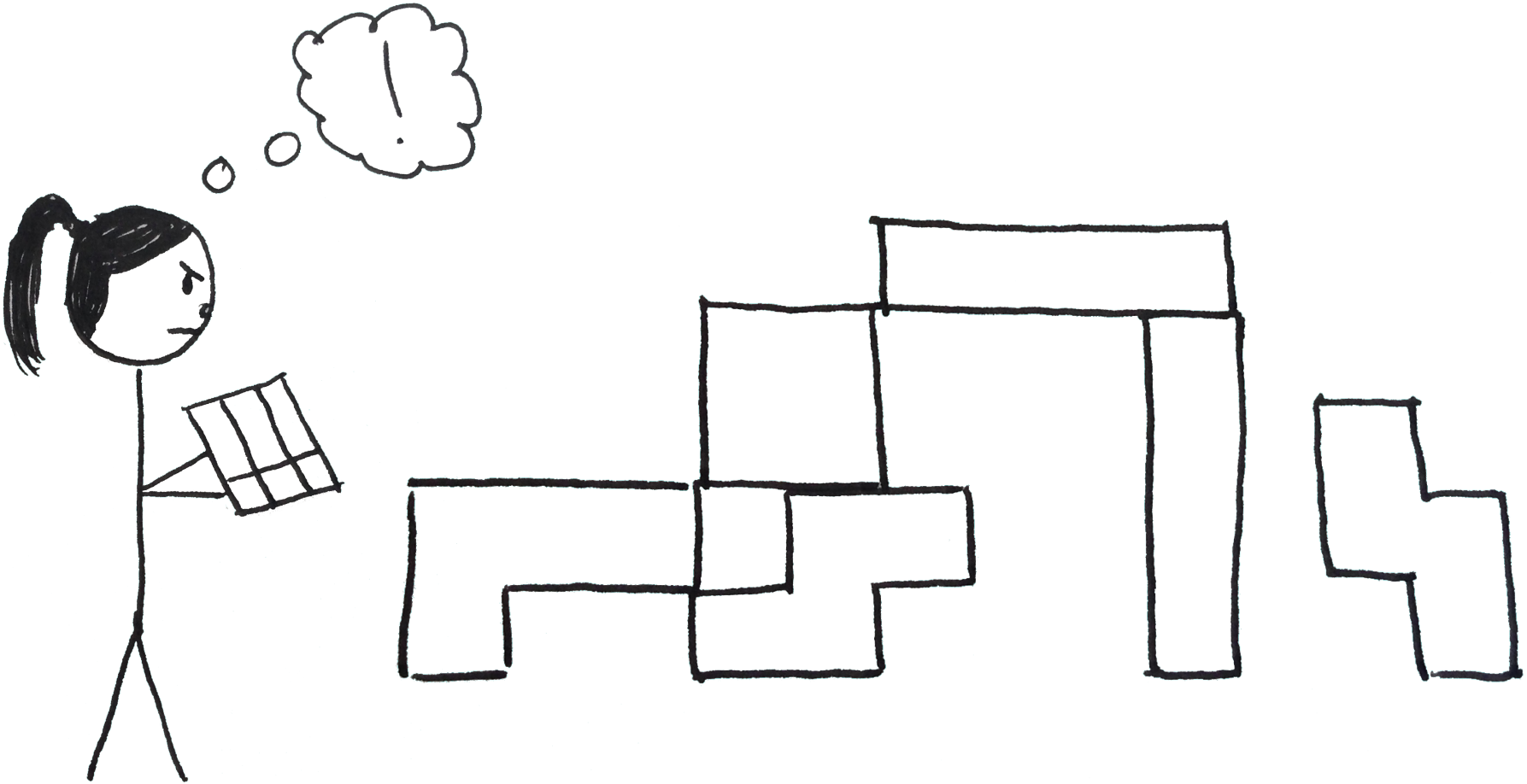
Full-stack Python Web Applications

Kate Heddleston

@heddle317

Python is often one part of a much larger system.



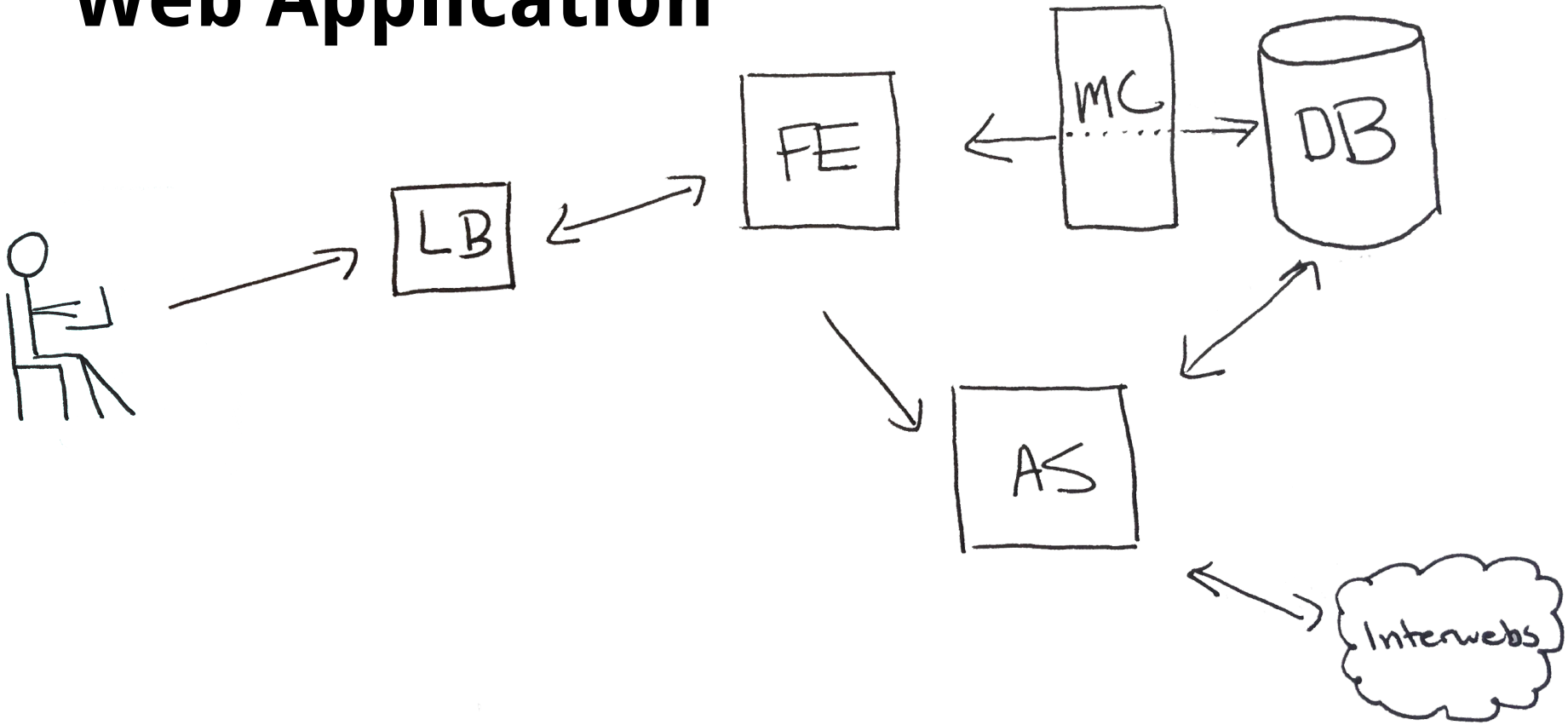
What we’re going to talk about...

1. A (semi) typical web application
2. Dev, staging, production, deploy system
3. Helpful python libraries

What we’re not going to talk about...

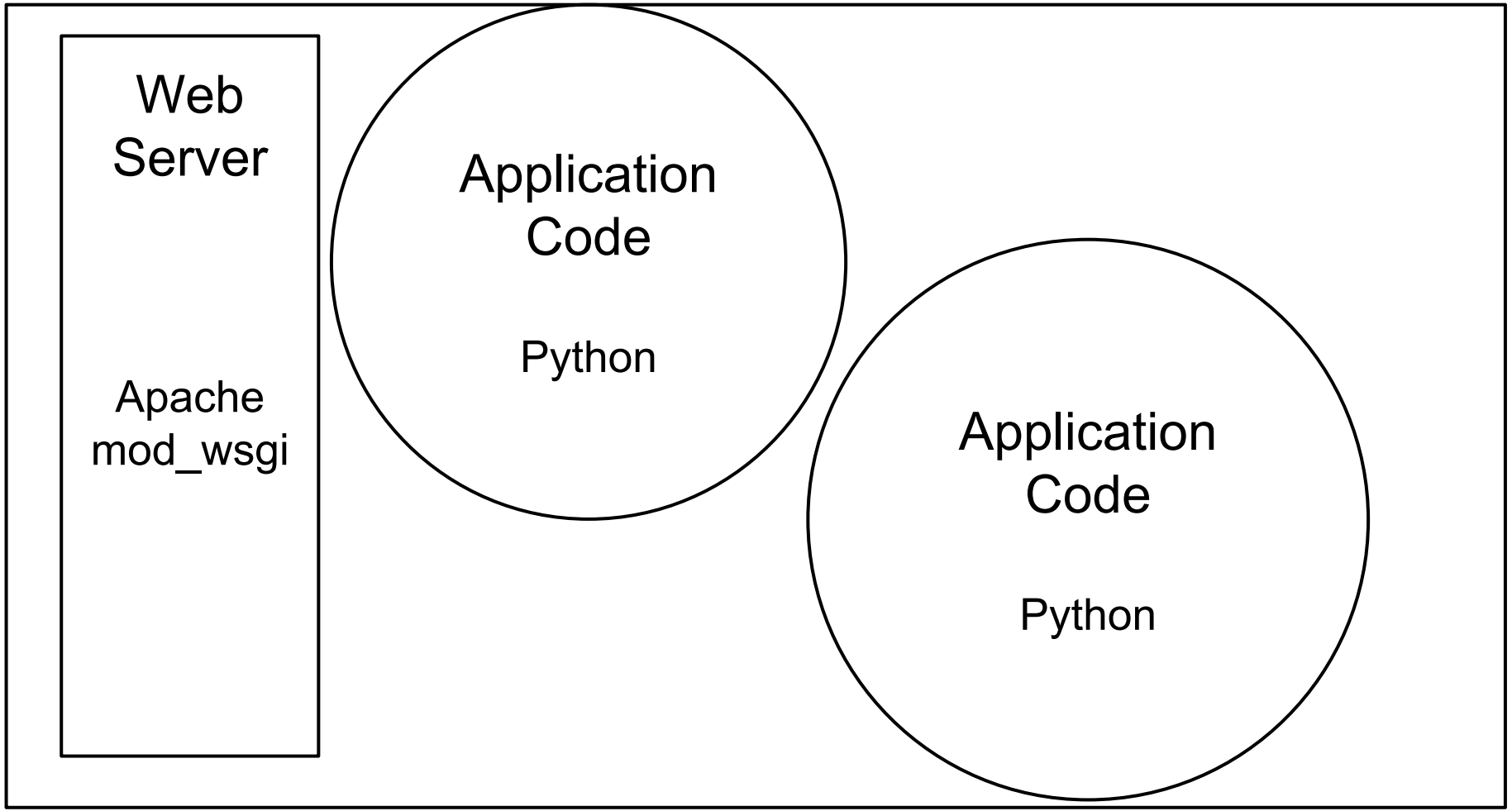
- Massively scalable web applications.
- Every single installation on the machine.
- Nitty gritty details of anything.

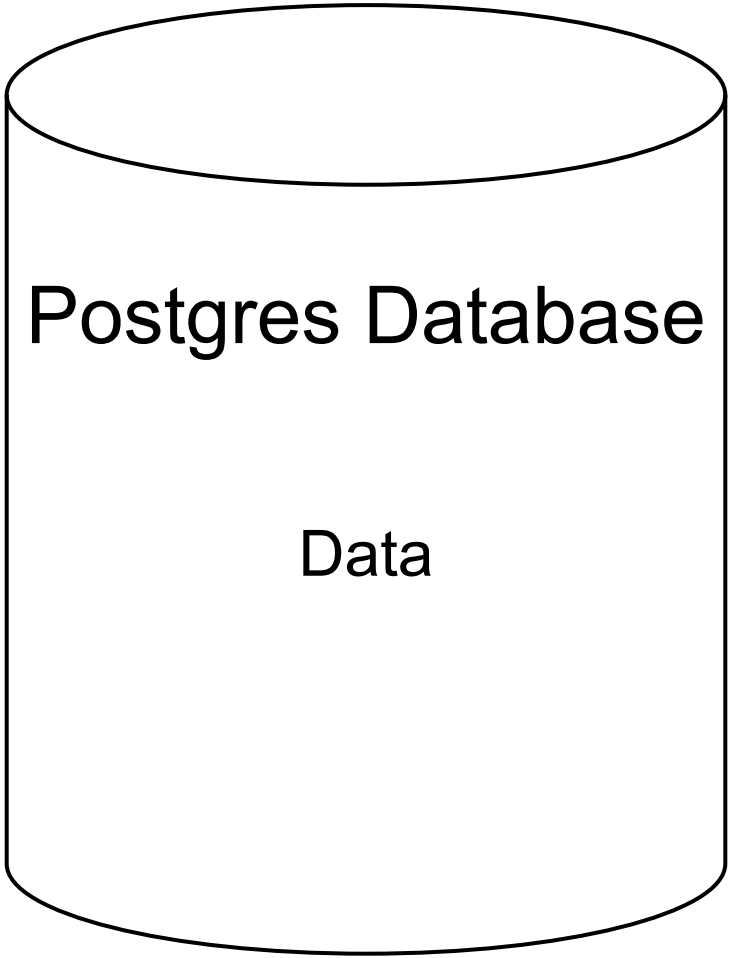
Web Application

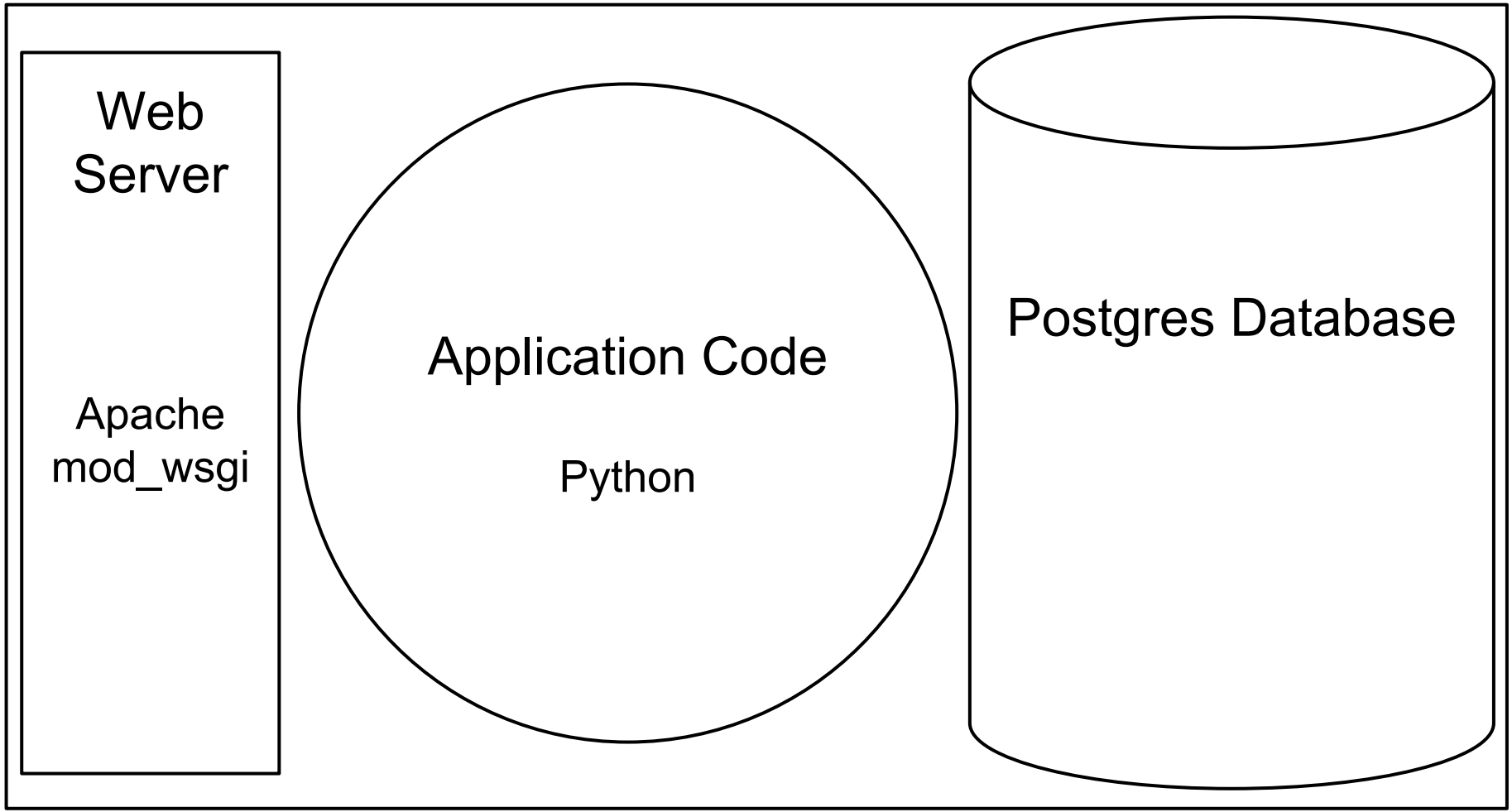


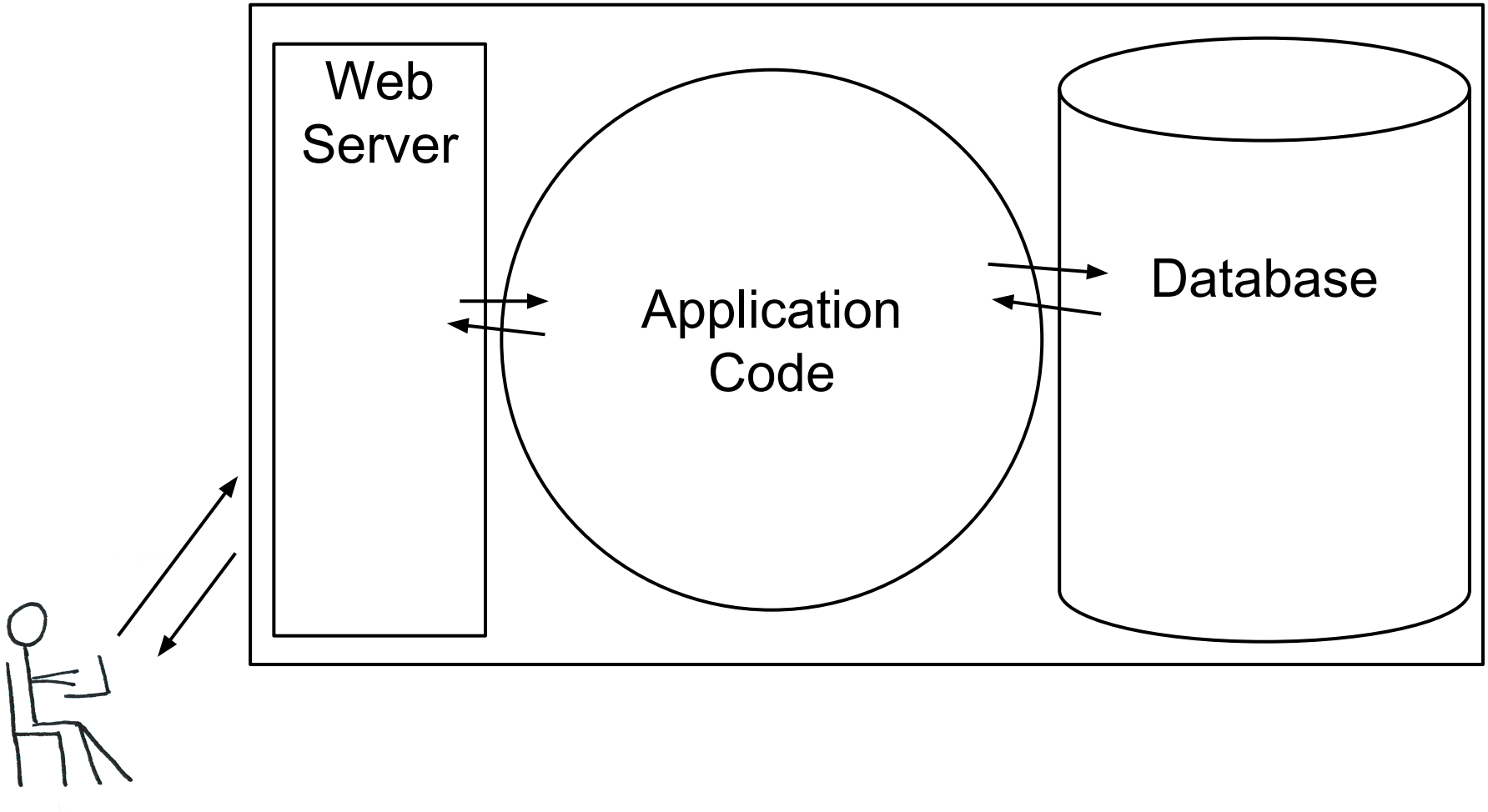
Parts of a Stack

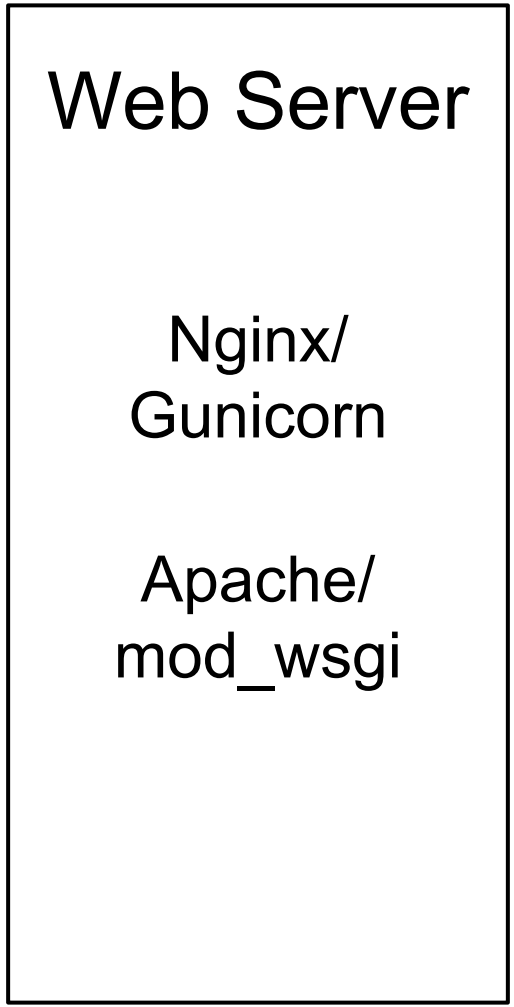
1. Operating System
2. Web Server
3. Database
4. Application Language

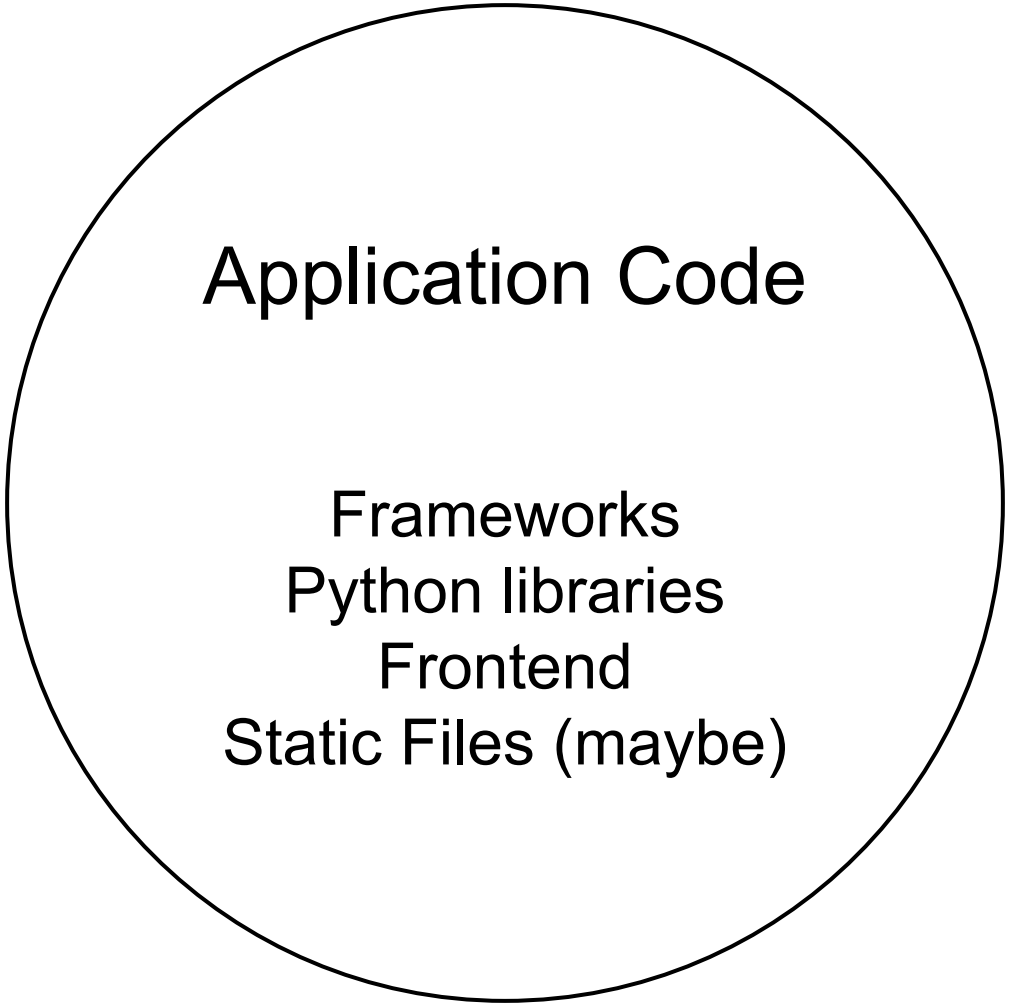

Web
Server
Apache
mod_wsgi
Application
Code
Python
Application
Code
Python

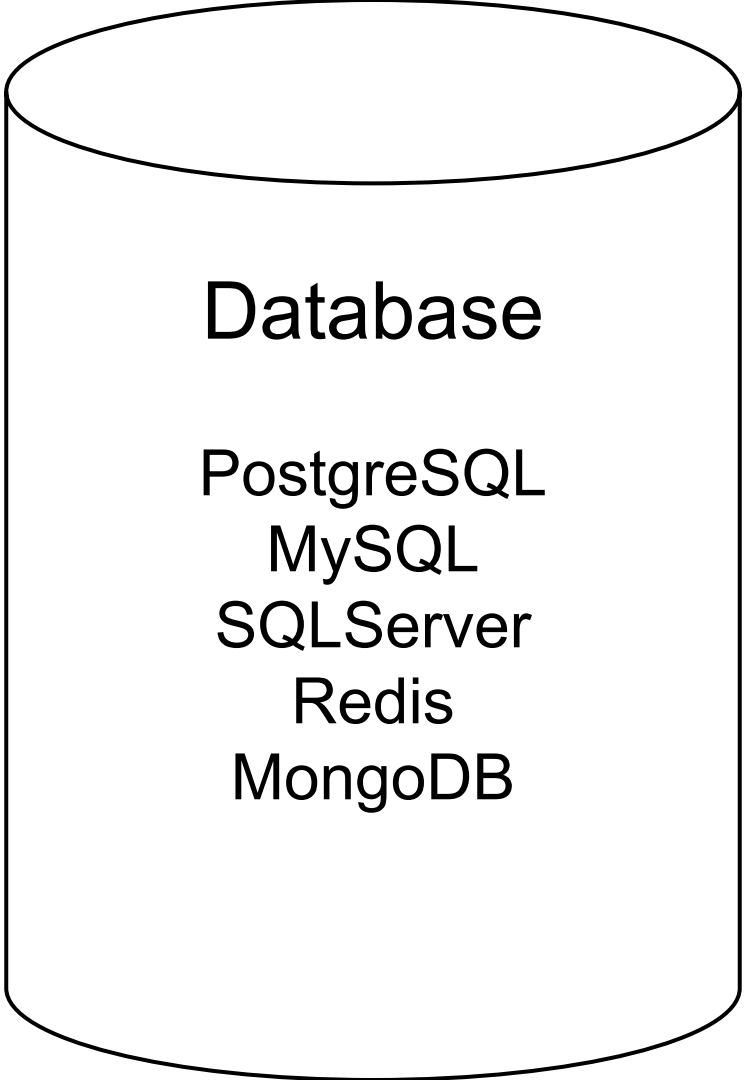

Postgres Database
Data

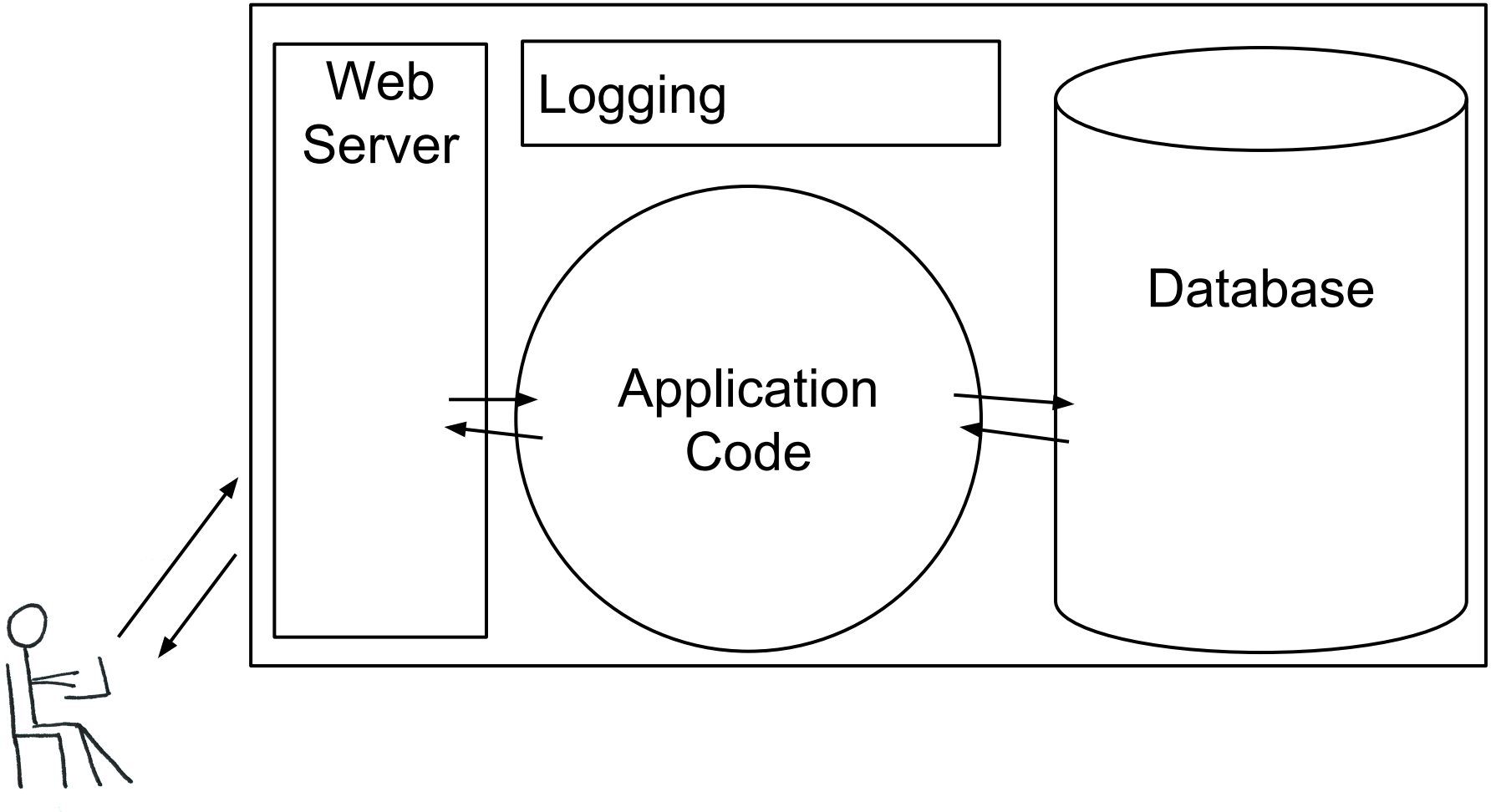

Web
Server
Apache
mod_wsgi
Application Code
Python
Postgres Database


Web
Server
Application
Code
Database


Web Server
Nginx/
Gunicorn
Apache/
mod_wsgi

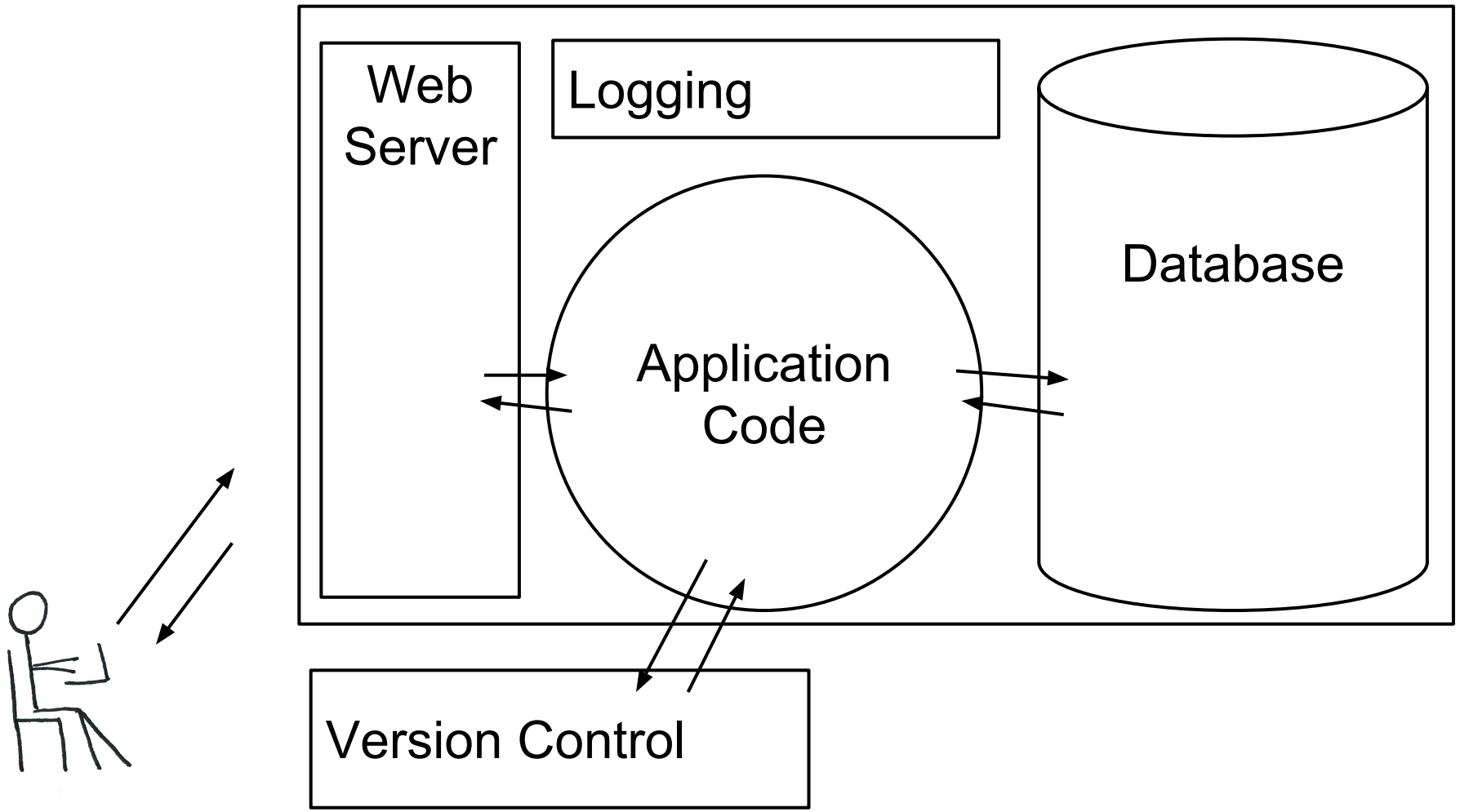

Application Code
Frameworks
Python libraries
Frontend
Static Files (maybe)


Database
PostgreSQL
MySQL
SQLServer
Redis
MongoDB


Web
Server
Logging
Database
Application
Code

Logging

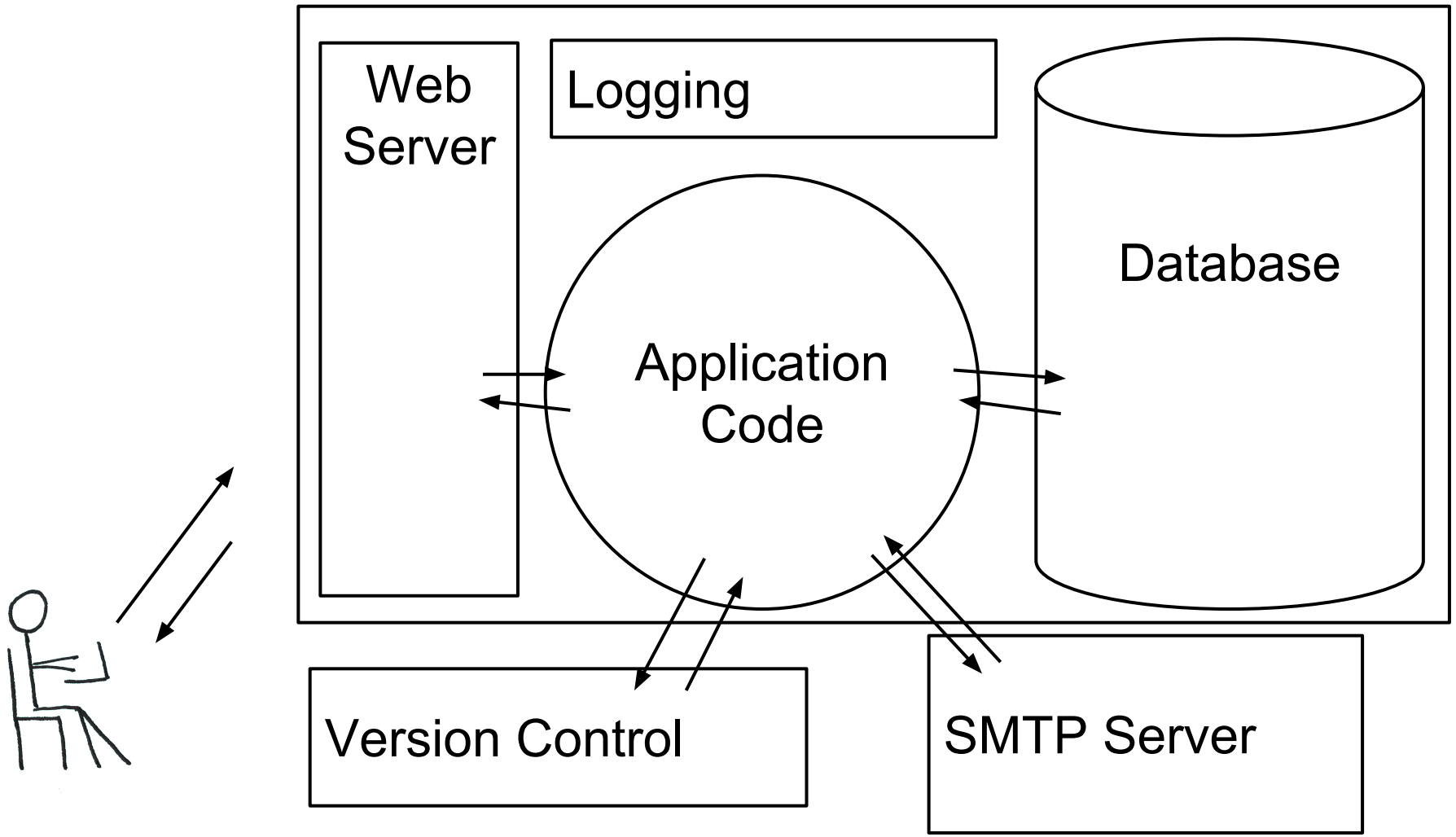
Log files on the machine


Web
Server
Logging
Database
Application
Code
Version Control

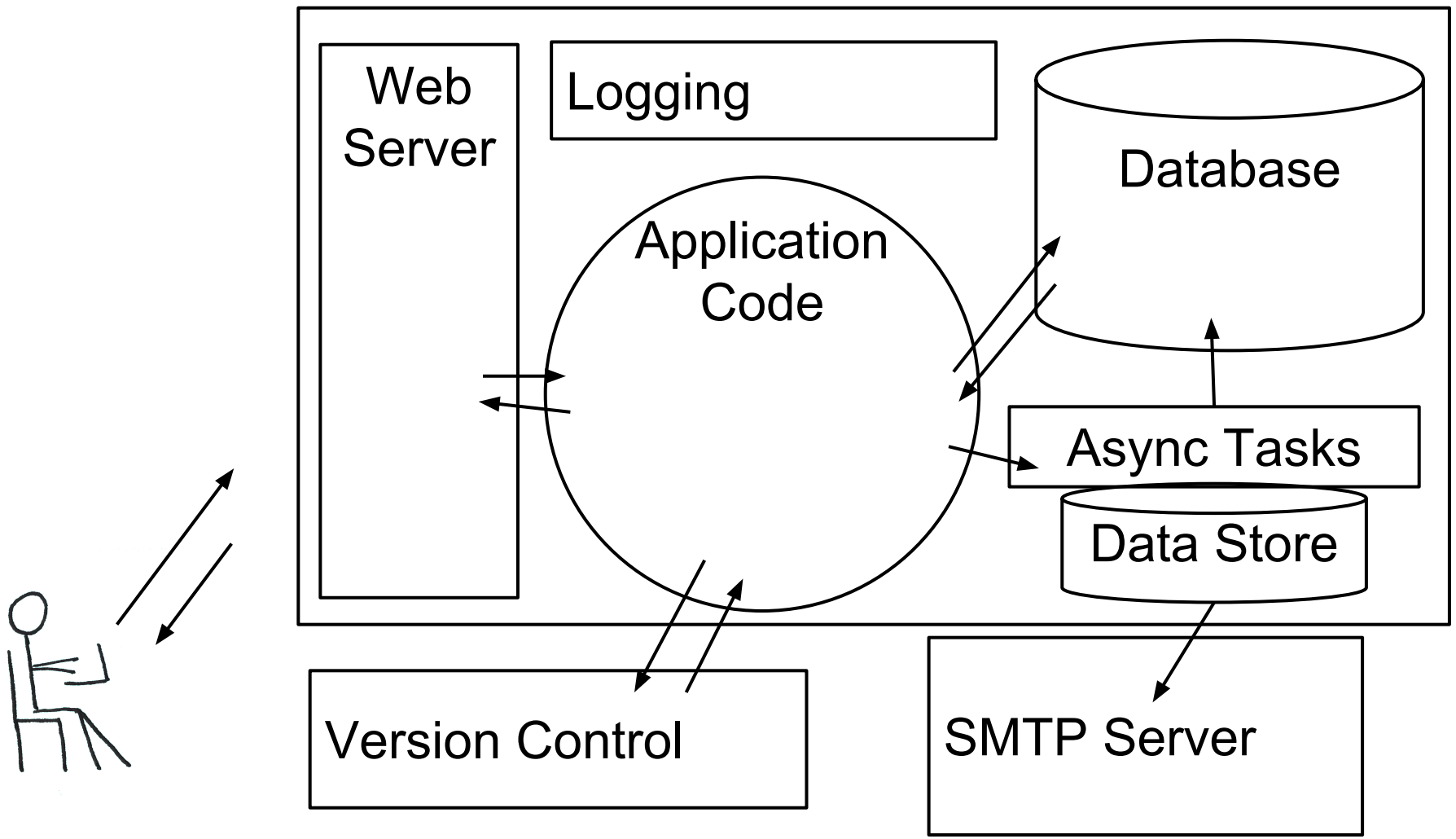
Version Control

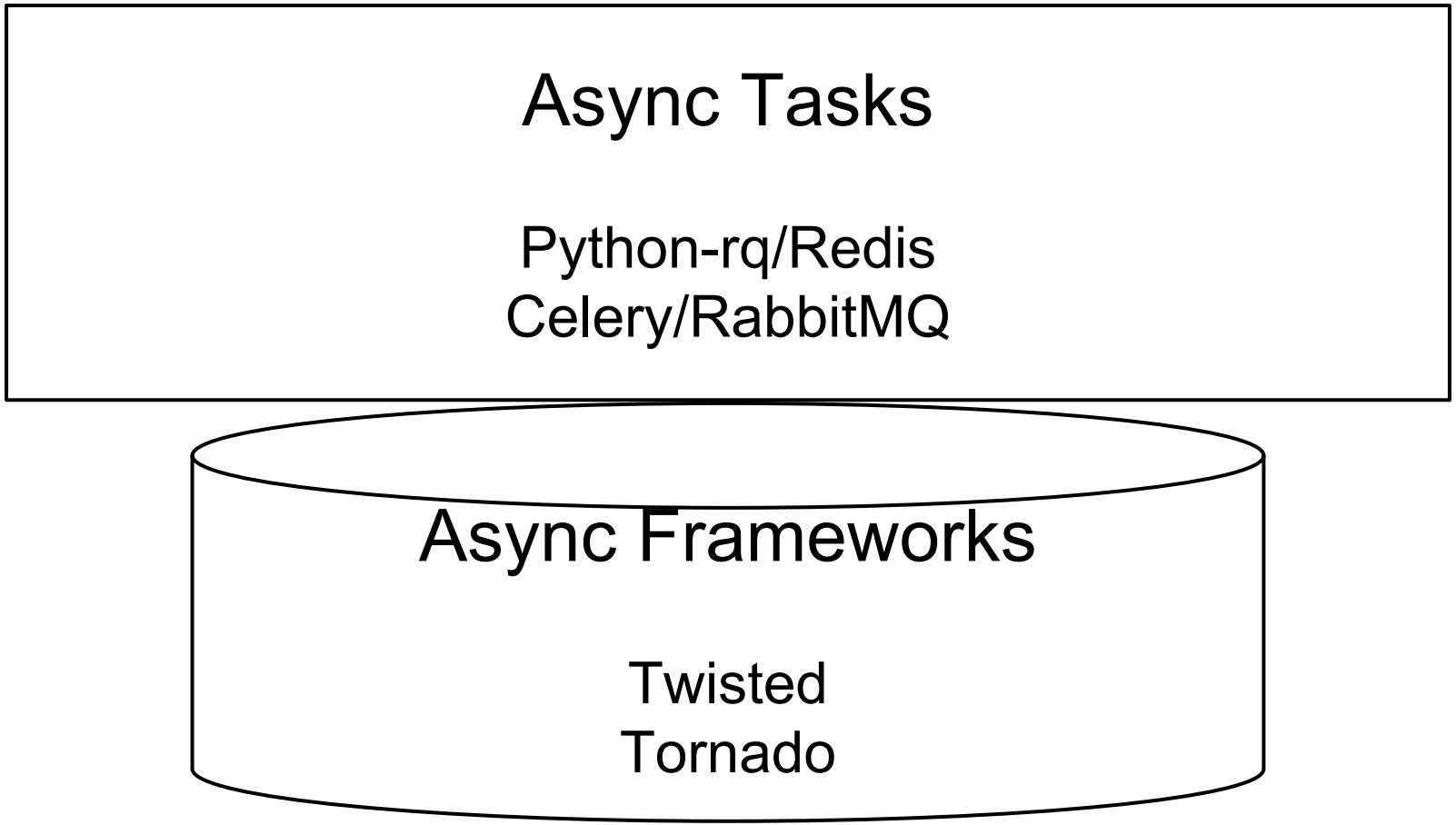
git
svn

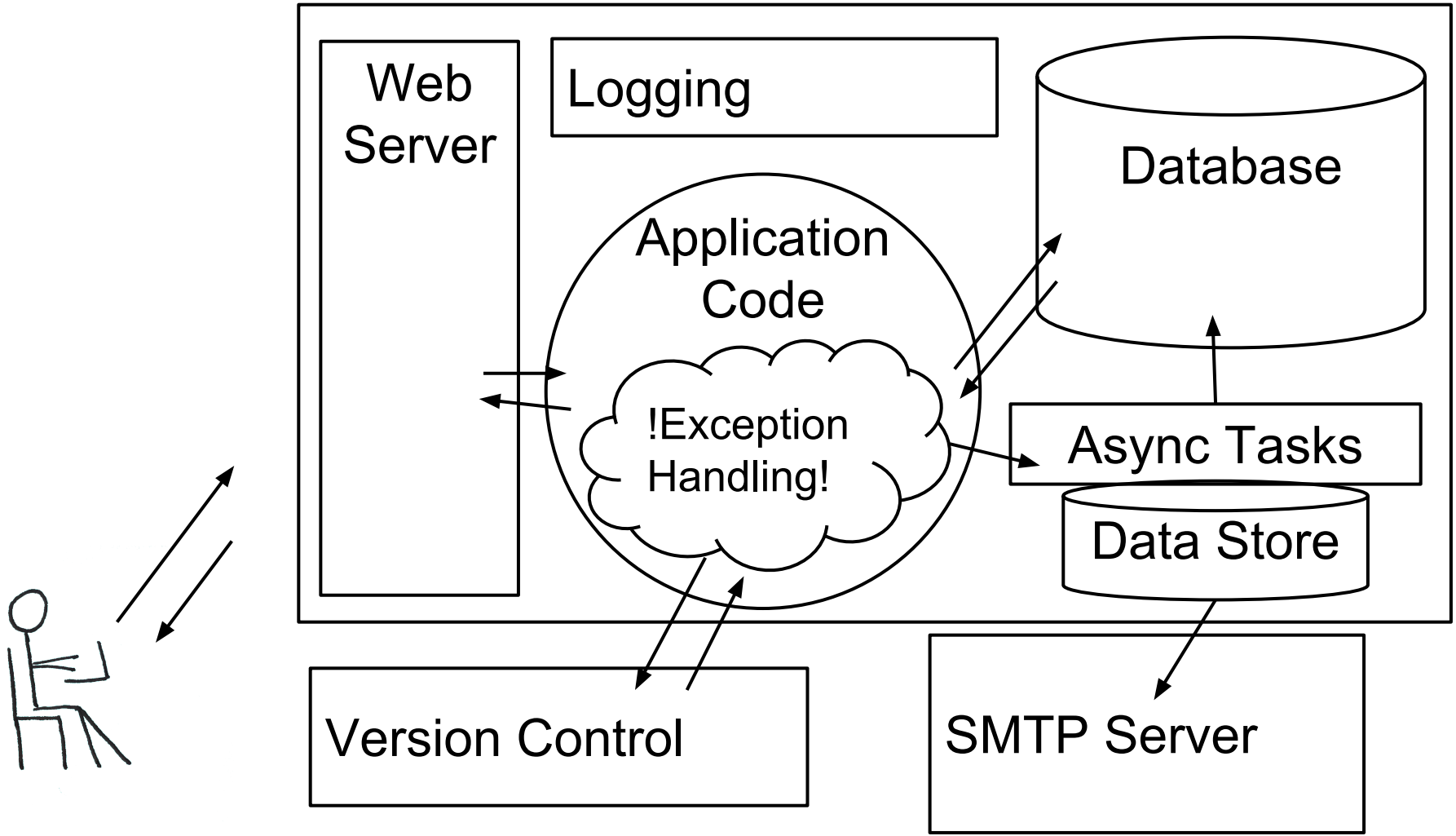
Github
Bitbucket

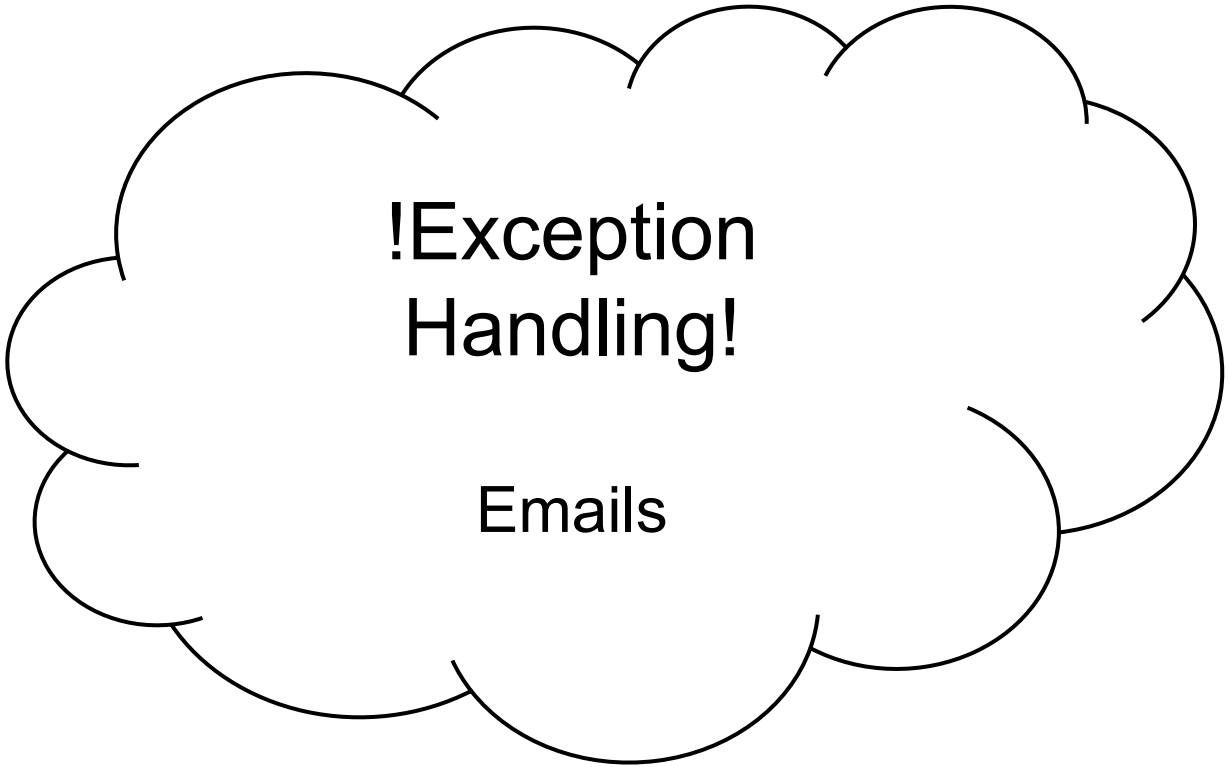

Web
Server
Logging
Database
Application
Code
Version Control
SMTP Server

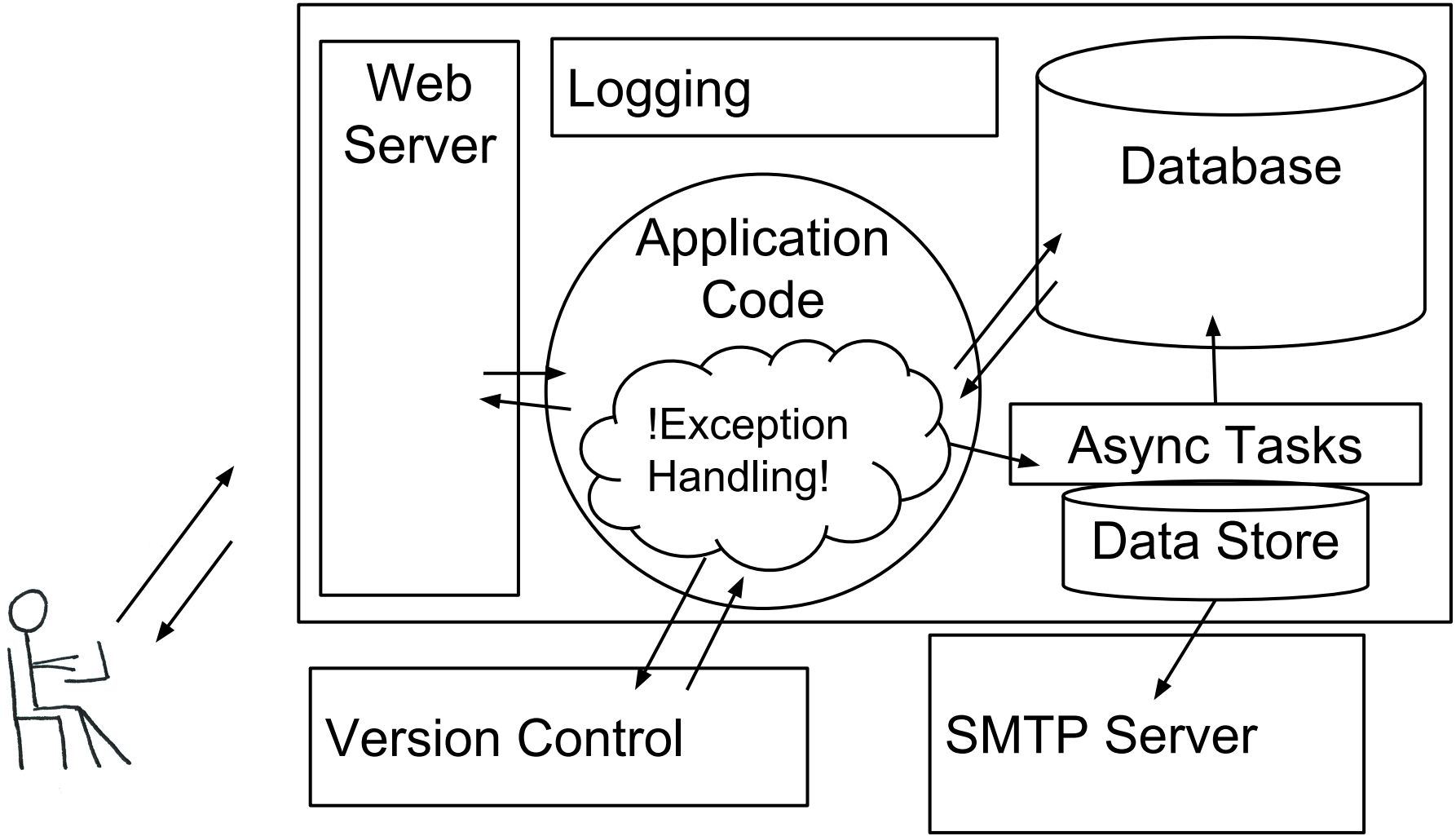

SMTP Server
PostmarkApp
Sendgrid
Amazon SES

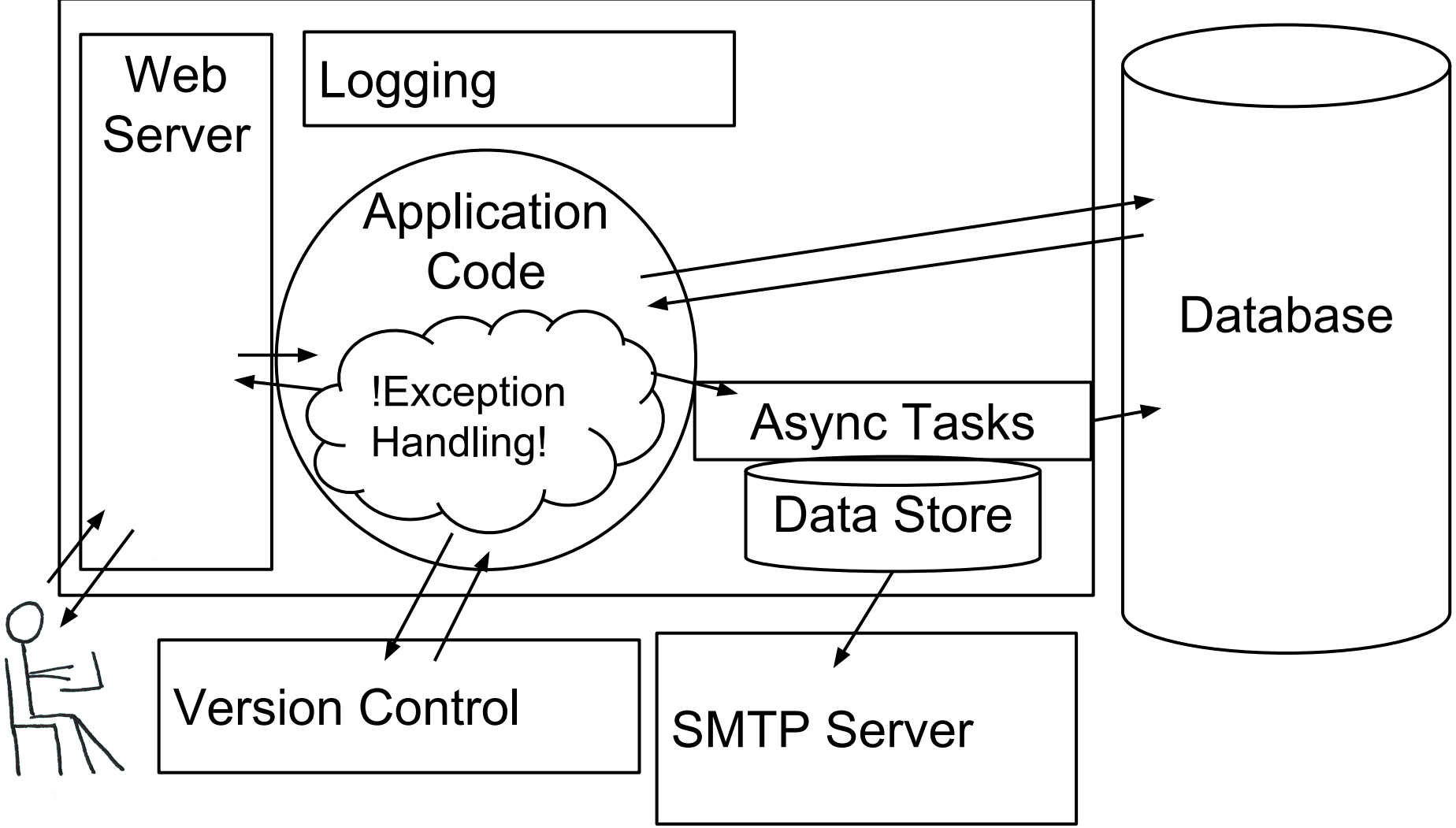

Web Server
Logging
Database
Application Code
Async Tasks
Data Store
Version Control
SMTP Server

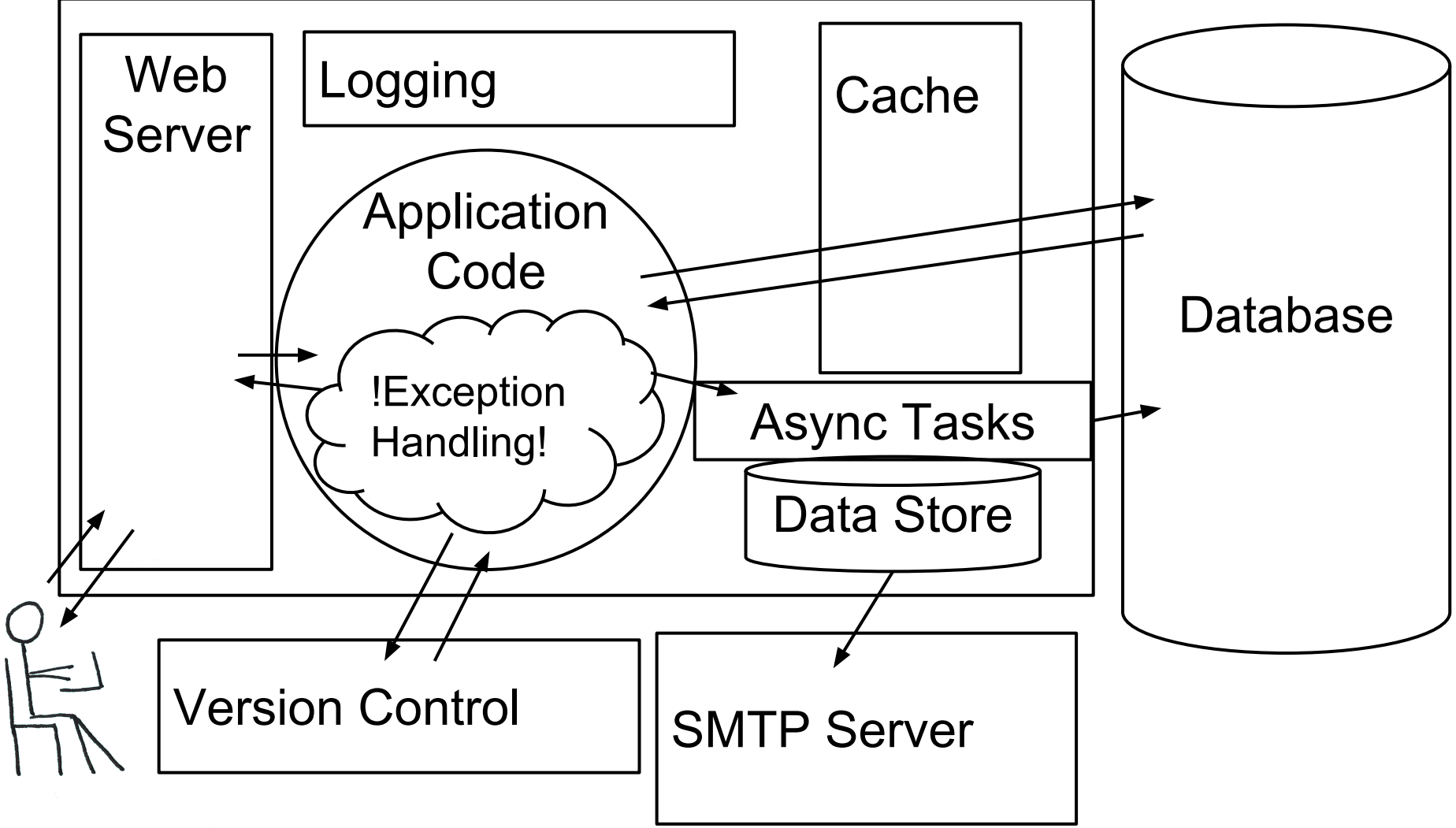

Async Tasks
Python-rq/Redis
Celery/RabbitMQ
Async Frameworks
Twisted
Tornado

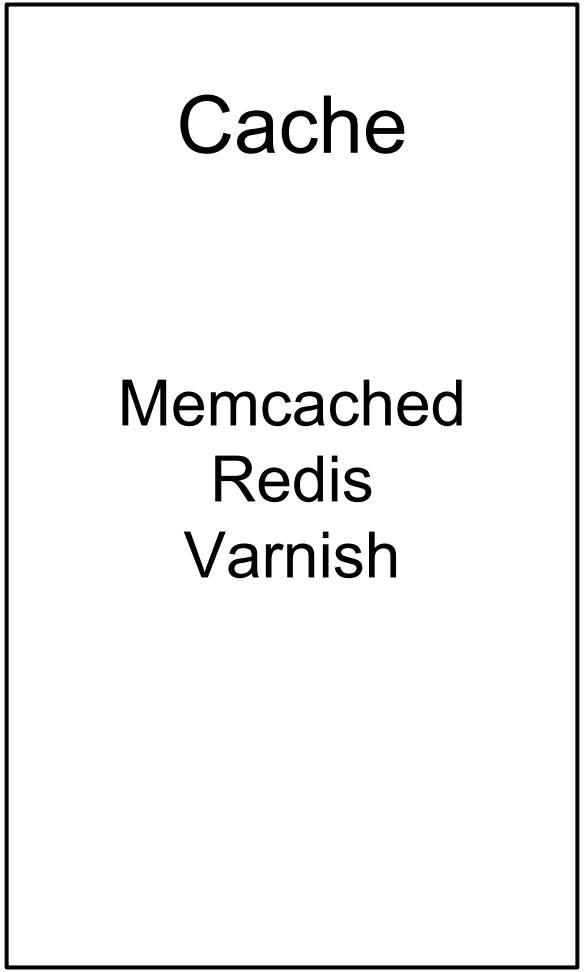

Web Server
Logging
Database
Application Code
!Exception Handling!
Async Tasks
Data Store
Version Control
SMTP Server

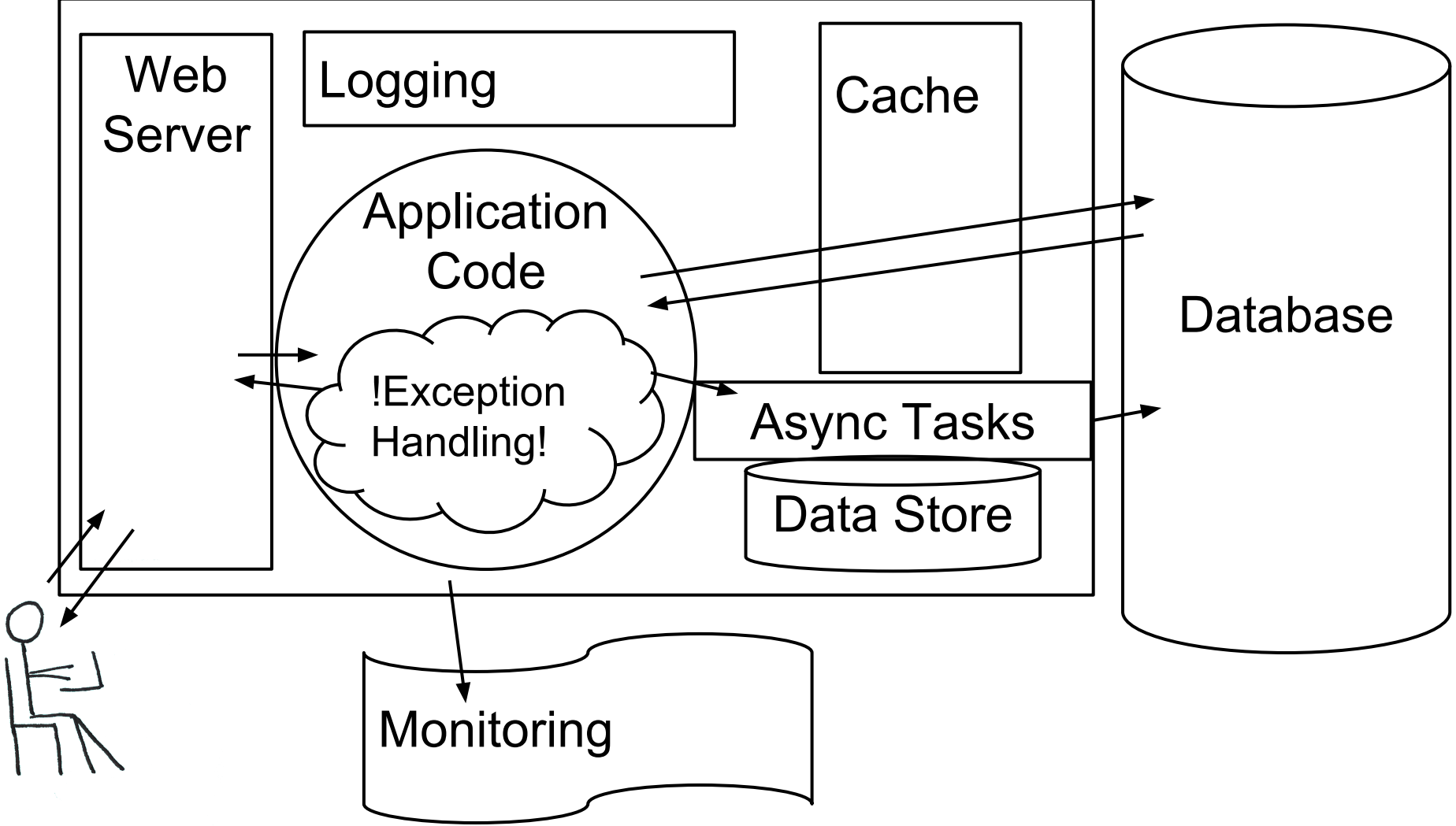

!Exception
Handling!
Emails

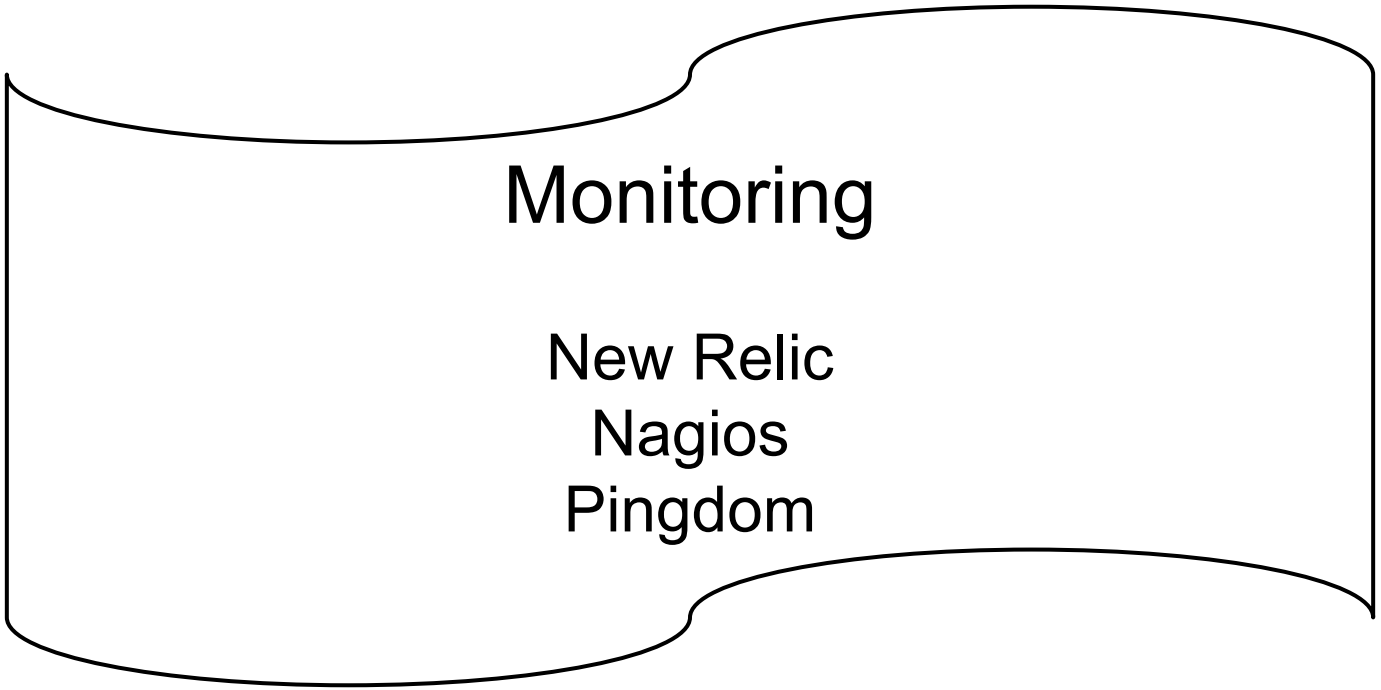

Web Server
Logging
Database
Application Code
!Exception Handling!
Async Tasks
Data Store
Version Control
SMTP Server

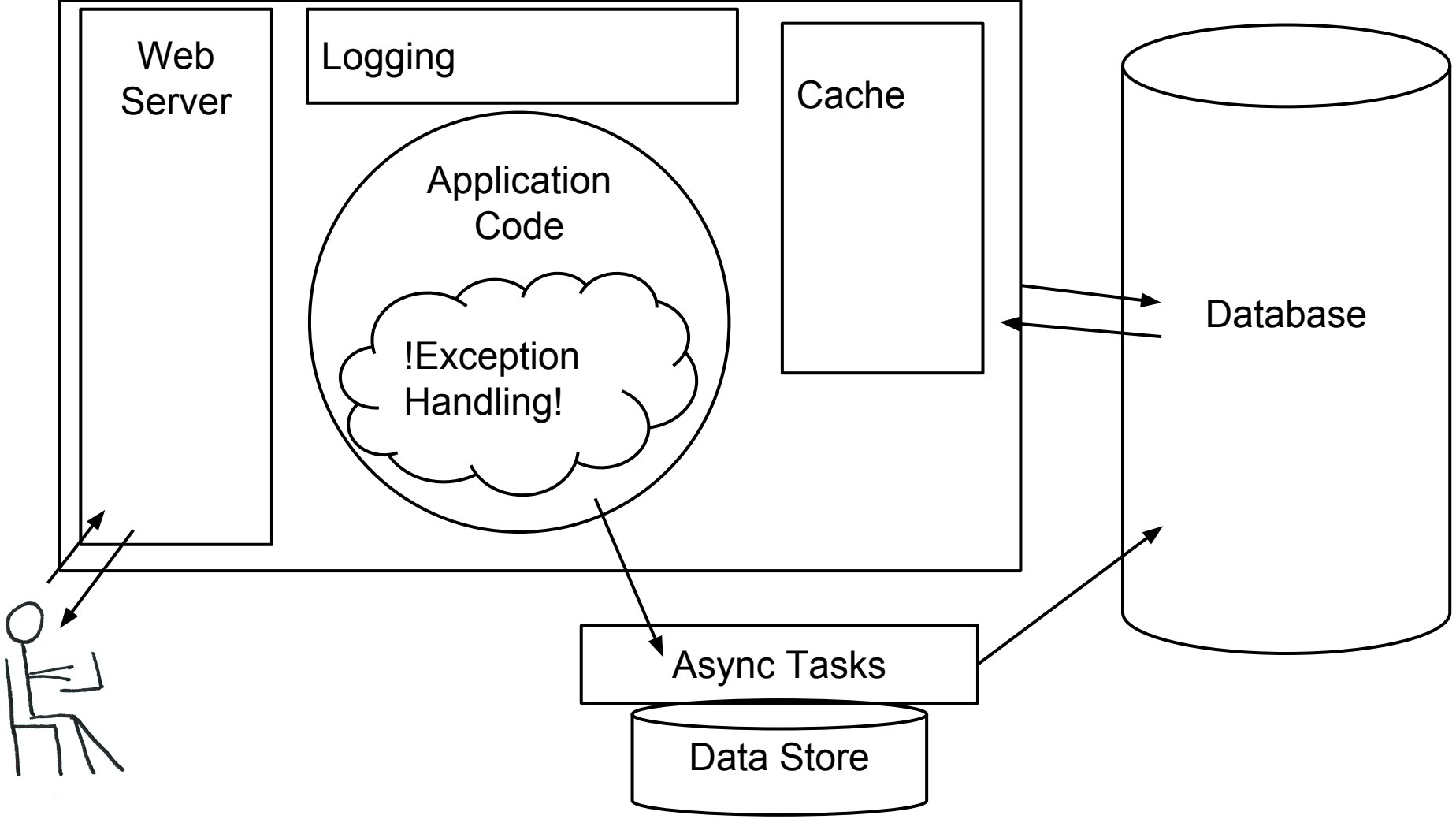

Web Server
Logging
Application Code
!Exception Handling!
Async Tasks
Data Store
Database
Version Control
SMTP Server

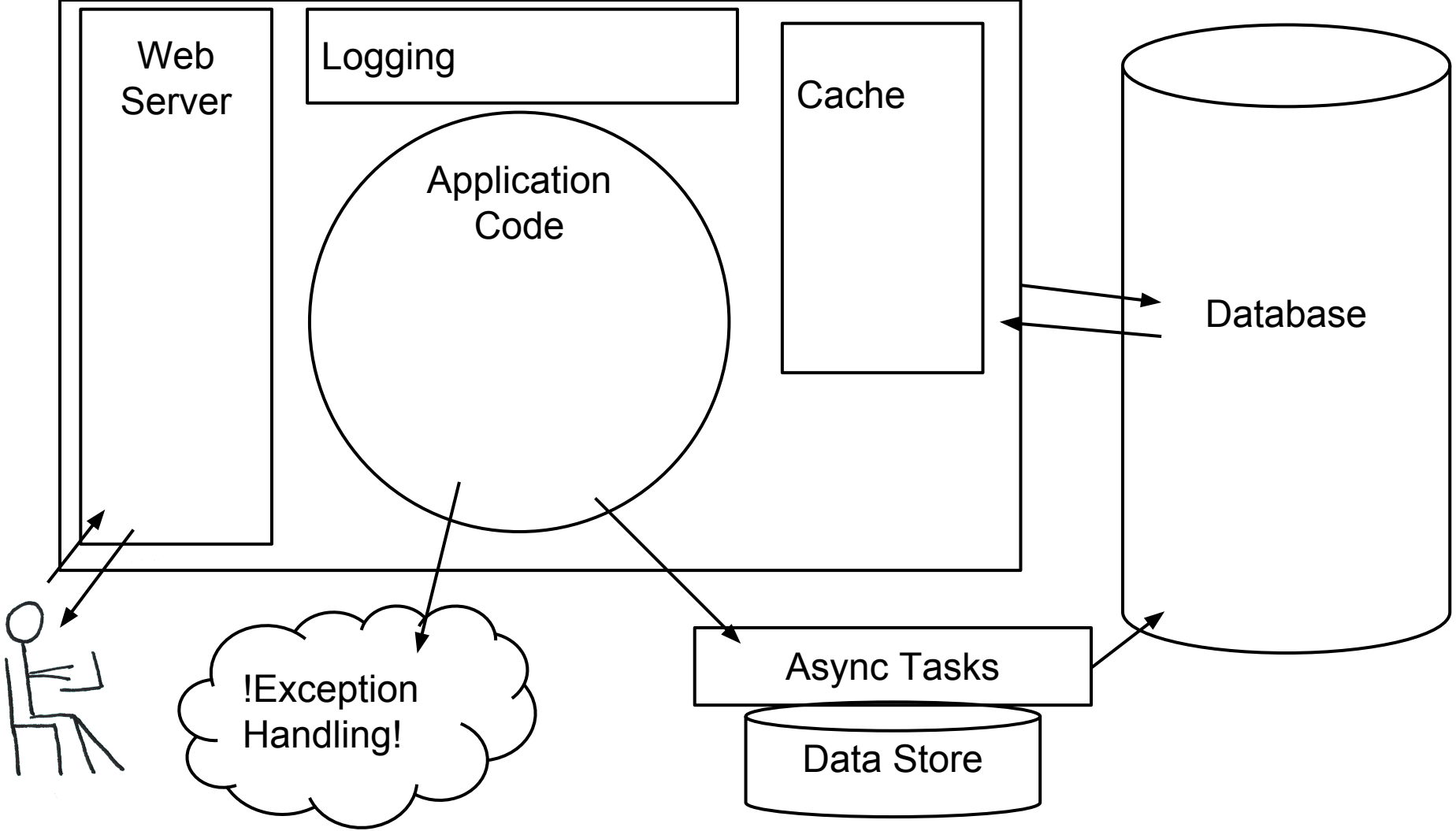

Web Server
Logging
Cache
Application Code
Database
!Exception Handling!
Async Tasks
Data Store
Version Control
SMTP Server

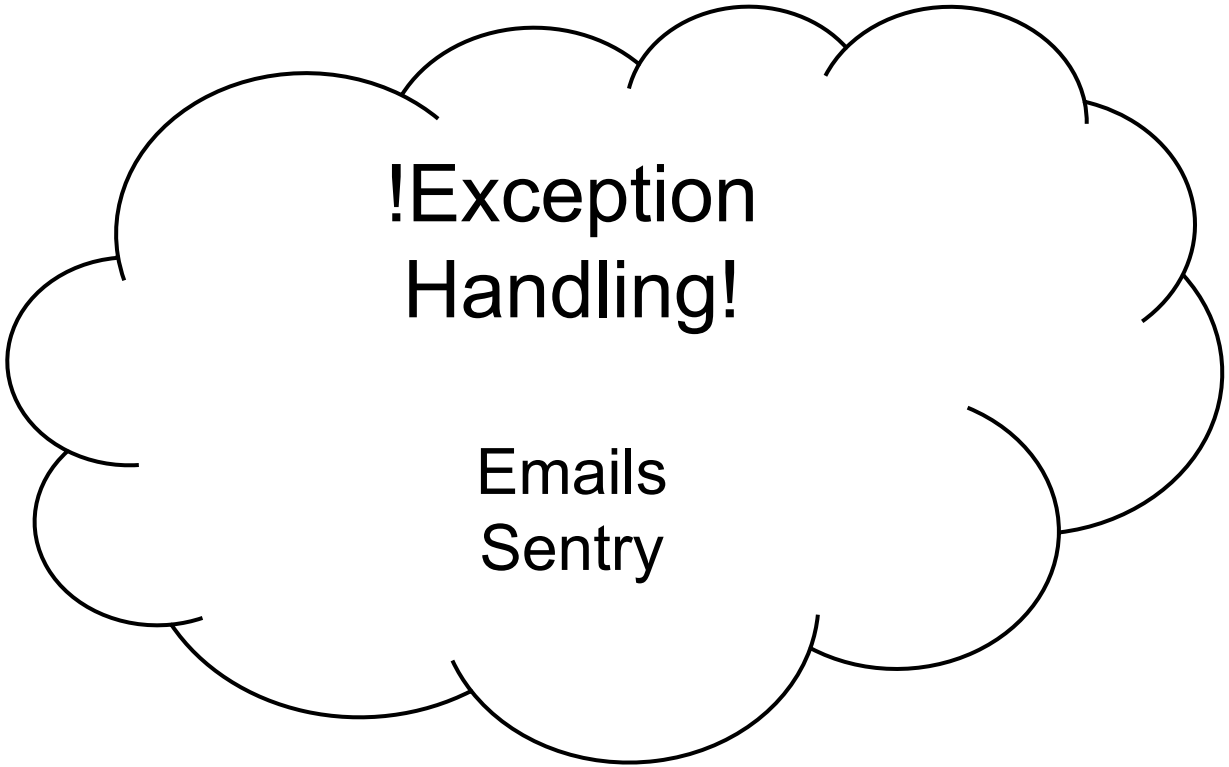

Cache
Memcached
Redis
Varnish

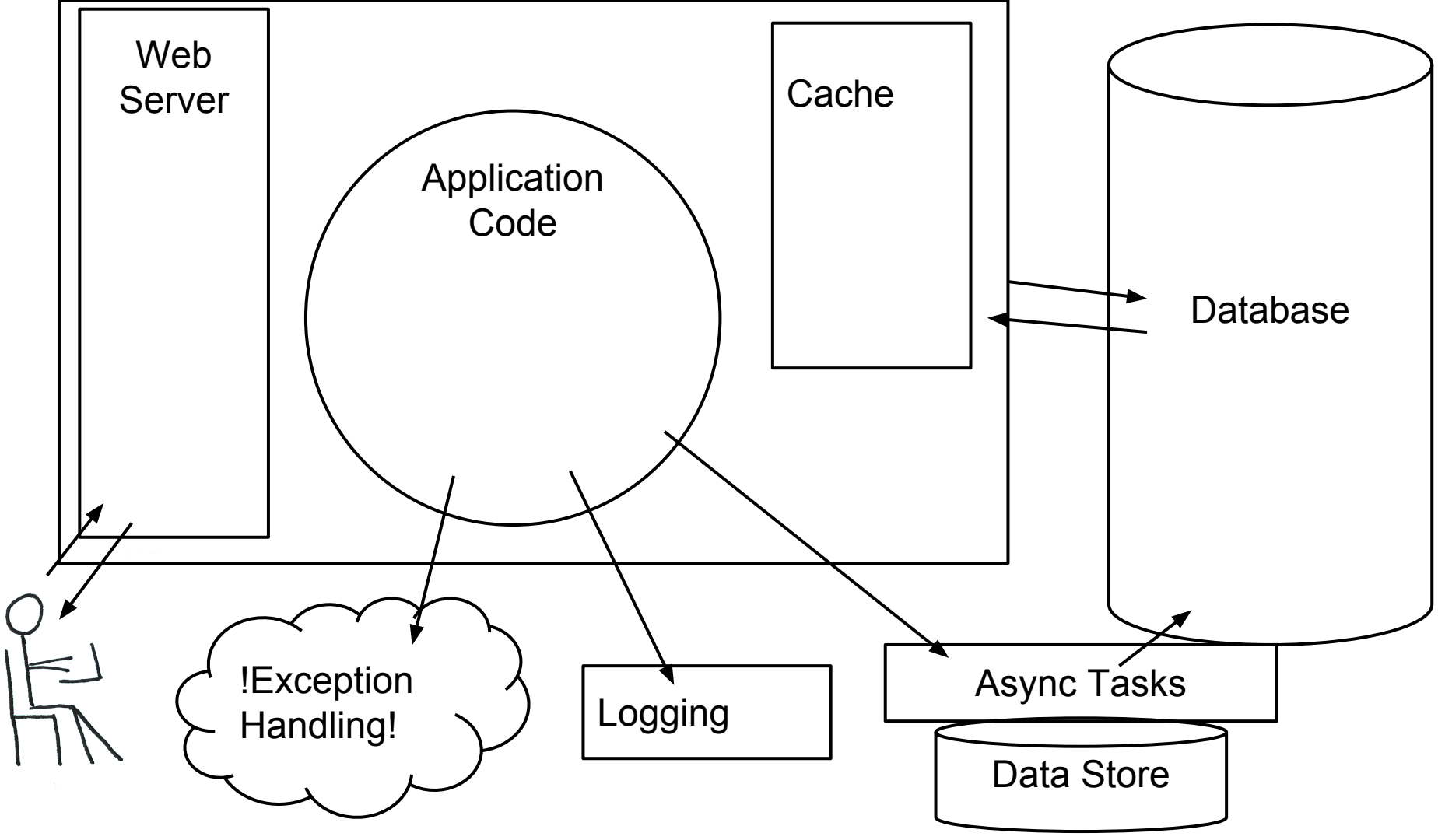

Web Server
Logging
Cache
Application Code
Database
!Exception Handling!
Async Tasks
Data Store
Monitoring


Monitoring
New Relic
Nagios
Pingdom


Web
Server
Logging
Cache
Application
Code
!Exception
Handling!
Database
Async Tasks
Data Store

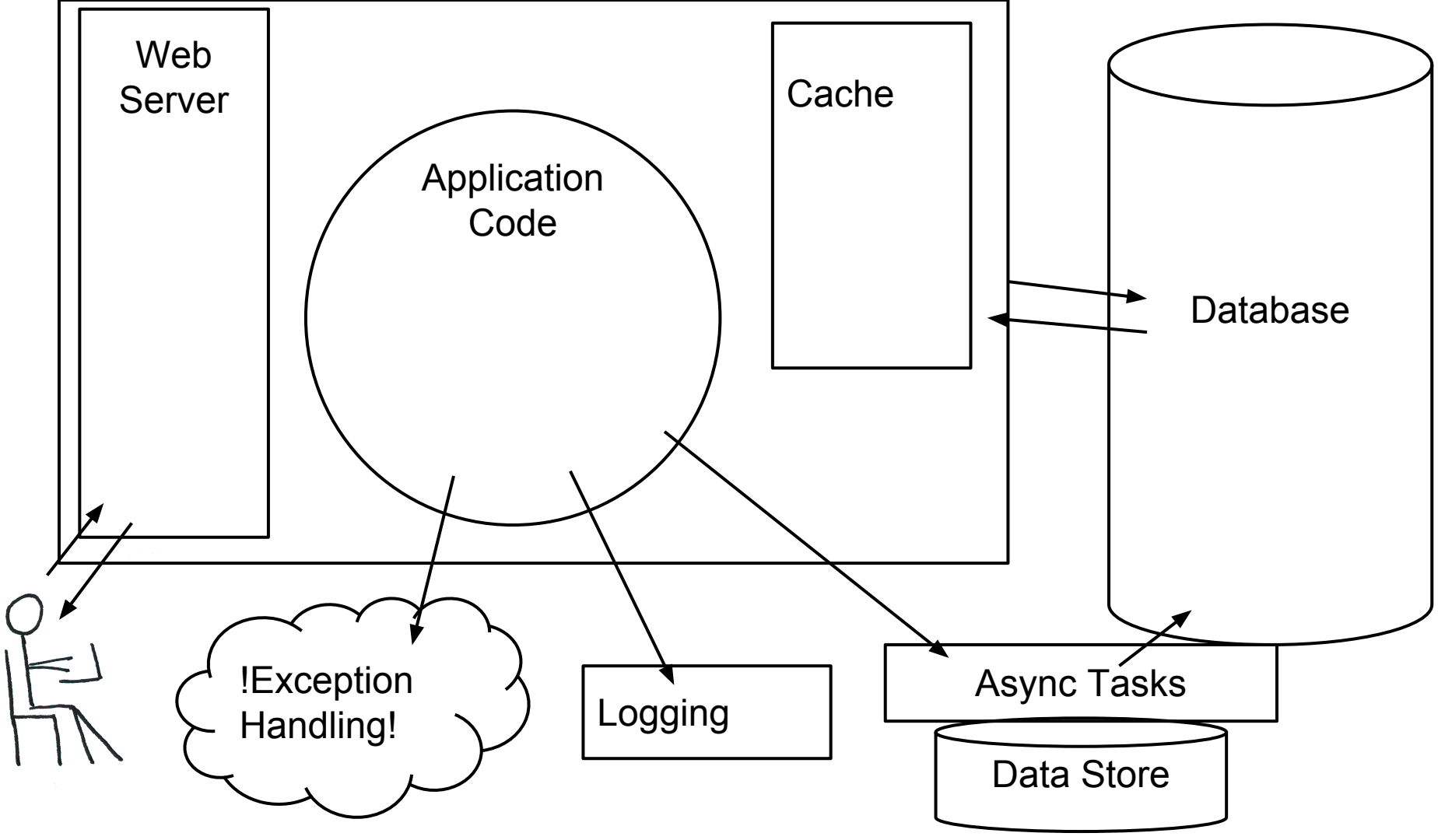

Web
Server
Logging
Cache
Application
Code
Database
!Exception
Handling!
Async Tasks
Data Store

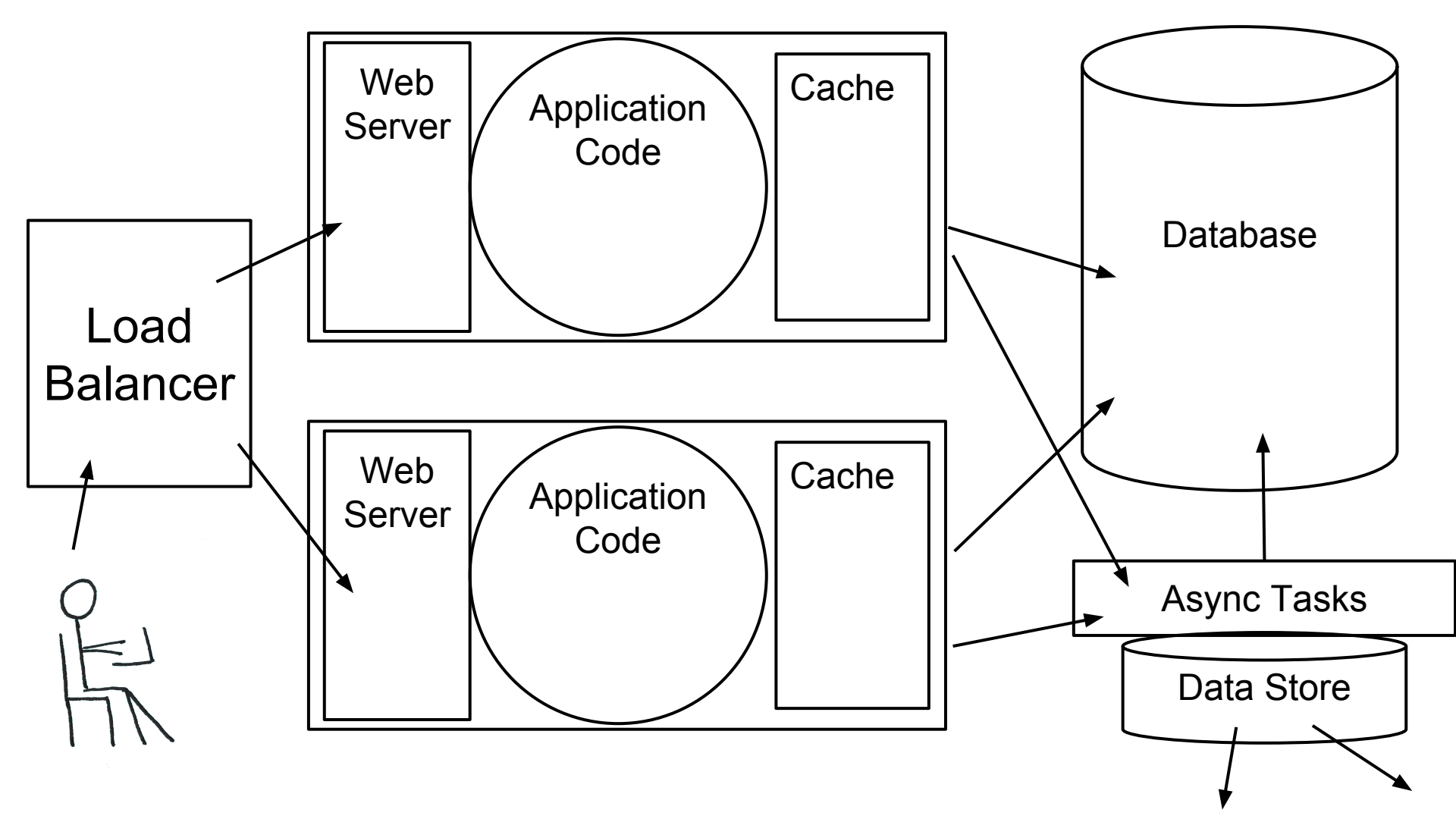

!Exception
Handling!
Emails
Sentry

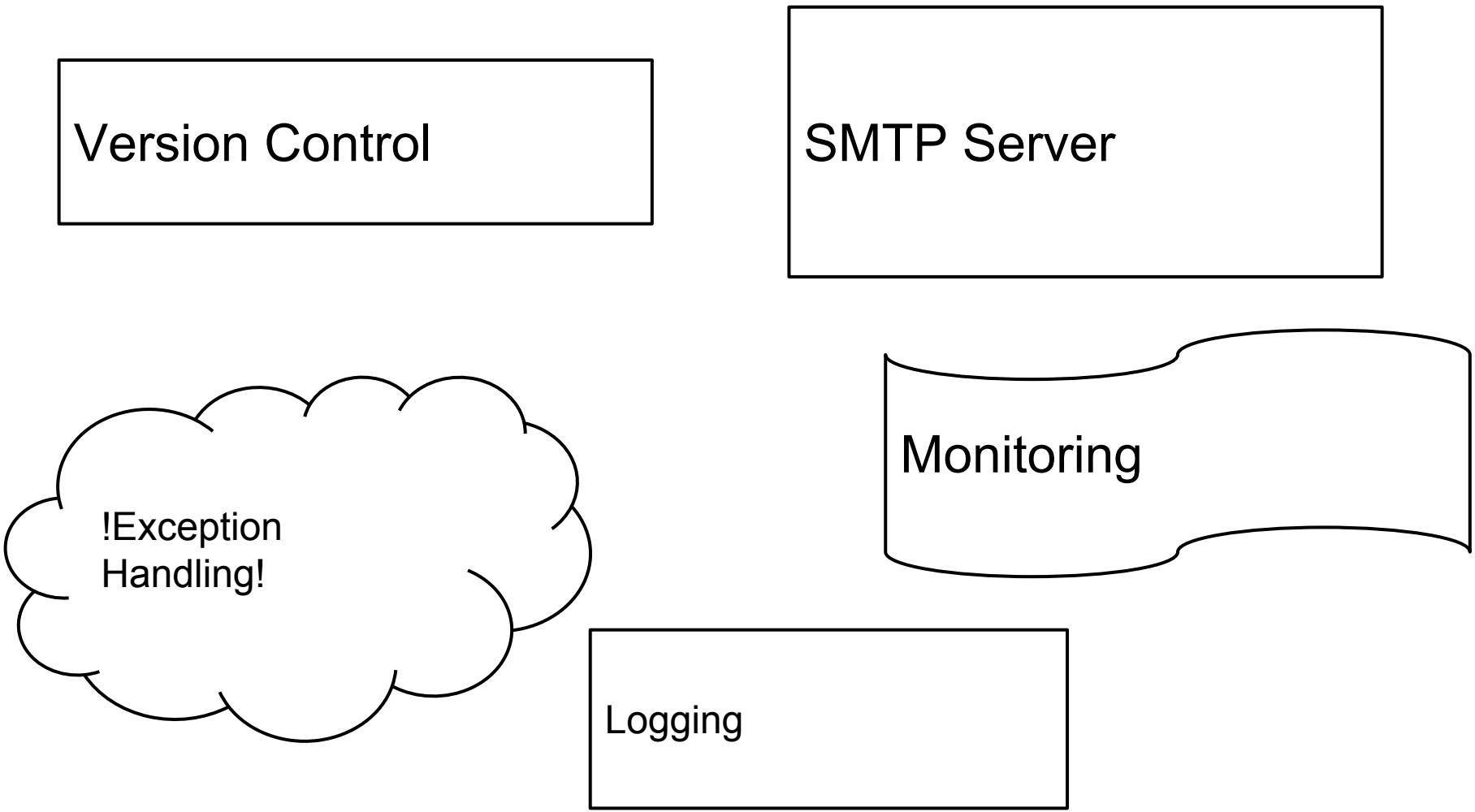

Web
Server
Cache
Application
Code
Database
!Exception
Handling!
Logging
Async Tasks
Data Store

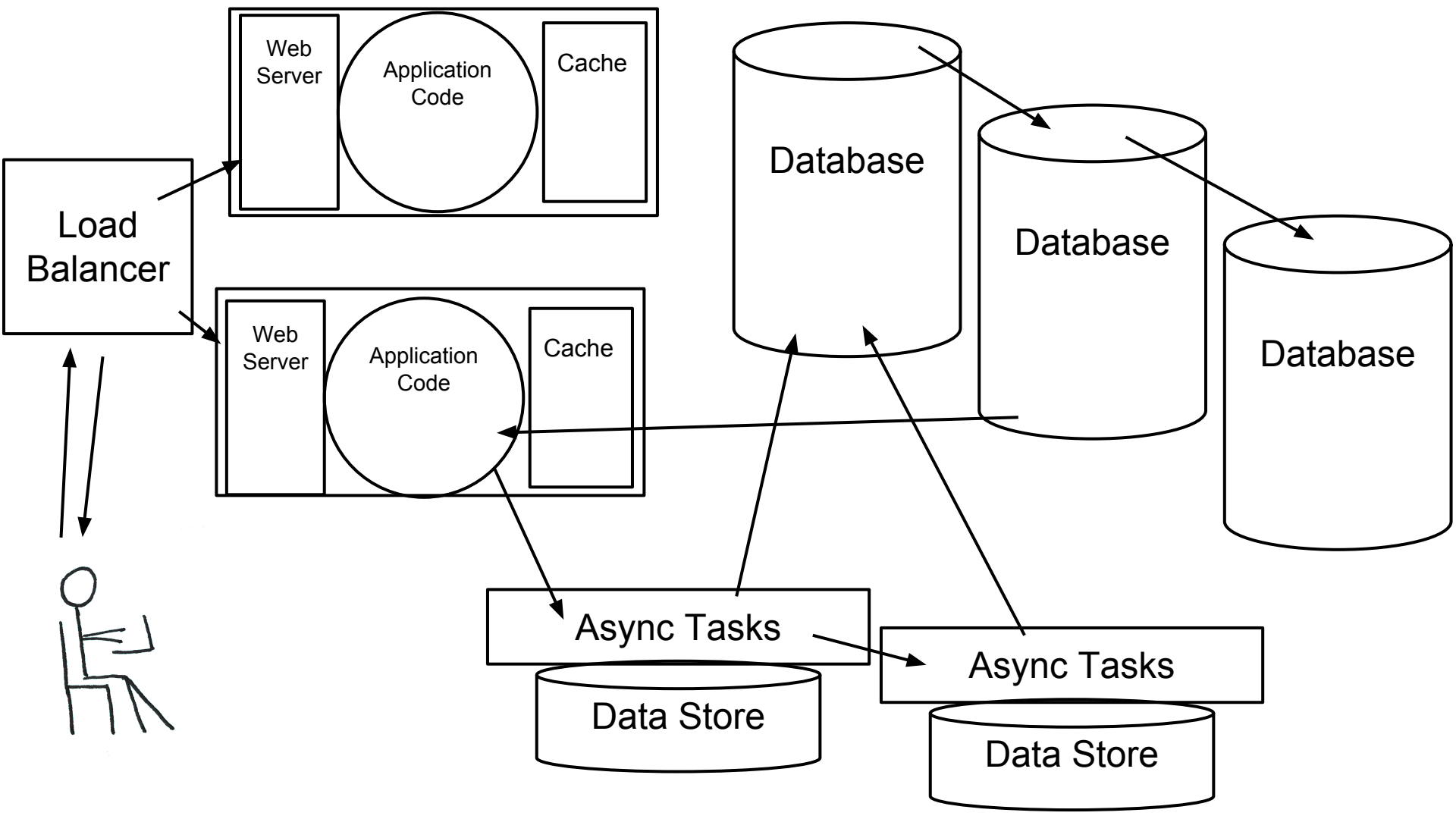
Logging

Log Server
Loggly
Splunk

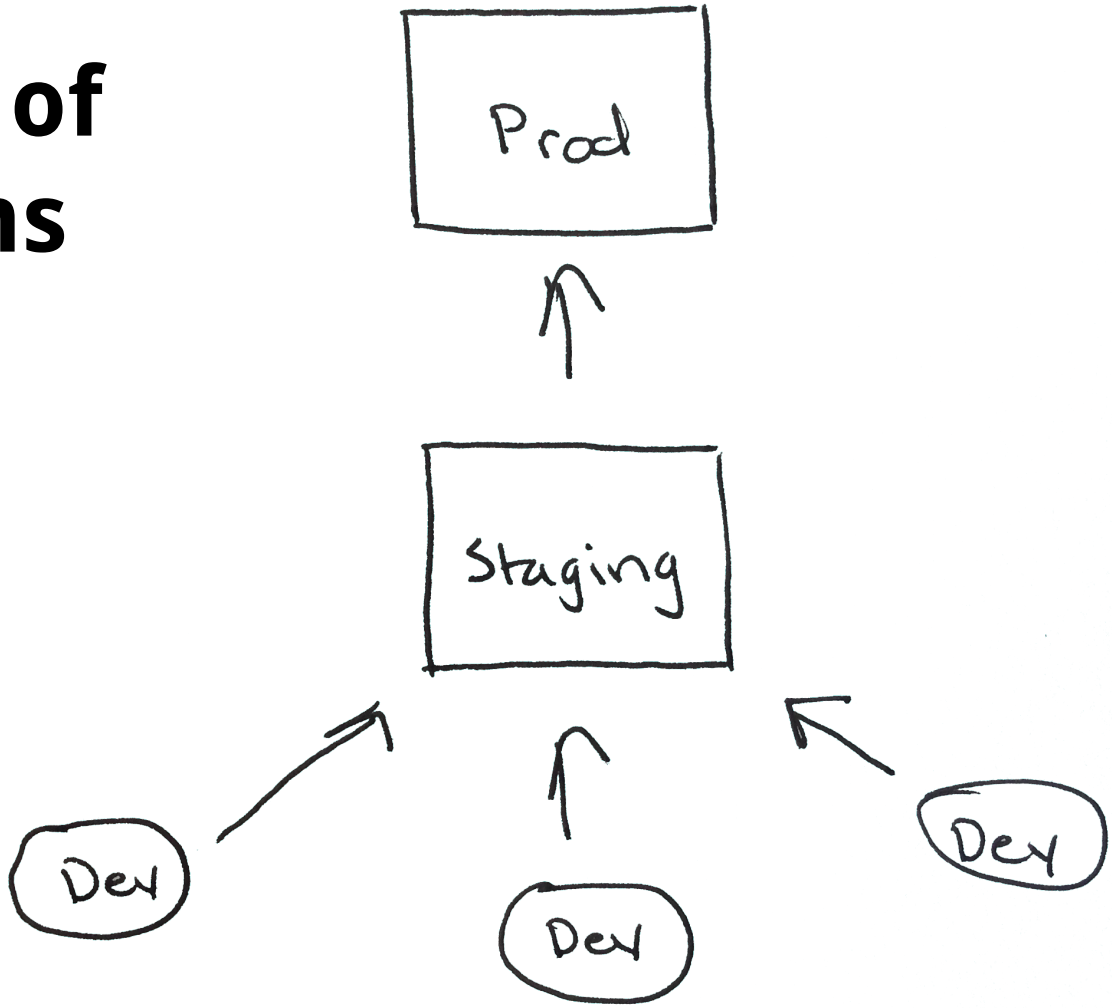

Web
Server
Cache
Application
Code
Database
!Exception
Handling!
Logging
Async Tasks
Data Store

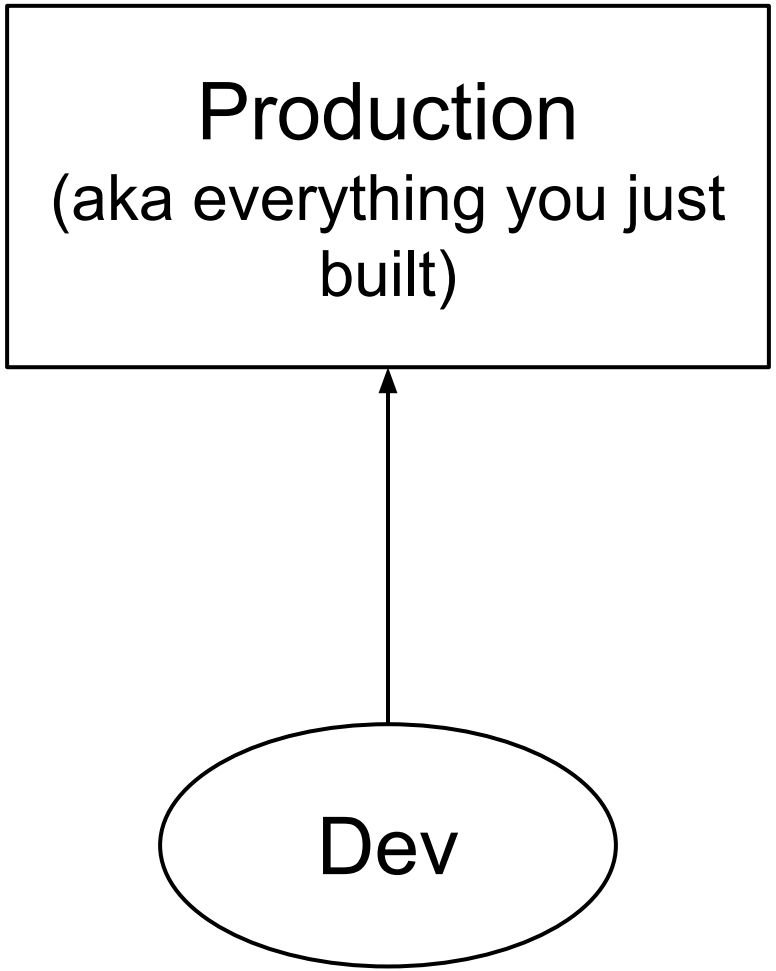

Web Server
Application Code
Cache
Load Balancer
Web Server
Application Code
Cache
Database
Async Tasks
Data Store

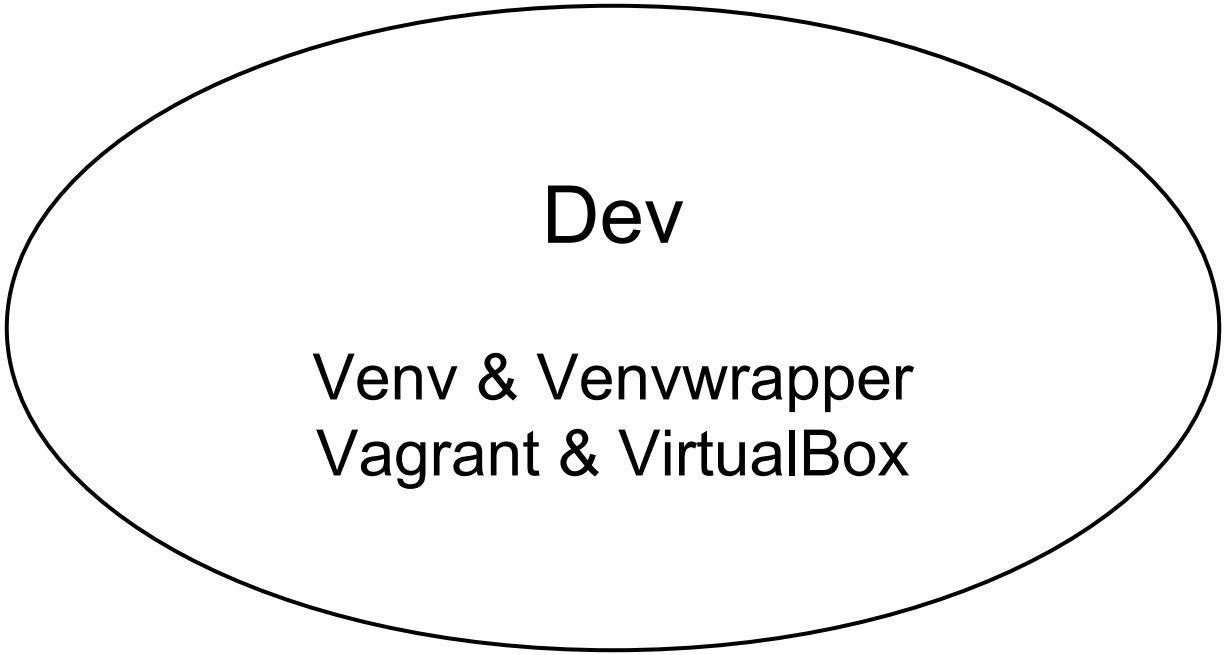

Version Control
SMTP Server
Monitoring
!Exception
Handling!
Logging

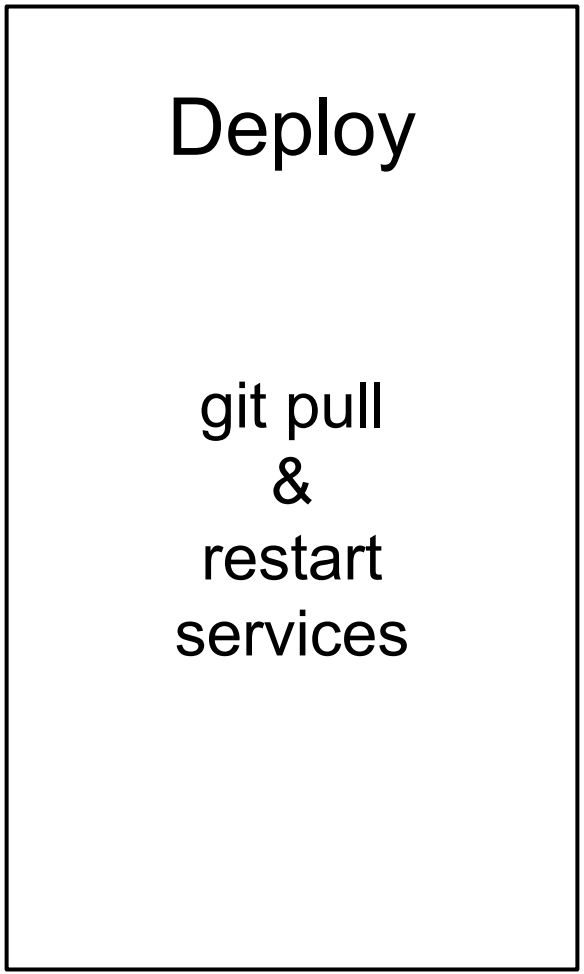

Web Server
Application Code
Cache
Load Balancer
Web Server
Application Code
Cache
Database
Database
Database
Async Tasks
Data Store
Async Tasks
Data Store

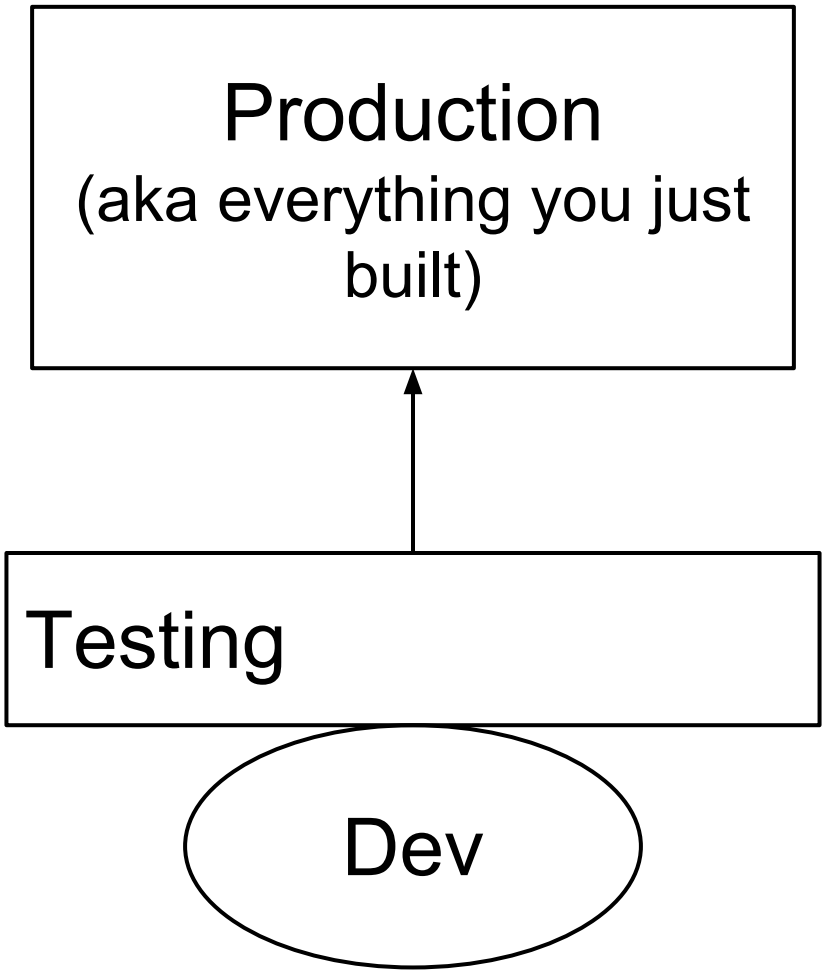
System of Systems

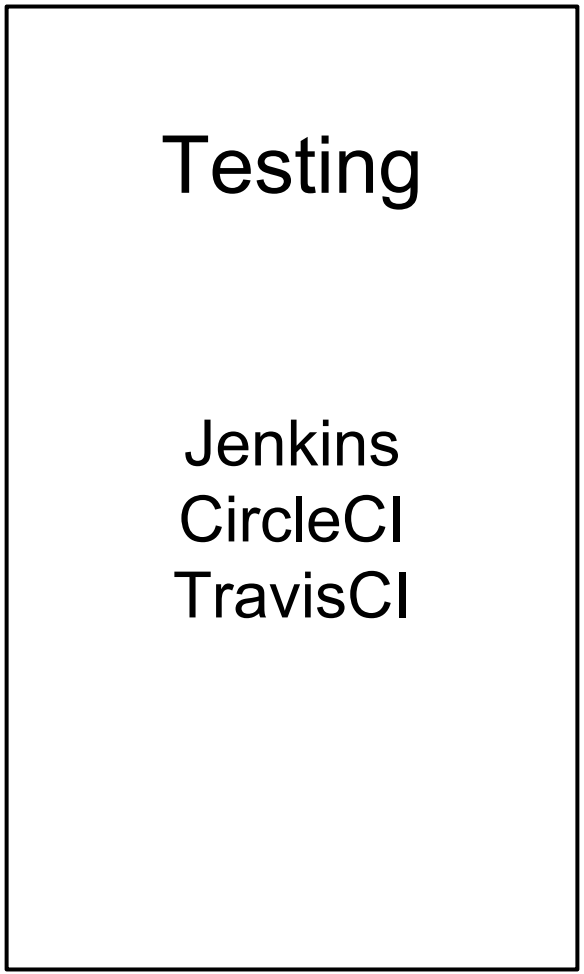


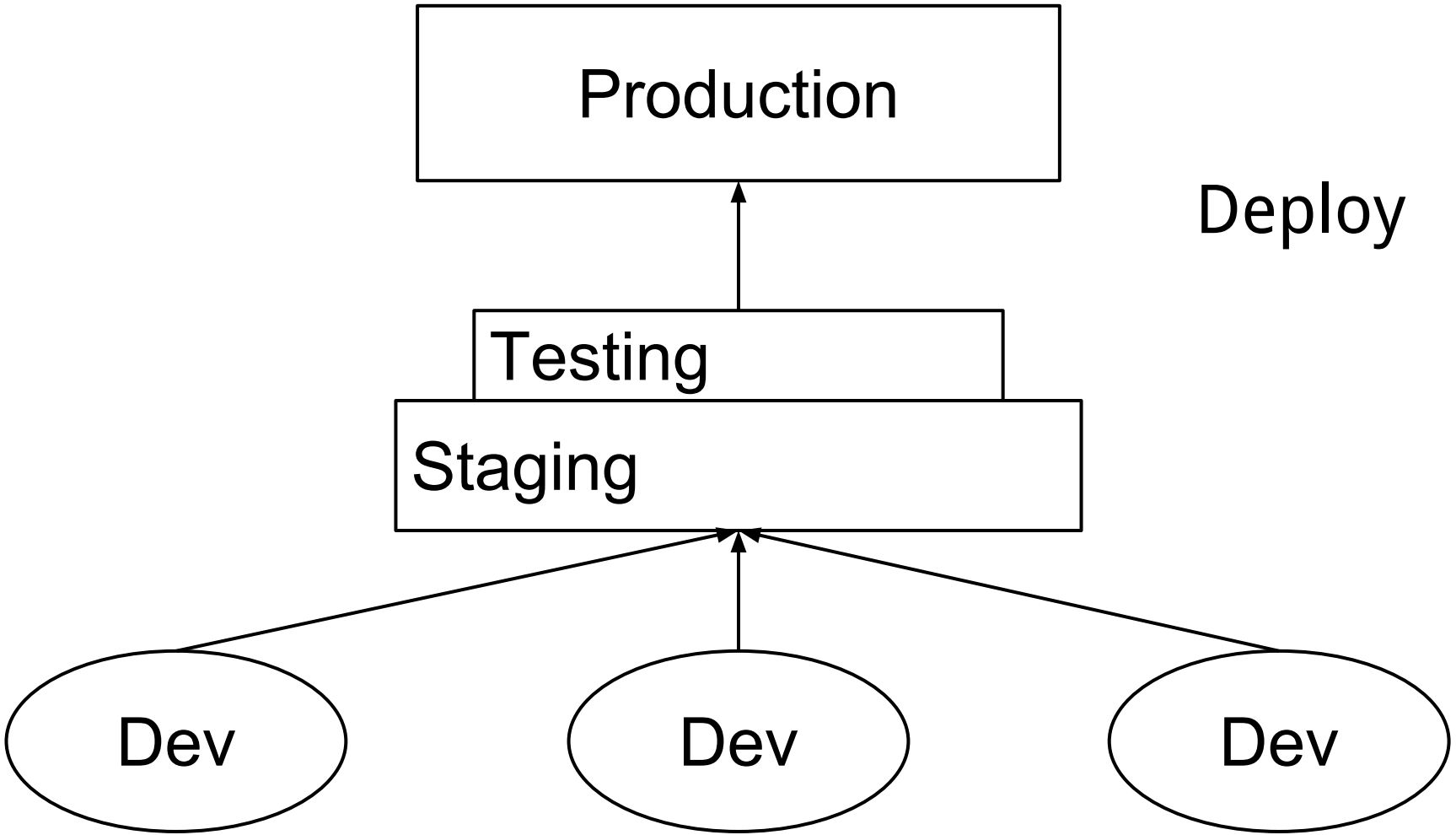

Production
(aka everything you just built)
Deploy
Dev

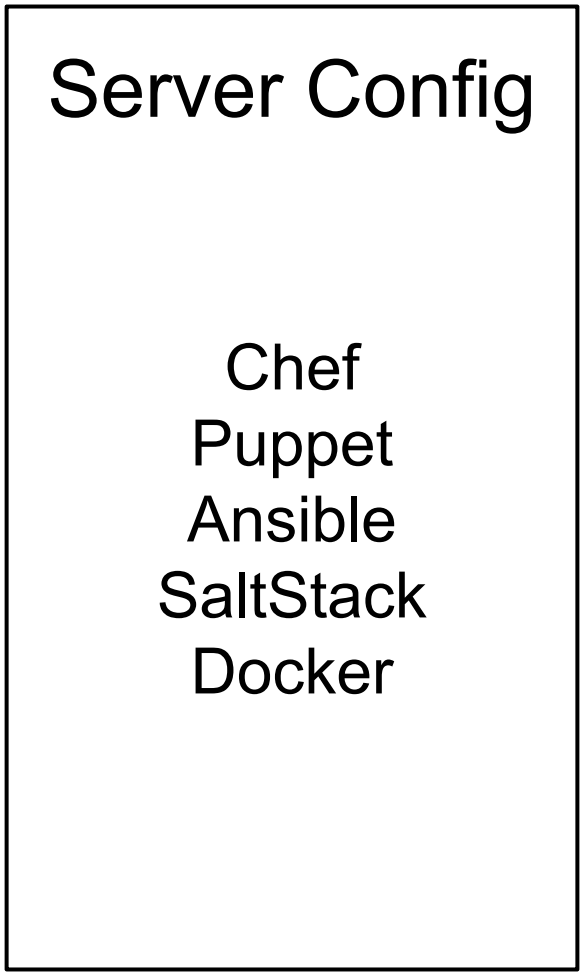

Dev
Venv & Venvwrapper
Vagrant & VirtualBox


Deploy
git pull
&
restart
services


Production
(aka everything you just built)
Deploy
Testing
Dev

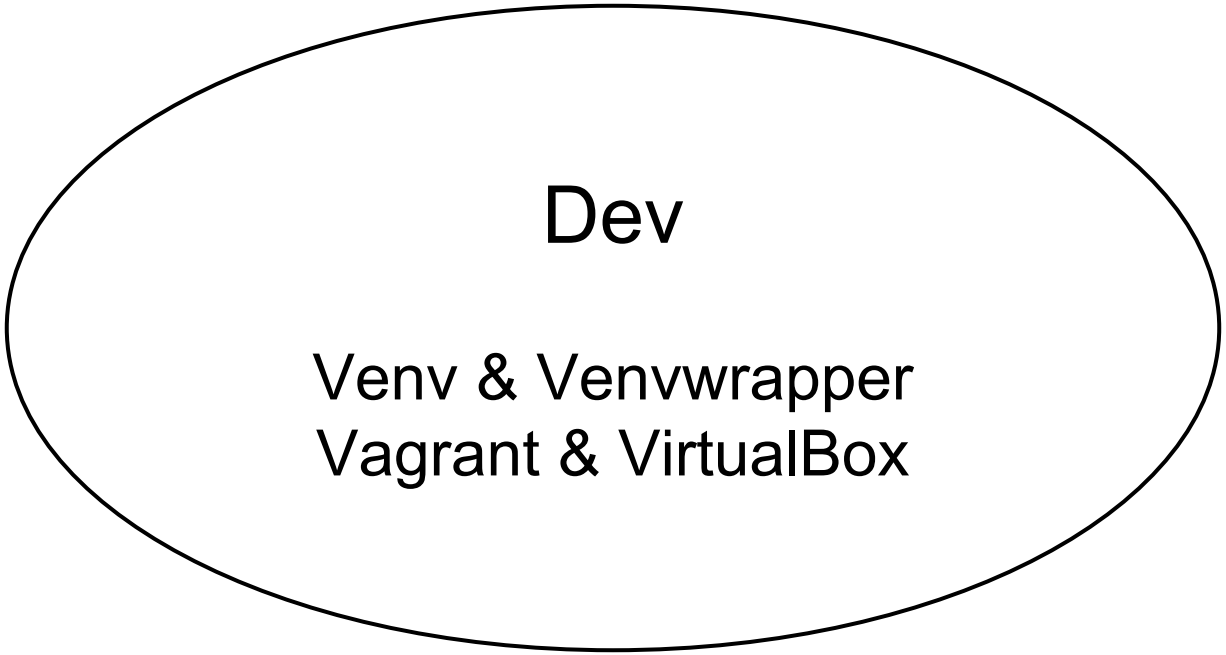

Testing
Jenkins
CircleCI
TravisCI

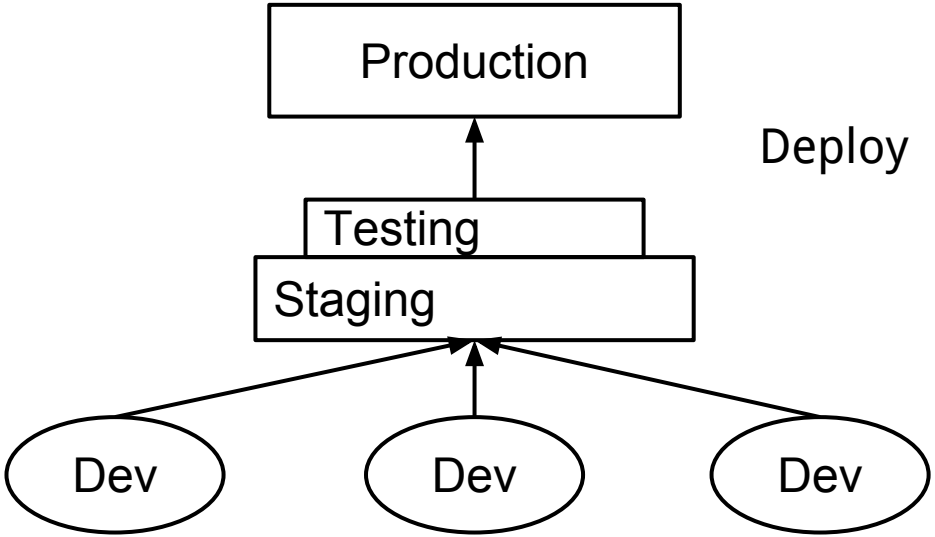

Production
Deploy
Testing
Staging
Dev
Dev
Dev

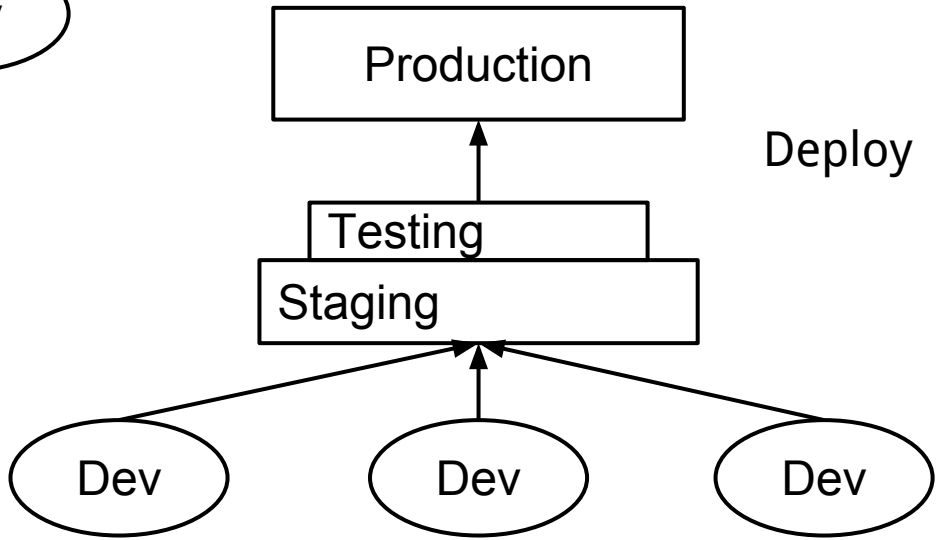

Server Config
Chef
Puppet
Ansible
SaltStack
Docker

Deploy

Chef
Puppet
Ansible
SaltStack
Docker


Dev
Venv & Venvwrapper
Vagrant & VirtualBox


Production
Deploy
Testing
Staging
Dev
Dev
Dev


Production
Deploy
Testing
Staging
Dev
Dev
Dev


Hosting
AWS
Rackspace
Linode

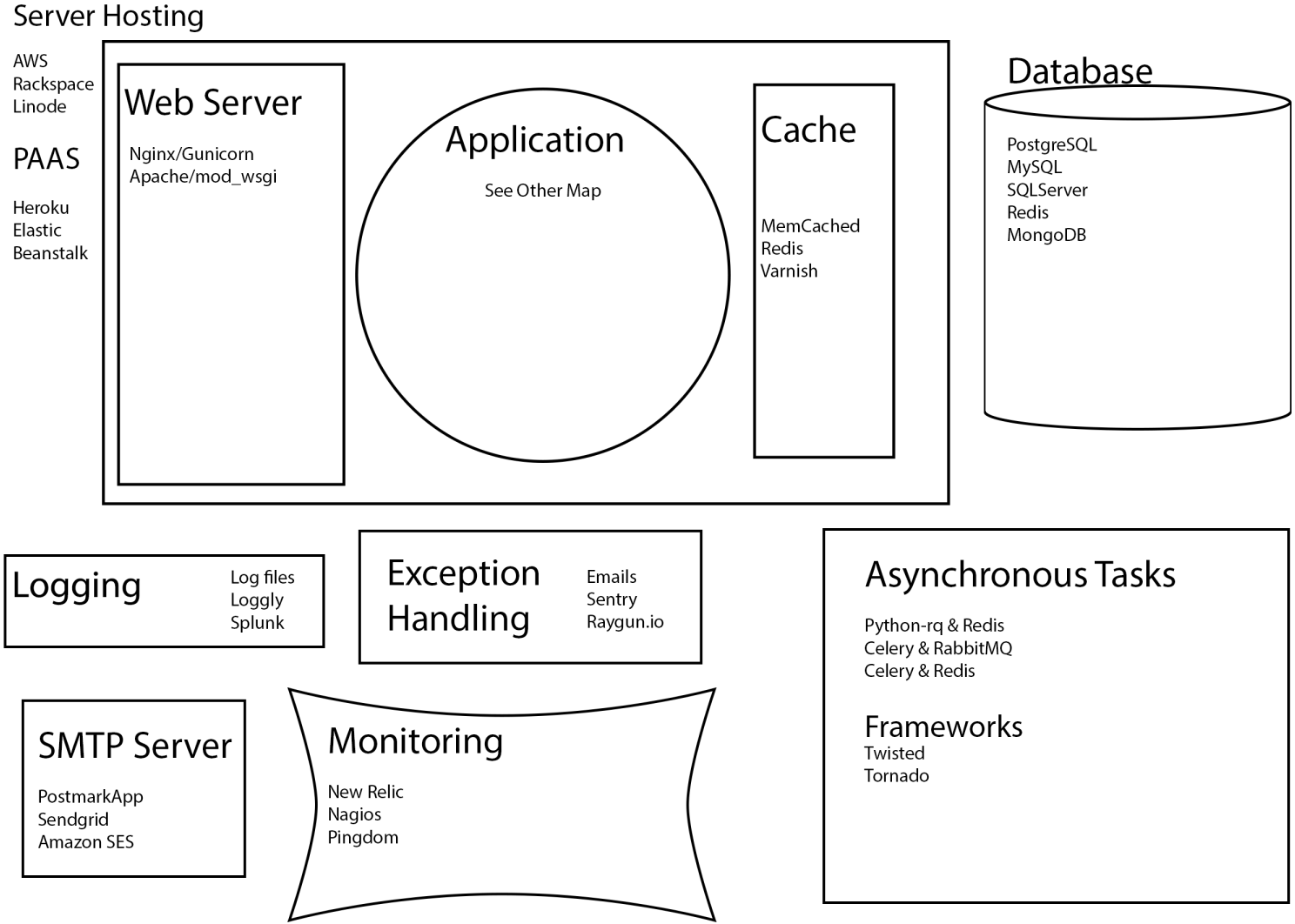
Chef Repo for a Web Application

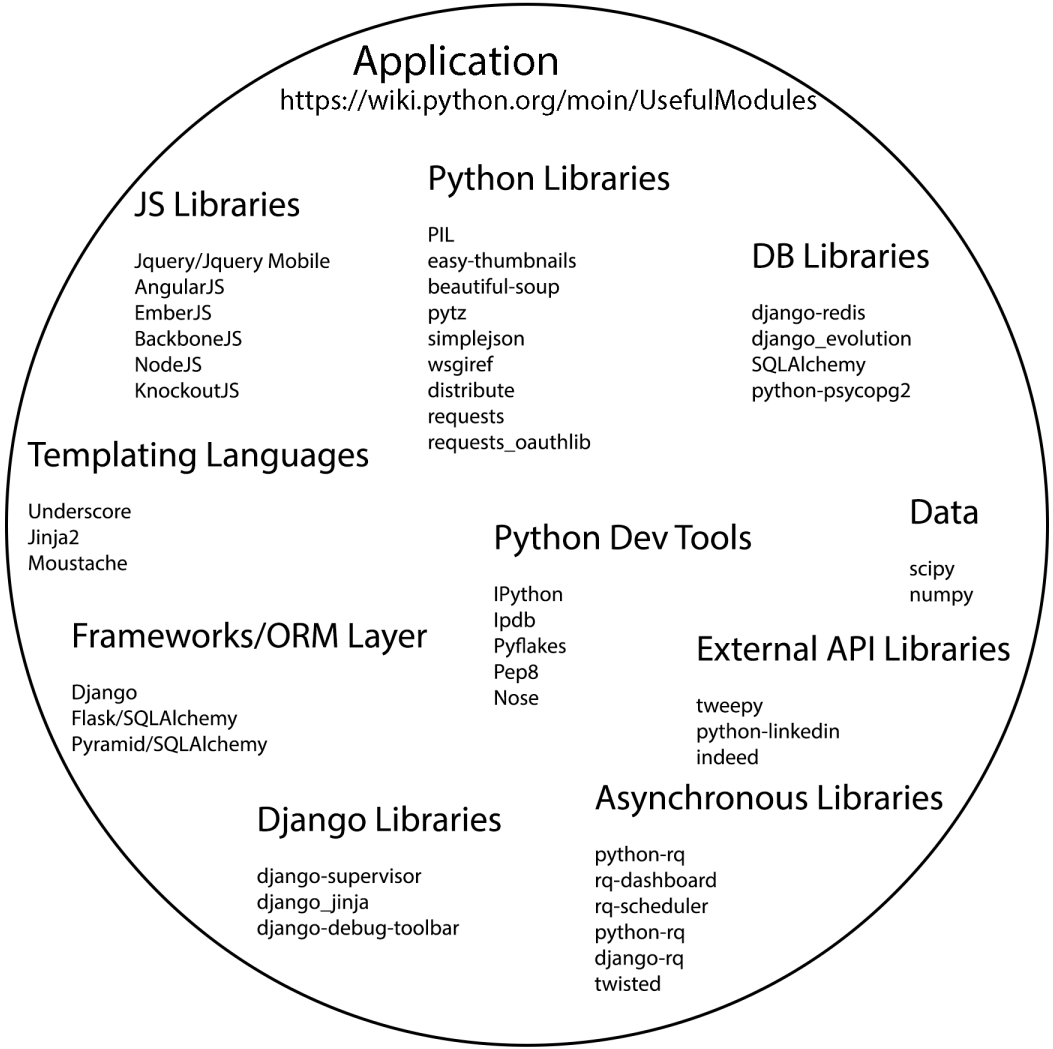
https://github.com/heddle317/django-chef-application

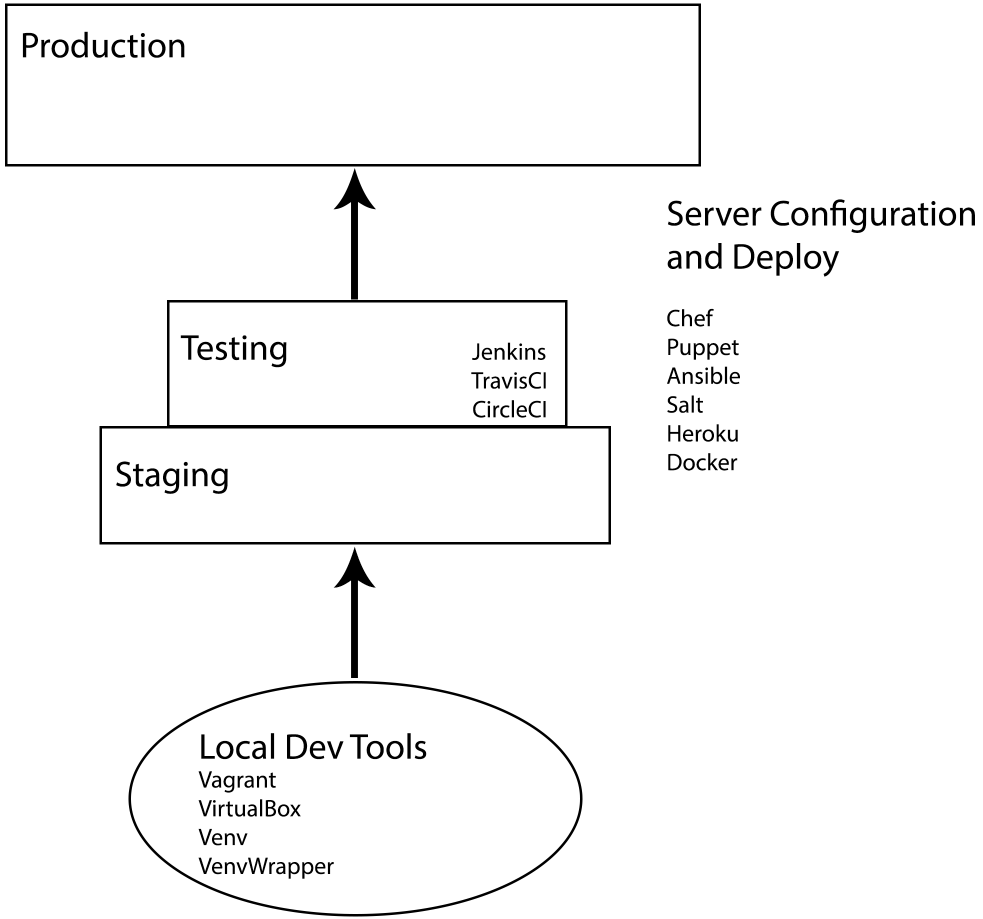

PaaS
Heroku
Elastic Beanstalk

Resources Maps

https://github.com/heddle317/full-stack-resources/tree/master/resources_maps

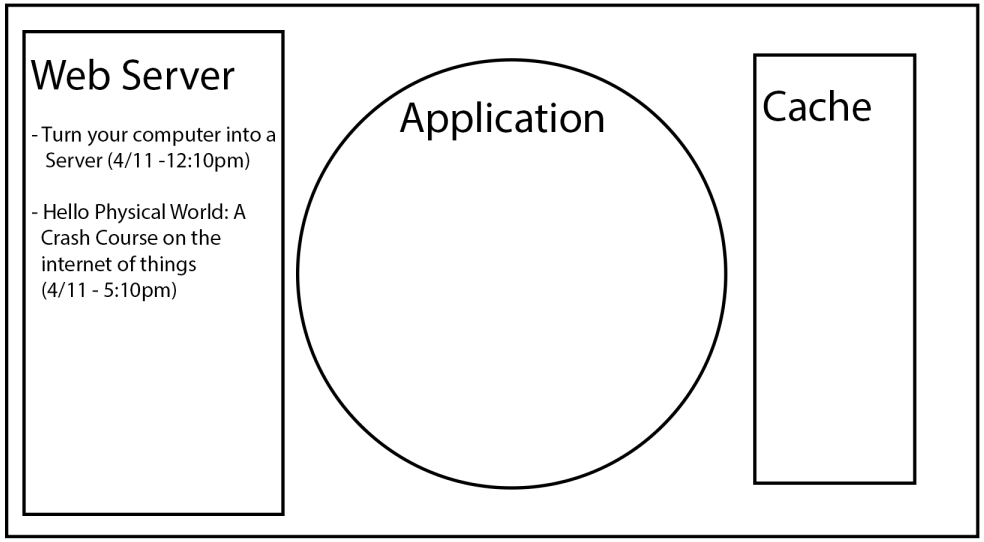

Server Hosting
AWS
Rackspace
Linode
PAAS
Heroku
Elastic
Beanstalk
Web Server
Nginx/Gunicorn
Apache/mod_wsgi
Application
See Other Map
Cache
MemCached
Redis
Varnish
Database
PostgreSQL
MySQL
SQLServer
Redis
MongoDB
Logging
Log files
Loggly
Splunk
Exception Handling
Emails
Sentry
Raygun.io
Asynchronous Tasks
Python-rq & Redis
Celery & RabbitMQ
Celery & Redis
Frameworks
Twisted
Tornado
SMTP Server
PostmarkApp
Sendgrid
Amazon SES
Monitoring
New Relic
Nagios
Pingdom


Application
https://wiki.python.org/moin/UsefulModules
JS Libraries
Jquery/Jquery Mobile
AngularJS
EmberJS
BackboneJS
NodeJS
KnockoutJS
Python Libraries
PIL
easy-thumbnails
beautiful-soup
pytz
simplejson
wsgiref
distribute
requests
requests_oauthlib
DB Libraries
django-redis
django_evolution
SQLAlchemy
python-psycopg2
Templating Languages
Underscore
Jinja2
Moustache
Python Dev Tools
IPython
Ipdb
Pyflakes
Pep8
Nose
Data
scipy
numpy
Frameworks/ORM Layer
Django
Flask/SQLAlchemy
Pyramid/SQLAlchemy
External API Libraries
tweepy
python-linkedin
indeed
Django Libraries
django-supervisor
django_jinja
django-debug-toolbar
Asynchronous Libraries
python-rq
rq-dashboard
rq-scheduler
python-rq
django-rq
twisted


Production
Testing
Jenkins
TravisCI
CircleCI
Staging
Local Dev Tools
Vagrant
VirtualBox
Venv
VenvWrapper
Server Configuration
and Deploy
Chef
Puppet
Ansible
Salt
Heroku
Docker

Talk Maps

https://github.com/heddle317/full-stack-resources/tree/master/talk_maps



Database

- Designging Django's Migrations (4/12 - 11:30am)
- Introduction to SQLAlchemy Core (4/12 - 1:55pm)
- Sane Schema migrations with Alembic and SQLAlchemy (4/12 - 2:35pm)
- Building the App (4/12 - 3:15pm)
- Postgres Performance for Humans (4/13 - 1:10pm)
- PostgreSQL is Web Scale (4/13 - 1:50pm)

Logging

Exception Handling

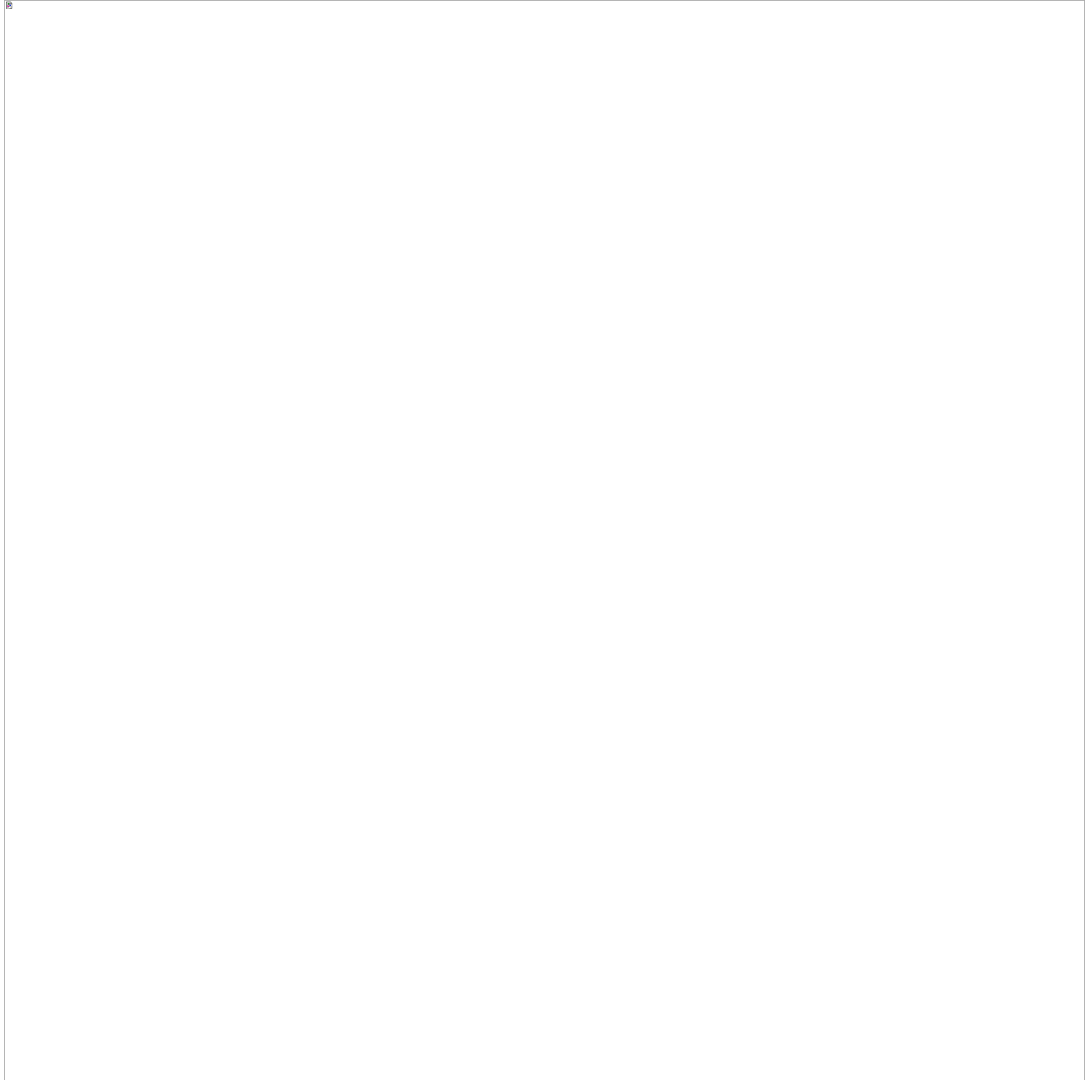
SMTP Server

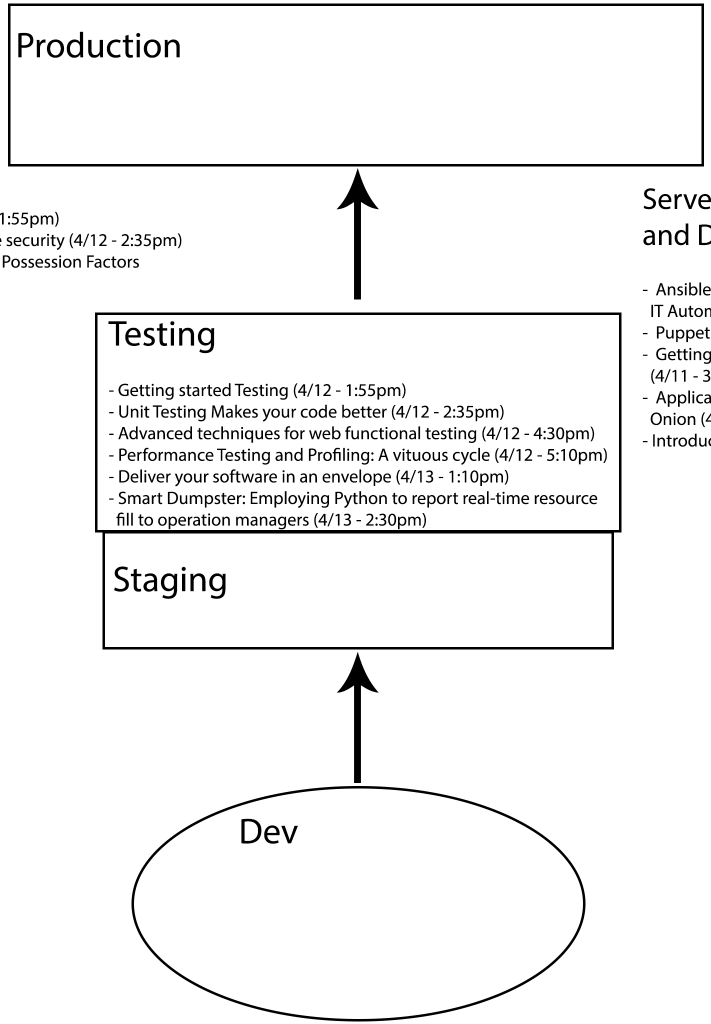
Monitoring

- Realtime predictive analytics using scikit-learn & RabbitMQ (4/11 - 3:15pm)
- Pushing Python: Building a High throughput low latency system (4/13 - 3:15pm)

Asynchronous Tasks

- An Introduction to Twisted (4/11 - 1:55pm)
- Twisted Mixing (4/11 - 2:35pm)
- What is Async, how does it work, and when should I use it? (4/11 - 3:15pm)
- Distributed Computing is Hard, Let's go shopping (4/11 - 4:30pm)
- Fan-in and Fan-out: The crucial components of concurrency (4/11 - 5:10pm)
- Which messaging layer should you use if you want to build a loosely coupled distributed python app? (4/12 - 5:10pm)




Production
Security
- The sorry state of SSL (4/12 - 1:55pm)
- Quick wins for better website security (4/12 - 2:35pm)
- Multi-factor Authentication - Possession Factors (4/12 - 3:15pm)
Server Configuration and Deploy
- Ansible - Python-Powered Radically simple IT Automation (4/11 - 1:55pm)
- Puppet Modules: Apps for Ops (4/11 - 2:35pm)
- Getting Started with SaltStack (4/11 - 3:15pm)
- Application Deployment State of the Onion (4/11 - 4:30pm)
- Introduction to Docker (4/12 - 10:50am)
Testing
- Getting started Testing (4/12 - 1:55pm)
- Unit Testing Makes your code better (4/12 - 2:35pm)
- Advanced techniques for web functional testing (4/12 - 4:30pm)
- Performance Testing and Profiling: A vituous cycle (4/12 - 5:10pm)
- Deliver your software in an envelope (4/13 - 1:10pm)
- Smart Dumpster: Employing Python to report real-time resource fill to operation managers (4/13 - 2:30pm)
Staging
Dev

Education

- The Young Coder: Let's learn python (or, 'So you want to run a young coders class) (4/11 - 1:55pm)
- The Python Pipeline: Why you should reach out to local teachers and how to do it (4/11 - 2:35pm)
- Teaching Python: To Infinity and Beyond (4/11 - 3:15pm)
- Technical onboarding, training, and mentoring (4/13 - 1:10pm)
- Software Carpentry: Lessons Learned (4/12 - 4:30pm)
- Outreach Program for Women: Lessons in Collaboration (4/13 - 1:50pm)
- Software Engineering Research for Hackers: Bridging the two solitudes (4/13 - 2:30pm)

Open Source

- Free Software, Free People (4/11 - 5:10pm)
- Hitchhiker's Guide to participating in open source (4/13 - 1:50pm)
- Set your code free: releasing and maintaining an open-source python project (4/13 - 2:30pm)

Fun

- Castle Anthrax: Dungeon Generation Techniques (4/11 - 4:30pm)
- Blending art, technology, and light, Python for interactive and real time LED installations (4/11 - 4:30pm)
- Hello Physical World: A crash course on the internet of things (4/11 - 5:10pm)
- Discovering Python (4/12 - 3:15pm)
- Cheap Helicopters in my living room (4/12 - 4:30pm)
- Programming an autonomous 20 foot blimp with python (4/12 - 5:10pm)

Gaming

- My big gay adventure. Making, releasing and selling an indie game made in python. (4/13 - 1:10pm)
- 2D/3D graphics with python on mobile platforms (4/13 - 1:20pm)

Personal

- It's dangerous to go alone: battling the invisible monsters in tech (4/12 - 5:10pm)
- Farewell and welcome home: python in two genders (4/13 - 1:10pm)

3 Takeaways

- What are the basic pieces of a full-stack.
- What do these pieces look like in different environments.
- Resources for learning more and working with these pieces.

Ask your questions now.

Kate Heddleston
@heddle317
https://github.com/heddle317/full-stack-resources

“A complex system that works is invariably found to have evolved from a simple system that works.”

— John Gall, *Systemantics (*1975)

“A system is never finished being developed until it ceases to be used.”

— attributed to Gerald M. Weinberg

“It is as if perfection be attained not when there is nothing more to add, but when there is nothing more to take away.”

— Antoine de Saint-Exupéry, *Terre des Hommes* (1939)

“There is no such thing as a small change to a large system.”

— systems folklore, source lost in the mists of time

“Everything should be made as simple as possible, but no simpler.”

— commonly attributed to Albert Einstein; it is actually a paraphrase of a comment he made in a 1933 lecture at Oxford