Architecture and Detailed Design Specification Template

Revision History

Date	Description	Author	Approver	Comments
<date>	<Version 1>	<Your Name>	<Approver's Name>	<First Revision>
26/10/17	Completion of all sections of the document	All team members		
29/10/17	Changes made based on review by team C3. Section 2.2(Updation of analytics in detail)	N L Ramya		
29/10/17	Changes made based on review by team C3 (Reviewing test cases)	N L Ramya		

Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

Signature	Printed Name	Title	Date
	<Your Name>	Lead Software Eng.	

Contents

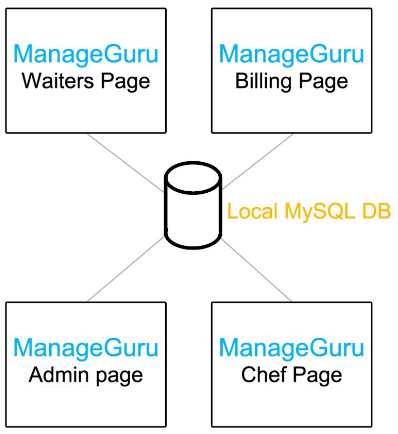
1.0 Architectural and Component-level design

Our product consists of three main components:

1) Web-based Management System
2) Centralised Cloud Computing System
3) Real Time Monitoring System (a Mobile Application and a Web Application)

1.1 Management System

This forms the data aggregation end of our system. The system is designed to provide an easy hotel management. The system is divided into more simpler components, 1) a simple web interface for the waiters to take in orders based on the current menu prepared by the head chef, 2) web interface for the billing staff to get all the orders placed by a particular table, 3) web interface for Inventory management and menu management for the head chef and 4) web interface for a local manager to administrate the whole system.



All the above components are linked by a local database set up at the hotel.

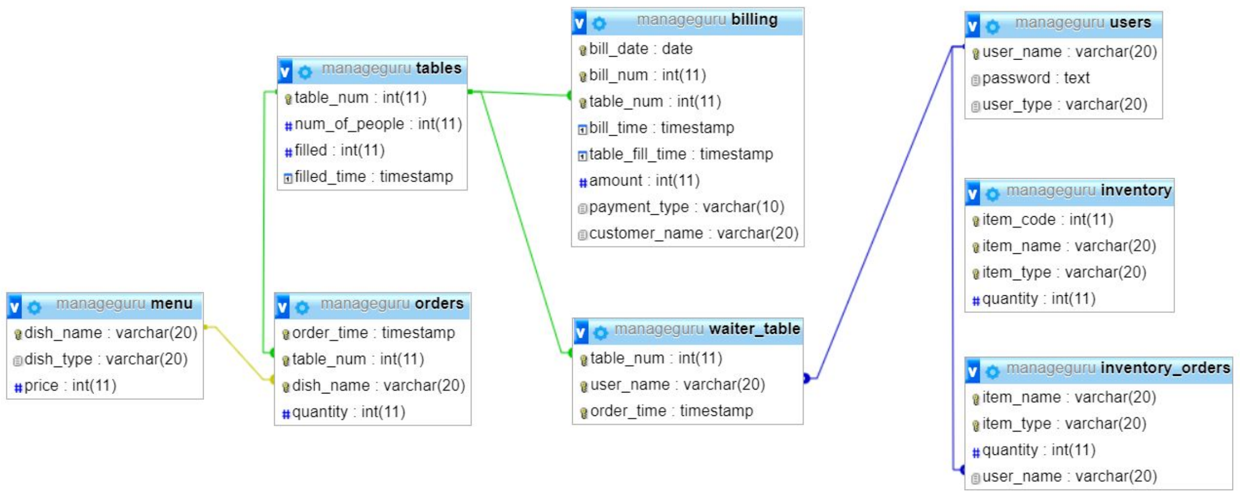


Fig 1.1 Local Database Schema

1.2 Cloud Computing System

ManageGuru's Cloud system form the central core system of our product. The updates from the management system is stored our cloud where analytics is performed on the gathered data. The cloud also runs a MySQL database server. Based on the analytics reports on the functioning of the franchises management system is provided to the owner/manager who might not be present at the location.

The system as said is a centralised system, so the owner/manager uses a mobile application to get real time updates by connecting to our cloud (ReSTFull API's).

1.3 Real Time Monitoring System

We provide the user with a mobile application that renders different real time stats management system, any time, any place. The system has a user authentication page at start and then the application renders the updates by invoking ReSTFull API's designed at the cloud end.

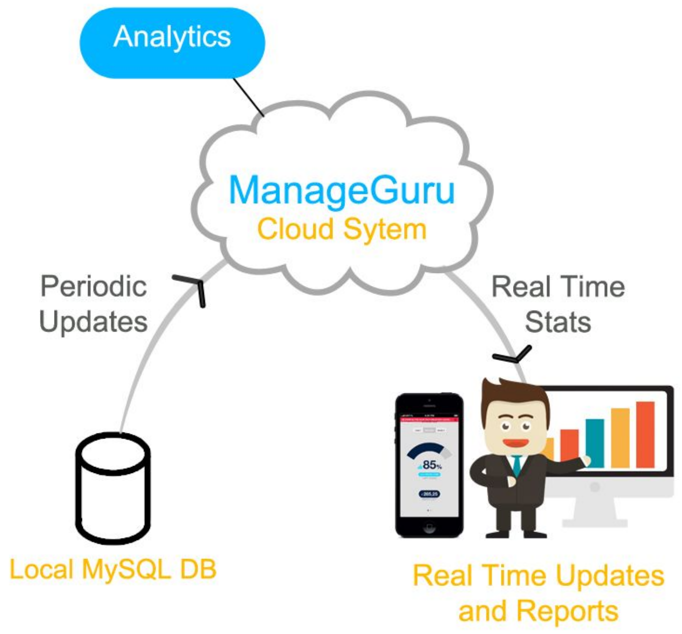


Fig 1.2 The Whole System

2.0 System Structure

2.1 Architecture diagram

Architecture style: Client - Server

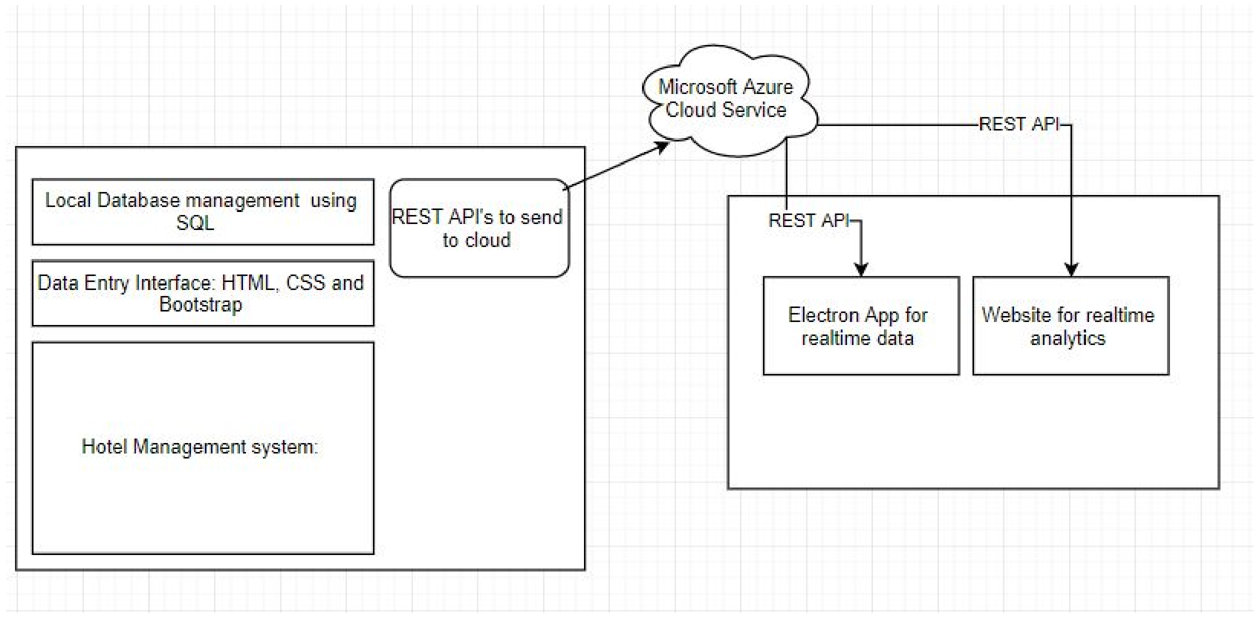

Microsoft Azure Cloud Service
REST API
Local Database management using SQL
REST API's to send to cloud
Data Entry Interface: HTML, CSS and Bootstrap
Hotel Management system:
REST API
Electron App for realtime data
Website for realtime analytics

Fig 2.1 The System Architecture. Centralised Azure cloud system providing RestFull service to the both the management end and also the monitoring end.

2.2 Description for Component

As discussed above the system consists of three main components, 1) Web-based Management System, 2) Centralised Cloud Computing System and 3) Real Time Monitoring System.

The ***Management System*** has a local webserver with MySQL database. It consists of multiple UI's built using **HTML5, Bootstrap and JQuery**. The backend is developed in **PHP**.

The ***Cloud System*** being used is **Microsoft Azure**. The cloud will also contain a **MySQL database** to store the updates. Analytics will be performed on the gathered data to generate reports. **ReSTFull API**'s are built for the users to get, post and update data at the cloud. The analytics we plan to include are such as the most active waiter and the most trending dish. We also plan to have bar graphs and pie charts showing the number of orders per day and per month and also the top most ordered dishes. We are also including the number of tables filled currently and average income to the outlet of the restaurant.

The ***Monitoring System*** is a mobile/web application. The system is built so that the owner/manager can check the working of the hotel even when not present locally. It is built using **Electron framework**. A web page which shows the reports genrated from the analytics.

2.3 Interaction Diagrams

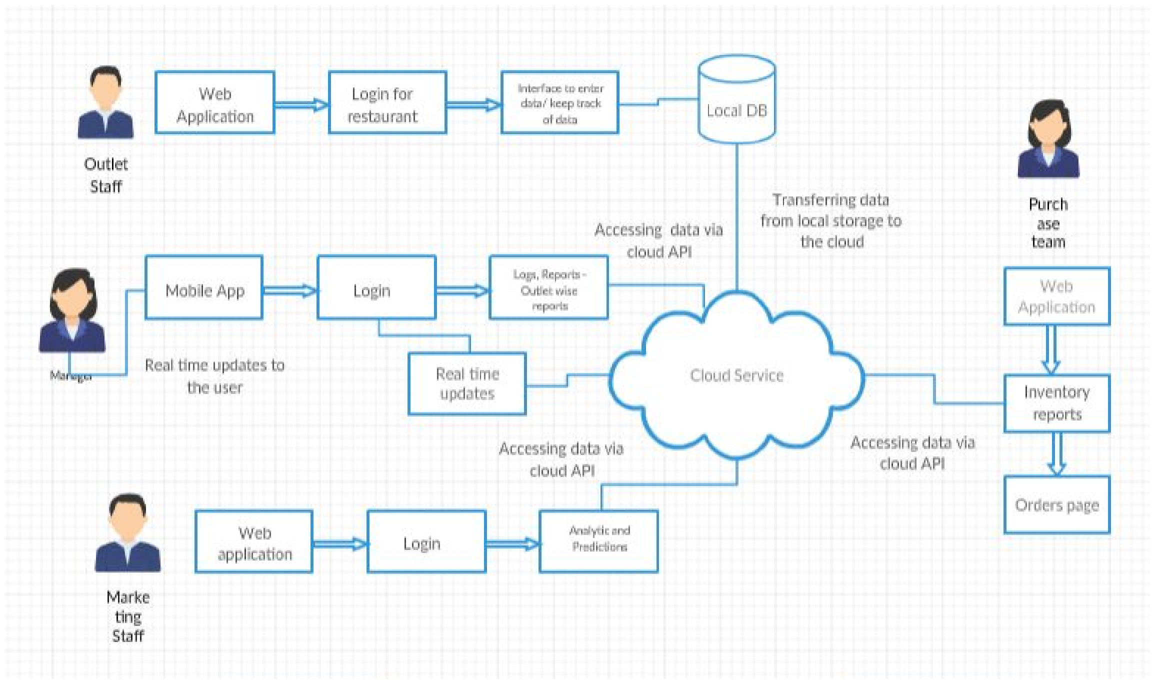

Outlet Staff
Web Application
Login for restaurant
Interface to enter data/ keep track of data
Local DB
Purch ase team
Transferring data from local storage to the cloud
Accessing data via cloud API
Mobile App
Login
Logs, Reports - Outlet wise reports
Web Application
Manager
Real time updates to the user
Real time updates
Cloud Service
Inventory reports
Accessing data via cloud API
Accessing data via cloud API
Orders page
Web application
Login
Analytic and Predictions
Marke ting Staff

Fig 2.2 Interaction Diagram. The diagram shows the interaction between the owner/manager, the hotel staff members, and the cloud system.

2.4 Describe usage scenarios and how you would test that

- ❏ The outlet staff will be provided with functionalities such as: Interface to easily view billing data, update new orders and transactions to the system.
- ❏ The purchase staff will have access to: Inventory manager which will keep track of all the goods and their respective quantities. Furthermore, they will be able to places orders to different vendors
- ❏ The management staff can do the following: View analytics of previous orders - make predictions as to what the customer currently requires.

Scenario testing can help to explore how the software will work in the hands of an end user.

Test Scenario 1: Check the Login Functionality

Test Scenario 2: Check that a New Order can be created

Test Scenario 3. Check without internet connectivity.

Test Scenario 4: Check reports and graphs

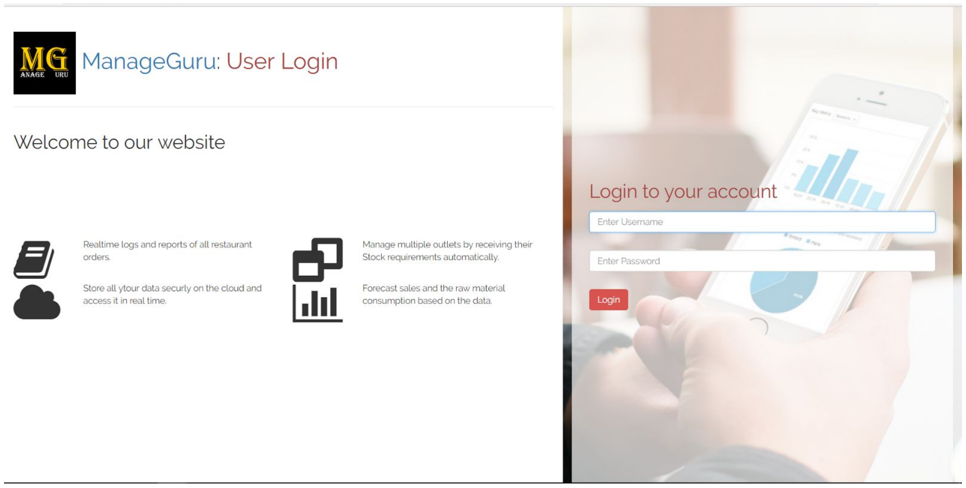
2.5 Architectural Styles and Patterns considered and for what reason

S.N	**Architectural Styles/ Pattern**	**Intent of this pattern**	**Rationale for choosing or not choosing**
1	Component Based SE	Each component is independent of every other	We have 4 major parts of the project: 1. Management system 2. Cloud services 3. Real Time application 4. Data analytics application. Developing each of them separately simplifies our approach
2.	MVC	Model: Data View: UI Controller: Exchange of information between the two	We could separate our project into these 3 parts. Since each of them would be independent, changing the view or the model would not affect the other.
3.	State logic display	This keeps our view different from the logic and data	This type of system allows for any part of the system to be modified without having to change the other two parts.
4.	Client – Server	All the data is stored on the server and client accesses it.	We have multiple websites and applications accessing a single server
5.	RESTful Services	Architecture pattern for the web that enforces uniform interface and other constraints bringing performance, scalability and modifiability.	We have multiple services and data transferred across various parts of our system which would benefit.

3.0 User interface design

3.1 ManageGuru's Management-End Login Page

The page consists of information about the services provided by our product **ManageGuru**. A side panel to enter the login credentials. The design is screen size responsive.


ManageGuru: User Login

Welcome to our website

Realtime logs and reports of all restaurant orders.

Store all ytour data securly on the cloud and access it in real time.

Manage multiple outlets by receiving their Stock requirements automatically.

Forecast sales and the raw material consumption based on the data.

Login to your account

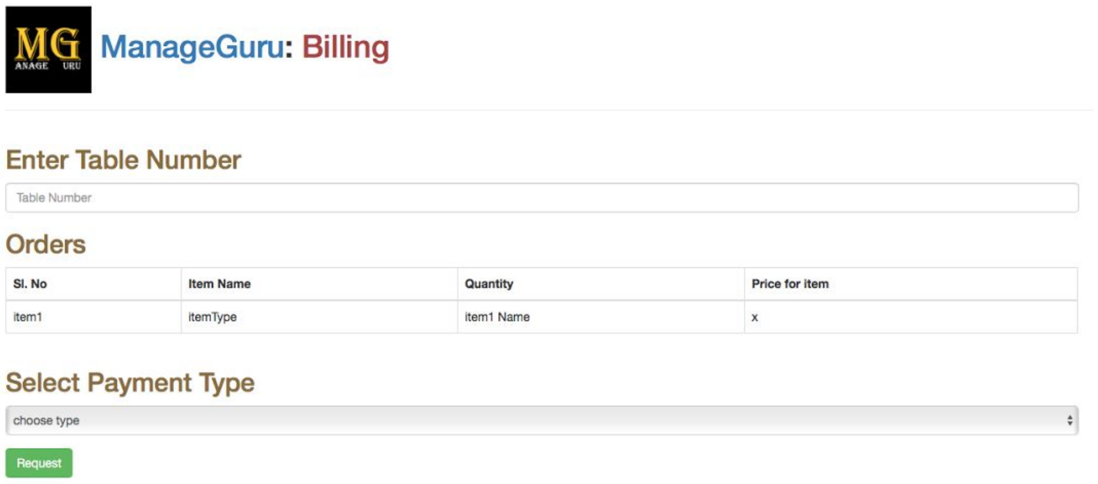
Enter Username

Enter Password

Login

3.2 ManageGuru's Billing Entry Page

The billing page is used to take account of amount paid and the mode of payment for the respective bill number. The bill also has the orders placed by the customer. The UI here provides a view of **all the orders placed** by the customers at a table and the **total amount** and a **select option** to choose the mode of payment used by the customer (ex. cash or card).


ManageGuru: Billing

Enter Table Number

Table Number

Orders

Sl. No	Item Name	Quantity	Price for item
item1	itemType	item1 Name	x

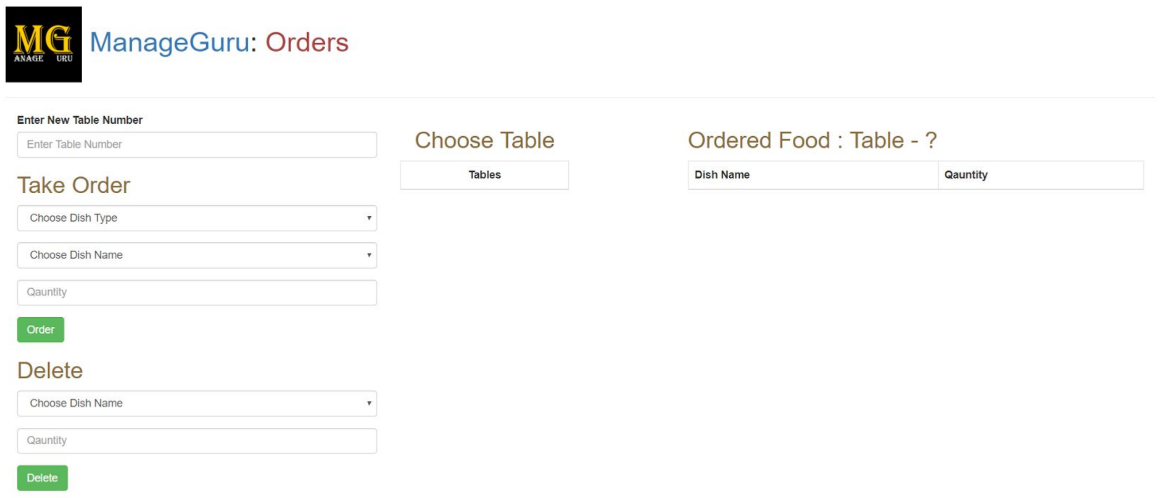
Select Payment Type

choose type

Request

3.3 ManageGuru's Waiter Order Entry

The orders page is used by the waiters of the hotel. It provides UI to **take orders** for a **particular table** and also **shows the all ordered food** by the customer at the table. If any order is cancelled by the customer, then a **Delete** form is provided to remove the dish from the orders.


ManageGuru: Orders

Enter New Table Number

Enter Table Number

Take Order

Choose Dish Type

Choose Dish Name

Qauntity

Order

Delete

Choose Dish Name

Qauntity

Delete

Choose Table

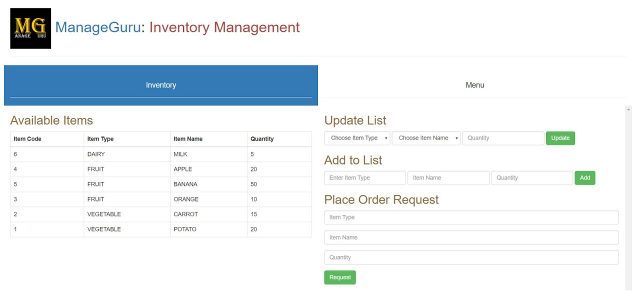
Tables

Ordered Food : Table - ?

Dish Name	Qauntity

3.4 ManageGuru's Chef Management-End

The Chef Management end has two parts, 1) Inventory Management and 2) Menu Management. In Inventory Management tab the chef can **see all the current items** present in the inventory, **update the list** if the items are used, **add new items** to the inventory list and also **place a buy order request** which is approved by the owner/manager. In the Menu Management tab, the chef can **add/delete the dishes** in the menu.


ManageGuru: Inventory Management

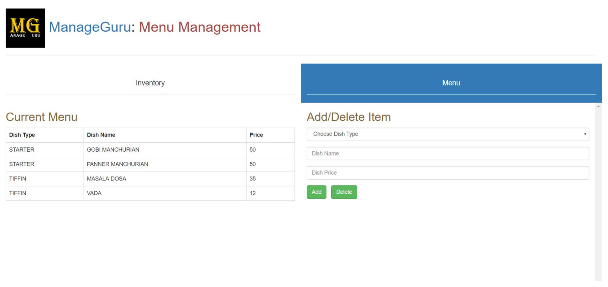
Available Items

Item Code	Item Type	Item Name	Quantity
6	DAIRY	MILK	5
4	FRUIT	APPLE	20
5	FRUIT	BANANA	50
3	FRUIT	ORANGE	10
2	VEGETABLE	CARROT	15
1	VEGETABLE	POTATO	20

Update List

Add to List

Place Order Request


ManageGuru: Menu Management

Current Menu

Dish Type	Dish Name	Price
STARTER	GOBI MANCHURIAN	50
STARTER	PANNER MANCHURIAN	50
TIFFIN	MASALA DOSA	35
TIFFIN	VADA	12

Add/Delete Item

3.5 Other User Interfaces

1. **Admin Page at the Management End**, used by the owner/manager present in the hotel to add new users to the management system, see all currently active users (attendance) and the order requests placed.
2. **Reports Page at the Monitor End**, used by the owner to monitor the working of the hotel remotely. The report page provides all the analytics report and real time statistics.

4.0 Detailed Design Approach

4.1 Design patterns considered and for what reason

S.No	Design Pattern	Intent of this pattern	Rationale for choosing or not choosing
1	Inheritance	To make a concrete class layout.	To have a clear idea of a class hierarchy
2	Abstraction	Abstraction as is.	To provide an abstract way of looking at data and behaviour
3	Enumeration	Ordered listing of all the items in a collection.	To provide a few fixed objects of a datatype with a few objects
4	Decorator	Easily extend functionality using callbacks.	Common and easy javascript pattern to elegantly extend code.
5	Adaptor	Change the interface of a function allowing its functionality.	Again, easy to implement pattern on javascript suiting our web platforms to change function/class interface.

6	Strategy	An interchangeable set of algorithms that encapsulate each other.	Provide a similar service abstraction with many services under one hood.
7	Async Event Based Programming	The program isn't block from handling events while an event is being handled.	To not have our web service become unusable due to each active client.
8	Lock	Lock a resource to a particular user.	To ensure synchronised access to a modified resource, nearly always important in concurrent applications.
9	Thread Pool	Maintains multiple threads waiting for tasks to be allocated for concurrent execution by the supervising program.	To easily pool and manage a large number of threads for a large number of tasks. Useful in scaling web servers and runtimes that operate as such.