

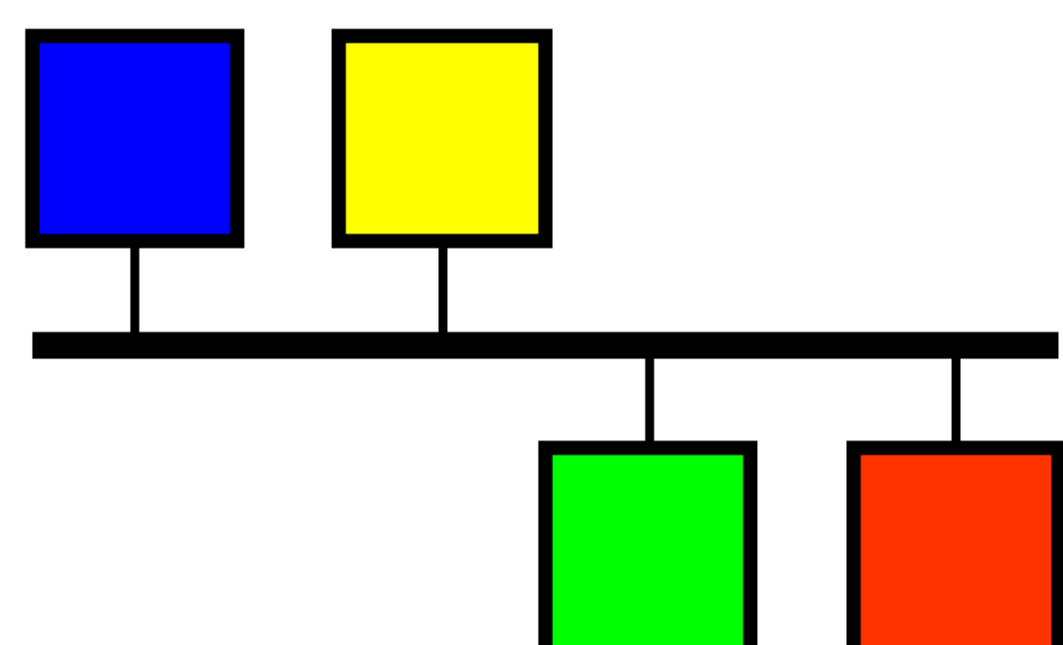
INTRODUCTION

The power supply developed by Indrajeet Prasad at FOTON was implemented into an EPICS control system. As part of the EPICS Input Output Controller (IOC), a specific device interface compliant with global rules was setup to support communication with the control system and a database was configured to store the device data. EPICS is an open source framework widely used in the scientific community. It offers support for communication with a wide range of devices and a framework to create custom device support.

EPICS

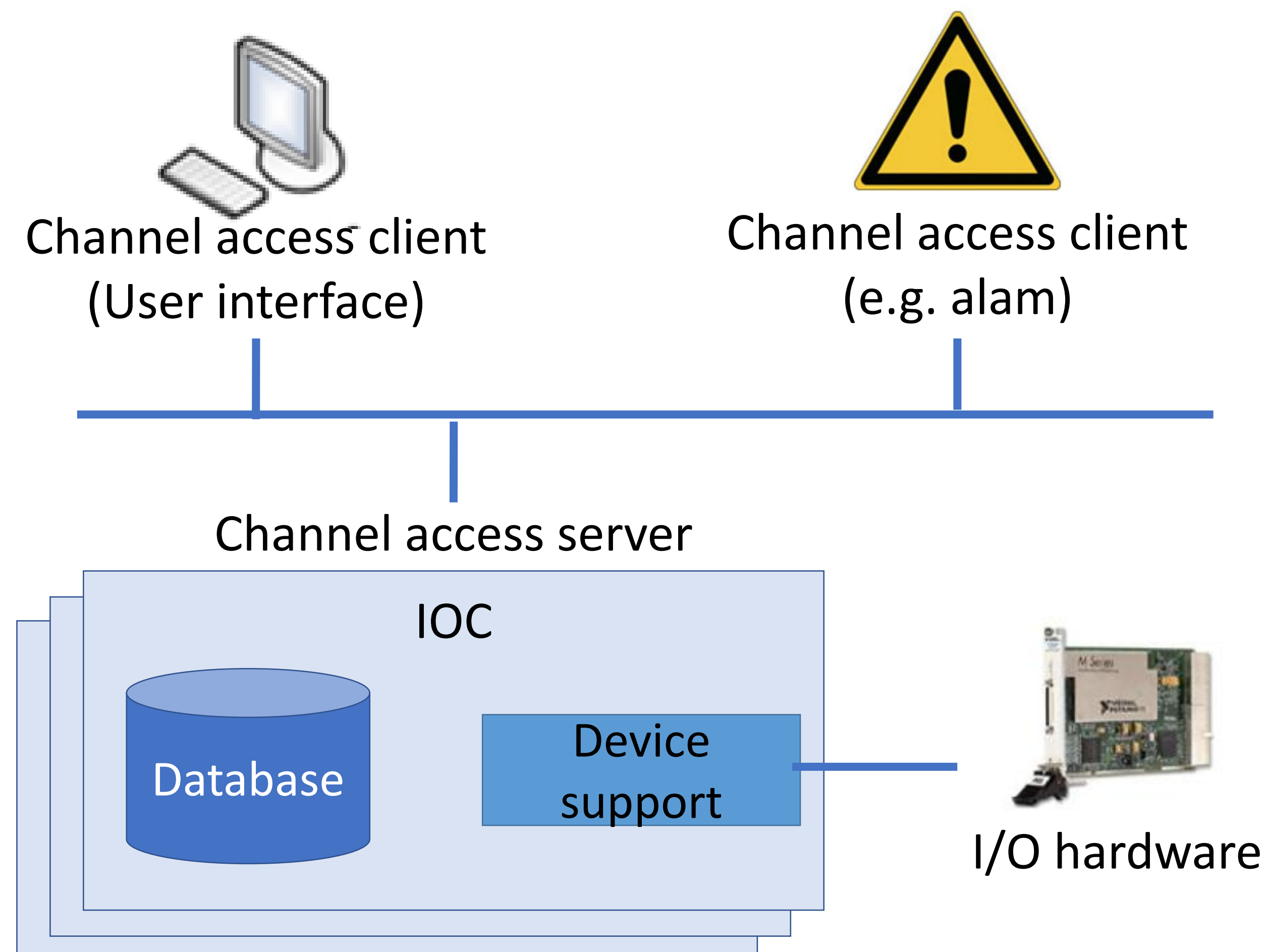
Architecture

EPICS is organized [2] around channel access servers, to which multiple channel access clients can connect. The channel access server is the intermediary between the clients and process variables (PV) representing physical quantities of the system (e.g. state, value,...) and stored in databases. In EPICS, the database references all devices, drivers and records required for the control system to handle all apparatus and behaviour of the particle accelerator [3].

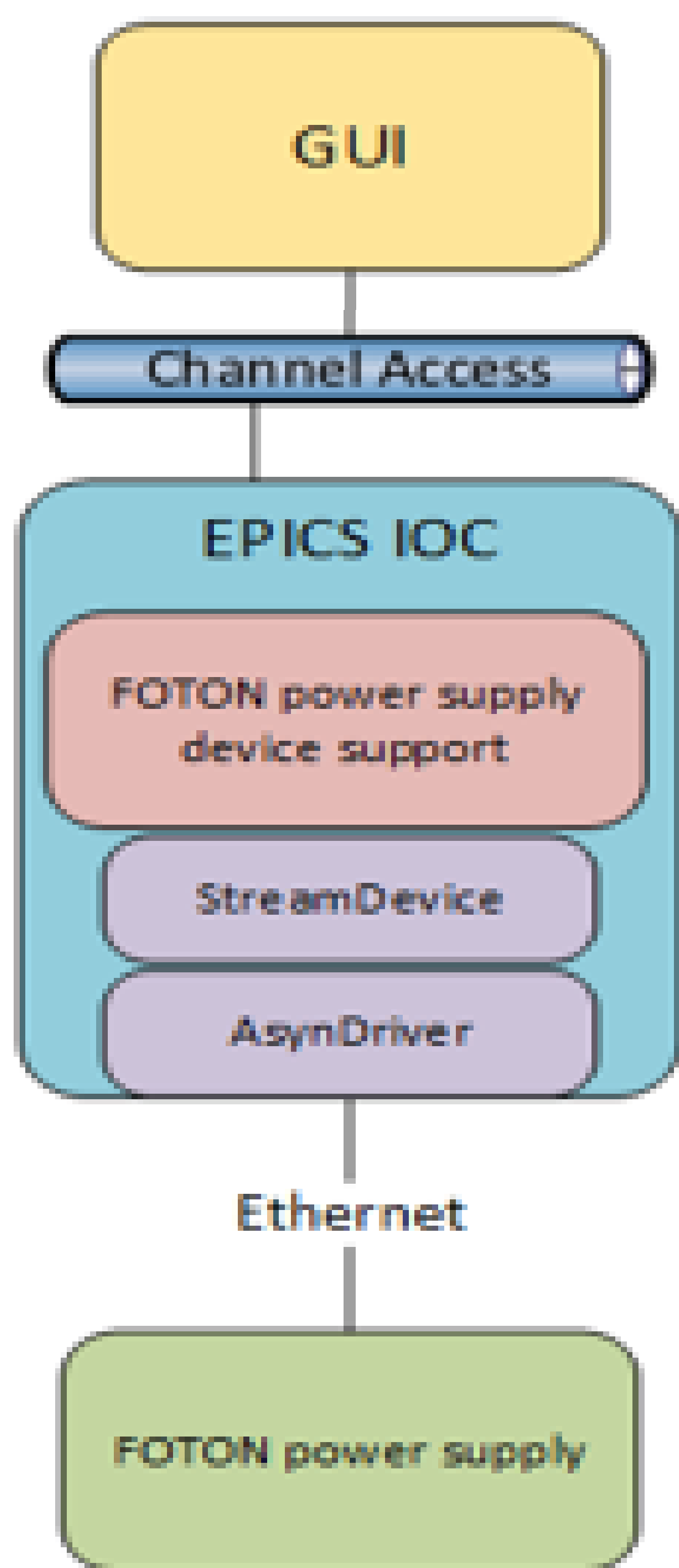


Experimental Physics and Industrial Control System (EPICS) [1]

- Is an open source framework
- Is a distributed system
- Supports a wide variety of device communication protocols
- Is flexible and can be adapted to various setup



POWER SUPPLY INTEGRATION



Overview

Within the AVA project, Indrajeet Prasad at FOTON is designing and building a reversible power supply for use in beamlines and rings for antimatter research. Integrating this device into the EPICS control system with the whole vertical column serves as a demonstration for control system integration of all future devices.

Technologies

- EPICS framework
- Graphic User Interface (GUI) developed with CS-Studio Phoebus [4]

Interface to the power supply

Communication between the IOC and the device is done via EPICS asyn driver and stream device modules. A protocol file mapping the serial commands recognized by the power supply to custom functions needs to be added to the EPICS application. The appropriate function is then referenced in the record needing to communicate to the device.

Database

The control system needs to make sure that all the relevant information is stored and transmitted to the appropriate party to manage its behaviour. The data is saved in Process variables (PV) and organized in records with a unique name and specific attributes shaping the application.

The power supply control system is using a specific set of records, drivers and epics modules to be able to perform in the full range of its capacity.

References

- [1] EPICS official website <https://epics-controls.org/>
- [2] EPICS record reference manual https://wiki-ext.aps.anl.gov/epics/index.php/RRM_3-14
- [3] EPICS developer guide <https://epics.anl.gov/base/R3-14/12-docs/AppDevGuide.pdf>
- [4] Phoebus https://controlsoftware.sns.ornl.gov/css_phoebus/

