

Search:

ID Lecturer	Lecturer Name	Sex	Email	Spesilazation
1710061982	MUHAMMAD JUNESTRADA DIEM	L		Ilmu Ekonomi
1711061966	ZULFIKRI	L	zulkiifiwancik@yahoo.com	Akuntansi
1715021982	RIMA FEBRIANTI	L	rima_febrianti@yahoo.com	Ilmu Ekonomi
1717081977	AMRI UTAMA	P	amriutama2@gmail.com	Akuntansi
1719051969	HADLI A. HARAHAH	L		Teknik
1721051995	KIRANTI ANDELA PUTRI	P	andelaputrikiranti@gmail.com	Adminstras Bisnis
1721101981	IRWAN JAYA	L	irwan_guide81@yahoo.com	Bahasa Inggris
1726011994	HADI WIJAYA	L	hadi.jedank@gmail.com	Ilmu Komputer
1728021989	RIO PERMATA	L		Ilmu Komputer
1729011967	RUDA ERMANSYAH	L		Airline Reservation

Showing 21 to 30 of 446 entries

Previous 1 2 **3** 4 5 ... 45 Next

Figure 3 Lecturer Page Display in Table Form

### 3.2 Performance of Application

Figure 4 is the performance of a RESTful web service as seen from the network traffic which is the communication between the client/server. In the picture there are a series of requests that come from the client with the HTTP GET method that accesses 2 domains, namely `https://integrator.polsri.ac.id` and `https://busin.polsri.ac.id`. This request is sent using the AJAX method to request services to the address `https://integrator.polsri.ac.id` which contains several RESTful web services operations, and the resulting information is then visualized in the business

intelligence dashboard located in the `https://busin.polsri.ac.id` in the form of table data or in the form of various kinds of graphic information to make it easier to read the information. With the AJAX method, the information in the web page can be easily updated without having to reload the web page when making a request to the server, and receiving a response from the server.

Because it involves 2 different domains, in developing a RESTful web service on the server side it is necessary to add a cross join mechanism, so that access to resources can be done. Setting this up by adding a script like the following program notation:

```
Header('Access-Control-Allow-Origin: *');
Header('Access-Control-Allow-Headers: *');
Header('Access-Control-Allow-Methods: GET,
POST, OPTIONS, PUT, DELETE');
```

The 1st line is used so that RESTful web services can be accessed from various sources or other domain addresses, while the 2nd line allows RESTful web

service consumers to add header options in their program scripts when making requests, while the 3rd line allows Standard methods of RESTful web services can be accessed from various source domains and applications.

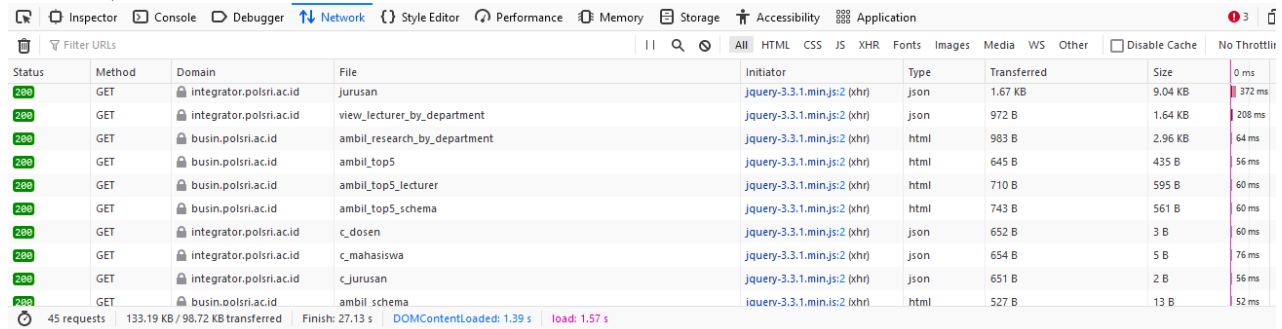


Figure 4 Monitoring Network Implementation of Single Page Application

#### 4. CONCLUSION

Based on the research that has been done, it can be concluded that the Single Page Application (SPA) concept can be used as a model of interaction between client and server by utilizing AJAX technology and RESTful web services. CRUD operations (create, read, update, delete) can be done easily without having to reload web pages repeatedly. These processes are executed indirectly visible to the user, and there is no need to display the detailed stages of execution. The results of the execution in the form of output information in the form of graphs and tables will then be on the web page without showing the process of loading the web page. This makes web applications lighter and faster to respond. From the business intelligence applications that have been produced, it shows that SPA technology is very helpful in providing dynamic data sources, and improving system performance with easy data access and web application response speed.

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