SAN JOSE STATE UNIVERSITY

FALL 2017

CMPE 273 - Lab #3

Submitted to: Professor Simon Shim

Submitted by:
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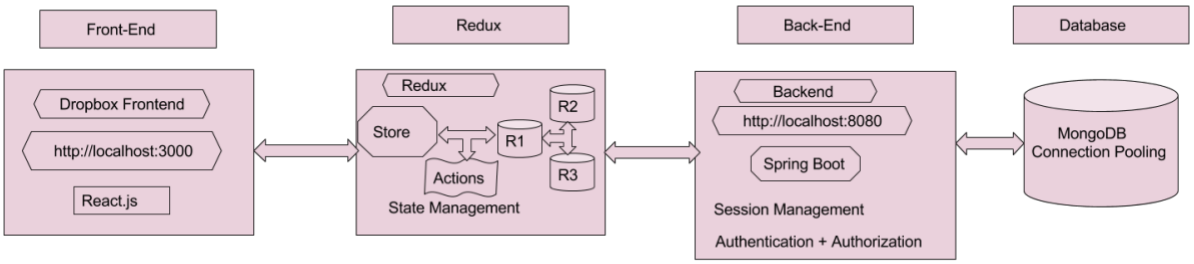
Github Link –
https://github.com/MeenakshiParyani/Dropbox-Prototype.git

Dropbox Prototype – Spring & React

1. System Architecture:

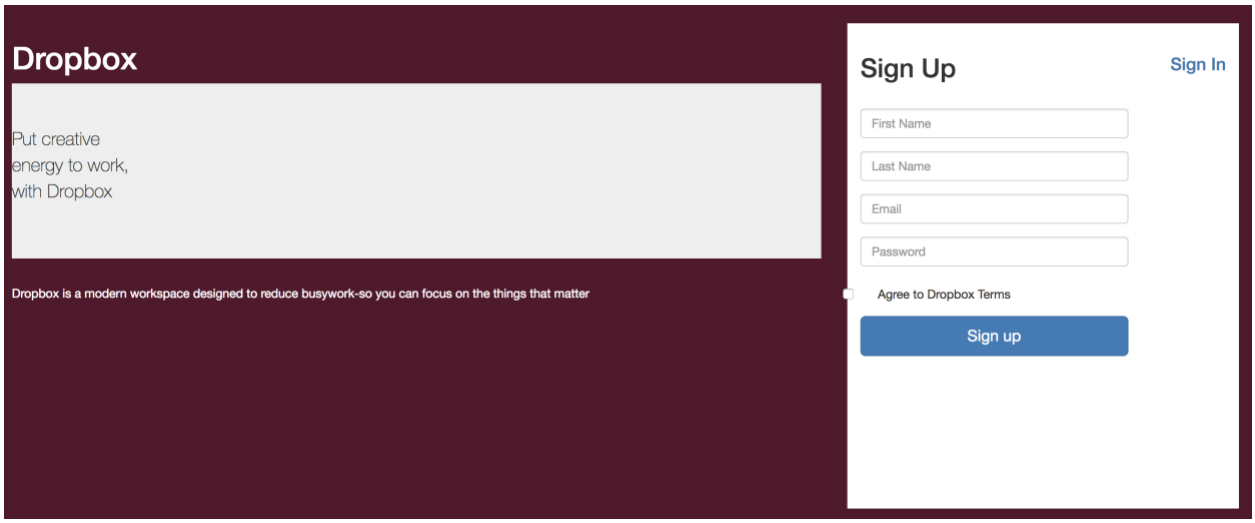


2. DropBox Application Functionalities

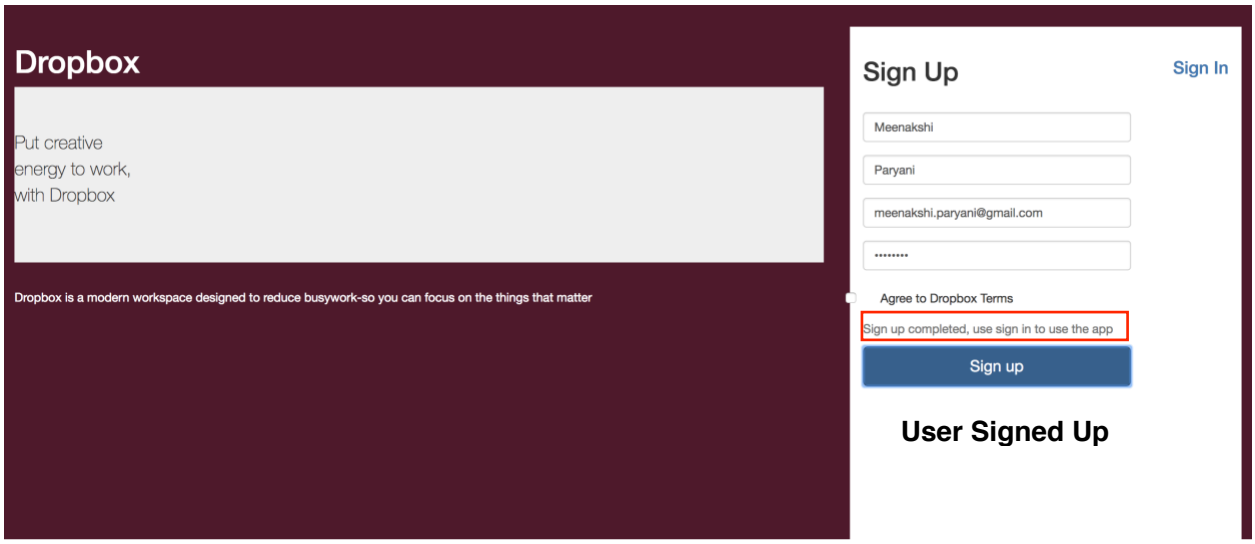
2.1 Basic User Functionalities

2.1.1 Sign Up

Front-End Run



Front-End Result



Back-End Code

Controller:-

```
@RestController
@CrossOrigin(origins = "http://localhost:3000")
@RequestMapping("/api/user")
public class UserResource {

    @Autowired
    private UserService userService;

    @RequestMapping(value = "/signup", headers = "Accept=application/json", method = RequestMethod.POST)
    @ResponseStatus(HttpStatus.CREATED)
    public ResponseEntity<?> signup(@RequestBody User user){
        return new ResponseEntity(userService.signupUser(user), HttpStatus.OK);
    }
```

Service:-

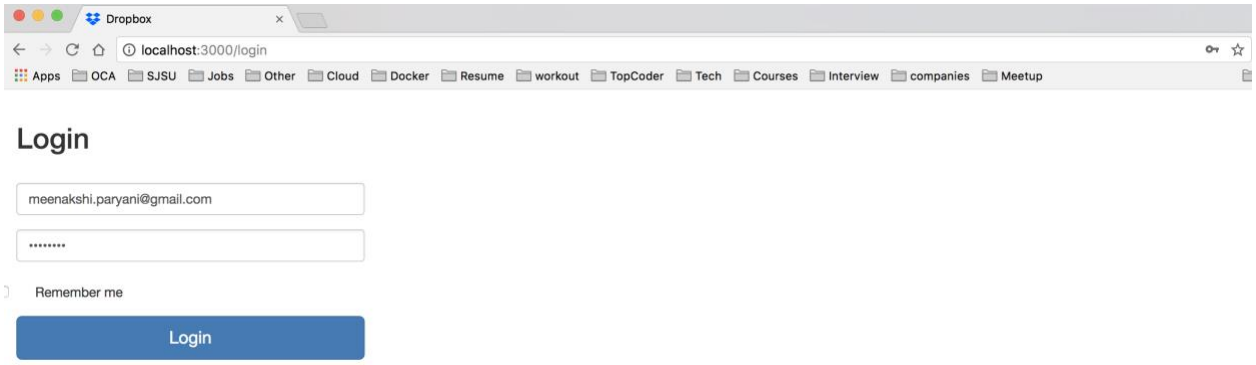
```
@Service
public class UserService {

    public List<User> getAllUsers() { return userRepository.findAll(); }

    @Autowired
    private UserRepository userRepository;

    public User signupUser(User user){
        user.setFullname();
        System.out.println("Sign Up Completed for User " + user.getFullname());
        return userRepository.save(user);
    }
```

Back-End Result

```
2017-12-11 12:51:48.253  INFO 14470 --- [  restartedMain] o.s.j.e.a.AnnotationMBeanExporter        : Registering beans for JMX exposure on startup
2017-12-11 12:51:48.261  INFO 14470 --- [  restartedMain] s.b.c.e.t.TomcatEmbeddedServletContainer : Tomcat started on port(s): 8080 (http)
2017-12-11 12:51:48.263  INFO 14470 --- [  restartedMain] c.d.prototype.PrototypeApplication       : Started PrototypeApplication in 10.964 seconds (JVM running for 22196.02)
2017-12-11 12:51:53.910  INFO 14470 --- [nio-8080-exec-1] o.a.c.c.C.[Tomcat-6].[localhost].[/]     : Initializing Spring FrameworkServlet 'dispatcherServlet'
2017-12-11 12:51:53.910  INFO 14470 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet        : FrameworkServlet 'dispatcherServlet': initialization started
2017-12-11 12:51:53.916  INFO 14470 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet        : FrameworkServlet 'dispatcherServlet': initialization completed in 6 ms
Sign Up Completed for User Meenakshi Paryani
2017-12-11 12:51:53.929  INFO 14470 --- [nio-8080-exec-1] org.mongodb.driver.connection            : Opened connection [connectionId{localValue:29, serverValue:548}] to localhost:27017
```

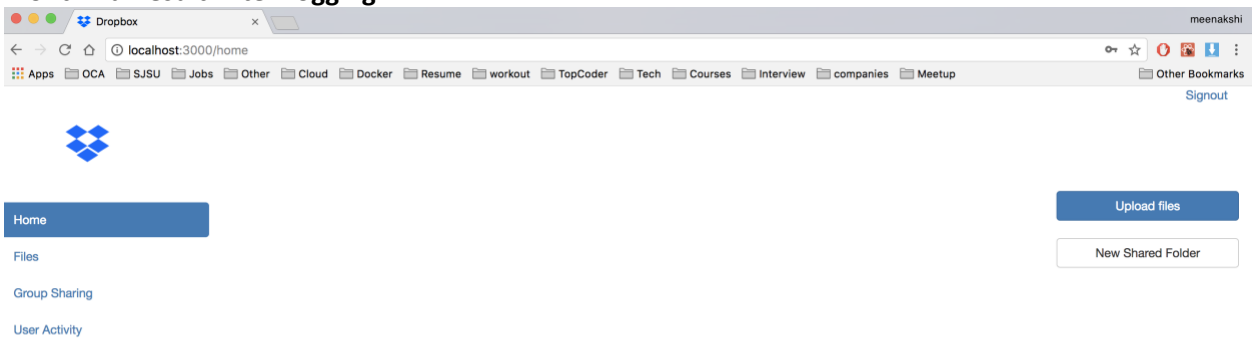
2.1.2 Sign In/ Login

Front-End Run



Front-End Result After Logging In

Home Page After Login



Back-End Code

Controller: -

```
@RequestMapping(value = "/login", headers = "Accept=application/json", method = RequestMethod.POST, produces = "application/json")
@ResponseStatus(HttpStatus.CREATED)
public ResponseEntity<?> login(@RequestBody User user, HttpSession session){
    User dbUser = userService.loginUser(user);
    if(dbUser != null) {
        session.setAttribute( s: "userId", dbUser.getId());
        return new ResponseEntity(dbUser, HttpStatus.OK);
    }
    else
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
}
```

Service: -

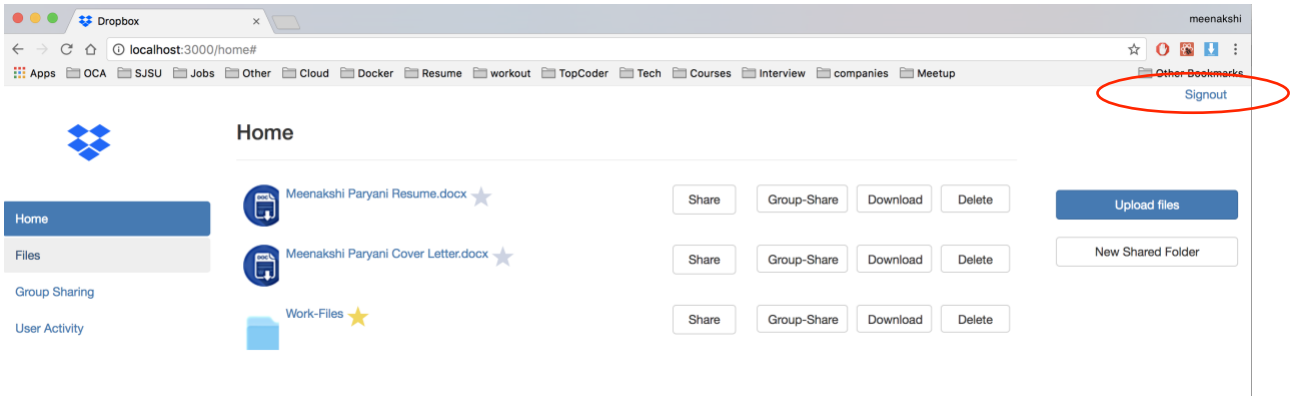
```
public User loginUser(User user){
    List<User> users = userRepository.findByEmailAndPassword(user.getEmail(), user.getPassword());
    if(users != null && users.size() >0){
        System.out.println("User " + users.get(0).getFullname() + " Signed In !");
        return users.get(0);
    }
    return null;
}
```

Back-End Result

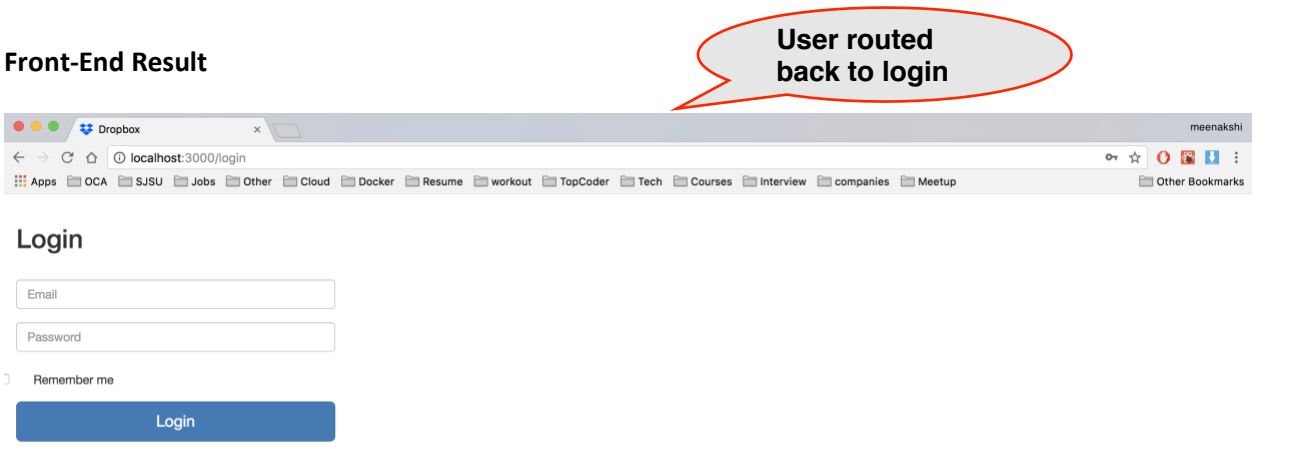
```
2017-12-11 13:03:34.365  INFO 15474 --- [  restartedMain] o.s.d.r.w.BasePathAwareHandlerMapping    : Mapped "{[/profile],methods=[GET]}" onto org.springframework.http.HttpEntity<org.springf
2017-12-11 13:03:34.365  INFO 15474 --- [  restartedMain] o.s.d.r.w.BasePathAwareHandlerMapping    : Mapped "{[/profile],methods=[OPTIONS]}" onto public org.springframework.http.HttpEntity<
2017-12-11 13:03:34.376  INFO 15474 --- [  restartedMain] o.s.b.d.a.OptionalLiveReloadServer       : LiveReload server is running on port 35729
2017-12-11 13:03:34.497  INFO 15474 --- [  restartedMain] o.s.j.e.a.AnnotationMBeanExporter        : Registering beans for JMX exposure on startup
2017-12-11 13:03:34.506  INFO 15474 --- [  restartedMain] s.b.c.e.t.TomcatEmbeddedServletContainer : Tomcat started on port(s): 8080 (http)
2017-12-11 13:03:34.508  INFO 15474 --- [  restartedMain] c.d.prototype.PrototypeApplication       : Started PrototypeApplication in 10.86 seconds (JVM running for 335.874)
2017-12-11 13:03:39.912  INFO 15474 --- [nio-8080-exec-1] o.a.c.c.C.[Tomcat].[localhost].[/]       : Initializing Spring FrameworkServlet 'dispatcherServlet'
2017-12-11 13:03:39.913  INFO 15474 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet        : FrameworkServlet 'dispatcherServlet': initialization started
2017-12-11 13:03:39.915  INFO 15474 --- [nio-8080-exec-1] o.s.web.servlet.DispatcherServlet        : FrameworkServlet 'dispatcherServlet': initialization completed in 2 ms
2017-12-11 13:03:39.933  INFO 15474 --- [nio-8080-exec-2] org.mongodb.driver.connection            : Opened connection [connectionId{localValue:6, serverValue:559}] to localhost:27017
User Meenakshi Paryani Signed In !
```

2.1.3 Sign out

Front-End Run



Front-End Result



Back-End Code

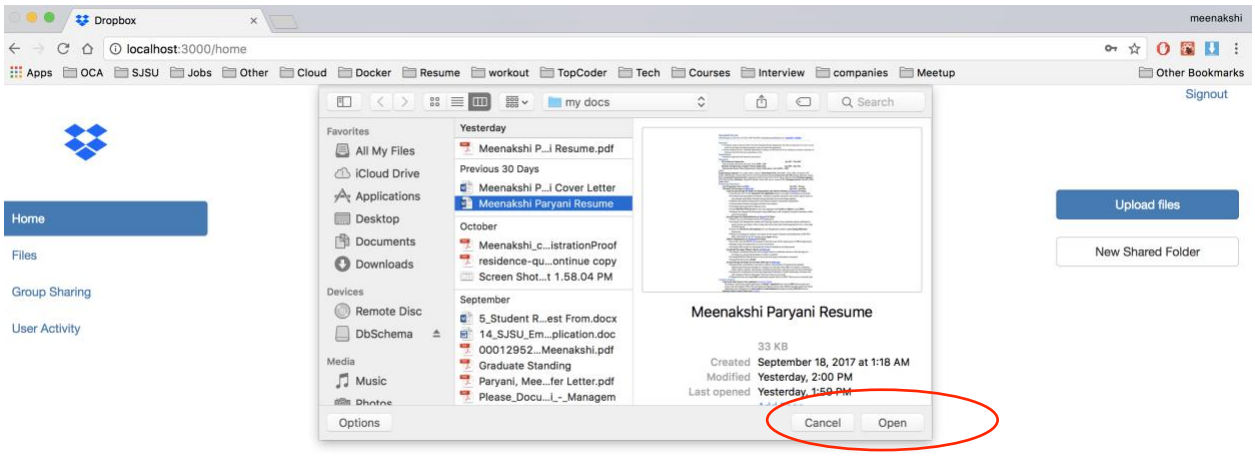
Controller: -

```
@RequestMapping(value = "/logout", method = RequestMethod.GET, produces = "application/json")
public ResponseEntity<?> logout(HttpSession session){
    System.out.println("Invalidating user " + session.getAttribute( s: "userId"));
    session.invalidate();
    return new ResponseEntity(HttpStatus.OK);
}
```

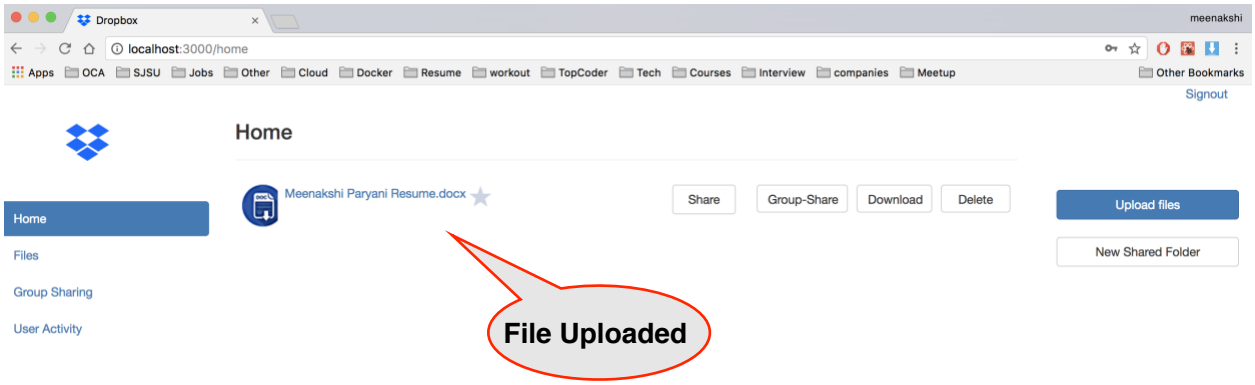
2.2 File related functionalities

2.2.1 Upload Files

Front-End Run



Front-End Result



Back-End Code

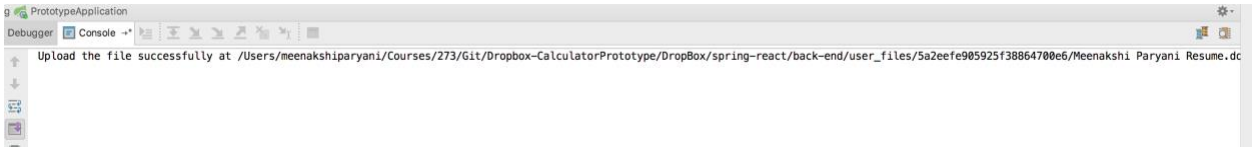
Controller: -

```
@RequestMapping(value = "/upload", method = RequestMethod.POST)
public ResponseEntity<?> uploadFile(HttpSession session, @RequestBody MultipartFile file, @RequestHeader String currentpath) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        MultipartFile[] files = {file};
        boolean fileUploaded = fileService.uploadFiles(files, userId, currentpath);
        if(fileUploaded){
            List<UserFile> userFiles = fileService.getUserFiles(userId, currentpath);
            return new ResponseEntity(userFiles, HttpStatus.OK);
        } else
            return new ResponseEntity(HttpStatus.BAD_REQUEST);
    }
}
```

Service: -

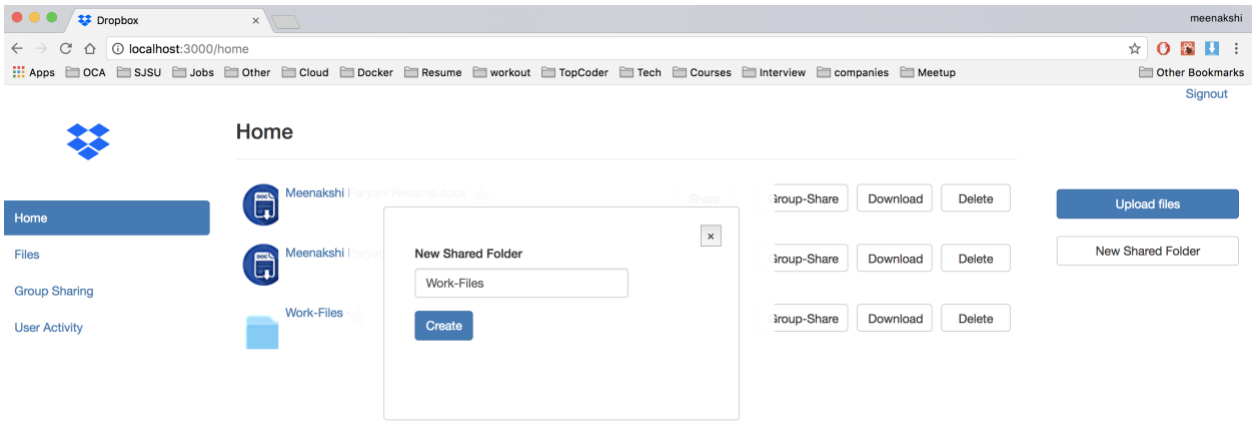
```
public boolean uploadFiles(MultipartFile[] files, String userId, String path) {
    try{
        User user = userRepository.findOne(userId);
        for (MultipartFile file : files) {
            FileOutputStream fos = null;
            String fileName = file.getOriginalFilename();
            File convFile = new File( pathname: userFileDir + File.separator + userId + File.separator + path + File.separator + fileName);

            convFile.createNewFile();
            fos = new FileOutputStream(convFile);
            fos.write(file.getBytes());
            fos.close();
            if(user.getFiles() != null)
                user.getFiles().add(new UserFile(fileName, isDir: false, isShared: false, sharedWithUsers: null, sharedWithGroups: null, path , isStared: false));
            else{
                ArrayList<UserFile> userfiles = new ArrayList<UserFile>();
                userfiles.add(new UserFile(fileName, isDir: false, isShared: false, sharedWithUsers: null, sharedWithGroups: null, path , isStared: false));
                user.setFiles(userfiles);
            }
            user.addActivity(new UserActivity( operation: "You Uploaded file " , fileName, new Date()));
            System.out.println("Upload the file successfully at " + convFile.getCanonicalPath());

        }
        userRepository.save(user);
    }catch (FileNotFoundException e) {
        System.out.println("Failed to upload the file");
        e.printStackTrace();
        return false;
    } catch (IOException e) {
        System.out.println("Failed to upload the file");
        e.printStackTrace();
        return false;
    }catch(Exception e){
        e.printStackTrace();
        return false;
    }
    return true;
}
```

Back-End Result

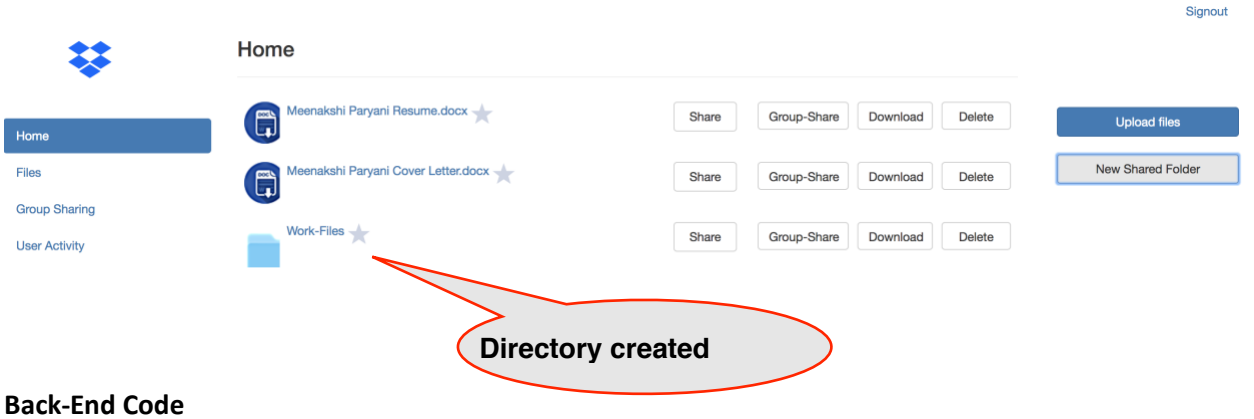


2.2.2 Create Directory

Front-End Run



Front-End Result



Back-End Code

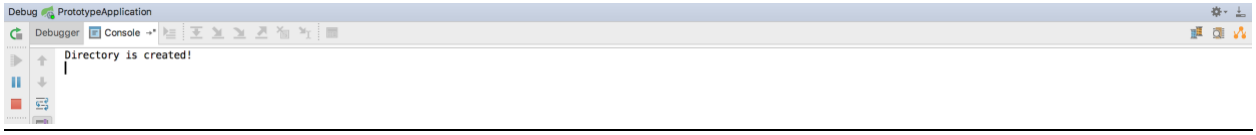
Controller: -

```
@RequestMapping(value = "/createDir", method = RequestMethod.POST)
public ResponseEntity<?> createDir(HttpSession session,@RequestBody  Map<String, Object> payload) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean dirCreated = fileService.createDir(userId, payload.get("dirpath").toString(), payload.get("dirname").toString());
        List<UserFile> files = fileService.getUserFiles(userId, payload.get("dirpath").toString());
        return new ResponseEntity(files, HttpStatus.CREATED);
    }
}
```

Service: -

```java
public boolean createDir(String userId, String dirPath, String dirName) {

    User user = userRepository.findOne(userId);
    try{
        String createdirPath = userFileDir + File.separator + userId + File.separator + dirPath + File.separator + dirName;
        File dir = new File(createdirPath);
        if (!dir.exists()) {
            if (dir.mkdirs()) {
                System.out.println("Directory is created!");
                if(user.getFiles() != null)
                    user.getFiles().add(new UserFile(dirName,  isDir: true,  isShared: false,  sharedWithUsers: null,  sharedWithGroups: null, dirPath ,  isStared: false));
                else{
                    ArrayList<UserFile> files = new ArrayList<UserFile>();
                    files.add(new UserFile(dirName,  isDir: true,  isShared: false,  sharedWithUsers: null,  sharedWithGroups: null, dirPath ,  isStared: false));
                    user.setFiles(files);
                }
                user.addActivity(new UserActivity( operation: "You Created the Directory " , dirName, new Date()));
                userRepository.save(user);
                return true;
            } else {
                System.out.println("Failed to create directory!");
                return false;
            }
        }else{
            return true;
        }

    }catch(Exception e){
        e.printStackTrace();
        return false;
    }

}
```

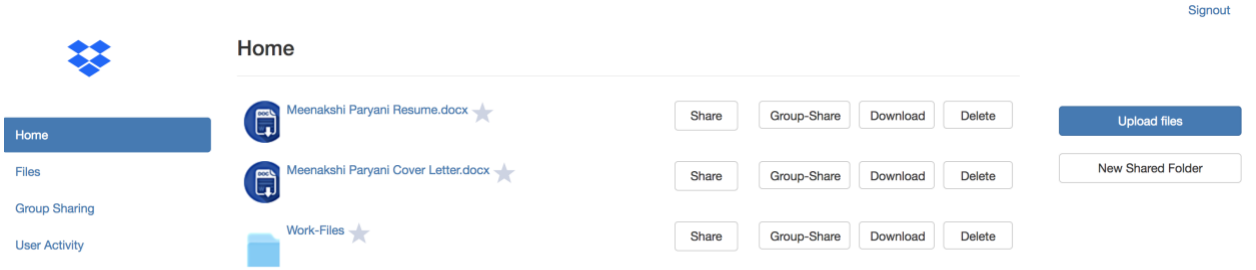
Back-End Result



2.2.3 List User Files

Listing of all files

Front-End Result



Back-End Code

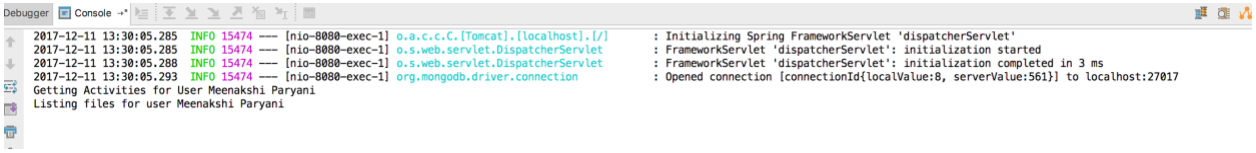
Controller: -

```java
@RequestMapping(value = "/list", method = RequestMethod.GET, produces = "application/json")
public ResponseEntity<?> listDir(@RequestHeader String currentPath, HttpSession session) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if (userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        List<UserFile> files = fileService.getUserFiles(userId, currentPath);
        return new ResponseEntity(files, HttpStatus.OK);
    }

}
```

Service: -

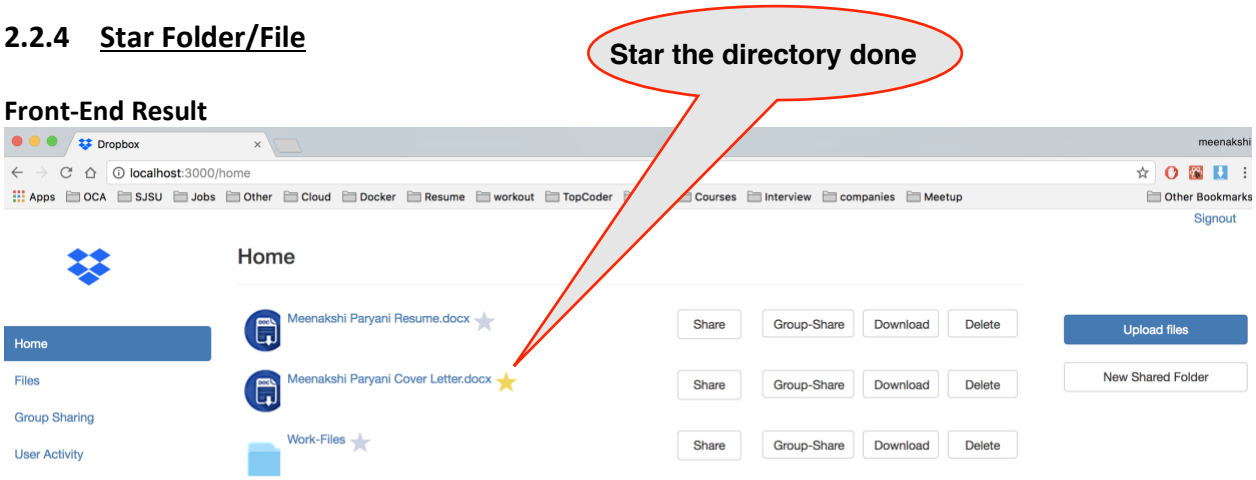
```
public List<UserFile> getUserFiles(String userId, String currentPath){
    User user = userRepository.findOne(userId);
    if(user.getFiles() != null){
        List<UserFile> files = user.getFiles().stream().filter( file -> file.getCurrentPath().equals(currentPath)).collect(Collectors.toList());
        System.out.println("Listing files for user " + user.getFullname());
        return files;
    }
    return null;
}
```

Back-End Result



2.2.4 Star Folder/File

Front-End Result



Back-End Code

Controller: -

```
public boolean starFileOrDir(String userId, UserFile userFile) {
    User user = userRepository.findOne(userId);
    try{
        UserFile targetFile = null;
        ArrayList<UserFile> files = user.getFiles();
        for(UserFile file : files){
            if(file.getCurrentPath().equals(userFile.getCurrentPath()) && file.getName().equals(userFile.getName())){
                file.setStared(!file.getStared());
                targetFile = file;
            }
        }
        if(targetFile != null){
            String op = targetFile.getStared() ? " Stared " : " Unstared ";
            String fileOrDir = targetFile.isDir() ? " Directory " : " File ";
            user.addActivity(new UserActivity( operation: "You" + op + "the" + fileOrDir,  targetFile.getName(), new Date()));
            System.out.println("You" + op + "the" + fileOrDir + targetFile.getName());
        }

        user.setFiles(files);
        userRepository.save(user);
        return true;
    }catch(Exception e){
        e.printStackTrace();
        return false;
    }
}
```

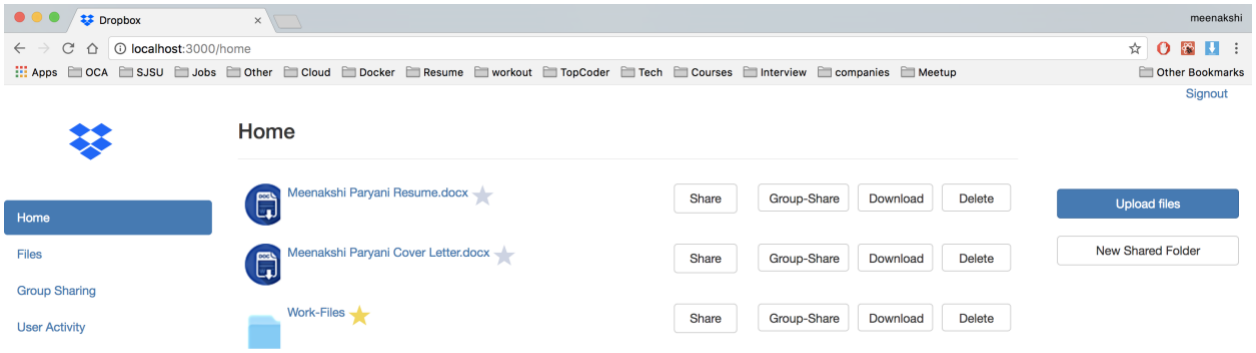
Service: -

```
@RequestMapping(value = "/star", method = RequestMethod.PUT)
public ResponseEntity<?> starOrUnstarFileOrDir(HttpSession session,@RequestBody  UserFile userFile) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean fileOrdirStared = fileService.starFileOrDir(userId, userFile);
        if(fileOrdirStared){
            List<UserFile> files = fileService.getUserFiles(userId, userFile.getCurrentPath());
            return new ResponseEntity(files, HttpStatus.OK);
        }
        else
            return new ResponseEntity(HttpStatus.BAD_REQUEST);
    }
}
```

Back-End Result

2.2.5 Un-star Folder/File

Front-End Result



Back-End Code

Controller: -

```
public boolean starFileOrDir(String userId, UserFile userFile) {
    User user = userRepository.findOne(userId);
    try{
        UserFile targetFile = null;
        ArrayList<UserFile> files = user.getFiles();
        for(UserFile file : files){
            if(file.getCurrentPath().equals(userFile.getCurrentPath()) && file.getName().equals(userFile.getName())){
                file.setStared(!file.getStared());
                targetFile = file;
            }
        }
        if(targetFile != null){
            String op = targetFile.getStared() ? " Stared " : " Unstared ";
            String fileOrDir = targetFile.isDir() ? " Directory " : " File ";
            user.addActivity(new UserActivity( operation: "You" + op + "the" + fileOrDir,  targetFile.getName(), new Date()));
            System.out.println("You" + op + "the" + fileOrDir + targetFile.getName());
        }

        user.setFiles(files);
        userRepository.save(user);
        return true;
    }catch(Exception e){
        e.printStackTrace();
        return false;
    }
}
```

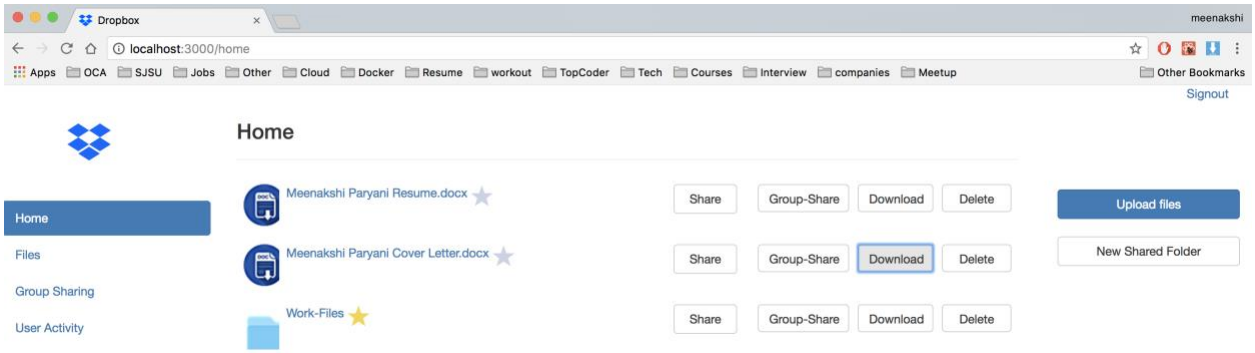
Service: -

```
@RequestMapping(value = "/star", method = RequestMethod.PUT)
public ResponseEntity<?> starOrUnstarFileOrDir(HttpSession session,@RequestBody  UserFile userFile) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean fileOrdirStared = fileService.starFileOrDir(userId, userFile);
        if(fileOrdirStared){
            List<UserFile> files = fileService.getUserFiles(userId, userFile.getCurrentPath());
            return new ResponseEntity(files, HttpStatus.OK);
        }
        else
            return new ResponseEntity(HttpStatus.BAD_REQUEST);
    }
}
```

Back-End Result

2.2.6 Download File

Front-End Result



Back-End Code

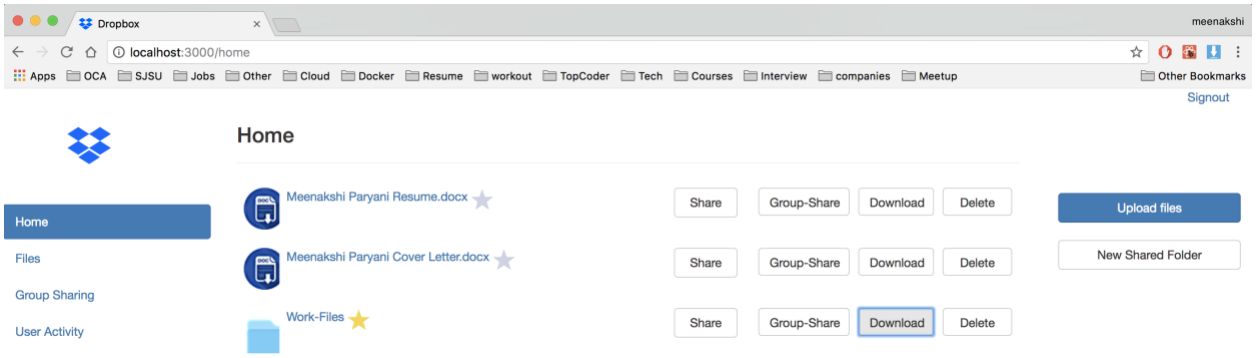
Controller: -

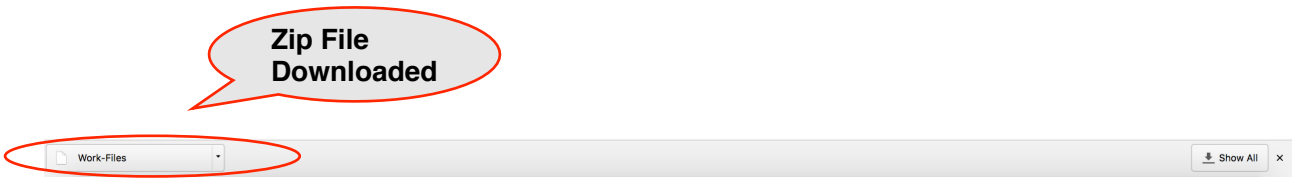
```java
@RequestMapping(value = "/download", method = RequestMethod.GET, produces = MediaType.APPLICATION_OCTET_STREAM_VALUE)
public ResponseEntity<?> downloadFile(HttpSession session, @RequestParam String filePath, @RequestParam String fileName, @RequestParam boolean isDir ) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if (userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        File file = fileService.getUserFile(userId,filePath , fileName, isDir);
        // Define the headers
        HttpHeaders headers = new HttpHeaders();
        headers.add( headerName: "Cache-Control",  headerValue: "no-cache, no-store, must-revalidate");
        headers.add( headerName: "Pragma",  headerValue: "no-cache");
        headers.add( headerName: "Expires",  headerValue: "0");
        headers.add( headerName: "Content-Type", new MimetypesFileTypeMap().getContentType(file));
        InputStreamResource resource = null;
        try {
            resource = new InputStreamResource(new FileInputStream(file));
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        }
        return ResponseEntity.ok()
                .headers(headers)
                .contentLength(file.length())
                .contentType(MediaType.parseMediaType("application/octet-stream"))
                .body(resource);

    }
}
```

Back-End Result

2.2.7 Download Directory as Zip

Front-End Result





Back-End Code

Controller: -

```java
@RequestMapping(value = "/download", method = RequestMethod.GET, produces = MediaType.APPLICATION_OCTET_STREAM_VALUE)
public ResponseEntity<?> downloadFile(HttpSession session, @RequestParam String filePath, @RequestParam String fileName, @RequestParam boolean isDir ) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if (userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        File file = fileService.getUserFile(userId,filePath , fileName, isDir);
        // Define the headers
        HttpHeaders headers = new HttpHeaders();
        headers.add( headerName: "Cache-Control",  headerValue: "no-cache, no-store, must-revalidate");
        headers.add( headerName: "Pragma",  headerValue: "no-cache");
        headers.add( headerName: "Expires",  headerValue: "0");
        headers.add( headerName: "Content-Type", new MimetypesFileTypeMap().getContentType(file));
        InputStreamResource resource = null;
        try {
            resource = new InputStreamResource(new FileInputStream(file));
        } catch (FileNotFoundException e) {
            e.printStackTrace();
        }
        return ResponseEntity.ok()
                .headers(headers)
                .contentLength(file.length())
                .contentType(MediaType.parseMediaType("application/octet-stream"))
                .body(resource);

    }
}
```

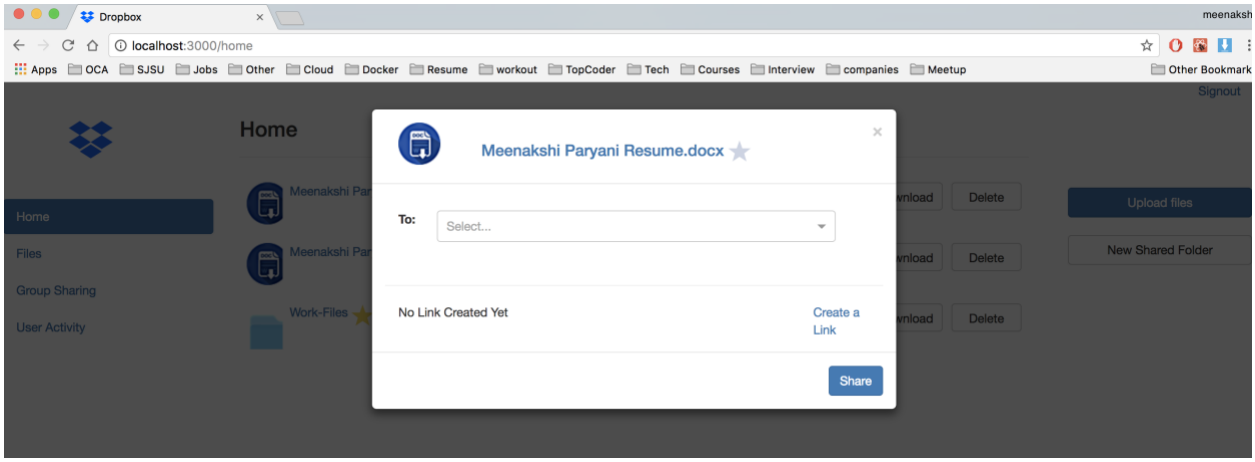
Service: -

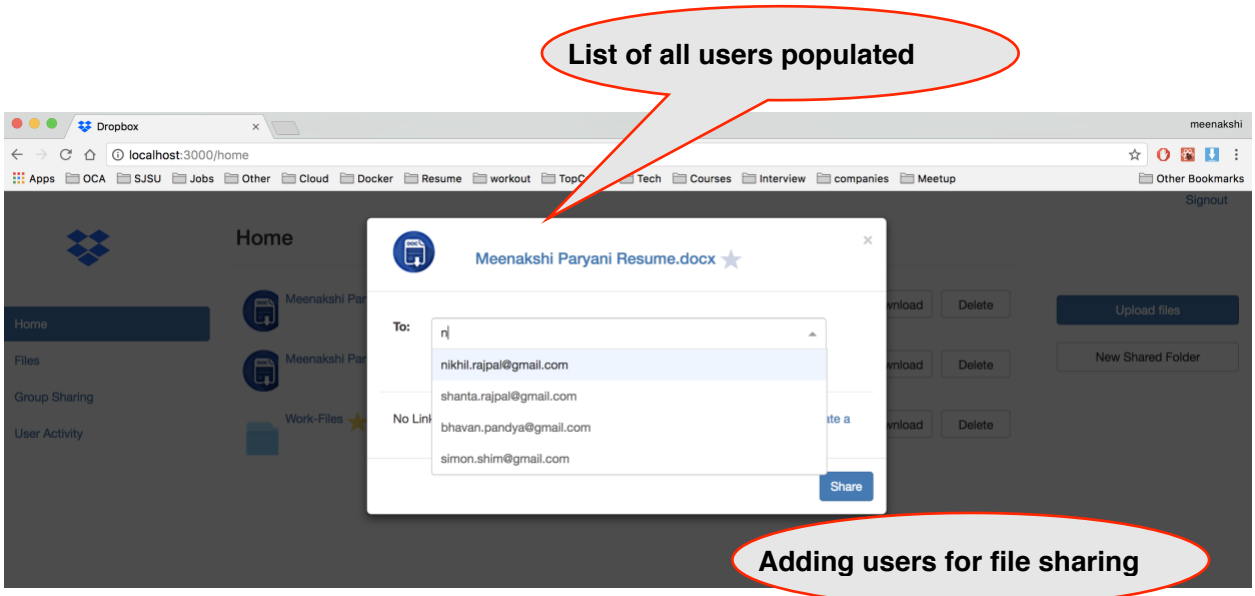
```java
public File getUserFile(String userId, String filePath, String fileName, boolean isDir){
    String fileOrDir = userFileDir + File.separator + userId + File.separator + filePath + File.separator + fileName;
    if(!isDir){
        File file = new File(fileOrDir);
        return file;
    }else{
        ZipFile zip = null;
        try{
            // Zip the directory and send it
            zip = new ZipFile("./tmp"+ File.separator + fileName+ ".zip");
            zip.addFolder(fileOrDir,  parameters: null);
            System.out.println("Created the zip file");
        }catch(ZipException e){
            e.printStackTrace();
        }
        return zip.getFile();
    }


}
```

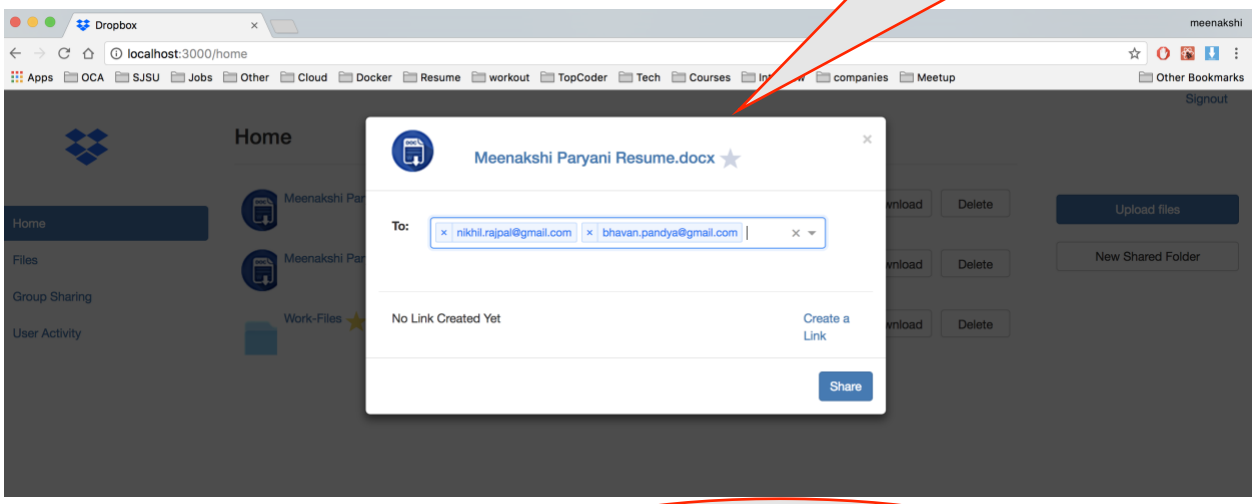
Back-End Result

2.2.8 Share Folder/File by Email

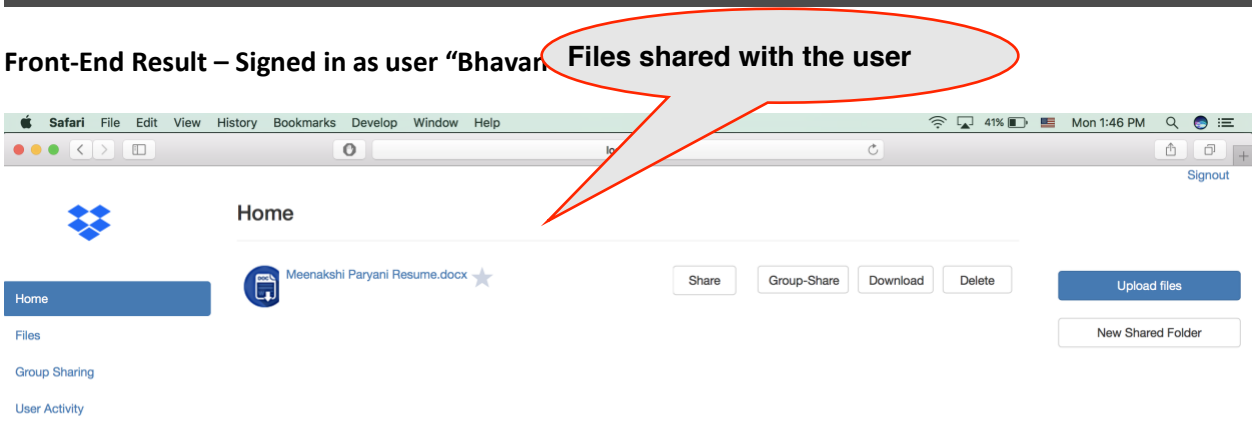
Front-End Run







Front-End Result – Signed in as user "Bhavan



Back-End Code

Controller: -

```java
@RequestMapping(value = "/shareWithUser", method = RequestMethod.POST)
public ResponseEntity<?> shareFileOrDirWithUser(HttpSession session, @RequestBody  UserFile file, @RequestHeader ArrayList<String> sharewithuserids) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean fileOrDirShared = fileService.shareFileOrDirWithUsers(userId, file, sharewithuserids);
        if(fileOrDirShared)
            return new ResponseEntity(HttpStatus.OK);
        else
            return new ResponseEntity(HttpStatus.BAD_REQUEST);
    }
}
```

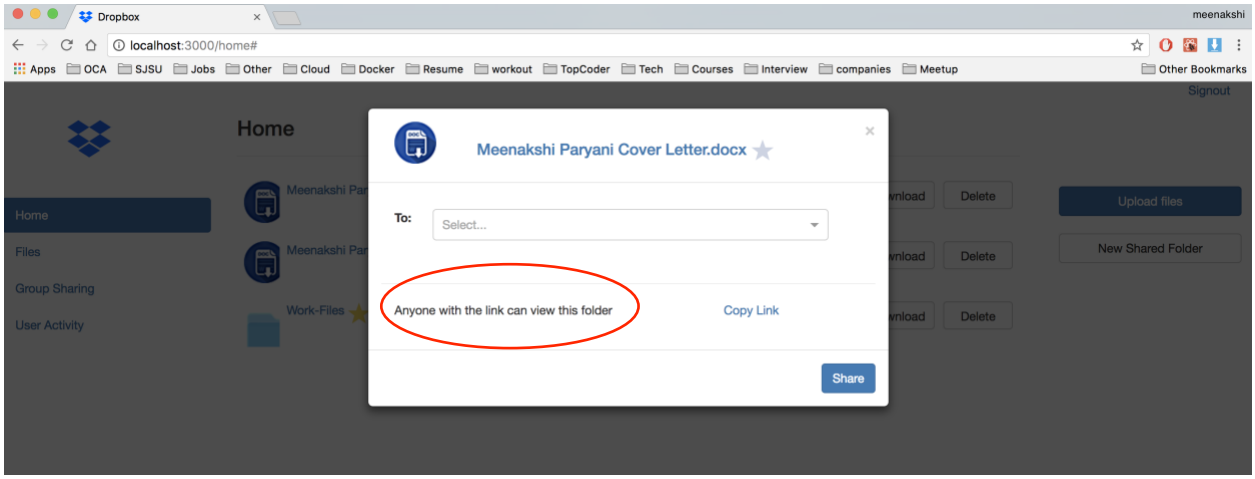
Service: -

```java
private void shareFileBetweenUsers(String fromUserId, String toUserId, UserFile file) throws IOException {
    User toUser = userRepository.findOne(toUserId);
    file.setStared(false);
    FileOutputStream fos = null;
    File sourceFile = new File( pathname: userFileDir + File.separator + fromUserId + File.separator + file.getCurrentPath() + File.separator + file.getName());
    File destFile = new File( pathname: userFileDir + File.separator + toUserId + File.separator + file.getCurrentPath() + File.separator + file.getName());
    if(file.isDir())
        FileUtils.copyDirectory(sourceFile, destFile);
    else
        org.apache.commons.io.FileUtils.copyFile(sourceFile, destFile);
    if(toUser.getFiles() != null)
        toUser.getFiles().add(file);
    else{
        ArrayList<UserFile> userFiles = new ArrayList<UserFile>();
        userFiles.add(file);
        toUser.setFiles(userFiles);
    }
    System.out.println("Shared the file " + destFile.getName() + " with User " + toUser.getFullname());
    userRepository.save(toUser);
}
```

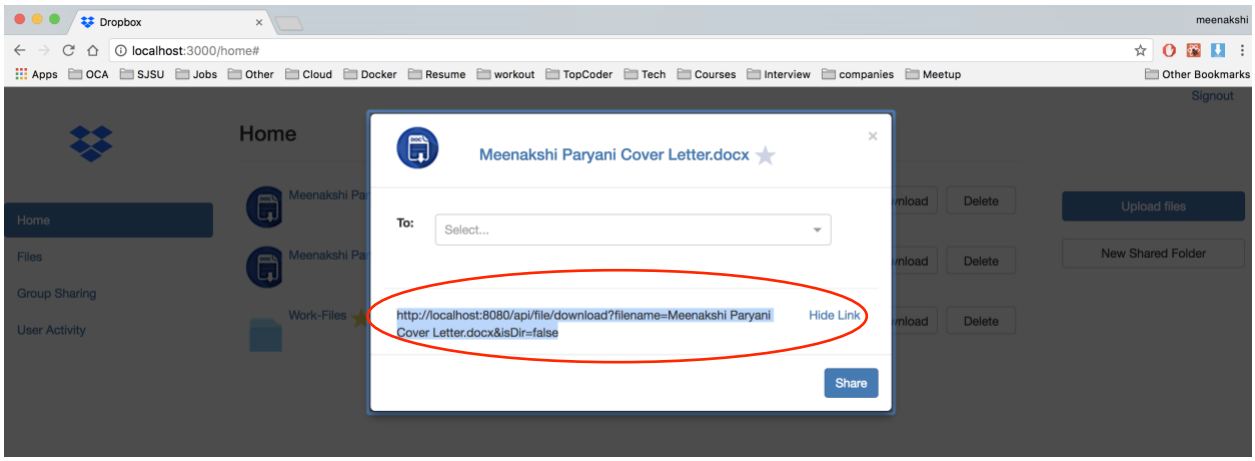
Back-End Result

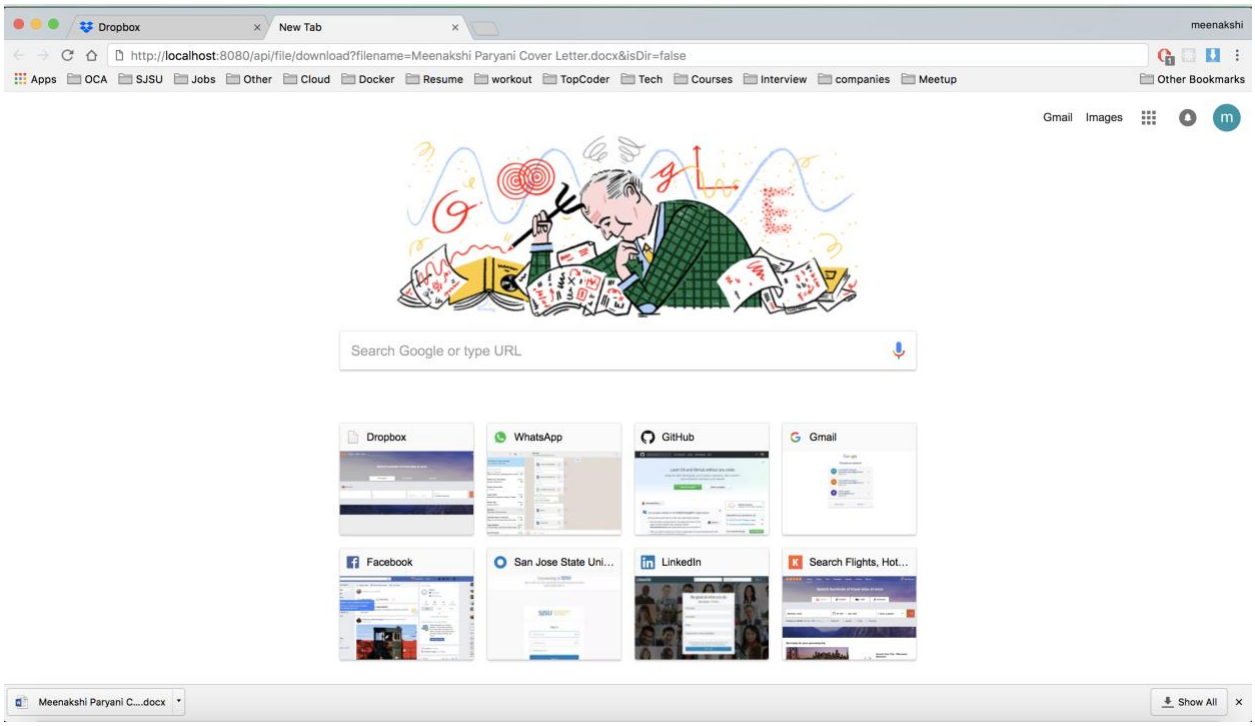
2.2.9 Share Folder/File by Link

Front-End Run



Front-End Result





Back-End Code

Controller: -

```
@RequestMapping(value = "/shareWithUser", method = RequestMethod.POST)
public ResponseEntity<?> shareFileOrDirWithUser(HttpSession session, @RequestBody  UserFile file, @RequestHeader ArrayList<String> sharewithuserids) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean fileOrDirShared = fileService.shareFileOrDirWithUsers(userId, file, sharewithuserids);
        if(fileOrDirShared)
            return new ResponseEntity(HttpStatus.OK);
        else
            return new ResponseEntity(HttpStatus.BAD_REQUEST);
    }
}
```

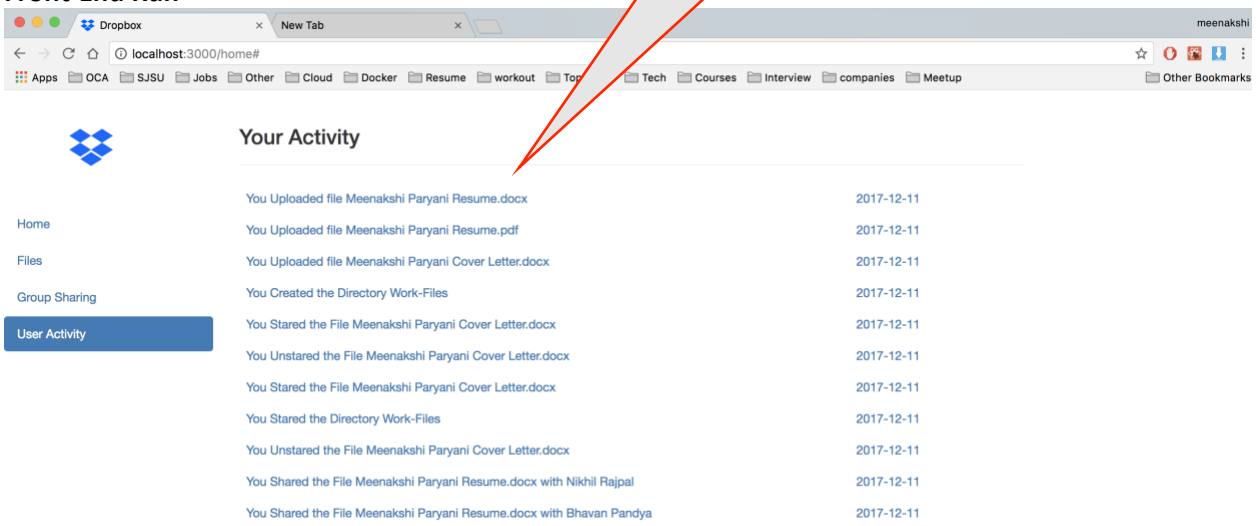
Service: -

```java
private void shareFileBetweenUsers(String fromUserId, String toUserId, UserFile file) throws IOException {
    User toUser = userRepository.findOne(toUserId);
    file.setStared(false);
    FileOutputStream fos = null;
    File sourceFile = new File( pathname: userFileDir + File.separator + fromUserId + File.separator + file.getCurrentPath() + File.separator + file.getName());
    File destFile = new File( pathname: userFileDir + File.separator + toUserId + File.separator + file.getCurrentPath() + File.separator + file.getName());
    if(file.isDir())
        FileUtils.copyDirectory(sourceFile, destFile);
    else
        org.apache.commons.io.FileUtils.copyFile(sourceFile, destFile);
    if(toUser.getFiles() != null)
        toUser.getFiles().add(file);
    else{
        ArrayList<UserFile> userFiles = new ArrayList<UserFile>();
        userFiles.add(file);
        toUser.setFiles(userFiles);
    }
    System.out.println("Shared the file " + destFile.getName() + " with User " + toUser.getFullname());
    userRepository.save(toUser);
}
```

2.3 User Activity

List of all user activities

Front-End Run



Back-End Code

Controller: -

```java
@RequestMapping(value = "/getUserActivities", method = RequestMethod.GET, produces = "application/json")
public ResponseEntity<?> getUserActivities(HttpSession session){
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if(userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else
        return new ResponseEntity(userService.getActivities(userId), HttpStatus.OK);
}
```

Service: -

Adding User Activity with every operation

```java
    System.out.println("Directory is Deleted at " + fileOrDir.getAbsolutePath());
    user.addActivity(new UserActivity( operation: "You Deleted the directory " , dirName, new Date()));
    ArrayList<UserFile> childFiles = new ArrayList<UserFile>();
```

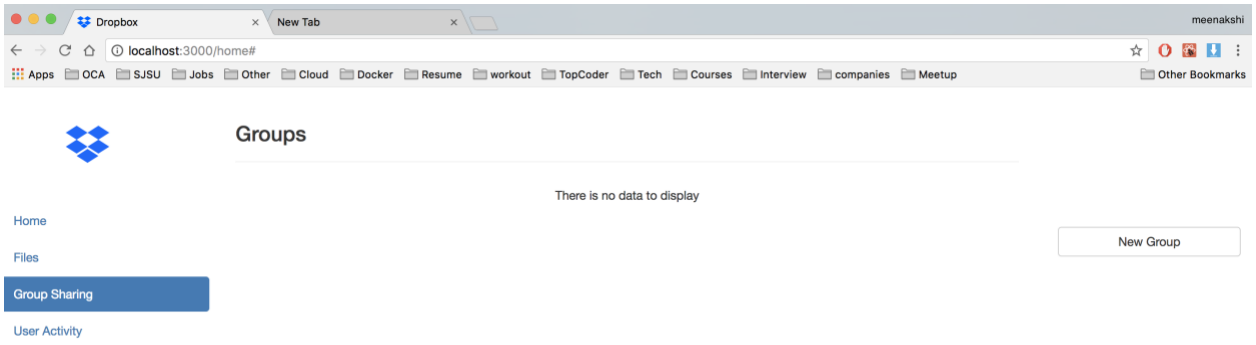
```
public List<UserActivity> getActivities(String userId) {
    User user = userRepository.findOne(userId);
    System.out.println("Getting Activities for User " + user.getFullname());
    return user.getActivities();
}
```

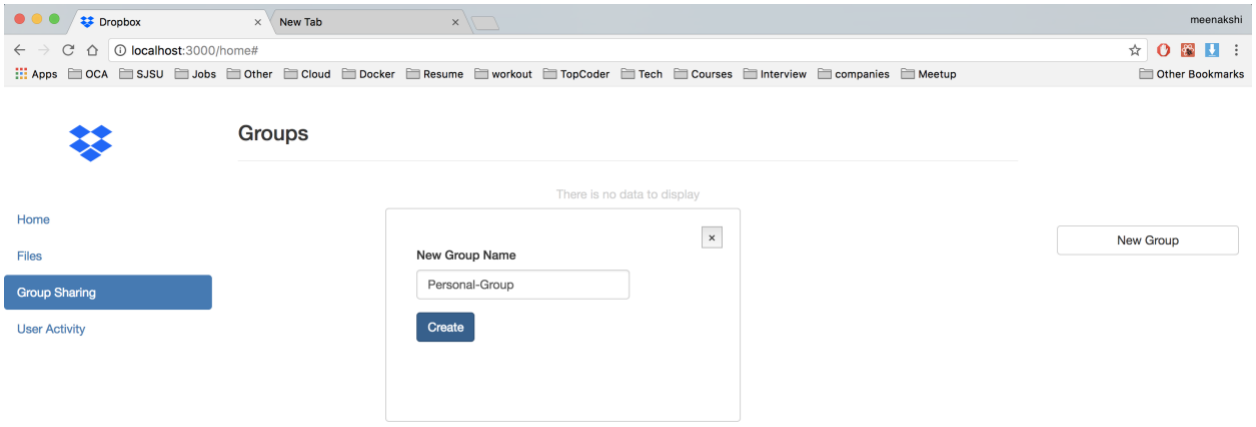
Back-End Result

2.4 Group Share Related Functionalities

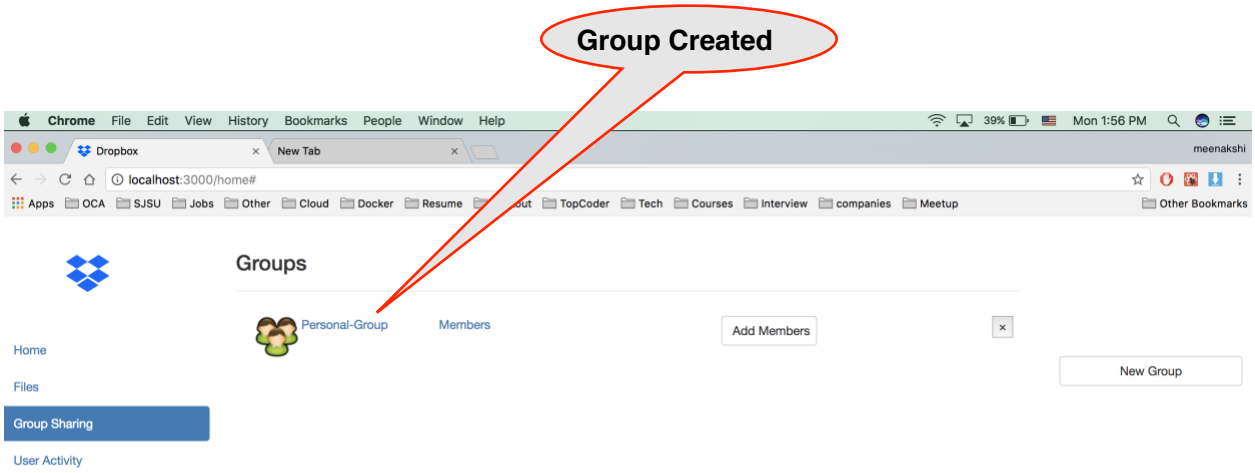
2.4.1 Create Group

Front-End Run





Front-End Result



Back-End Code

Controller: -

```
@Autowired
private GroupService groupService;

@RequestMapping(value = "/create", method = RequestMethod.POST)
public ResponseEntity<?> createGroup(HttpSession session, @RequestBody UserGroup userGroup) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean groupCreated = groupService.createGroup(userGroup, userId);
        if(groupCreated){
            ArrayList<UserGroup> groups = groupService.getUserGroups(userId);
            return new ResponseEntity<Object>(groups, HttpStatus.CREATED);
        }
        else
            return new ResponseEntity<Object>(HttpStatus.BAD_REQUEST);
    }
}
```

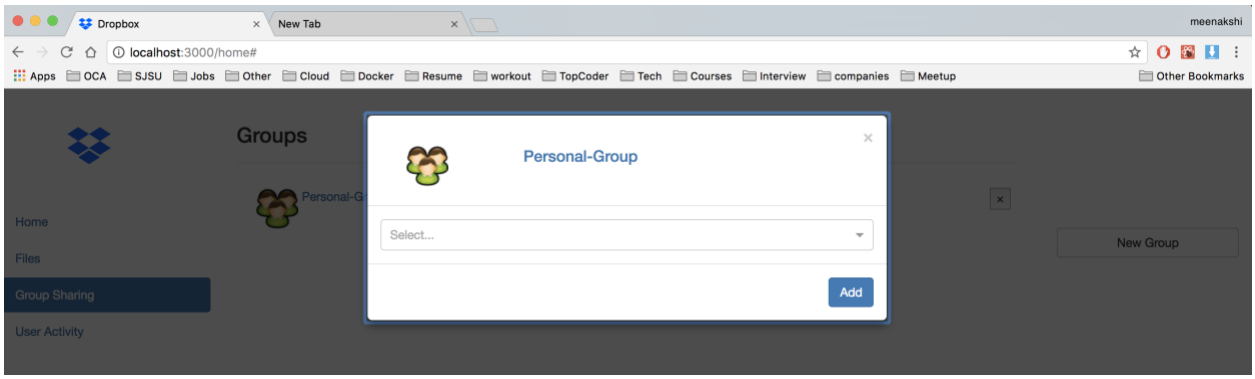
Service: -

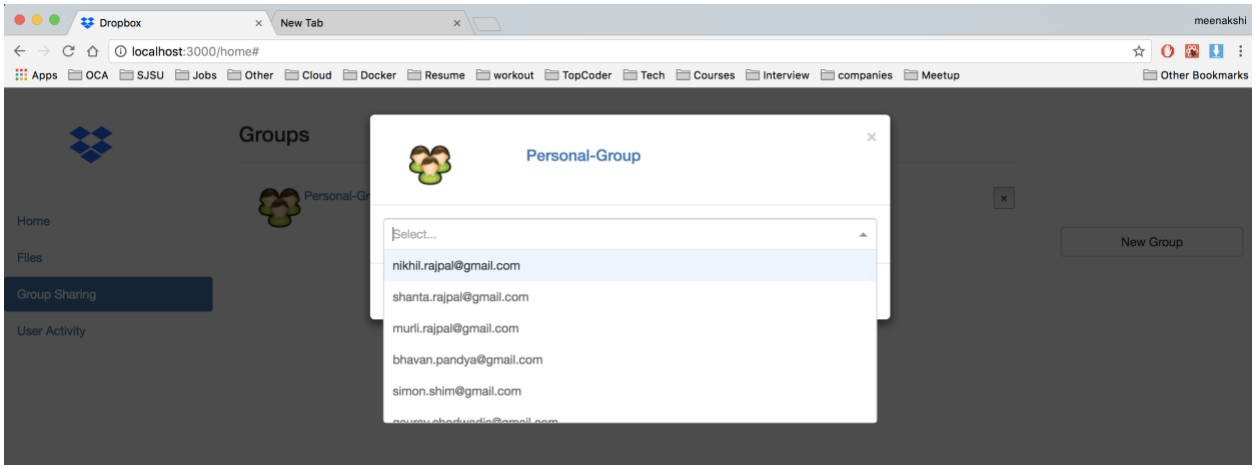
```
@Autowired
private UserRepository userRepository;

public boolean createGroup(UserGroup userGroup, String userId) {
    try{
        User user = userRepository.findOne(userId);
        if(!groupExists(userGroup.getGroupName(),user)){
            user.addGroup(userGroup);
            user.addActivity(new UserActivity( operation: "You Created the Group " , userGroup.getGroupName(), new Date()));
            userRepository.save(user);

            System.out.println("Created group " + userGroup.getGroupName() + " for " + user.getFullname());
            return true;
        }else{
            return true;
        }
    }catch(Exception e) {
        e.printStackTrace();
        return false;
    }
}
```

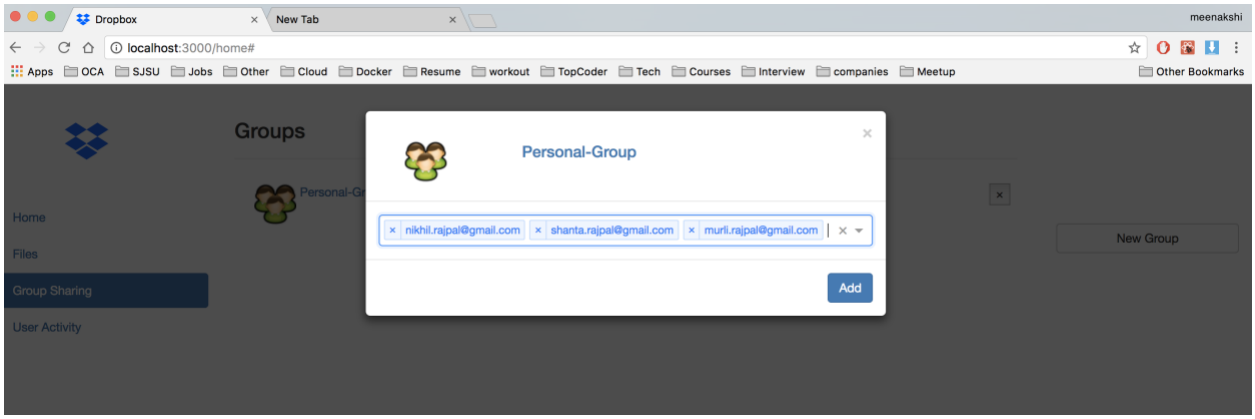
Back-End Result

2.4.2 Add Members In Group

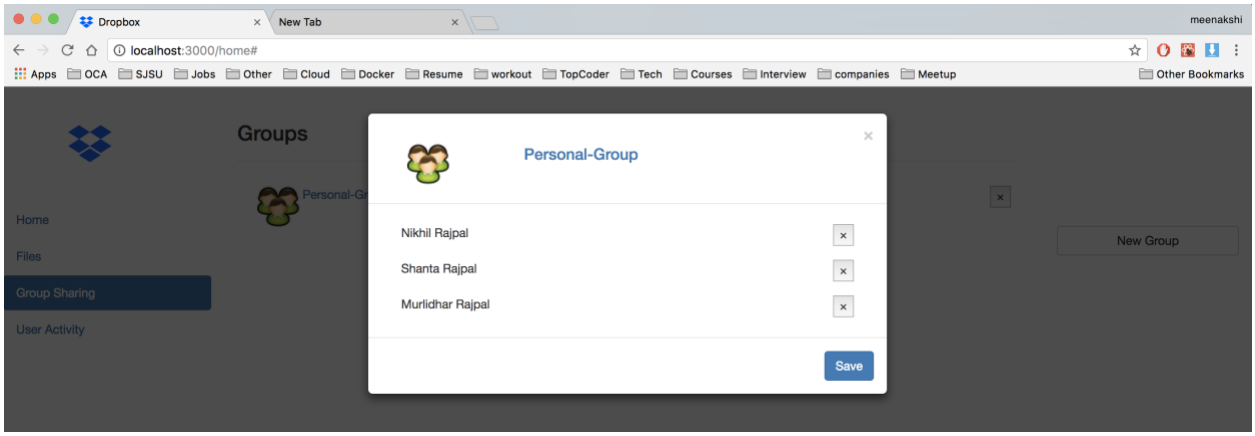
Front-End Run







Front-End Result



Back-End Code

Controller: -

```
@RequestMapping(value = "/addMembers", method = RequestMethod.PUT)
public ResponseEntity<?> addMembers(HttpSession session, @RequestBody Map<String, Object> payload) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean membersAdded = groupService.addGroupMembers(payload.get("groupName").toString(), userId, (ArrayList<String>) payload.get("userIds"));
        if(membersAdded){
            ArrayList<UserGroup> groups = groupService.getUserGroups(userId);
            return new ResponseEntity<Object>(groups, HttpStatus.OK);
        }

        else
            return new ResponseEntity<Object>(HttpStatus.BAD_REQUEST);
    }
}
```

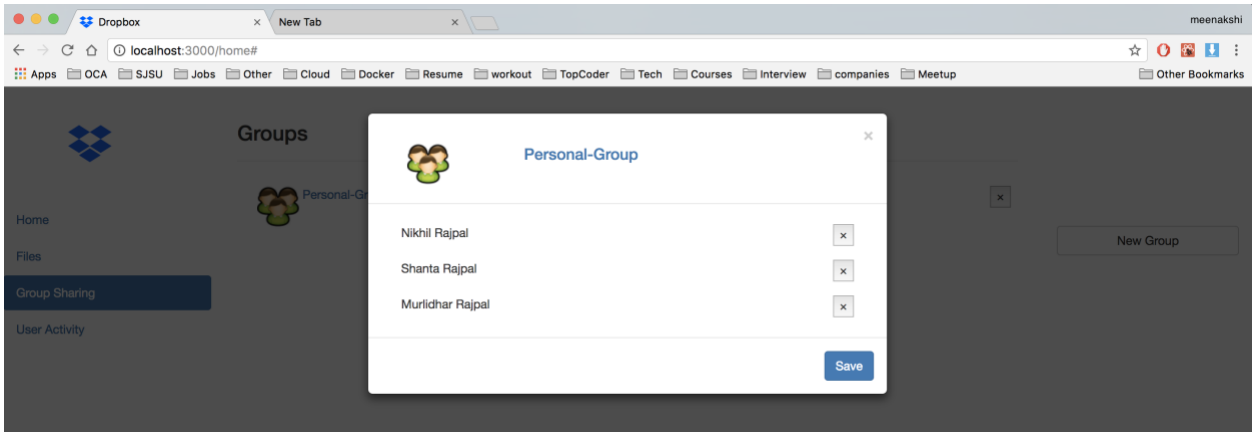
Service: -

```
public boolean addGroupMembers(String groupName, String userId, ArrayList<String> memberIds) {
    User user = userRepository.findOne(userId);
    ArrayList<UserGroup> groups = user.getGroups();
    for(UserGroup userGroup : groups){
        if(userGroup.getGroupName().equals(groupName)){
            for(String groupMemberId : memberIds) {
                User groupMember = userRepository.findOne(groupMemberId);
                groupMember.setGroups(null);
                groupMember.setFiles(null);
                userGroup.addGroupMember(groupMember);
                user.addActivity(new UserActivity( operation: "You added " + groupMember.getFullname() + " to the group " , groupName, new Date()));
                System.out.println("Added " + groupMember.getFullname() + " to the " + userGroup.getGroupName() + " group");
            }
            user.setGroups(groups);
            userRepository.save(user);
            return true;
        }else{
            return false;
        }

    }
    return false;
}
```

Back-End Result

2.4.3 Show Members In Group

Front-End Result



Back-End Code

Controller: -

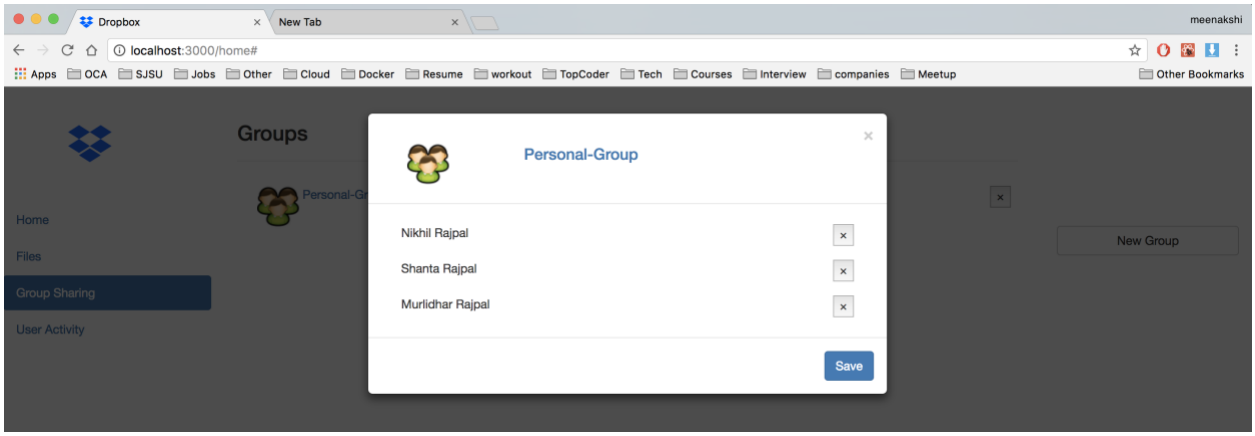
```
@RequestMapping(value = "/getMembers", method = RequestMethod.PUT)
public ResponseEntity<?> getMembers(HttpSession session, @RequestBody Map<String, Object> payload) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        ArrayList<User> members = groupService.getGroupMembers(payload.get("groupName").toString(), userId);
        return new ResponseEntity<Object>(members, HttpStatus.OK);
    }
}
```

Service: -

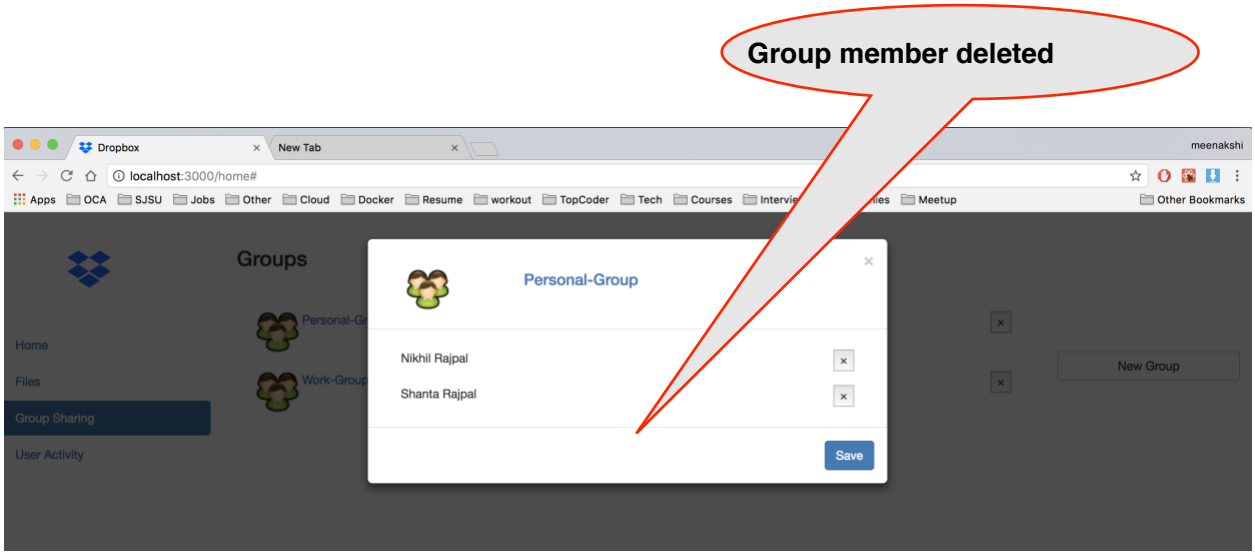
```
public ArrayList<User> getGroupMembers(String groupName, String userId) {
    User user = userRepository.findOne(userId);
    ArrayList<UserGroup> groups = user.getGroups();
    for(UserGroup userGroup : groups){
        if(userGroup.getGroupName().equals(groupName)){
            return userGroup.getGroupMembers();
        }
    }
    return null;
}
```

2.4.4 Delete Member From Group

Front-End Run



Front-End Result



Back-End Code

Controller: -

```
@RequestMapping(value = "/deleteMembers", method = RequestMethod.PUT)
public ResponseEntity<?> deleteMembers(HttpSession session, @RequestBody Map<String, Object> payload) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean membersDeleted = groupService.deleteGroupMembers(payload.get("groupName").toString(), userId, (ArrayList<String>) payload.get("userIds"));
        if(membersDeleted)
            return new ResponseEntity<Object>(HttpStatus.OK);
        else
            return new ResponseEntity<Object>(HttpStatus.BAD_REQUEST);
    }
}
```

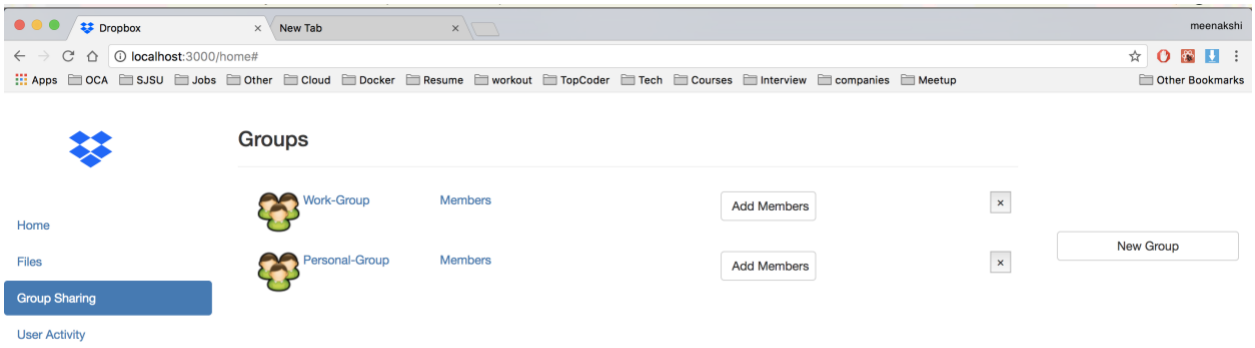
Service: -

```
public boolean deleteGroupMembers(String groupName, String userId, ArrayList<String> userIds) {
    User user = userRepository.findOne(userId);
    ArrayList<UserGroup> groups = user.getGroups();
    for(UserGroup userGroup : groups){
        if(userGroup.getGroupName().equals(groupName)){
            for(String groupMemberId : userIds) {
                User groupMember = userRepository.findOne(groupMemberId);
                userGroup.removeGroupMember(groupMember);
                user.addActivity(new UserActivity( operation: "You Removed " + groupMember.getFullname() + " from the group " , groupName, new Date()));
                System.out.println(groupMember.getFullname() + " removed from " + userGroup.getGroupName());
            }
            user.setGroups(groups);
            userRepository.save(user);

            return true;
        }else{
            return false;
        }

    }
    return false;
}
```

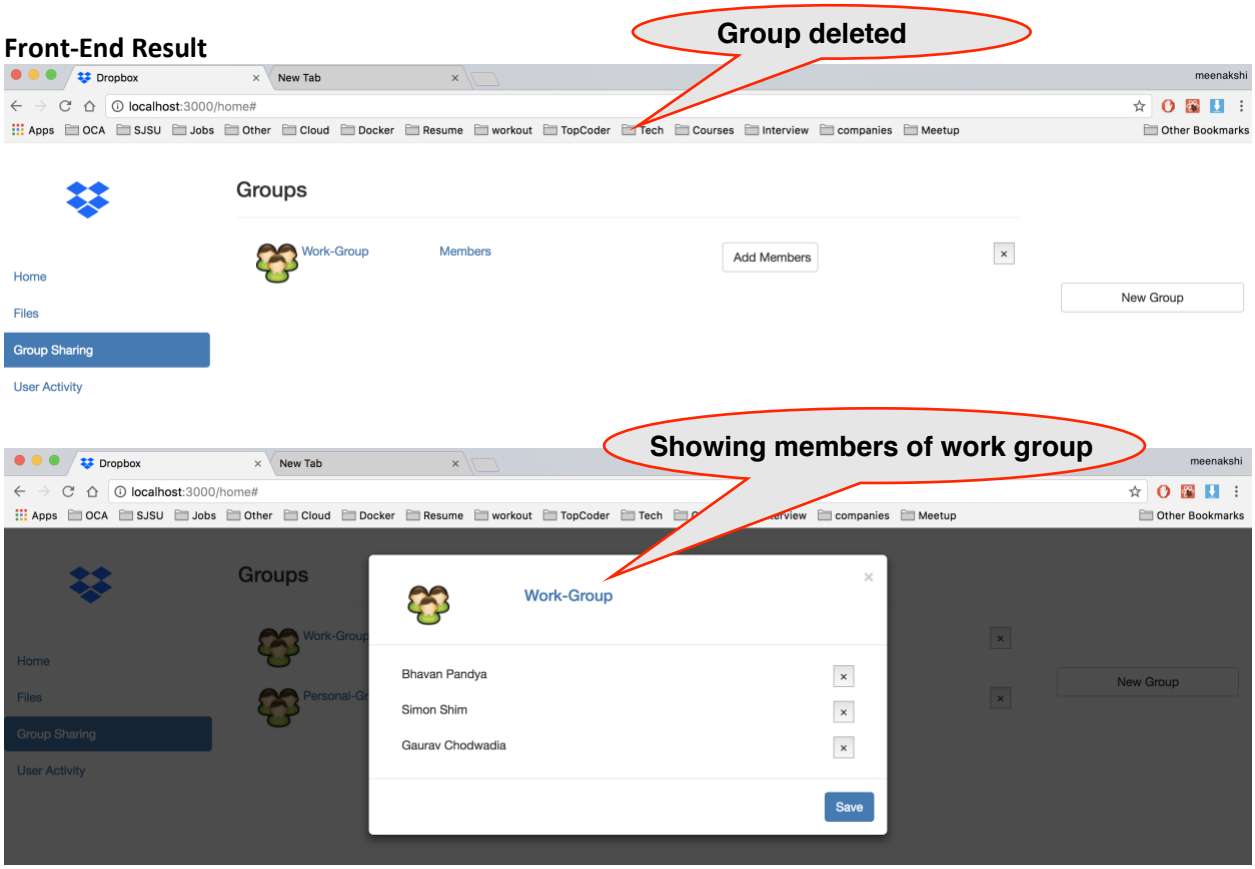
Back-End Result

2.4.5 Delete Group

Front-End Run



Front-End Result



Back-End Code

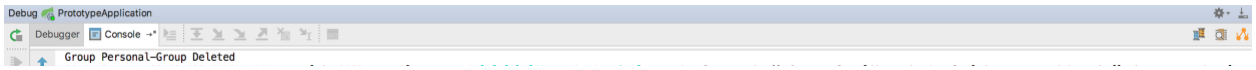
Controller: -

```
@RequestMapping(value = "/delete", method = RequestMethod.POST)
public ResponseEntity<?> deleteGroup(HttpSession session, @RequestBody Map<String, Object> payload) {
    String userId = session.getAttribute( s: "userId") != null ? session.getAttribute( s: "userId").toString() : null;
    if ( userId == null)
        return new ResponseEntity(HttpStatus.UNAUTHORIZED);
    else {
        boolean groupDeleted = groupService.deleteGroup(userId, payload.get("name").toString());
        if(groupDeleted)
            return new ResponseEntity<Object>(HttpStatus.OK);
        else
            return new ResponseEntity<Object>(HttpStatus.BAD_REQUEST);
    }
}
```

Service: -

```java
public boolean deleteGroup(String userId, String groupName) {
    User user = userRepository.findOne(userId);
    ArrayList<UserGroup> groups = user.getGroups();
    UserGroup groupToRemove = new UserGroup();
    for(UserGroup group: groups){
        if(group.getGroupName().equals(groupName)){
            groupToRemove = group;
            groups.remove(groupToRemove);
            user.addActivity(new UserActivity( operation: "You Deleted the group " + groupToRemove.getGroupName() , groupName, new Date()));
            System.out.println("Group " + groupName + " Deleted");
        }
    }
    user.setGroups(groups);
    userRepository.save(user);
    return true;
}
```

Back-End Result



3. J-Unit Test Cases

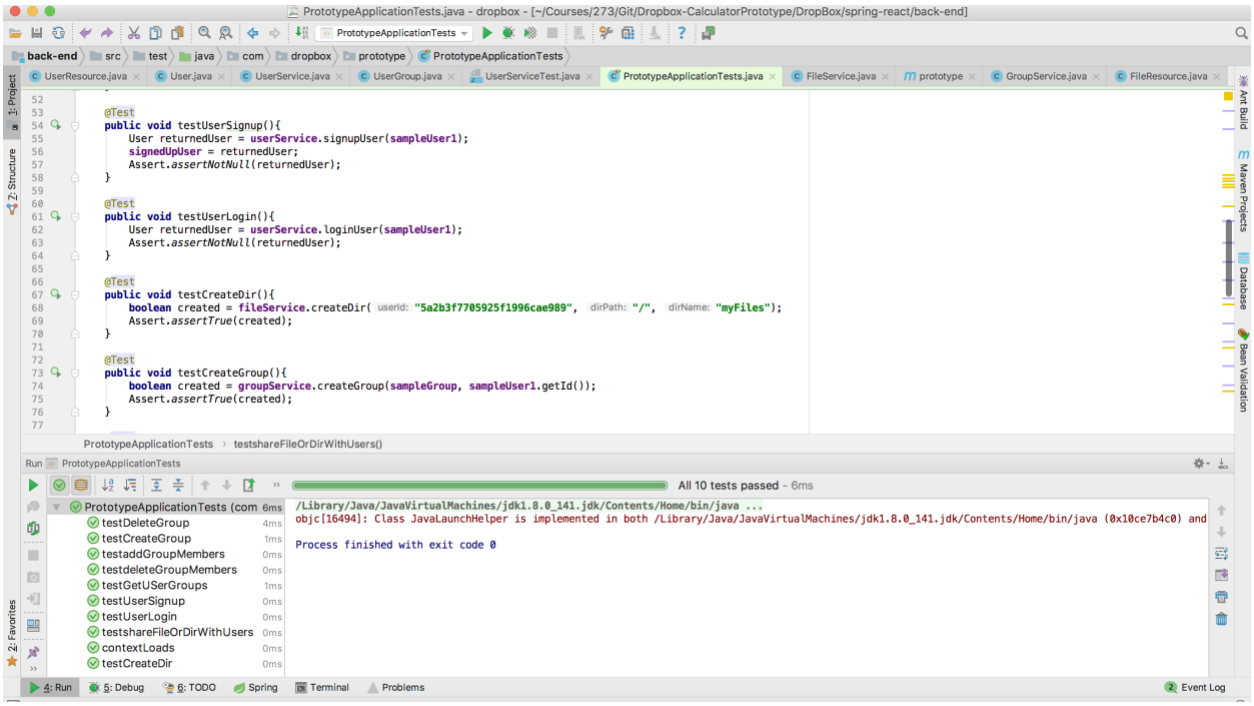
3.1 Test Cases

```java
package com.dropbox.prototype;

import ...

@RunWith(SpringRunner.class)
@SpringBootTest
public class PrototypeApplicationTests {

    @Test
    public void contextLoads() {
    }

    @Autowired
    private UserService userService;

    @Autowired
    private FileService fileService;

    @Autowired
    private GroupService groupService;


    User sampleUser1 = null;
    User sampleUser2 = null;
    User signedUpUser = null;
    UserGroup sampleGroup = null;
    UserFile sampleFile = null;

    @Before
    public void prepareUser(){
        sampleUser1 = new User( id: null,  firstname: "Paul",  lastname: "Nyguen",  email: "paul.nuyguen@sjsu.edu",  password: "password");
        sampleUser2 = new User( id: null,  firstname: "David",  lastname: "Anastasiu",  email: "david.a@sjsu.edu",  password: "password");
        ArrayList<User> groupUsers = new ArrayList<User>();
        groupUsers.add(sampleUser1);
        sampleGroup = new UserGroup( groupName: "Work", groupUsers);
    }

    @Test
    public void testUserSignup(){
        User returnedUser = userService.signupUser(sampleUser1);
        signedUpUser = returnedUser;
        Assert.assertNotNull(returnedUser);
```

```java
@Before
public void prepareUser(){
    sampleUser1 = new User( id: null,  firstname: "Paul",  lastname: "Nyguen",  email: "paul.nuyguen@sjsu.edu",  password: "password");
    sampleUser2 = new User( id: null,  firstname: "David",  lastname: "Anastasiu",  email: "david.a@sjsu.edu",  password: "password");
    ArrayList<User> groupUsers = new ArrayList<User>();
    groupUsers.add(sampleUser1);
    sampleGroup = new UserGroup( groupName: "Work", groupUsers);
}

@Test
public void testUserSignup(){
    User returnedUser = userService.signupUser(sampleUser1);
    signedUpUser = returnedUser;
    Assert.assertNotNull(returnedUser);
}

@Test
public void testUserLogin(){
    User returnedUser = userService.loginUser(sampleUser1);
    Assert.assertNotNull(returnedUser);
}

@Test
public void testCreateDir(){
    boolean created = fileService.createDir( userId: "5a2b3f7705925f1996cae989",  dirPath: "/",  dirName: "myFiles");
    Assert.assertTrue(created);
}

@Test
public void testCreateGroup(){
    boolean created = groupService.createGroup(sampleGroup, sampleUser1.getId());
    Assert.assertTrue(created);
}

@Test
public void testaddGroupMembers(){
    ArrayList<String> newUsers = new ArrayList<String>();
    newUsers.add(sampleUser2.getId());
    boolean created = groupService.addGroupMembers(sampleGroup.getGroupName(), sampleUser1.getId(), newUsers);
    Assert.assertTrue(created);
}

@Test
```

```java
@Test
public void testCreateGroup(){
    boolean created = groupService.createGroup(sampleGroup, sampleUser1.getId());
    Assert.assertTrue(created);
}

@Test
public void testaddGroupMembers(){
    ArrayList<String> newUsers = new ArrayList<String>();
    newUsers.add(sampleUser2.getId());
    boolean created = groupService.addGroupMembers(sampleGroup.getGroupName(), sampleUser1.getId(), newUsers);
    Assert.assertTrue(created);
}

@Test
public void testDeleteGroup(){
    boolean deleted = groupService.deleteGroup(sampleUser1.getId(), sampleGroup.getGroupName());
    Assert.assertTrue(deleted);
}

@Test
public void testdeleteGroupMembers(){
    ArrayList<String> newUsers = new ArrayList<String>();
    newUsers.add(sampleUser2.getId());
    boolean membersDeleted = groupService.deleteGroupMembers(sampleGroup.getGroupName(), sampleUser1.getId(), newUsers);
    Assert.assertTrue(membersDeleted);
}

@Test
public void testGetUSerGroups(){
    ArrayList<UserGroup> groups = groupService.getUserGroups(sampleUser1.getId());
    Assert.assertTrue( condition: groups.size()==1);
}

@Test
public void testshareFileOrDirWithUsers(){
    ArrayList<String> users = new ArrayList<String>();
    users.add(sampleUser2.getId());
    boolean fileShared = fileService.shareFileOrDirWithUsers(sampleUser1.getId(), sampleFile, users);
    Assert.assertTrue(fileShared);
}
```

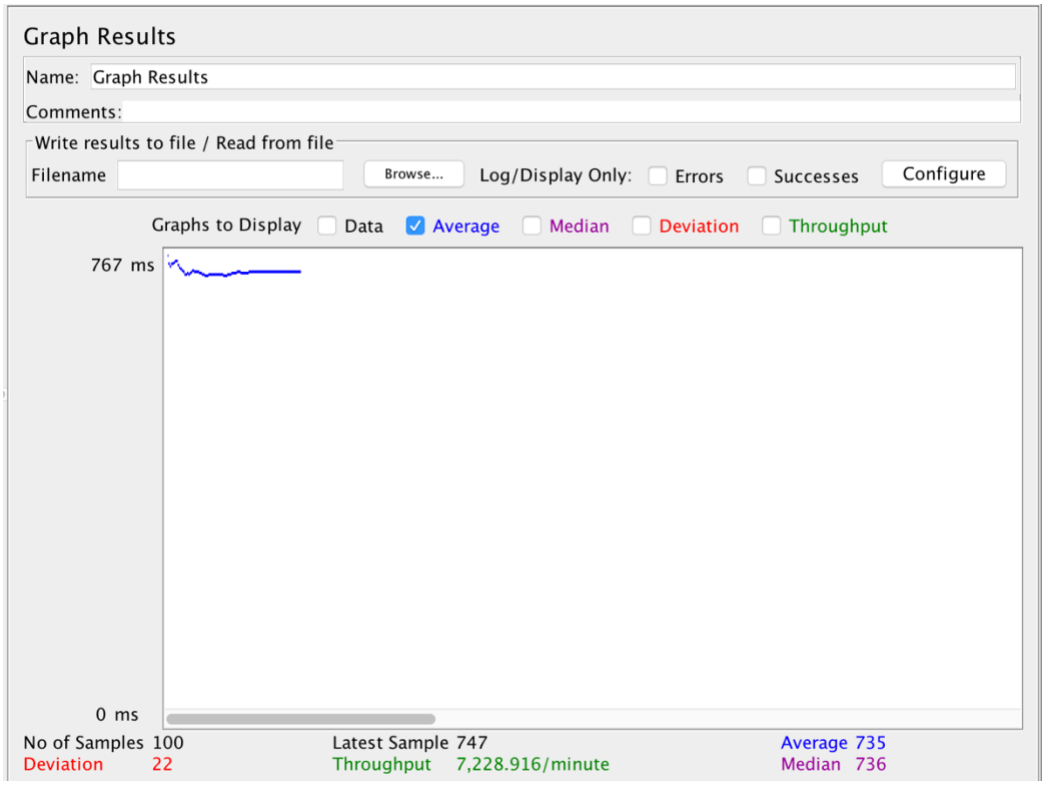
3.2 Test Results



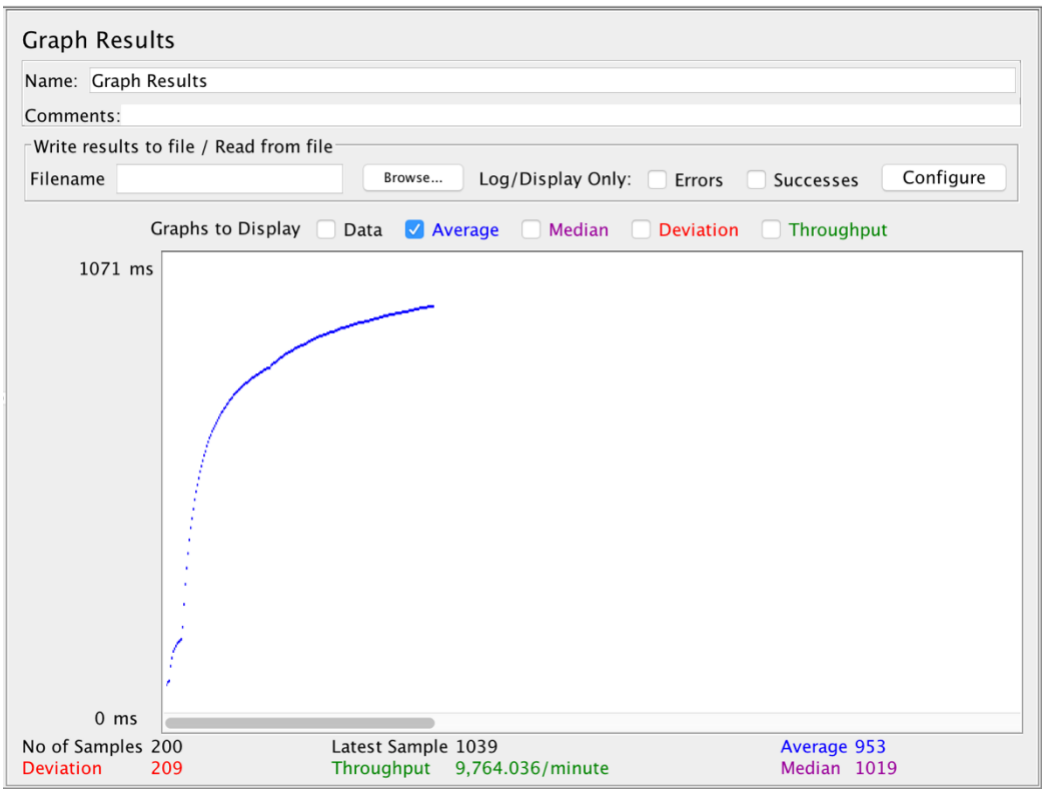
4. Performance Results

4.1 Without Connection Pooling

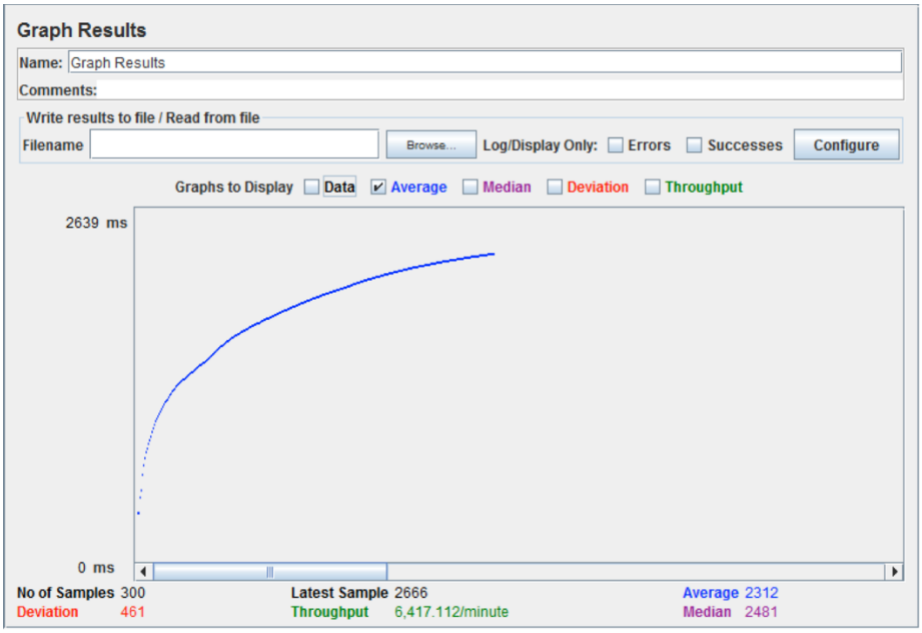
4.1.1 100 Users



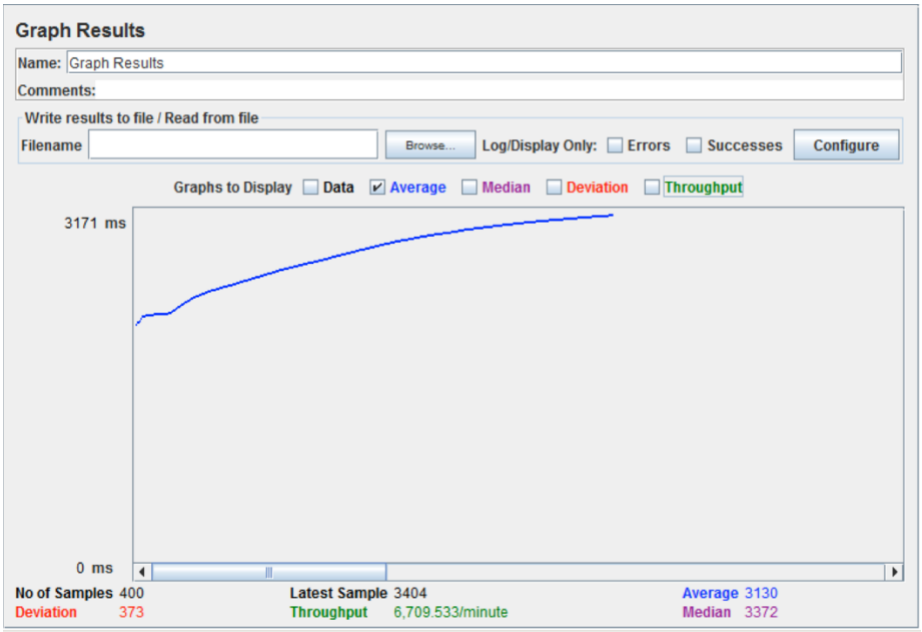
4.1.2 200 Users



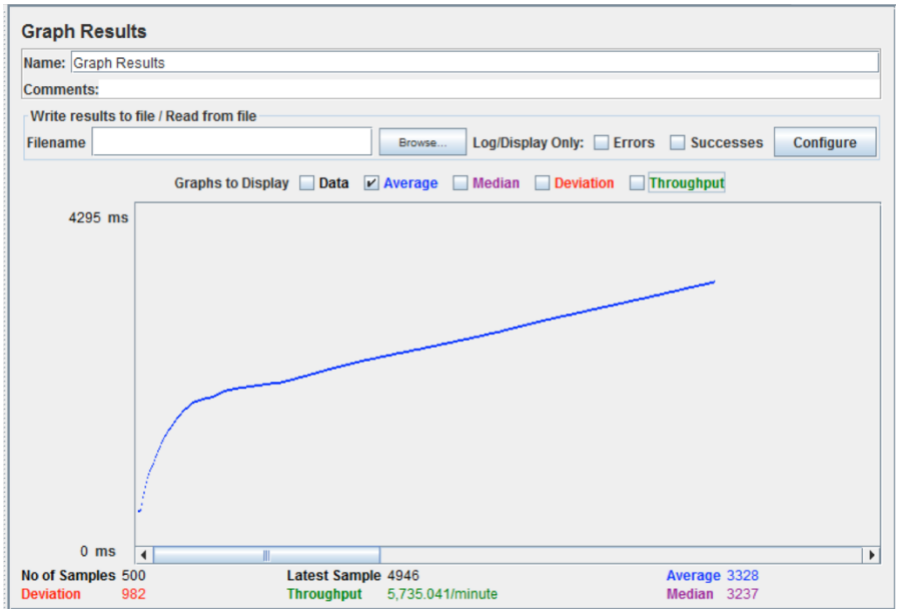
4.1.3 300 Users



4.1.4 400 Users

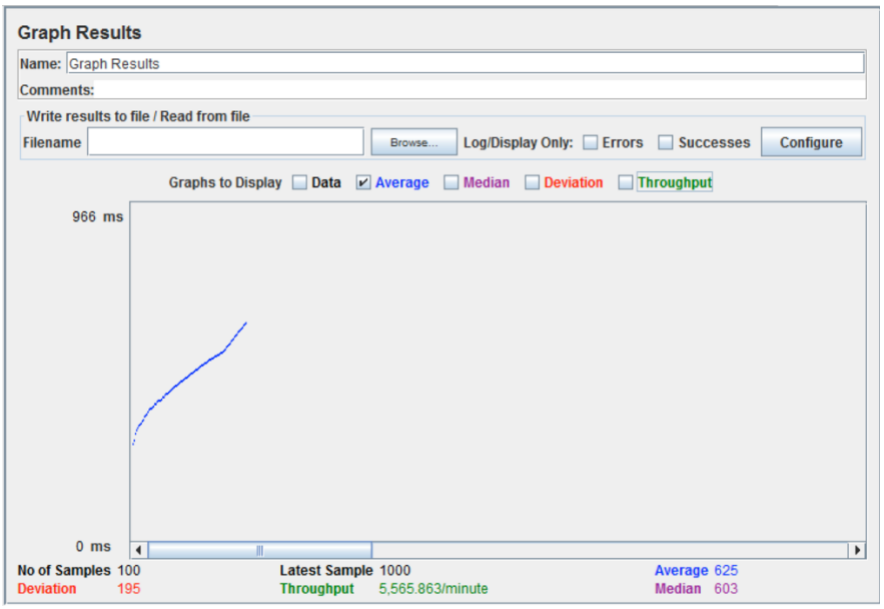


4.1.5 500 Users



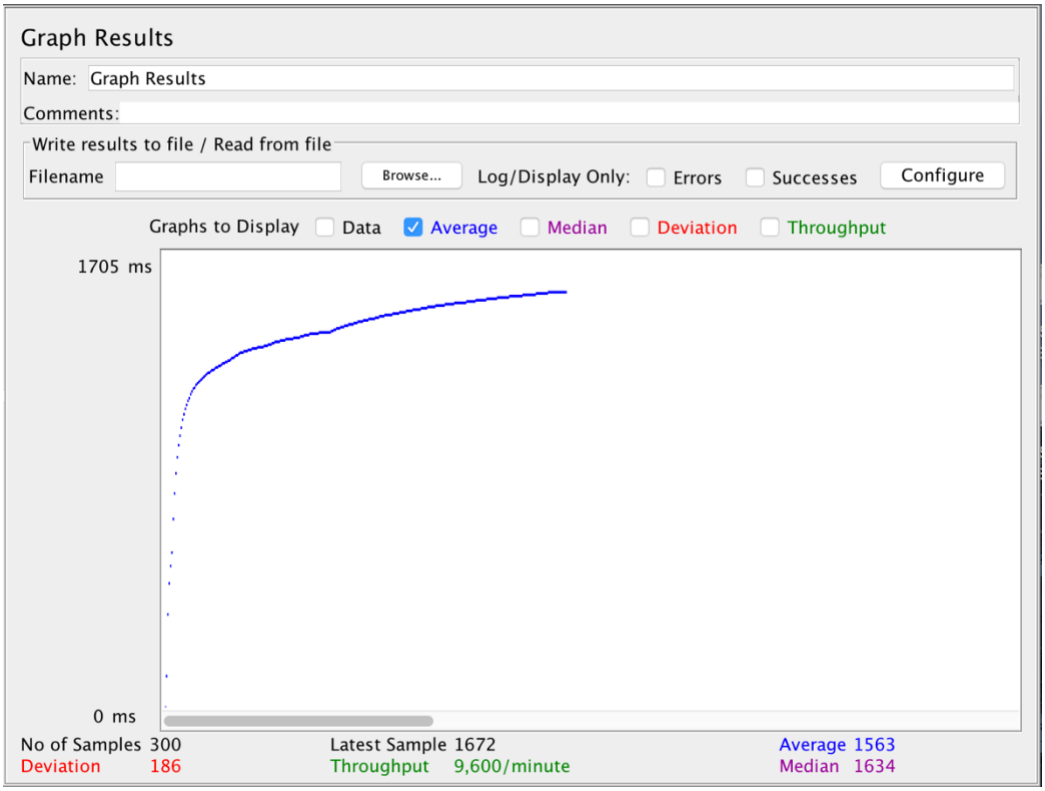
4.2 With Mongo DB Connection Pooling

4.2.1 100 Users

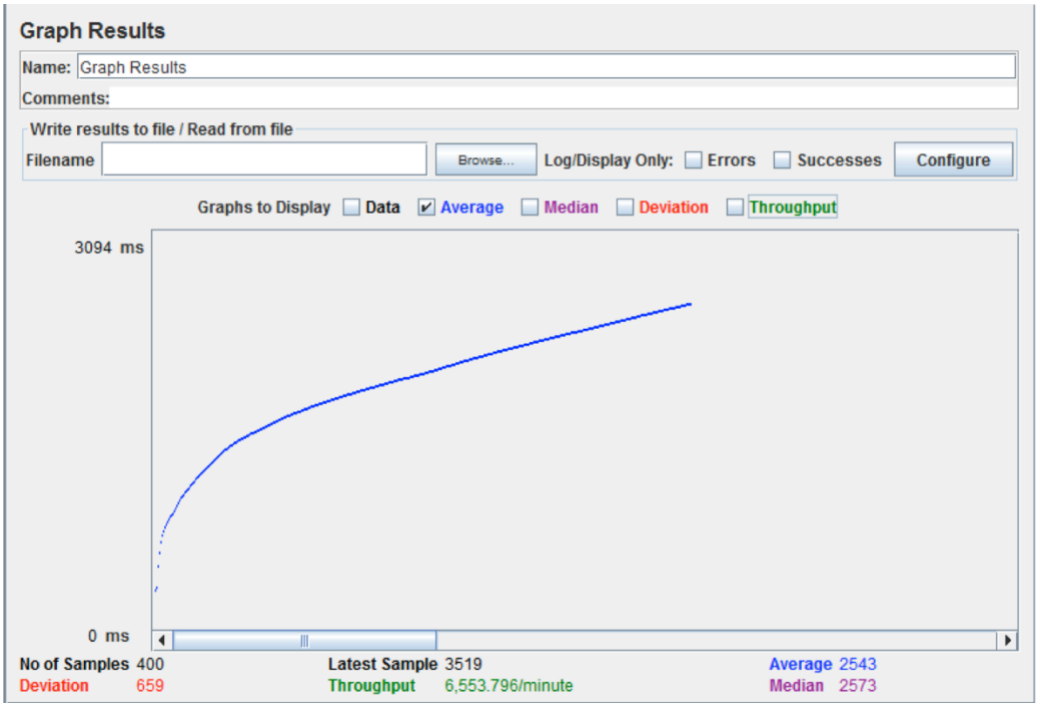


4.2.2 200 Users

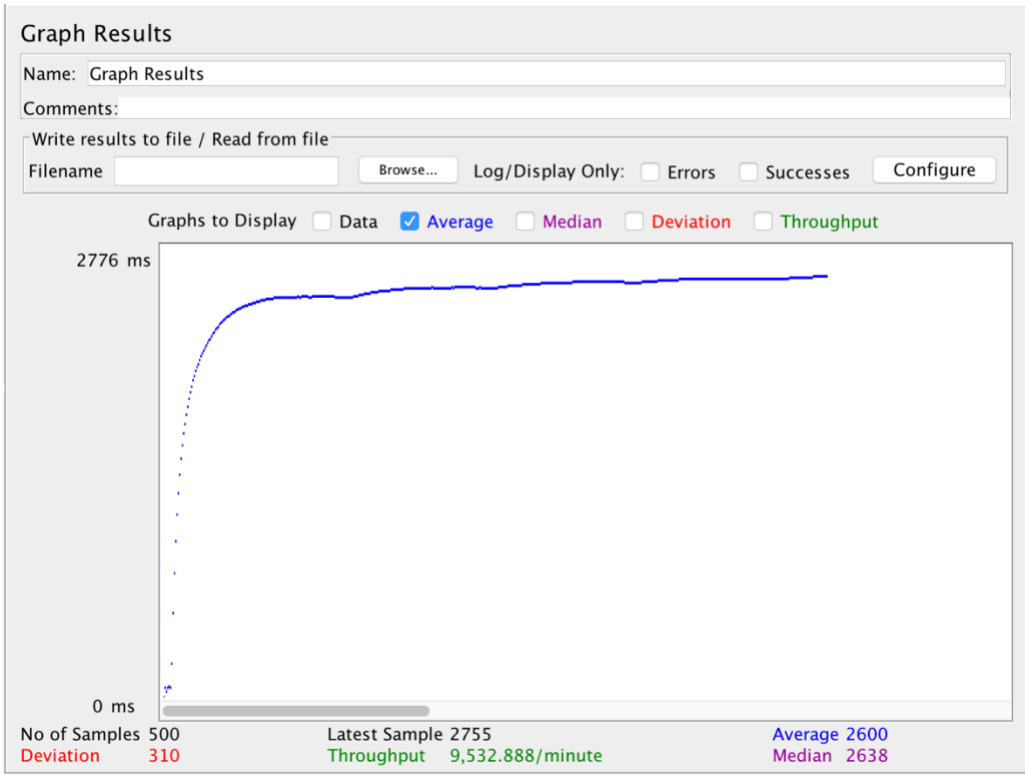
4.2.3 300 Users



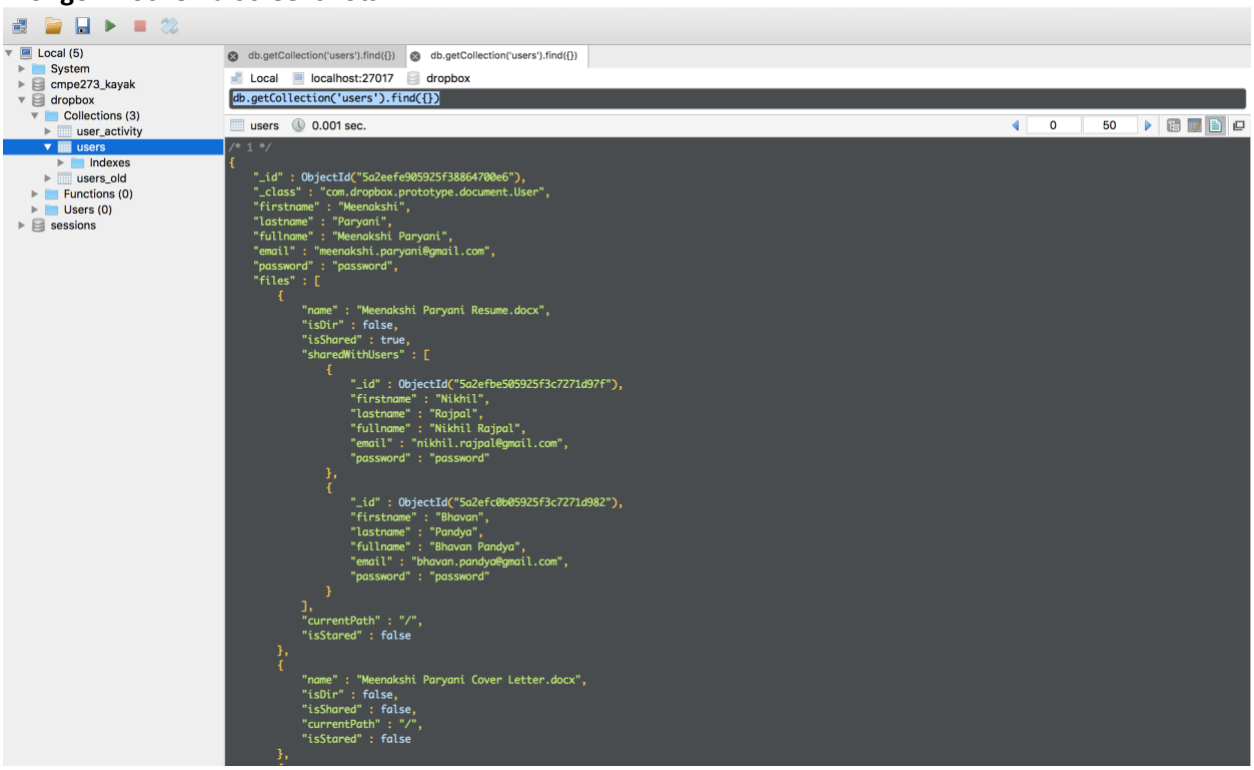
4.2.4 400 Users

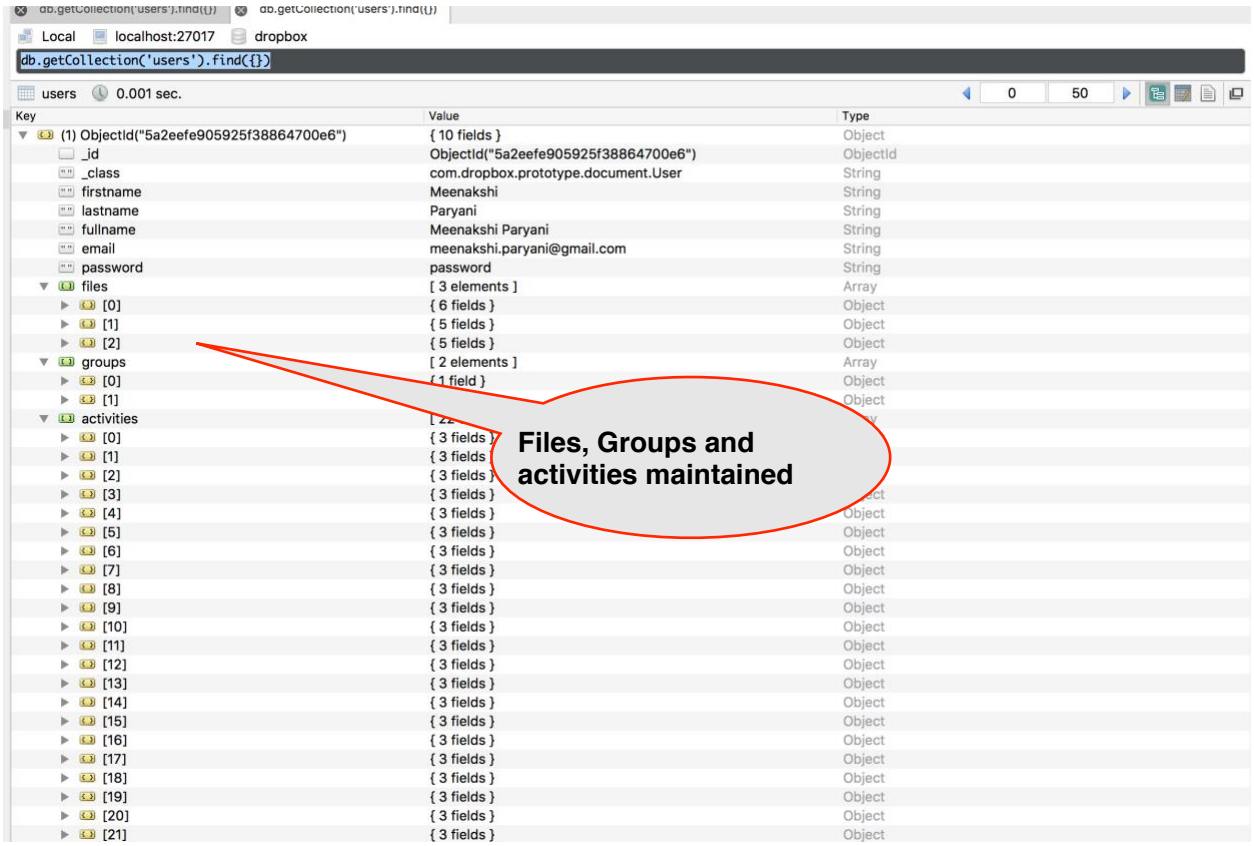


4.2.5 500 Users



5. MongoDB Schema Screenshots




Local
localhost:27017
dropbox
db.getCollection('users').find({})
users
0.001 sec.
0
50
Key
Value
Type
(1) ObjectId("5a2eefe905925f38864700e6")
{ 10 fields }
Object
_id
ObjectId("5a2eefe905925f38864700e6")
ObjectId
_class
com.dropbox.prototype.document.User
String
firstname
Meenakshi
String
lastname
Paryani
String
fullname
Meenakshi Paryani
String
email
meenakshi.paryani@gmail.com
String
password
password
String
files
[3 elements]
Array
[0]
{ 6 fields }
Object
[1]
{ 5 fields }
Object
[2]
{ 5 fields }
Object
groups
[2 elements]
Array
[0]
{ 1 field }
Object
[1]
Object
activities
[0]
{ 3 fields }
[1]
{ 3 fields }
[2]
{ 3 fields }
[3]
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[4]
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Object
Files, Groups and activities maintained