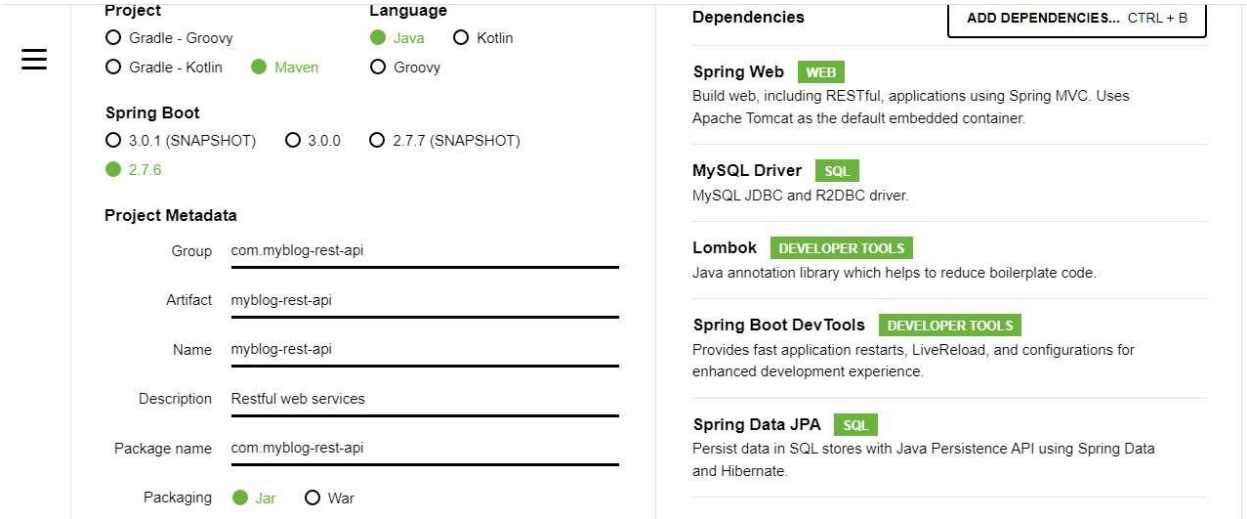
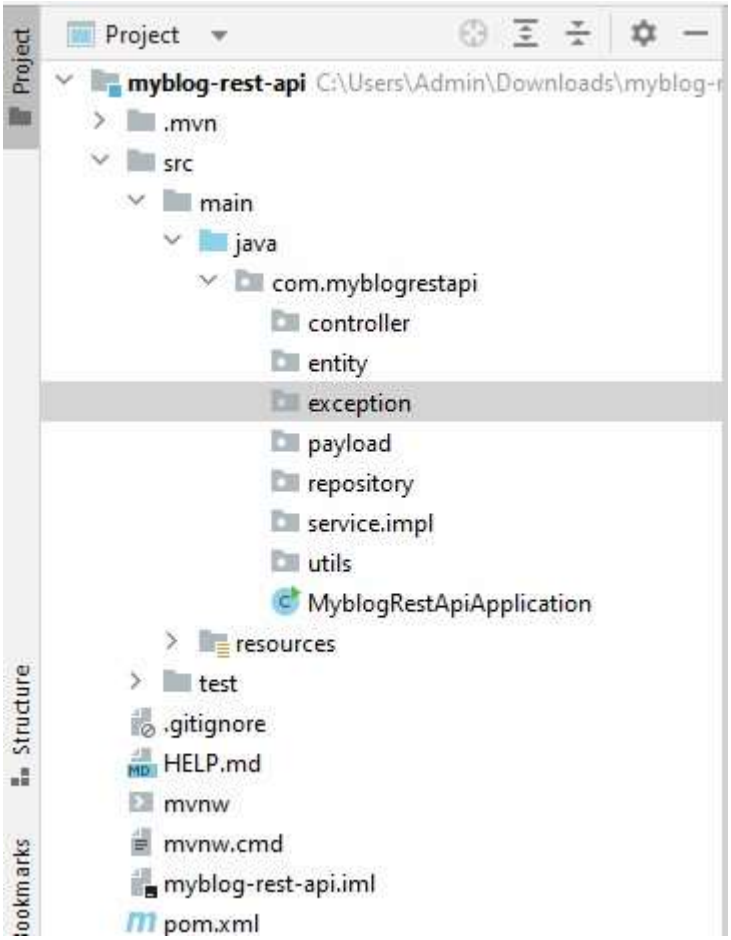
Developing restful web services in spring boot

1. Create Spring boot project with following dependencies:



2. Create Following Project Structure in IntelliJ Idea



Step 3: Create POST Entity Class

```
import lombok.AllArgsConstructor; import
lombok.Data;
import lombok.NoArgsConstructor;

import javax.persistence.*;

@Data
@AllArgsConstructor
@NoArgsConstructor

@Entity
@Table
(
 name = "posts", uniqueConstraints = {@UniqueConstraint(columnNames = {"title"})}
)
public class Post {

   @Id
   @GeneratedValue( strategy = GenerationType.IDENTITY)    )
private Long id;

   @Column(name = "title", nullable = false)
private String title;

   @Column(name = "description", nullable = false)
private String description;

   @Column(name = "content", nullable = false)
private String content;
}
```

Step 3: Update application.properties file

```
spring.datasource.url = jdbc:mysql://localhost:3306/myblog?useSSL=false&serverTimezone=UTC
spring.datasource.username = root spring.datasource.password = root
```

```
# hibernate properties spring.jpa.properties.hibernate.dialect =
org.hibernate.dialect.MySQL5InnoDBDialect

# Hibernate ddl auto  spring.jpa.hibernate.ddl-auto
= update
```

Step 4: Create Post Repository Layer:

```
import org.springframework.data.jpa.repository.JpaRepository;

public interface PostRepository extends JpaRepository<Post, Long> {

}
```

Step 5: Create Payload PostDto class

```
import lombok.Data;

@Data
public class PostDto {
private long id;     private
String title;     private String
description;     private String
content;
}
```

Step 6: Create PostService Interface

```
import java.util.List;

public interface PostService {
   PostDto createPost(PostDto postDto);
}
```

Step 7: Create PostServiceImpl class

```
@Service public class PostServiceImpl  implements
PostService {
```

```
    private PostRepository postRepository;

    public PostServiceImpl(PostRepository postRepository) {
this.postRepository = postRepository;
    }

    @Override     public PostDto
createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
return postResponse;
    }

// convert Entity into DTO     private PostDto
mapToDTO(Post post){        PostDto postDto =
new PostDto();        postDto.setId(post.getId());
postDto.setTitle(post.getTitle());
postDto.setDescription(post.getDescription());
postDto.setContent(post.getContent());
return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
Post post = new Post();
post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());        return
post;
    }
}
```

Step 8: Create PostController Class:

```
@RestController
@RequestMapping("/api/posts") public
class PostController {

   private PostService postService;

   public PostController(PostService postService) {
this.postService = postService;
   }

   // create blog post rest api
   @PostMapping     public ResponseEntity<PostDto> createPost(@RequestBody
PostDto postDto){     return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
   }
}
```

Step 9: Create Exception class

```
import org.springframework.http.HttpStatus; import
org.springframework.web.bind.annotation.ResponseStatus;

@ResponseStatus(value = HttpStatus.NOT_FOUND) public class
ResourceNotFoundException extends RuntimeException{

   private String resourceName;
private String fieldName;     private
long fieldValue;



public ResourceNotFoundException(String resourceName, String fieldName, long fieldValue) {

super(String.format("%s not found with %s : '%s'", resourceName, fieldName,
fieldValue)); // Post not found with id : 1        this.resourceName =
resourceName;        this.fieldName = fieldName;        this.fieldValue =
fieldValue;
   }
```

```
   public String getResourceName() {
return resourceName;
   }

   public String getFieldName() {
return fieldName;
   }

   public long getFieldValue() {
return fieldValue;
   }
}
```

Step 10: Create GetMapping in controller layer:

```
import java.util.List;

@RestController
@RequestMapping("/api/posts") public
class PostController {

   private PostService postService;

   public PostController(PostService postService) {
this.postService = postService;
   }

   // create blog post rest api
   @PostMapping
   public ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
   }

   // get all posts rest api
   @GetMapping     public
List<PostDto> getAllPosts(){
return postService.getAllPosts();
   }
```

```
}
```

Step 11: Update PostService interface:

```
import com.springboot.blog.payload.PostDto;

import java.util.List;

public interface PostService {
   PostDto createPost(PostDto postDto);

   List<PostDto> getAllPosts();

}
```

Step 12: Update PostServiceImpl class:

```
import com.springboot.blog.entity.Post; import
com.springboot.blog.exception.ResourceNotFoundException; import
com.springboot.blog.payload.PostDto; import
com.springboot.blog.repository.PostRepository; import
com.springboot.blog.service.PostService; import
org.springframework.beans.factory.annotation.Autowired; import
org.springframework.stereotype.Service;

import java.util.List;
import java.util.stream.Collectors;

@Service public class PostServiceImpl implements
PostService {

   private PostRepository postRepository;

   public PostServiceImpl(PostRepository postRepository) {
this.postRepository = postRepository;
   }
```

```
   @Override     public PostDto
createPost(PostDto postDto) {

       // convert DTO to entity
       Post post = mapToEntity(postDto);
       Post newPost = postRepository.save(post);

       // convert entity to DTO
       PostDto postResponse = mapToDTO(newPost);
return postResponse;
   }

   @Override
   public List<PostDto> getAllPosts() {
       List<Post> posts = postRepository.findAll();        return posts.stream().map(post
-> mapToDTO(post)).collect(Collectors.toList());
   }


   // convert Entity into DTO     private PostDto
mapToDTO(Post post){        PostDto postDto =
new PostDto();        postDto.setId(post.getId());
postDto.setTitle(post.getTitle());
postDto.setDescription(post.getDescription());
postDto.setContent(post.getContent());
       return postDto;
   }

   // convert DTO to entity
   private Post mapToEntity(PostDto postDto){
Post post = new Post();
post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());        return
post;
   }
}
```

Step 13: Create DeleteMapping By Id:

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.service.PostService;
import org.springframework.http.HttpStatus; import
org.springframework.http.ResponseEntity; import
org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping("/api/posts") public
class PostController {

   private PostService postService;

   public PostController(PostService postService) {
this.postService = postService;
   }

   // create blog post rest api     @PostMapping     public
ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
   }

   // get all posts rest api
   @GetMapping     public
List<PostDto> getAllPosts(){
return postService.getAllPosts();
   }

   // get post by id
   @GetMapping("/{id}")     public ResponseEntity<PostDto>
getPostById(@PathVariable(name = "id") long id){        return
ResponseEntity.ok(postService.getPostById(id));
   }

}
```

Step 14: Update PostServiceImpl interface:

```
import com.springboot.blog.payload.PostDto;

import java.util.List;

public interface PostService {
   PostDto createPost(PostDto postDto);

   List<PostDto> getAllPosts();

   PostDto getPostById(long id);

}
```

Step 15: Update PostServiceImpl class

```
import com.springboot.blog.entity.Post; import
com.springboot.blog.exception.ResourceNotFoundException; import
com.springboot.blog.payload.PostDto;
import com.springboot.blog.repository.PostRepository; import
com.springboot.blog.service.PostService; import
org.springframework.beans.factory.annotation.Autowired; import
org.springframework.stereotype.Service;

import java.util.List;
import java.util.stream.Collectors;

@Service public class PostServiceImpl implements
PostService {

   private PostRepository postRepository;

   public PostServiceImpl(PostRepository postRepository) {
this.postRepository = postRepository;
   }

   @Override     public PostDto
createPost(PostDto postDto) {
```

```
        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
return postResponse;
    }

    @Override
    public List<PostDto> getAllPosts() {
        List<Post> posts = postRepository.findAll();        return posts.stream().map(post
-> mapToDTO(post)).collect(Collectors.toList());
    }

    @Override     public PostDto
getPostById(long id) {        Post post =
postRepository.findById(id).orElseThro
w(() -> new
ResourceNotFoundException("Post",
"id", id));        return mapToDTO(post);
    }


    // convert Entity into DTO     private PostDto
mapToDTO(Post post){        PostDto postDto =
new PostDto();        postDto.setId(post.getId());
postDto.setTitle(post.getTitle());
postDto.setDescription(post.getDescription());
postDto.setContent(post.getContent());
return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
Post post = new Post();
post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
```

```
post.setContent(postDto.getContent());        return
post;
   }
}
```

Step 16: Create UpdateMapping Controller

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.service.PostService;
import org.springframework.http.HttpStatus; import
org.springframework.http.ResponseEntity; import
org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping("/api/posts")
public class PostController {

   private PostService postService;

   public PostController(PostService postService) {
this.postService = postService;
   }

   // create blog post rest api     @PostMapping     public
ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
   }

   // get all posts rest api
   @GetMapping     public
List<PostDto> getAllPosts(){
return postService.getAllPosts();
   }

   // get post by id
```

```
   @GetMapping("/{id}")     public ResponseEntity<PostDto>
getPostById(@PathVariable(name = "id") long id){        return
ResponseEntity.ok(postService.getPostById(id));
   }

   // update post by id rest api     @PutMapping("/{id}")     public
ResponseEntity<PostDto> updatePost(@RequestBody PostDto postDto,
@PathVariable(name = "id") long id){

      PostDto postResponse = postService.updatePost(postDto, id);

      return new ResponseEntity<>(postResponse, HttpStatus.OK);
   }

}
```

Step 17: Update PostService Interface:

```
import com.springboot.blog.payload.PostDto;

import java.util.List;

public interface PostService {
   PostDto createPost(PostDto postDto);

   List<PostDto> getAllPosts();

   PostDto getPostById(long id);

   PostDto updatePost(PostDto postDto, long id);
}
```

Step 18: Update PostServiceImpl class:

```
import com.springboot.blog.entity.Post; import
com.springboot.blog.exception.ResourceNotFoundException; import
com.springboot.blog.payload.PostDto; import
com.springboot.blog.repository.PostRepository; import
com.springboot.blog.service.PostService; import
```

```
org.springframework.beans.factory.annotation.Autowired; import
org.springframework.stereotype.Service;

import java.util.List;
import java.util.stream.Collectors;

@Service public class PostServiceImpl implements
PostService {

   private PostRepository postRepository;

   public PostServiceImpl(PostRepository postRepository) {
this.postRepository = postRepository;
   }

   @Override     public PostDto
createPost(PostDto postDto) {

      // convert DTO to entity
      Post post = mapToEntity(postDto);
      Post newPost = postRepository.save(post);

      // convert entity to DTO
      PostDto postResponse = mapToDTO(newPost);
return postResponse;
   }

   @Override
   public List<PostDto> getAllPosts() {
      List<Post> posts = postRepository.findAll();        return posts.stream().map(post
-> mapToDTO(post)).collect(Collectors.toList());
   }

   @Override
   public PostDto getPostById(long id) {
      Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));        return
mapToDTO(post);
   }
```

```
   @Override     public PostDto updatePost(PostDto
postDto, long id) {
       // get post by id from the database
       Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));

       post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());

       Post updatedPost = postRepository.save(post);
       return mapToDTO(updatedPost);
   }


   // convert Entity into DTO     private PostDto
mapToDTO(Post post){        PostDto postDto =
new PostDto();        postDto.setId(post.getId());
postDto.setTitle(post.getTitle());
postDto.setDescription(post.getDescription());
postDto.setContent(post.getContent());
return postDto;
   }

   // convert DTO to entity
   private Post mapToEntity(PostDto postDto){
Post post = new Post();
post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());        return
post;
   }
}
```

Step 19: Create DeleteMapping controller:

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.service.PostService;
```

```
import org.springframework.http.HttpStatus; import
org.springframework.http.ResponseEntity; import
org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping("/api/posts") public
class PostController {     private
PostService postService;

   public PostController(PostService postService) {
this.postService = postService;
   }

   // create blog post rest api     @PostMapping     public
ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
   }

   // get all posts rest api
   @GetMapping     public
List<PostDto> getAllPosts(){
return postService.getAllPosts();
   }

   // get post by id
   @GetMapping("/{id}")     public ResponseEntity<PostDto>
getPostById(@PathVariable(name = "id") long id){        return
ResponseEntity.ok(postService.getPostById(id));
   }

   // update post by id rest api     @PutMapping("/{id}")     public
ResponseEntity<PostDto> updatePost(@RequestBody PostDto postDto,
@PathVariable(name = "id") long id){

      PostDto postResponse = postService.updatePost(postDto, id);
```

```
      return new ResponseEntity<>(postResponse, HttpStatus.OK);
   }

   // delete post rest api
   @DeleteMapping("/{id}")     public ResponseEntity<String>
deletePost(@PathVariable(name = "id") long id){
postService.deletePostById(id);

       return new ResponseEntity<>("Post entity deleted successfully.", HttpStatus.OK);
   }
}
```

Step 20: Update PostService Interface:

```
import com.springboot.blog.payload.PostDto;

import java.util.List;

public interface PostService {
   PostDto createPost(PostDto postDto);

   List<PostDto> getAllPosts();

   PostDto getPostById(long id);

   PostDto updatePost(PostDto postDto, long id);

   void deletePostById(long id);
}
```

Step 21: Create PostServiceImpl class:

```
import com.springboot.blog.entity.Post; import
com.springboot.blog.exception.ResourceNotFoundException; import
com.springboot.blog.payload.PostDto; import
com.springboot.blog.repository.PostRepository; import
com.springboot.blog.service.PostService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;
```

```
import java.util.List;
import java.util.stream.Collectors;

@Service public class PostServiceImpl implements
PostService {

   private PostRepository postRepository;

   public PostServiceImpl(PostRepository postRepository) {
this.postRepository = postRepository;
   }

   @Override     public PostDto
createPost(PostDto postDto) {

      // convert DTO to entity
      Post post = mapToEntity(postDto);
      Post newPost = postRepository.save(post);

      // convert entity to DTO
      PostDto postResponse = mapToDTO(newPost);
return postResponse;
   }

   @Override
   public List<PostDto> getAllPosts() {
      List<Post> posts = postRepository.findAll();        return posts.stream().map(post
-> mapToDTO(post)).collect(Collectors.toList());
   }

   @Override
   public PostDto getPostById(long id) {
      Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));        return
mapToDTO(post);
   }
```

```
    @Override     public PostDto updatePost(PostDto
postDto, long id) {        // get post by id from the
database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));

        post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());

        Post updatedPost = postRepository.save(post);
return mapToDTO(updatedPost);
    }

    @Override     public void
deletePostById(long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
postRepository.delete(post);
    }

    // convert Entity into DTO     private PostDto
mapToDTO(Post post){        PostDto postDto =
new PostDto();        postDto.setId(post.getId());
postDto.setTitle(post.getTitle());
postDto.setDescription(post.getDescription());
postDto.setContent(post.getContent());
return postDto;
    }

    // convert DTO to entity
    private Post mapToEntity(PostDto postDto){
Post post = new Post();
post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());        return
post;
    }
```

}

Pagination and Sorting in rest API

Step 1: Update Post Controller Class:

```
import com.springboot.blog.payload.PostDto;
import com.springboot.blog.payload.PostResponse;
import com.springboot.blog.service.PostService;
import org.springframework.http.HttpStatus; import
org.springframework.http.ResponseEntity; import
org.springframework.web.bind.annotation.*;

import java.util.List;

@RestController
@RequestMapping("/api/posts") public
class PostController {

   private PostService postService;

   public PostController(PostService postService) {
this.postService = postService;
   }

   // create blog post rest api     @PostMapping     public
ResponseEntity<PostDto> createPost(@RequestBody PostDto postDto){
return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
   }

   // get all posts rest api
   @GetMapping     public
PostResponse getAllPosts(
         @RequestParam(value = "pageNo", defaultValue = "0", required = false)  int
pageNo,
@RequestParam(value = "pageSize", defaultValue = "10", required = false) int
pageSize,
```

```
@RequestParam(value = "sortBy", defaultValue = "id", required = false) String sortBy,
@RequestParam(value = "sortDir", defaultValue = "asc", required = false) String
sortDir
    ){
        return postService.getAllPosts(pageNo, pageSize, sortBy, sortDir);
    }

    // get post by id
    @GetMapping("/{id}")     public ResponseEntity<PostDto>
getPostById(@PathVariable(name = "id") long id){        return
ResponseEntity.ok(postService.getPostById(id));
    }

    // update post by id rest api     @PutMapping("/{id}")     public
ResponseEntity<PostDto> updatePost(@RequestBody PostDto postDto,
@PathVariable(name = "id") long id){

        PostDto postResponse = postService.updatePost(postDto, id);

        return new ResponseEntity<>(postResponse, HttpStatus.OK);
    }

    // delete post rest api
    @DeleteMapping("/{id}")     public ResponseEntity<String>
deletePost(@PathVariable(name = "id") long id){

        postService.deletePostById(id);

        return new ResponseEntity<>("Post entity deleted successfully.", HttpStatus.OK);
    }
}
```

Step 2: Update PostService interface”:

```
import com.springboot.blog.payload.PostDto; import
com.springboot.blog.payload.PostResponse;

import java.util.List;
```

```
public interface PostService {
   PostDto createPost(PostDto postDto);

   PostResponse getAllPosts(int pageNo, int pageSize, String sortBy, String sortDir);

   PostDto getPostById(long id);

   PostDto updatePost(PostDto postDto, long id);

   void deletePostById(long id);
}
```

Step 3: Update PostServiceImpl class:

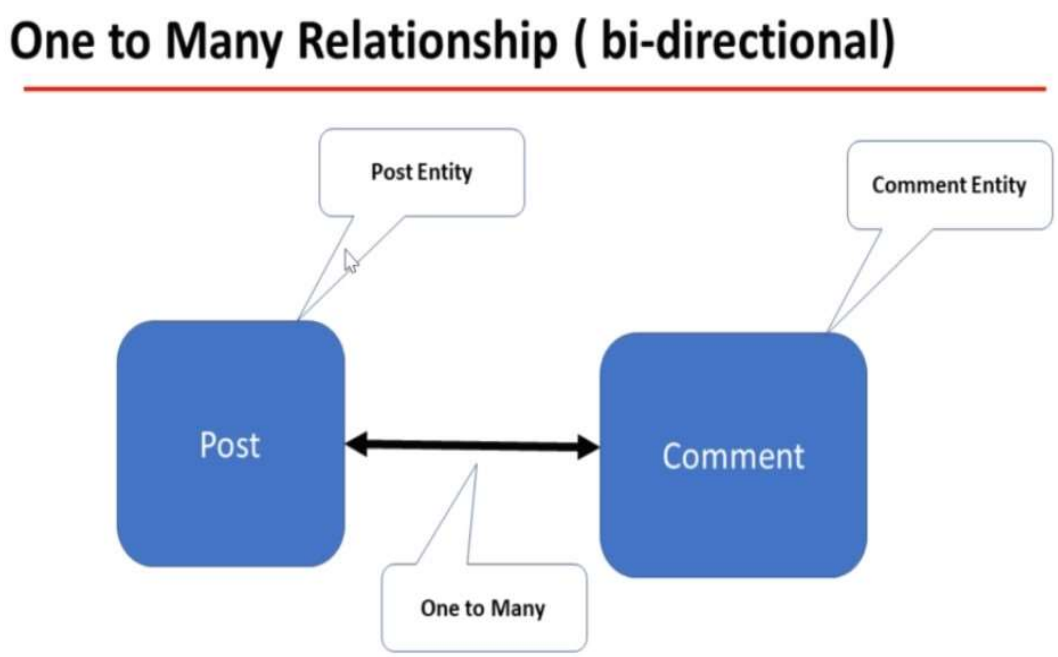
```
import com.springboot.blog.entity.Post; import
com.springboot.blog.exception.ResourceNotFoundException; import
com.springboot.blog.payload.PostDto; import
com.springboot.blog.payload.PostResponse; import
com.springboot.blog.repository.PostRepository; import
com.springboot.blog.service.PostService; import
org.springframework.beans.factory.annotation.Autowired; import
org.springframework.data.domain.Page; import
org.springframework.data.domain.PageRequest; import
org.springframework.data.domain.Pageable; import
org.springframework.data.domain.Sort; import
org.springframework.stereotype.Service;

import java.util.List;
import java.util.stream.Collectors;

@Service public class PostServiceImpl implements
PostService {     private PostRepository
postRepository;

   public PostServiceImpl(PostRepository postRepository) {
this.postRepository = postRepository;
   }
```

```
   @Override     public PostDto
createPost(PostDto postDto) {

      // convert DTO to entity
      Post post = mapToEntity(postDto);
      Post newPost = postRepository.save(post);

      // convert entity to DTO
      PostDto postResponse = mapToDTO(newPost);
return postResponse;
   }

   @Override     public PostResponse getAllPosts(int pageNo, int pageSize, String
sortBy, String sortDir) {

      Sort sort = sortDir.equalsIgnoreCase(Sort.Direction.ASC.name()) ?
Sort.by(sortBy).ascending()
            : Sort.by(sortBy).descending();

      // create Pageable instance
      Pageable pageable = PageRequest.of(pageNo, pageSize, sort);

      Page<Post> posts = postRepository.findAll(pageable);

      // get content for page object
      List<Post> listOfPosts = posts.getContent();

      List<PostDto> content= listOfPosts.stream().map(post ->
mapToDTO(post)).collect(Collectors.toList());

      PostResponse postResponse = new PostResponse();
postResponse.setContent(content);
postResponse.setPageNo(posts.getNumber());
postResponse.setPageSize(posts.getSize());
postResponse.setTotalElements(posts.getTotalElements());
postResponse.setTotalPages(posts.getTotalPages());
postResponse.setLast(posts.isLast());

      return postResponse;
```

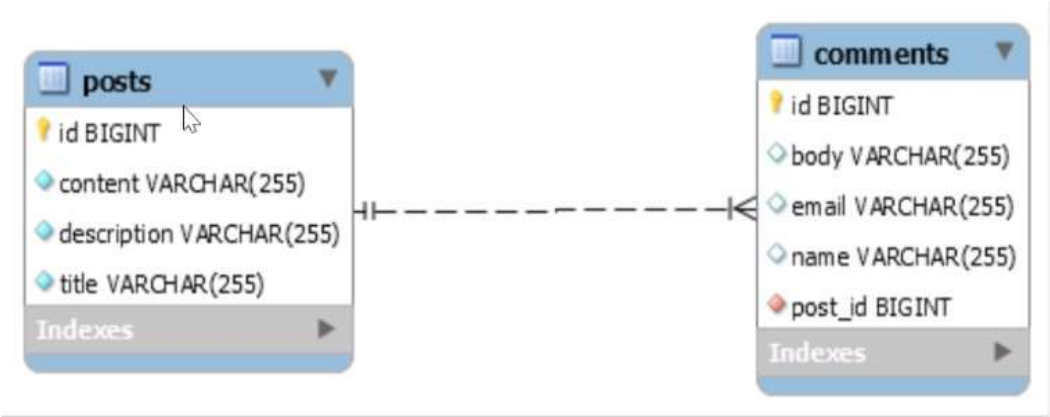
```
    }

    @Override
    public PostDto getPostById(long id) {
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));        return
mapToDTO(post);
    }

    @Override     public PostDto updatePost(PostDto
postDto, long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));

        post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());

        Post updatedPost = postRepository.save(post);
return mapToDTO(updatedPost);
    }

    @Override     public void
deletePostById(long id) {
        // get post by id from the database
        Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
postRepository.delete(post);
    }

    // convert Entity into DTO     private PostDto
mapToDTO(Post post){        PostDto postDto =
new PostDto();        postDto.setId(post.getId());
postDto.setTitle(post.getTitle());
postDto.setDescription(post.getDescription());
postDto.setContent(post.getContent());
return postDto;
    }
```

```
   // convert DTO to entity
   private Post mapToEntity(PostDto postDto){
Post post = new Post();
post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());        return
post;
   }
}
```

Create Comments API Later



ER(Entity Relationship Diagram)



URL Documentation with status code:

REST APIs for Comment Resource

HTTP Method	URL Path	Status Code	Description
GET	/api/posts/{postId}/comments	200 (OK)	Get all comments which belongs to post with id = postId
GET	/api/posts/{postId}/comments/{id}	200 (OK)	Get comment by id if it belongs to post with id = postId
POST	/api/posts/{postsId}/comments	201 (Created)	Create new comment for post with id = postId
PUT	/api/posts/{postId}/comments/{id}	200 (OK)	Update comment by id if it belongs to post with id = postId
DELETE	/api/posts/{postId}/comments/{id}	200 (OK)	Delete comment by id if it belongs to post with id = postId

Step 1: Create Comment Entity Class and do oneTomany bidirectional mapping

```
import lombok.AllArgsConstructor; import
lombok.Data;
import lombok.NoArgsConstructor;

import javax.persistence.*;

@Data
```

```
@AllArgsConstructor
@NoArgsConstructor

@Entity
@Table(name = "comments") public
class Comment {

   @Id
   @GeneratedValue(strategy = GenerationType.IDENTITY)
private long id;

   private String name;
private String email;
private String body;

   @ManyToOne(fetch = FetchType.LAZY)
@JoinColumn(name = "post_id", nullable = false)
private Post post;
}
```

Step 2: Update Post Entity Class:

```
import lombok.*;

import javax.persistence.*;
import java.util.HashSet;
import java.util.Set;

@Getter
@Setter
@AllArgsConstructor
@NoArgsConstructor

@Entity
@Table(
      name = "posts", uniqueConstraints = {@UniqueConstraint(columnNames =
{"title"})}
)
public class Post {
```

```
   @Id
   @GeneratedValue(          strategy =
GenerationType.IDENTITY
   )
   private Long id;

   @Column(name = "title", nullable = false)
private String title;

   @Column(name = "description", nullable = false)
private String description;

   @Column(name = "content", nullable = false)
private String content;

   @OneToMany(mappedBy = "post", cascade = CascadeType.ALL, orphanRemoval =
true)    private Set<Comment> comments = new HashSet<>();

}
```

Step 3: Create CommentDto class

```
@Data public class
CommentDto {    private
long id;    private String
name;   private String
email;   private String
body;
}
```

Step 4: Create CommentService Interface:

```
import java.util.List;

public interface CommentService {
   CommentDto createComment(long postId, CommentDto commentDto);
}
```

Step 5: Create CommentServiceImpl class:

```
@Service public class CommentServiceImpl implements
CommentService {

   private CommentRepository
commentRepository;     private PostRepository
postRepository;     private ModelMapper mapper;
   public CommentServiceImpl(CommentRepository
commentRepository,  PostRepository postRepository, ModelMapper
mapper) {        this.commentRepository = commentRepository;
this.postRepository = postRepository;        this.mapper = mapper;
   }

   @Override     public CommentDto createComment(long postId, CommentDto
commentDto) {

      Comment comment = mapToEntity(commentDto);

      // retrieve post entity by id
      Post post = postRepository.findById(postId).orElseThrow(
            () -> new ResourceNotFoundException("Post", "id", postId));

      // set post to comment entity
comment.setPost(post);

      // comment entity to DB
      Comment newComment =  commentRepository.save(comment);

      return mapToDTO(newComment);
   }

private CommentDto mapToDTO(Comment comment){
      CommentDto commentDto = mapper.map(comment, CommentDto.class);

      CommentDto commentDto = new CommentDto();
commentDto.setId(comment.getId());
commentDto.setName(comment.getName());
commentDto.setEmail(comment.getEmail());
```

```
commentDto.setBody(comment.getBody());      return
commentDto;
   }

   private Comment mapToEntity(CommentDto commentDto){
      Comment comment = mapper.map(commentDto, Comment.class);
Comment          comment          =          new          Comment();
comment.setId(commentDto.getId());
comment.setName(commentDto.getName());
comment.setEmail(commentDto.getEmail());
comment.setBody(commentDto.getBody());       return  comment;
   }

}
```

Step 6: Create RestController CommentController Class:

```
@RestController
@RequestMapping("/api/")
public class CommentController {

   private CommentService commentService;

   public CommentController(CommentService commentService) {
this.commentService = commentService;
   }

   @PostMapping("/posts/{postId}/comments")
   public ResponseEntity<CommentDto> createComment(@PathVariable(value =
"postId") long postId,
                                    @RequestBody CommentDto commentDto){
      return new ResponseEntity<>(commentService.createComment(postId,
commentDto), HttpStatus.CREATED);
   }
}
```

Get All Comments By PostId

Step 1: Update CommentRepository as shown below:

```
import org.springframework.data.jpa.repository.JpaRepository;

import java.util.List;

public interface CommentRepository extends JpaRepository<Comment, Long> {
   List<Comment> findByPostId(long postId);
}
```

Step 2: Update CommentService Interface:

```
import java.util.List;

public interface CommentService {
   CommentDto createComment(long postId, CommentDto commentDto);

   List<CommentDto> getCommentsByPostId(long postId);

}
```

Step 3: Update CommentServiceImpl Class:

```
@Service public class CommentServiceImpl implements
CommentService {

   private CommentRepository commentRepository;
   private PostRepository postRepository;
private ModelMapper mapper;
   public CommentServiceImpl(CommentRepository
commentRepository, PostRepository postRepository, ModelMapper
mapper) {        this.commentRepository = commentRepository;
this.postRepository = postRepository;        this.mapper = mapper;
   }

   @Override     public CommentDto createComment(long postId, CommentDto
commentDto) {

      Comment comment = mapToEntity(commentDto);
```

```
        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // set post to comment entity
comment.setPost(post);

        // comment entity to DB
        Comment newComment =  commentRepository.save(comment);

        return mapToDTO(newComment);
    }

    @Override     public List<CommentDto>
getCommentsByPostId(long postId) {
        // retrieve comments by postId
        List<Comment> comments = commentRepository.findByPostId(postId);

        // convert list of comment entities to list of comment dto's
return                comments.stream().map(comment                ->
mapToDTO(comment)).collect(Collectors.toList());
    }

private CommentDto mapToDTO(Comment comment){
        CommentDto commentDto = mapper.map(comment, CommentDto.class);

       CommentDto commentDto = new CommentDto();
commentDto.setId(comment.getId());
commentDto.setName(comment.getName());
commentDto.setEmail(comment.getEmail());
commentDto.setBody(comment.getBody());
return  commentDto;
    }

    private Comment mapToEntity(CommentDto commentDto){
        Comment comment = mapper.map(commentDto, Comment.class);
Comment            comment            =            new            Comment();
comment.setId(commentDto.getId());
```

```
comment.setName(commentDto.getName());
comment.setEmail(commentDto.getEmail());
comment.setBody(commentDto.getBody());        return  comment;
   }
}
```

Step 4: Create handler method in CommentController Layer:

```
@RestController
@RequestMapping("/api/")
public class CommentController {

   private CommentService commentService;

   public CommentController(CommentService commentService) {
this.commentService = commentService;
   }

   @PostMapping("/posts/{postId}/comments")     public
ResponseEntity<CommentDto> createComment(@PathVariable(value =
"postId") long postId,  @RequestBody CommentDto commentDto){

return new ResponseEntity<>(commentService.createComment(postId, commentDto),
HttpStatus.CREATED);
   }

   @GetMapping("/posts/{postId}/comments")
   public List<CommentDto> getCommentsByPostId(@PathVariable(value =
"postId") Long postId){        return commentService.getCommentsByPostId(postId);
   }
}
```

Get Comment By CommentId

Step 1: Update CommentService interface:

```
import java.util.List;
```

```
public interface CommentService {
   CommentDto createComment(long postId, CommentDto commentDto);

   List<CommentDto> getCommentsByPostId(long postId);

   CommentDto getCommentById(Long postId, Long commentId);

}
```

Step 2: Create BlogApi Exception class:

```
import org.springframework.http.HttpStatus;

public class BlogAPIException extends RuntimeException {

   private HttpStatus status;
private String message;

   public BlogAPIException(HttpStatus status, String message)
      { this.status = status; this.message = message;
   }

   public BlogAPIException(String message, HttpStatus status, String message1)
{       super(message);        this.status = status;        this.message = message1;
   }

   public HttpStatus getStatus() {
return status;
   }

   @Override     public String
getMessage() {        return
message;
   }
}
```

Step 3: Update CommentServiceImpl class:

```
@Service public class CommentServiceImpl implements
CommentService {

   private CommentRepository
commentRepository;     private PostRepository
postRepository;     private ModelMapper mapper;
   public CommentServiceImpl(CommentRepository
commentRepository, PostRepository postRepository, ModelMapper
mapper) {        this.commentRepository = commentRepository;
this.postRepository = postRepository;        this.mapper = mapper;
   }

   @Override     public CommentDto createComment(long postId, CommentDto
commentDto) {

      Comment comment = mapToEntity(commentDto);

      // retrieve post entity by id
      Post post = postRepository.findById(postId).orElseThrow(
            () -> new ResourceNotFoundException("Post", "id", postId));

      // set post to comment entity
comment.setPost(post);

      // comment entity to DB
      Comment newComment =  commentRepository.save(comment);

      return mapToDTO(newComment);
   }

   @Override     public List<CommentDto>
getCommentsByPostId(long postId) {
      // retrieve comments by postId
      List<Comment> comments = commentRepository.findByPostId(postId);

      // convert list of comment entities to list of comment dto's
return                comments.stream().map(comment                ->
mapToDTO(comment)).collect(Collectors.toList());
   }
```

```
   @Override     public CommentDto getCommentById(Long postId, Long
commentId) {
      // retrieve post entity by id
      Post post = postRepository.findById(postId).orElseThrow(
            () -> new ResourceNotFoundException("Post", "id", postId));

      // retrieve comment by id
      Comment comment = commentRepository.findById(commentId).orElseThrow(() -
>              new ResourceNotFoundException("Comment", "id",
commentId));

      if(!comment.getPost().getId().equals(post.getId())){           throw new
BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belong to post");
      }

      return mapToDTO(comment);
   }

private CommentDto mapToDTO(Comment comment){
      CommentDto commentDto = mapper.map(comment, CommentDto.class);

      CommentDto commentDto = new CommentDto();
commentDto.setId(comment.getId());
commentDto.setName(comment.getName());
commentDto.setEmail(comment.getEmail());
commentDto.setBody(comment.getBody());      return
commentDto;
   }

   private Comment mapToEntity(CommentDto commentDto){
      Comment comment = mapper.map(commentDto, Comment.class);
Comment              comment              =              new              Comment();
comment.setId(commentDto.getId());
comment.setName(commentDto.getName());
comment.setEmail(commentDto.getEmail());
comment.setBody(commentDto.getBody());       return  comment;
   }
}
```

Step 4: Update CommentController class:

```
@RestController
@RequestMapping("/api/")
public class CommentController {

   private CommentService commentService;

   public CommentController(CommentService commentService) {
this.commentService = commentService;
   }

   @PostMapping("/posts/{postId}/comments")     public
ResponseEntity<CommentDto> createComment(@PathVariable(value =
"postId") long postId,
@RequestBody CommentDto commentDto){        return new
ResponseEntity<>(commentService.createComment(postId, commentDto),
HttpStatus.CREATED);
   }

   @GetMapping("/posts/{postId}/comments")
   public List<CommentDto> getCommentsByPostId(@PathVariable(value =
"postId") Long postId){        return commentService.getCommentsByPostId(postId);
   }

   @GetMapping("/posts/{postId}/comments/{id}")     public
ResponseEntity<CommentDto> getCommentById(@PathVariable(value =
"postId") Long postId,
                                        @PathVariable(value = "id") Long commentId){
      CommentDto commentDto =
commentService.getCommentById(postId, commentId);        return new
ResponseEntity<>(commentDto, HttpStatus.OK);
   }
}
```

Developing Update Comment Rest API

Rest api url: http://localhost:8080/api/posts/{postId}/comments{id}

Step 1: Update CommentController with following handler method:

```
@PutMapping("/posts/{postId}/comments/{id}")     public
ResponseEntity<CommentDto> updateComment(@PathVariable(value =
"postId") Long postId,
                                    @PathVariable(value = "id") Long commentId,
                                    @RequestBody CommentDto commentDto){
      CommentDto updatedComment =
commentService.updateComment(postId, commentId, commentDto); return
new ResponseEntity<>(updatedComment, HttpStatus.OK);
   }
```

Step 2: Update CommentService Interface:

```
import java.util.List;

public interface CommentService {
   CommentDto createComment(long postId, CommentDto commentDto);

   List<CommentDto> getCommentsByPostId(long postId);

   CommentDto getCommentById(Long postId, Long commentId);

   CommentDto updateComment(Long postId, long commentId, CommentDto
commentRequest);

}
```

Step 3: Update CommentServiceImpl class:

```
@Override

   public CommentDto updateComment(Long postId, long commentId, CommentDto
commentRequest) {

      // retrieve post entity by id

      Post post = postRepository.findById(postId).orElseThrow(
```

```
            () -> new ResourceNotFoundException("Post", "id", postId));


        // retrieve comment by id
        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->
new ResourceNotFoundException("Comment", "id", commentId));


        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belongs
to post");
        }


        comment.setName(commentRequest.getName());
comment.setEmail(commentRequest.getEmail());
comment.setBody(commentRequest.getBody());


        Comment updatedComment = commentRepository.save(comment);
return mapToDTO(updatedComment);
    }
```

Perform Testing in PostMan:

Delete Comment Feature

URL: http://localhost:8080/api/posts/{postId}/comments/{id}

Step 1: Update CommentController Class:

```
   @DeleteMapping("/posts/{postId}/comments/{id}")

   public ResponseEntity<String> deleteComment(@PathVariable(value = "postId") Long
postId,

                                    @PathVariable(value = "id") Long commentId){

       commentService.deleteComment(postId, commentId);        return new

ResponseEntity<>("Comment deleted successfully", HttpStatus.OK);

   }
```

Step 2: Update CommentService Interface

```
import java.util.List; public interface

CommentService {

   CommentDto createComment(long postId, CommentDto commentDto);


   List<CommentDto> getCommentsByPostId(long postId);


   CommentDto getCommentById(Long postId, Long commentId);


   CommentDto updateComment(Long postId, long commentId, CommentDto
commentRequest);


   void deleteComment(Long postId, Long commentId);

}
```

Step 3: Update CommentServiceImpl class

```
  @Override     public void deleteComment(Long postId, Long

commentId) {

       // retrieve post entity by id
```

```
    Post post = postRepository.findById(postId).orElseThrow(
        () -> new ResourceNotFoundException("Post", "id", postId));

    // retrieve comment by id
    Comment comment = commentRepository.findById(commentId).orElseThrow(() ->
new ResourceNotFoundException("Comment", "id", commentId));
if(!comment.getPost().getId().equals(post.getId())){

        throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belongs
to post");
    }

    commentRepository.delete(comment);
  }
```

ModelMapper library or MapStruct

Step 1: Add the following dependency:

```
<!-- https://mvnrepository.com/artifact/org.modelmapper/modelmapper -->
        <dependency>
            <groupId>org.modelmapper</groupId>
            <artifactId>modelmapper</artifactId>
            <version>2.3.9</version>
        </dependency>
```

Step 2: Update PostServiceImpl class as shown below:

```
@Service public class PostServiceImpl implements
PostService {
```

```
    private PostRepository postRepository;

    private ModelMapper mapper;

    public PostServiceImpl(PostRepository postRepository, ModelMapper mapper) {
this.postRepository = postRepository;          this.mapper = mapper;
    }

    @Override     public PostDto
createPost(PostDto postDto) {

        // convert DTO to entity
        Post post = mapToEntity(postDto);
        Post newPost = postRepository.save(post);

        // convert entity to DTO
        PostDto postResponse = mapToDTO(newPost);
return postResponse;
    }

    @Override     public PostResponse getAllPosts(int pageNo, int pageSize, String sortBy,
String sortDir) {

        Sort sort = sortDir.equalsIgnoreCase(Sort.Direction.ASC.name()) ?
```

```
Sort.by(sortBy).ascending()
            : Sort.by(sortBy).descending();

      // create Pageable instance
      Pageable pageable = PageRequest.of(pageNo, pageSize, sort);


      Page<Post> posts = postRepository.findAll(pageable);


      // get content for page object
      List<Post> listOfPosts = posts.getContent();


      List<PostDto> content= listOfPosts.stream().map(post ->
mapToDTO(post)).collect(Collectors.toList());


      PostResponse postResponse = new PostResponse();
postResponse.setContent(content);        postResponse.setPageNo(posts.getNumber());
postResponse.setPageSize(posts.getSize());
postResponse.setTotalElements(posts.getTotalElements());
postResponse.setTotalPages(posts.getTotalPages());
postResponse.setLast(posts.isLast());


      return postResponse;
   }
```

```
   @Override     public PostDto
getPostById(long id) {        Post post =
postRepository.findById(id).orElseThro
w(() -> new
ResourceNotFoundException("Post",
"id", id));        return mapToDTO(post);
   }

   @Override     public PostDto updatePost(PostDto
postDto, long id) {
       // get post by id from the database
       Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));

       post.setTitle(postDto.getTitle());
post.setDescription(postDto.getDescription());
post.setContent(postDto.getContent());

       Post updatedPost = postRepository.save(post);
return mapToDTO(updatedPost);
   }

   @Override     public void
deletePostById(long id) {
       // get post by id from the database
```

```
    Post post = postRepository.findById(id).orElseThrow(() -> new
ResourceNotFoundException("Post", "id", id));
postRepository.delete(post);

  }


  // convert Entity into DTO      private
PostDto mapToDTO(Post post){
    PostDto postDto = mapper.map(post, PostDto.class);
//      PostDto postDto = new PostDto();
//      postDto.setId(post.getId());
//      postDto.setTitle(post.getTitle());
//      postDto.setDescription(post.getDescription());
//              postDto.setContent(post.getContent());
return postDto;
  }


  // convert DTO to entity       private Post
mapToEntity(PostDto postDto){
    Post post = mapper.map(postDto, Post.class);
//      Post post = new Post();
//      post.setTitle(postDto.getTitle());
//      post.setDescription(postDto.getDescription());
//              post.setContent(postDto.getContent());
return post;
  }
```

}

Step 3: Update CommentServiceImpl class:

@Service public class CommentServiceImpl implements

CommentService {

private CommentRepository commentRepository;

private PostRepository postRepository; private

ModelMapper mapper;

public CommentServiceImpl(CommentRepository commentRepository, PostRepository

postRepository, ModelMapper mapper) { this.commentRepository =

commentRepository; this.postRepository = postRepository; this.mapper =

mapper;

}

@Override public CommentDto createComment(long postId, CommentDto

commentDto) {

Comment comment = mapToEntity(commentDto);

// retrieve post entity by id

Post post = postRepository.findById(postId).orElseThrow(

() -> new ResourceNotFoundException("Post", "id", postId));

// set post to comment entity

```
        comment.setPost(post);


        // comment entity to DB
        Comment newComment =  commentRepository.save(comment);


        return mapToDTO(newComment);
    }


    @Override     public List<CommentDto>
getCommentsByPostId(long postId) {
        // retrieve comments by postId
        List<Comment> comments = commentRepository.findByPostId(postId);


        // convert list of comment entities to list of comment dto's
        return comments.stream().map(comment ->
mapToDTO(comment)).collect(Collectors.toList());
    }


    @Override     public CommentDto getCommentById(Long postId, Long
commentId) {
        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // retrieve comment by id
```

```
        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->
new ResourceNotFoundException("Comment", "id", commentId));

        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belong to
post");
        }

        return mapToDTO(comment);
    }

    @Override
    public CommentDto updateComment(Long postId, long commentId, CommentDto
commentRequest) {
        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // retrieve comment by id
        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->
new ResourceNotFoundException("Comment", "id", commentId));

        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belongs
to post");
        }
```

```
        comment.setName(commentRequest.getName());
comment.setEmail(commentRequest.getEmail());
comment.setBody(commentRequest.getBody());

        Comment updatedComment = commentRepository.save(comment);
return mapToDTO(updatedComment);
    }

    @Override     public void deleteComment(Long postId, Long
commentId) {
        // retrieve post entity by id
        Post post = postRepository.findById(postId).orElseThrow(
                () -> new ResourceNotFoundException("Post", "id", postId));

        // retrieve comment by id
        Comment comment = commentRepository.findById(commentId).orElseThrow(() ->
new ResourceNotFoundException("Comment", "id", commentId));

        if(!comment.getPost().getId().equals(post.getId())){
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "Comment does not belongs
to post");
        }

        commentRepository.delete(comment);
```

```
    }

    private CommentDto mapToDTO(Comment comment){
        CommentDto commentDto = mapper.map(comment, CommentDto.class);

//      CommentDto commentDto = new CommentDto();
//      commentDto.setId(comment.getId());
//      commentDto.setName(comment.getName());
//      commentDto.setEmail(comment.getEmail());
//       commentDto.setBody(comment.getBody());
return  commentDto;
    }

    private Comment mapToEntity(CommentDto commentDto){
        Comment comment = mapper.map(commentDto, Comment.class);
//      Comment comment = new Comment();
//      comment.setId(commentDto.getId());
//      comment.setName(commentDto.getName());
//      comment.setEmail(commentDto.getEmail());
//       comment.setBody(commentDto.getBody());
return  comment;

    }
}
```

Exception Handling – Specific Exception & Global Exception

Step 1: Create ErrorDetails class in payload package

```
import java.util.Date;

public class ErrorDetails {
private Date timestamp;
private String message;
private String details;

   public ErrorDetails(Date timestamp, String message, String details) {
this.timestamp = timestamp;        this.message = message;
this.details = details;
   }

   public Date getTimestamp() {
return timestamp;
   }

   public String getMessage() {
return message;

   }
```

```
   public String getDetails() {
return details;
   }
}
```

Step 2: Create GlobalExceptionHandler class in exceptionpackage import

```
com.springboot.blog.payload.ErrorDetails; import
org.springframework.http.HttpHeaders; import
org.springframework.http.HttpStatus; import
org.springframework.http.ResponseEntity; import
org.springframework.validation.FieldError; import
org.springframework.web.bind.MethodArgumentNotValidException; import
org.springframework.web.bind.annotation.ControllerAdvice; import
org.springframework.web.bind.annotation.ExceptionHandler; import
org.springframework.web.context.request.WebRequest;
import
org.springframework.web.servlet.mvc.method.annotation.ResponseEntityExceptionHandler;


import java.util.Date; import
java.util.HashMap; import
java.util.Map;


@ControllerAdvice
public class GlobalExceptionHandler extends ResponseEntityExceptionHandler {


   // handle specific exceptions
```

```
   @ExceptionHandler(ResourceNotFoundException.class)

   public ResponseEntity<ErrorDetails>
handleResourceNotFoundException(ResourceNotFoundException exception,

                                                WebRequest webRequest){

      ErrorDetails errorDetails = new ErrorDetails(new Date(), exception.getMessage(),

webRequest.getDescription(false));        return new ResponseEntity<>(errorDetails,

HttpStatus.NOT_FOUND);

   }


   @ExceptionHandler(BlogAPIException.class)     public ResponseEntity<ErrorDetails>

handleBlogAPIException(BlogAPIException exception,

                                                WebRequest webRequest){

      ErrorDetails errorDetails = new ErrorDetails(new Date(), exception.getMessage(),

webRequest.getDescription(false));        return new ResponseEntity<>(errorDetails,

HttpStatus.BAD_REQUEST);

   }

   // global exceptions

   @ExceptionHandler(Exception.class)     public ResponseEntity<ErrorDetails>

handleGlobalException(Exception exception,

                                            WebRequest webRequest){

      ErrorDetails errorDetails = new ErrorDetails(new Date(), exception.getMessage(),

webRequest.getDescription(false));        return new ResponseEntity<>(errorDetails,

HttpStatus.INTERNAL_SERVER_ERROR);

   }

}
```

Spring Validations

Step 1: Add dependency in pom.xml file

```
<!-- https://mvnrepository.com/artifact/org.springframework.boot/spring-boot-startervalidation -->

        <dependency>

            <groupId>org.springframework.boot</groupId>

            <artifactId>spring-boot-starter-validation</artifactId>

        </dependency>
```

Step 2: Add Validation annotations in DTO classes package

```
com.springboot.blog.payload;


import io.swagger.annotations.ApiModel; import

io.swagger.annotations.ApiModelProperty; import

lombok.Data;


import javax.validation.constraints.NotEmpty;

import javax.validation.constraints.Size; import

java.util.Set;


@ApiModel(description = "Post model information")

@Data

public class PostDto {


   private long id;
```

```
   // title should not be null  or empty
   // title should have at least 2 characters
   @NotEmpty
   @Size(min = 2, message = "Post title should have at least 2 characters")
private String title;

   // post description should be not null or empty
   // post description should have at least 10 characters
   @NotEmpty
   @Size(min = 10, message = "Post description should have at least 10 characters")
private String description;

   // post content should not be null or empty
      @NotEmpty     private String
content;     private Set<CommentDto>
comments;
}
```

Step 3: Add @Valid annotation in controller class: import

com.springboot.blog.payload.PostDto; import

com.springboot.blog.payload.PostResponse; import

com.springboot.blog.service.PostService; import

com.springboot.blog.utils.AppConstants; import

```
io.swagger.annotations.Api; import

io.swagger.annotations.ApiOperation; import

io.swagger.annotations.ApiResponses; import

org.springframework.http.HttpStatus; import

org.springframework.http.ResponseEntity; import

org.springframework.security.access.prepost.PreAuthorize; import

org.springframework.web.bind.annotation.*;


import javax.validation.Valid;


@RestController

@RequestMapping()

public class PostController {


   private PostService postService;


   public PostController(PostService postService) {

this.postService = postService;

   }

   // create blog post rest api

   @PostMapping("/api/v1/posts")    public ResponseEntity<PostDto> createPost(@Valid

@RequestBody PostDto postDto){       return new

ResponseEntity<>(postService.createPost(postDto), HttpStatus.CREATED);

   }
```

```
   // get all posts rest api

   @GetMapping("/api/v1/posts")

public PostResponse getAllPosts(

        @RequestParam(value = "pageNo", defaultValue =
AppConstants.DEFAULT_PAGE_NUMBER, required = false) int pageNo,

        @RequestParam(value = "pageSize", defaultValue =
AppConstants.DEFAULT_PAGE_SIZE, required = false) int pageSize,

        @RequestParam(value = "sortBy", defaultValue = AppConstants.DEFAULT_SORT_BY,
required = false) String sortBy,

        @RequestParam(value = "sortDir", defaultValue =
AppConstants.DEFAULT_SORT_DIRECTION, required = false) String sortDir

   ){

      return postService.getAllPosts(pageNo, pageSize, sortBy, sortDir);

   }



   // get post by id

   @GetMapping(value = "/api/v1/posts/{id}")     public ResponseEntity<PostDto>

getPostByIdV1(@PathVariable(name = "id") long id){        return

ResponseEntity.ok(postService.getPostById(id));

   }

   // update post by id rest api

   @PutMapping("/api/v1/posts/{id}")

   public ResponseEntity<PostDto> updatePost(@Valid @RequestBody PostDto postDto,
@PathVariable(name = "id") long id){



      PostDto postResponse = postService.updatePost(postDto, id);
```

```
    return new ResponseEntity<>(postResponse, HttpStatus.OK);
  }

  // delete post rest api
  @DeleteMapping("/api/v1/posts/{id}")    public ResponseEntity<String>
deletePost(@PathVariable(name = "id") long id){

    postService.deletePostById(id);

    return new ResponseEntity<>("Post entity deleted successfully.", HttpStatus.OK);
  }
}
```

Spring Security

Step 1: Add Spring Dependency Jar

```
<dependency>
<groupId>org.springframework.boot</groupId>
<artifactId>spring-boot-starter-security</artifactId>
</dependency>
```

Step 2: All Links of rest api are now secured

Step 3: Update application.properties file

Spring.security.user.name=pankaj

Spring.security.user.password=password

Spring.security.user.roles=ADMIN

Step 4: Implementing basic authentication

Develop config package

Step 5: Develop SecurityConfig class and Extend WebSecurityConfigurerAdapter

@Configuration

@EnableWebSecurity public class SecurityConfig extends

WebSecurityConfigurerAdapter {

@Override protected void configure(HttpSecurity http)

throws Exception {

http

.csrf().disable()

.authorizeRequests()

.anyRequest()

.authenticated()

.and()

.httpBasic();

}

}

In memory Authentication

Step 1: Update SecurityConfig class as shown below:

```
package com.springboot.blog.config;

import org.springframework.context.annotation.Bean; import
org.springframework.context.annotation.Configuration; import
org.springframework.http.HttpMethod; import
org.springframework.security.config.annotation.method.configuration.EnableGlo
balMethodSecurity; import
```

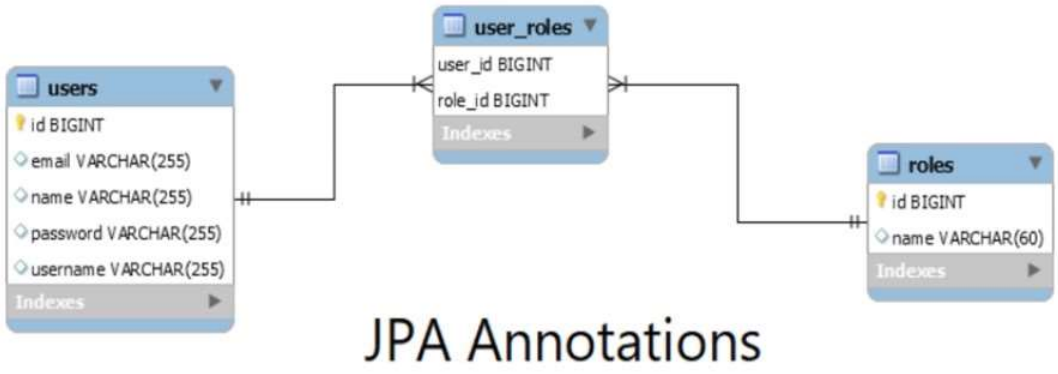
```
org.springframework.security.config.annotation.web.builders.HttpSecurity;
import
org.springframework.security.config.annotation.web.configuration.EnableWebSec
urity; import
org.springframework.security.config.annotation.web.configuration.WebSecurityC
onfigurerAdapter;
import org.springframework.security.core.userdetails.User; import
org.springframework.security.core.userdetails.UserDetails; import
org.springframework.security.core.userdetails.UserDetailsService; import
org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder; import
org.springframework.security.crypto.password.PasswordEncoder; import
org.springframework.security.provisioning.InMemoryUserDetailsManager;


@Configuration
@EnableWebSecurity
@EnableGlobalMethodSecurity(prePostEnabled = true)
public class SecurityConfig extends WebSecurityConfigurerAdapter {


    @Bean
    PasswordEncoder passwordEncoder(){
return new BCryptPasswordEncoder();
    }

    @Override
    protected void configure(HttpSecurity http) throws Exception {
http
                .csrf().disable()
                .authorizeRequests()
                .antMatchers(HttpMethod.GET, "/api/**").permitAll()
                .anyRequest()
                .authenticated()
                .and()
.httpBasic();
    }



        @Override
@Bean
    protected UserDetailsService userDetailsService() {
        UserDetails ramesh =
User.builder().username("pankaj").password(passwordEncoder()
                .encode("password")).roles("USER").build();
UserDetails admin =
User.builder().username("admin").password(passwordEncoder()
.encode("admin")).roles("ADMIN").build();         return new
InMemoryUserDetailsManager(ramesh, admin);
    }
}
```

Step 2: Add @PreAuthorize("hasRole('ADMIN')") Annotation in controller layer

```
package com.springboot.blog.controller;
 import com.springboot.blog.payload.PostDto;
import com.springboot.blog.payload.PostResponse;
import com.springboot.blog.service.PostService;
import com.springboot.blog.utils.AppConstants;
import org.springframework.http.HttpStatus;
import org.springframework.http.ResponseEntity;
import org.springframework.security.access.prepost.PreAuthorize; import
org.springframework.web.bind.annotation.*;
 import
javax.validation.Valid; import
java.util.List;

@RestController
@RequestMapping("/api/posts") public
class PostController {

    private PostService postService;

    public PostController(PostService postService) {
this.postService = postService;
    }

    @PreAuthorize("hasRole('ADMIN')")
    // create blog post rest api
    @PostMapping
    public ResponseEntity<PostDto> createPost(@Valid @RequestBody PostDto
postDto){
        return new ResponseEntity<>(postService.createPost(postDto),
HttpStatus.CREATED);
    }

    // get all posts rest api
    @GetMapping
    public PostResponse getAllPosts(
            @RequestParam(value = "pageNo", defaultValue =
AppConstants.DEFAULT_PAGE_NUMBER, required = false) int pageNo,
@RequestParam(value = "pageSize", defaultValue =
AppConstants.DEFAULT_PAGE_SIZE, required = false) int pageSize,
            @RequestParam(value = "sortBy", defaultValue =
AppConstants.DEFAULT_SORT_BY, required = false) String sortBy,
            @RequestParam(value = "sortDir", defaultValue =
AppConstants.DEFAULT_SORT_DIRECTION, required = false) String sortDir
    ){
        return postService.getAllPosts(pageNo, pageSize, sortBy, sortDir);
}

    // get post by id
    @GetMapping("/{id}")
    public ResponseEntity<PostDto> getPostById(@PathVariable(name = "id")
long id){
```

```
        return ResponseEntity.ok(postService.getPostById(id));
    }

    @PreAuthorize("hasRole('ADMIN')")
    // update post by id rest api
    @PutMapping("/{id}")
    public ResponseEntity<PostDto> updatePost(@Valid @RequestBody PostDto postDto,
@PathVariable(name = "id") long id){

       PostDto postResponse = postService.updatePost(postDto, id);

       return new ResponseEntity<>(postResponse, HttpStatus.OK);
    }

    @PreAuthorize("hasRole('ADMIN')")
    // delete post rest api
@DeleteMapping("/{id}")
    public ResponseEntity<String> deletePost(@PathVariable(name = "id") long
id){
        postService.deletePostById(id);

        return new ResponseEntity<>("Post entity deleted successfully.",
HttpStatus.OK);
    }
}
```

Create JPA Entities User & Role



Step 1: Create user table:

```
package com.springboot.blog.entity;
 import
lombok.Data;
 import
javax.persistence.*; import
java.util.Set;

@Data
@Entity
```

```
@Table(name = "users", uniqueConstraints = {
        @UniqueConstraint(columnNames = {"username"}),
        @UniqueConstraint(columnNames = {"email"})
})
public class User {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
private long id;     private String name;     private
String username;     private String email;     private
String password;

    @ManyToMany(fetch = FetchType.EAGER, cascade = CascadeType.ALL)
    @JoinTable(name = "user_roles",
            joinColumns = @JoinColumn(name = "user_id", referencedColumnName
= "id"),
            inverseJoinColumns = @JoinColumn(name = "role_id",
referencedColumnName = "id"))     private Set<Role> roles;
}
```

Step 2: Create Role Entity Class:

```
package com.springboot.blog.entity;
 import
lombok.Getter; import
lombok.Setter;

import javax.persistence.*;

@Setter
@Getter
@Entity
@Table(name = "roles") public
class Role {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
private long id;

    @Column(length = 60)
private String name; }
```

Create Repository Layer

Step 1: Create UserRepository Layer

```
package com.springboot.blog.repository; import
com.springboot.blog.entity.User; import
org.springframework.data.domain.Example;
import org.springframework.data.jpa.repository.JpaRepository;

import java.util.Optional;

public interface UserRepository extends JpaRepository<User, Long> {
    Optional<User> findByEmail(String email);
    Optional<User> findByUsernameOrEmail(String username, String email);
    Optional<User> findByUsername(String username);
    Boolean existsByUsername(String username);
    Boolean existsByEmail(String email);
}
```

Step 2: Create RoleRepository Layer

```
import com.springboot.blog.entity.Role;
import org.springframework.data.jpa.repository.JpaRepository;

import java.util.Optional;

public interface RoleRepository extends JpaRepository<Role, Long> {
    Optional<Role> findByName(String name);
}
```

UserDetailsService Implementation

Step 1: Create CustomUserDetailsService class in security package

```
package com.springboot.blog.security;
  import com.springboot.blog.entity.Role; import
com.springboot.blog.entity.User; import
com.springboot.blog.repository.UserRepository; import
org.springframework.security.core.GrantedAuthority;
import org.springframework.security.core.authority.SimpleGrantedAuthority;
import org.springframework.security.core.userdetails.UserDetails; import
org.springframework.security.core.userdetails.UserDetailsService; import
org.springframework.security.core.userdetails.UsernameNotFoundException;
import org.springframework.stereotype.Service;
 import
java.util.Collection; import
java.util.Set;
import java.util.stream.Collectors;
 @Service
public class CustomUserDetailsService implements UserDetailsService {

    private UserRepository userRepository;
```

```
    public CustomUserDetailsService(UserRepository userRepository) {
this.userRepository = userRepository;
    }

    @Override
    public UserDetails loadUserByUsername(String usernameOrEmail) throws
UsernameNotFoundException {
        User user = userRepository.findByUsernameOrEmail(usernameOrEmail,
usernameOrEmail)
                .orElseThrow(() ->
                        new UsernameNotFoundException("User not found with
username or email:" + usernameOrEmail));         return new
org.springframework.security.core.userdetails.User(user.getEmail(),
user.getPassword(), mapRolesToAuthorities(user.getRoles()));     }
    private Collection< ? extends GrantedAuthority>
mapRolesToAuthorities(Set<Role> roles){
return roles.stream().map(role -> new
SimpleGrantedAuthority(role.getName())).collect(Collectors.toList());
    }
}
```

Step 2: Update SecurityConfig File as shown below:

```
package com.springboot.blog.config;
 import com.springboot.blog.security.CustomUserDetailsService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.context.annotation.Bean; import
org.springframework.context.annotation.Configuration; import
org.springframework.http.HttpMethod; import
org.springframework.security.config.annotation.authentication.builders.Authen
ticationManagerBuilder; import
org.springframework.security.config.annotation.method.configuration.EnableGlo
balMethodSecurity; import
org.springframework.security.config.annotation.web.builders.HttpSecurity;
import
org.springframework.security.config.annotation.web.configuration.EnableWebSec
urity; import
org.springframework.security.config.annotation.web.configuration.WebSecurityC
onfigurerAdapter;
import org.springframework.security.core.userdetails.User; import
org.springframework.security.core.userdetails.UserDetails; import
org.springframework.security.core.userdetails.UserDetailsService; import
org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder; import
org.springframework.security.crypto.password.PasswordEncoder; import
org.springframework.security.provisioning.InMemoryUserDetailsManager;
@Configuration
@EnableWebSecurity
@EnableGlobalMethodSecurity(prePostEnabled = true)
public class SecurityConfig extends WebSecurityConfigurerAdapter {

    @Autowired
```

```
    private CustomUserDetailsService userDetailsService;

    @Bean
    PasswordEncoder passwordEncoder(){
return new BCryptPasswordEncoder();
    }

    @Override
    protected void configure(HttpSecurity http) throws Exception {
http
                .csrf().disable()
                .authorizeRequests()
                .antMatchers(HttpMethod.GET, "/api/**").permitAll()
                .anyRequest()
                .authenticated()
                .and()
.httpBasic();
    }

    @Override
    protected void configure(AuthenticationManagerBuilder auth) throws
Exception {
        auth.userDetailsService(userDetailsService)
.passwordEncoder(passwordEncoder());
    }

    //    @Override
//    @Bean
//    protected UserDetailsService userDetailsService() {
//        UserDetails ramesh =
User.builder().username("ramesh").password(passwordEncoder()
//                .encode("password")).roles("USER").build();
//        UserDetails admin =
User.builder().username("admin").password(passwordEncoder()
//                .encode("admin")).roles("ADMIN").build();
//        return new InMemoryUserDetailsManager(ramesh, admin);
//    }
}
```

Developing Signin Rest API

Step 1: Create LoginDto class in payload package:

```
import lombok.Data;
```

@Data

public class LoginDto { private

String usernameOrEmail;

private String password;

}

Step 2: Create AuthController class in controller package:

```
import com.springboot.blog.payload.LoginDto; import
com.springboot.blog.repository.UserRepository; import
org.springframework.beans.factory.annotation.Autowired; import
org.springframework.http.HttpStatus; import
org.springframework.http.ResponseEntity;
import org.springframework.security.authentication.AuthenticationManager;
import
org.springframework.security.authentication.UsernamePasswordAuthenticationTok
en;
import org.springframework.security.core.Authentication;
import org.springframework.security.core.context.SecurityContextHolder;
import org.springframework.web.bind.annotation.PostMapping; import
org.springframework.web.bind.annotation.RequestBody; import
org.springframework.web.bind.annotation.RequestMapping; import
org.springframework.web.bind.annotation.RestController;

@RestController
@RequestMapping("/api/auth") public
class AuthController {

    @Autowired
    private AuthenticationManager authenticationManager;
    @PostMapping("/signin")
    public ResponseEntity<String> authenticateUser(@RequestBody LoginDto
loginDto){
        Authentication authentication = authenticationManager.authenticate(
new
UsernamePasswordAuthenticationToken(loginDto.getUsernameOrEmail(),
loginDto.getPassword())
        );
        SecurityContextHolder.getContext().setAuthentication(authentication);
return new ResponseEntity<>("User signed-in successfully!.", HttpStatus.OK);
    }
}
```

Step 3: Update SecurityConfig File:

```
import com.springboot.blog.security.CustomUserDetailsService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.context.annotation.Bean; import
org.springframework.context.annotation.Configuration; import
org.springframework.http.HttpMethod;
import org.springframework.security.authentication.AuthenticationManager;
import
org.springframework.security.config.annotation.authentication.builders.Authen
ticationManagerBuilder; import
org.springframework.security.config.annotation.method.configuration.EnableGlo
balMethodSecurity; import
org.springframework.security.config.annotation.web.builders.HttpSecurity;
import
org.springframework.security.config.annotation.web.configuration.EnableWebSec
urity; import
org.springframework.security.config.annotation.web.configuration.WebSecurityC
onfigurerAdapter;
import org.springframework.security.core.userdetails.User; import
org.springframework.security.core.userdetails.UserDetails; import
org.springframework.security.core.userdetails.UserDetailsService; import
org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder; import
org.springframework.security.crypto.password.PasswordEncoder; import
org.springframework.security.provisioning.InMemoryUserDetailsManager;
@Configuration
@EnableWebSecurity
@EnableGlobalMethodSecurity(prePostEnabled = true)
public class SecurityConfig extends WebSecurityConfigurerAdapter {

    @Autowired
    private CustomUserDetailsService userDetailsService;

    @Bean
    PasswordEncoder passwordEncoder(){
return new BCryptPasswordEncoder();
    }

    @Override
@Bean
    public AuthenticationManager authenticationManagerBean() throws Exception
{         return
super.authenticationManagerBean();     }

    @Override
    protected void configure(HttpSecurity http) throws Exception {
http
                .csrf().disable()
                .authorizeRequests()
                .antMatchers(HttpMethod.GET, "/api/**").permitAll()
                .antMatchers("/api/auth/**").permitAll()
                .anyRequest()
                .authenticated()
                .and()
.httpBasic();
    }
```

```
    @Override
    protected void configure(AuthenticationManagerBuilder auth) throws
Exception {
        auth.userDetailsService(userDetailsService)
.passwordEncoder(passwordEncoder());
    }

    //    @Override
//    @Bean
//    protected UserDetailsService userDetailsService() {
//        UserDetails ramesh =
User.builder().username("ramesh").password(passwordEncoder()
//                .encode("password")).roles("USER").build();
//        UserDetails admin =
User.builder().username("admin").password(passwordEncoder()
//                .encode("admin")).roles("ADMIN").build();
//        return new InMemoryUserDetailsManager(ramesh, admin);
//    }
}
```

Developing SignUp Feature Rest API

Step 1: Update AuthController class as shown below

```
package com.springboot.blog.controller;
 import com.springboot.blog.entity.Role; import
com.springboot.blog.entity.User; import
com.springboot.blog.payload.LoginDto; import
com.springboot.blog.payload.SignUpDto; import
com.springboot.blog.repository.RoleRepository; import
com.springboot.blog.repository.UserRepository; import
org.springframework.beans.factory.annotation.Autowired; import
org.springframework.http.HttpStatus; import
org.springframework.http.ResponseEntity;
import org.springframework.security.authentication.AuthenticationManager;
import
org.springframework.security.authentication.UsernamePasswordAuthenticationTok
en;
import org.springframework.security.core.Authentication;
import org.springframework.security.core.context.SecurityContextHolder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.web.bind.annotation.PostMapping; import
org.springframework.web.bind.annotation.RequestBody; import
org.springframework.web.bind.annotation.RequestMapping; import
org.springframework.web.bind.annotation.RestController;

import java.util.Collections;
```

```
@RestController
@RequestMapping("/api/auth") public
class AuthController {

    @Autowired
    private AuthenticationManager authenticationManager;

    @Autowired
    private UserRepository userRepository;

    @Autowired
    private RoleRepository roleRepository;

    @Autowired
    private PasswordEncoder passwordEncoder;

    @PostMapping("/signin")
    public ResponseEntity<String> authenticateUser(@RequestBody LoginDto
loginDto){
        Authentication authentication =
authenticationManager.authenticate(new UsernamePasswordAuthenticationToken(
loginDto.getUsernameOrEmail(), loginDto.getPassword()));
        SecurityContextHolder.getContext().setAuthentication(authentication);
return new ResponseEntity<>("User signed-in successfully!.",
HttpStatus.OK);
    }

    @PostMapping("/signup")
    public ResponseEntity<?> registerUser(@RequestBody SignUpDto signUpDto){
        // add check for username exists in a DB
        if(userRepository.existsByUsername(signUpDto.getUsername())){
return new ResponseEntity<>("Username is already taken!",
HttpStatus.BAD_REQUEST);
        }

        // add check for email exists in DB
        if(userRepository.existsByEmail(signUpDto.getEmail())){
return new ResponseEntity<>("Email is already taken!",
HttpStatus.BAD_REQUEST);
        }

        // create user object
        User user = new User();
user.setName(signUpDto.getName());
user.setUsername(signUpDto.getUsername());
user.setEmail(signUpDto.getEmail());
        user.setPassword(passwordEncoder.encode(signUpDto.getPassword()));
        Role roles = roleRepository.findByName("ROLE_ADMIN").get();
user.setRoles(Collections.singleton(roles));

        userRepository.save(user);
```

```
        return new ResponseEntity<>("User registered successfully",
HttpStatus.OK);

    } }
```

Step 2: Develop SignUpDto payload class:

```
import lombok.Data;
 @Data
public class SignUpDto {
private String name;     private
String username;     private
String email;     private String
password;
}
```

Developing JWT Token

For JWT Token add the following dependency:

```
<dependency>

<groupId>io.jsonwebtoken</groupId>

<artifactId>jjwt</artifactId>

<version>0.9.1</version>

</dependency>
```

Step 1: In security package create JwtAuthenticationEntryPoint import

org.springframework.security.core.AuthenticationException; import

org.springframework.security.web.AuthenticationEntryPoint; import

org.springframework.stereotype.Component;

import javax.servlet.ServletException; import

javax.servlet.http.HttpServletRequest; import

```
javax.servlet.http.HttpServletResponse;

import java.io.IOException;


@Component

public class JwtAuthenticationEntryPoint implements AuthenticationEntryPoint {

   @Override     public void

commence(HttpServletRequest request,

                    HttpServletResponse response,

                    AuthenticationException authException) throws IOException, ServletException {

      response.sendError(HttpServletResponse.SC_UNAUTHORIZED,
authException.getMessage());


   }

}
```

Step 2: Update application.properties file:

```
## App Properties app.jwt-secret=

JWTSecretKey app.jwt-expiration-

milliseconds = 604800000
```

Step 3: Develop JwtAuthenticationFilter class in security package:

```
package com.springboot.blog.security;


import org.springframework.beans.factory.annotation.Autowired;

import
org.springframework.security.authentication.UsernamePasswordAuthenticationToken;
import org.springframework.security.core.context.SecurityContextHolder; import
```

```
org.springframework.security.core.userdetails.UserDetails; import
org.springframework.security.web.authentication.WebAuthenticationDetailsSource; import
org.springframework.util.StringUtils; import
org.springframework.web.filter.OncePerRequestFilter;

import javax.servlet.FilterChain; import

javax.servlet.ServletException; import

javax.servlet.http.HttpServletRequest; import

javax.servlet.http.HttpServletResponse; import

java.io.IOException;


public class JwtAuthenticationFilter extends OncePerRequestFilter {


   // inject dependencies     @Autowired

private JwtTokenProvider tokenProvider;


   @Autowired     private CustomUserDetailsService

customUserDetailsService;


   @Override     protected void

doFilterInternal(HttpServletRequest request,

                            HttpServletResponse response,

                            FilterChain filterChain) throws ServletException, IOException {

      // get JWT (token) from http request

      String token = getJWTfromRequest(request);
```

```
    // validate token        if(StringUtils.hasText(token) &&
tokenProvider.validateToken(token)){
        // get username from token
        String username = tokenProvider.getUsernameFromJWT(token);
        // load user associated with token
        UserDetails userDetails = customUserDetailsService.loadUserByUsername(username);


        UsernamePasswordAuthenticationToken authenticationToken = new
UsernamePasswordAuthenticationToken(
            userDetails, null, userDetails.getAuthorities()
        );
        authenticationToken.setDetails(new
WebAuthenticationDetailsSource().buildDetails(request));
        // set spring security
        SecurityContextHolder.getContext().setAuthentication(authenticationToken);
    }
    filterChain.doFilter(request, response);
  }


  // Bearer <accessToken>    private String
getJWTfromRequest(HttpServletRequest request){          String
bearerToken = request.getHeader("Authorization");
if(StringUtils.hasText(bearerToken) &&
bearerToken.startsWith("Bearer ")){              return
bearerToken.substring(7, bearerToken.length());
```

```
        }
        return null;
    }

}
```

Step 4: Develop JwtTokenProvider class in security package:

```
package com.springboot.blog.security;

import com.springboot.blog.exception.BlogAPIException;
import io.jsonwebtoken.*; import
org.springframework.beans.factory.annotation.Value; import
org.springframework.http.HttpStatus; import
org.springframework.security.core.Authentication; import
org.springframework.stereotype.Component;

import java.util.Date;

@Component
public class JwtTokenProvider {

    @Value("${app.jwt-secret}")
private String jwtSecret;
@Value("${app.jwt-expiration-
```

```
milliseconds}")     private int
jwtExpirationInMs;

   // generate token     public String
generateToken(Authentication authentication){
       String username = authentication.getName();
       Date currentDate = new Date();
       Date expireDate = new Date(currentDate.getTime() + jwtExpirationInMs);

       String token = Jwts.builder()
              .setSubject(username)
              .setIssuedAt(new Date())
              .setExpiration(expireDate)
              .signWith(SignatureAlgorithm.HS512, jwtSecret)
              .compact();
return token;
   }

   // get username from the token     public String
getUsernameFromJWT(String token){
       Claims claims = Jwts.parser()
              .setSigningKey(jwtSecret)
              .parseClaimsJws(token)
              .getBody();
```

```
        return claims.getSubject();
    }

    // validate JWT token     public boolean
validateToken(String token){
        try{
            Jwts.parser().setSigningKey(jwtSecret).parseClaimsJws(token);
            return true;
        }catch (SignatureException ex){            throw new
BlogAPIException(HttpStatus.BAD_REQUEST, "Invalid JWT signature");
        } catch (MalformedJwtException ex) {            throw new
BlogAPIException(HttpStatus.BAD_REQUEST, "Invalid JWT token");
        } catch (ExpiredJwtException ex) {            throw new
BlogAPIException(HttpStatus.BAD_REQUEST, "Expired JWT token");
        } catch (UnsupportedJwtException ex) {            throw new
BlogAPIException(HttpStatus.BAD_REQUEST, "Unsupported JWT token");
        } catch (IllegalArgumentException ex) {
            throw new BlogAPIException(HttpStatus.BAD_REQUEST, "JWT claims string is empty.");
        }
    }

}
```

Step 4: Update AuthController class:

```
import com.springboot.blog.entity.Role; import
com.springboot.blog.entity.User; import
com.springboot.blog.payload.JWTAuthResponse; import
com.springboot.blog.payload.LoginDto; import
com.springboot.blog.payload.SignUpDto; import
com.springboot.blog.repository.RoleRepository; import
com.springboot.blog.repository.UserRepository; import
com.springboot.blog.security.JwtTokenProvider; import
org.springframework.beans.factory.annotation.Autowired; import
org.springframework.http.HttpStatus; import
org.springframework.http.ResponseEntity; import
org.springframework.security.authentication.AuthenticationManager;
import
org.springframework.security.authentication.UsernamePasswordAuthenticationToken
; import org.springframework.security.core.Authentication; import
org.springframework.security.core.context.SecurityContextHolder; import
org.springframework.security.crypto.password.PasswordEncoder; import
org.springframework.web.bind.annotation.PostMapping; import
org.springframework.web.bind.annotation.RequestBody; import
org.springframework.web.bind.annotation.RequestMapping; import
org.springframework.web.bind.annotation.RestController;

import java.util.Collections;

@RestController
```

```
@RequestMapping("/api/auth") public

class AuthController {


   @Autowired     private AuthenticationManager

authenticationManager;


   @Autowired     private UserRepository

userRepository;


   @Autowired     private RoleRepository

roleRepository;


   @Autowired     private PasswordEncoder

passwordEncoder;


   @Autowired     private JwtTokenProvider

tokenProvider;


   @PostMapping("/signin")

   public ResponseEntity<JWTAuthResponse> authenticateUser(@RequestBody LoginDto
loginDto){

      Authentication authentication = authenticationManager.authenticate(new
UsernamePasswordAuthenticationToken(

            loginDto.getUsernameOrEmail(), loginDto.getPassword()));
SecurityContextHolder.getContext().setAuthentication(authentication);
```

```
    // get token form tokenProvider
    String token = tokenProvider.generateToken(authentication);

    return ResponseEntity.ok(new JWTAuthResponse(token));
  }

  @PostMapping("/signup")    public ResponseEntity<?>
registerUser(@RequestBody SignUpDto signUpDto){

    // add check for username exists in a DB
if(userRepository.existsByUsername(signUpDto.getUsername())){
        return new ResponseEntity<>("Username is already taken!",
HttpStatus.BAD_REQUEST);
    }

    // add check for email exists in DB
if(userRepository.existsByEmail(signUpDto.getEmail())){          return new
ResponseEntity<>("Email is already taken!", HttpStatus.BAD_REQUEST);
    }

    // create user object
    User user = new User();       user.setName(signUpDto.getName());
user.setUsername(signUpDto.getUsername());
user.setEmail(signUpDto.getEmail());
user.setPassword(passwordEncoder.encode(signUpDto.getPassword()));
```

```
        Role roles = roleRepository.findByName("ROLE_ADMIN").get();
user.setRoles(Collections.singleton(roles));

        userRepository.save(user);

        return new ResponseEntity<>("User registered successfully", HttpStatus.OK);

    }
}
```

Step 5: Create payload class JWTAuthResponse

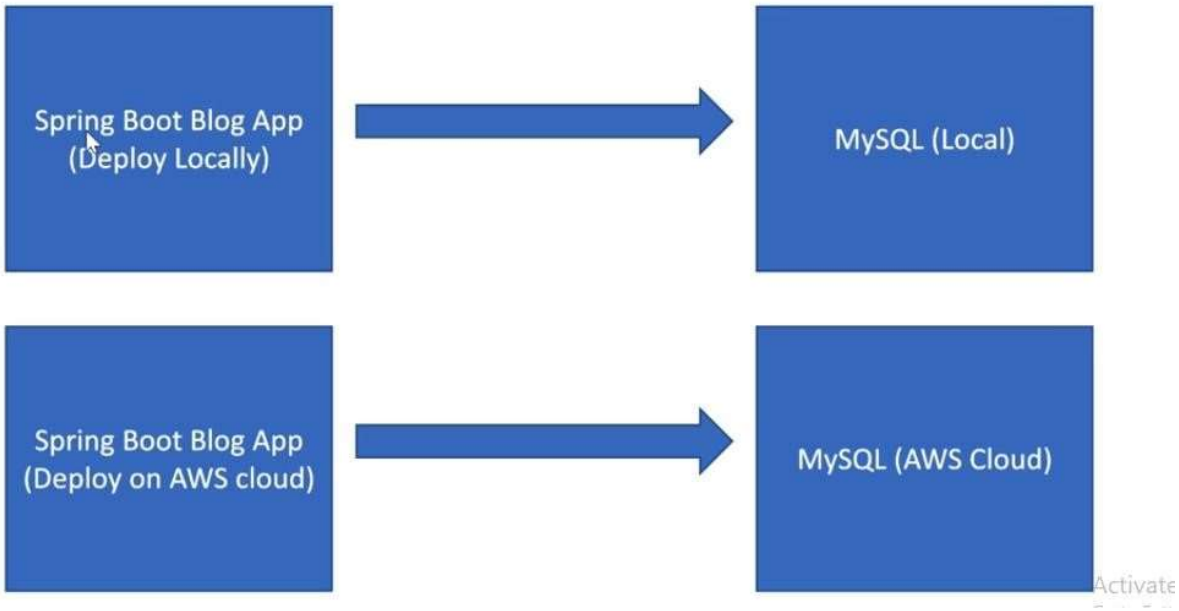
```
public class JWTAuthResponse {
private String accessToken;     private
String tokenType = "Bearer";

    public JWTAuthResponse(String accessToken) {
this.accessToken = accessToken;

    }
    public void setAccessToken(String accessToken) {
this.accessToken = accessToken;
    }
```

```
   public void setTokenType(String tokenType) {
this.tokenType = tokenType;
   }

   public String getAccessToken() {
return accessToken;
   }

   public String getTokenType() {
return tokenType;
   }
}
```

Deployment Of Spring Boot Application Amazon AWS Cloud:

Some Of the important cloud service provider

1. **AWS**
2. **Heroku**
3. **Google Cloud**
4. **Microsoft Azure**
5. **Oracle**
6. **IBM Cloud**



Important AWS Services every java developer should be aware of:

1. **Amazon EC2 -** Amazon Elastic Compute Cloud (EC2) is a web service that provides resizable computing capacity in the cloud. It allows users to rent virtual machines (VMs), known as instances, which can be used to run a variety of different operating systems and applications. With EC2, users can easily scale their computing resources up or down as needed, paying only for the resources they actually use. This makes it an ideal service for applications that have varying compute needs, such as web servers, batch processing, and big data processing. EC2 also provides a variety of different instance types, each optimized for different types of workloads, such as compute-optimized, memoryoptimized, and storage-optimized instances. Additionally, EC2 also provides features such as load balancing, auto-scaling, and virtual private cloud (VPC) to give users more control and security over their instances
2. **AWS Elastic Beanstalk -**

Amazon Elastic Beanstalk is a fully managed service offered by AWS that makes it easy to deploy, run, and scale web applications and services. It supports several programming languages including Java, .NET, PHP, Node.js, Python, Ruby, and Go. Elastic Beanstalk handles the provisioning of the infrastructure resources, load balancing, and automatic scaling, allowing developers to focus on writing code for their application. The service also includes monitoring and logging features, so developers can easily track the performance and troubleshoot issues.
Elastic Beanstalk provides a simple, unified user interface to deploy and manage web applications, as well as a command-line interface and APIs for more advanced users. It

integrates with other AWS services such as Amazon RDS, Amazon S3, Amazon SNS, and AWS Elasticache. Elastic Beanstalk also provides a feature called "platform versions" that allows developers to choose a specific version of the language runtime, web server, and other software components to use with their application.

3. **AMAZON RDS –**

Amazon Relational Database Service (RDS) is a web service that makes it easy to set up, operate, and scale a relational database in the cloud. RDS supports several popular database engines including MySQL, PostgreSQL, Oracle, Microsoft SQL Server, and Amazon Aurora.

RDS automates many of the time-consuming tasks typically associated with managing a relational database, such as provisioning, patching, backup, and recovery. It also provides features such as automatic failover, read replicas, and a point-in-time restore, which help to improve the availability and durability of the database. In addition, RDS allows users to easily scale the resources allocated to a database up or down as needed, and it also offers a variety of different instance types optimized for different types of workloads.

RDS also provides a feature called "Multi-AZ Deployments" that allows the user to create a primary DB instance and synchronously replicate the data to a standby instance in a different availability zone (AZ) for failover capabilities. This provides an automatic failover to the standby instance in the event of a planned or unplanned outage of the primary instance.

4. **S3 Service -** Amazon S3 (Simple Storage Service) is a cloud-based object storage service offered by Amazon Web Services (AWS). It allows users to store and retrieve any amount of data, at any time, from anywhere on the internet. S3 provides a simple web services interface that can be used to store and retrieve any amount of data, at any time, from anywhere on the web. It is designed for storing and retrieving large amounts of data, such as photos, videos, and backups. S3 is widely used for a variety of applications including, cloud storage, backup and archiving, big data analytics, disaster recovery, and more.
5. **Amazon Route 53 –**

Amazon Route 53 is a highly available and scalable Domain Name System (DNS) web service offered by AWS. It translates human-friendly domain names, such as www.example.com, into the IP addresses, such as 192.0.2.1, that computers use to identify each other on the internet. Route 53 is designed to give developers and businesses a reliable and cost-effective way to route end users to internet applications.

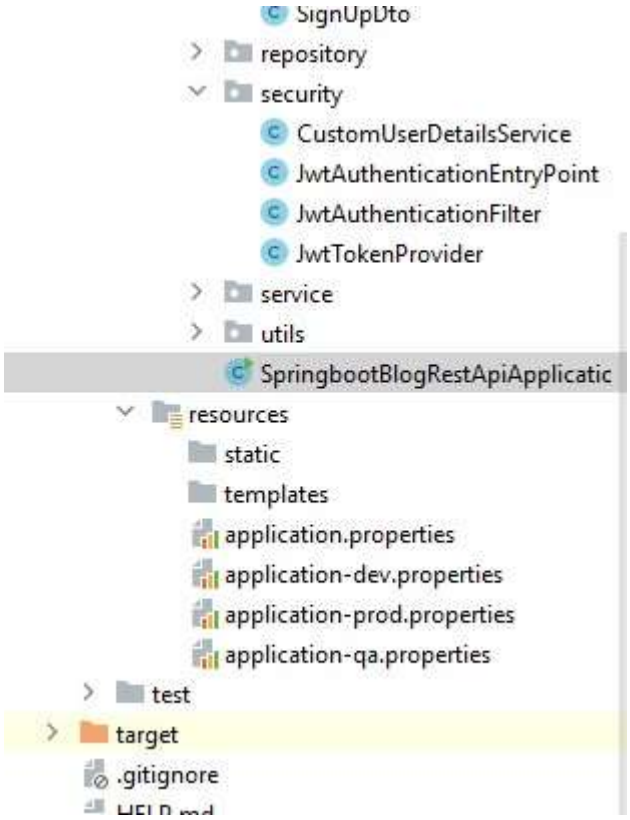
Route 53 provides a variety of different routing types, such as simple routing, which routes traffic to a single resource, such as a web server, and complex routing, which allows you to route traffic based on factors such as the geographic location of your users, the health of your resources, and the routing policies that you specify.

Route 53 also provides a feature called "Health Check", that allows the user to monitor the health of their resources, such as web servers, and route traffic to healthy resources. It also integrates with other AWS services such as Amazon CloudFront, Elastic Load Balancing, and AWS Elastic Beanstalk.

It also provides a feature called "Traffic Flow" that allows the user to create a visual representation of their routing policies and test how the traffic will be routed before it's updated.

Using Profiles In Spring Boot Application

Step 1: Create Following Properties file:



application.properties file content:

```
#spring.datasource.url = jdbc:mysql://localhost:3306/myblog
#spring.datasource.username = root
#spring.datasource.password = test

# hibernate properties
```

```
#spring.jpa.properties.hibernate.dialect = org.hibernate.dialect.MySQL5InnoDBDialect

# Hibernate ddl auto (create, create-drop, validate, update)
#spring.jpa.hibernate.ddl-auto = update


# App Properties app.jwt-secret=
JWTSecretKey
app.jwt-expiration-milliseconds = 604800000

spring.profiles.active=prod
```

application-dev.properties content:

```
spring.datasource.url = jdbc:mysql://localhost:3306/myblog
spring.datasource.username = root spring.datasource.password
= test

# hibernate properties
spring.jpa.properties.hibernate.dialect =
org.hibernate.dialect.MySQL5InnoDBDialect

# Hibernate ddl auto (create, create-drop, validate, update)
spring.jpa.hibernate.ddl-auto = update
```

application-qa.properties content:

```
spring.datasource.url = jdbc:mysql://localhost:3306/myblog
spring.datasource.username = root spring.datasource.password
= test

# hibernate properties
spring.jpa.properties.hibernate.dialect =
org.hibernate.dialect.MySQL5InnoDBDialect

# Hibernate ddl auto (create, create-drop, validate, update)
spring.jpa.hibernate.ddl-auto = update
```

application-prod.properties content:

```
spring.datasource.url = jdbc:mysql://localhost:3306/myblog
spring.datasource.username = root spring.datasource.password
= test

# hibernate properties
spring.jpa.properties.hibernate.dialect =
org.hibernate.dialect.MySQL5InnoDBDialect
```

```
# Hibernate ddl auto (create, create-drop, validate, update)
spring.jpa.hibernate.ddl-auto = update
```

Step 2: Create default (Meta Data) in tables

Manually Enter Data into Roles Table Using Command Line Runner

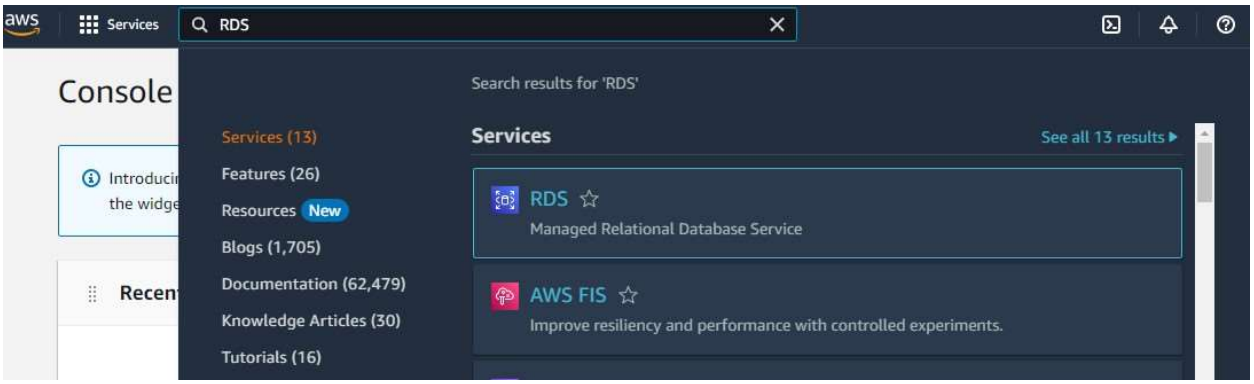
```
package com.springboot.blog;

import com.springboot.blog.entity.Role; import
com.springboot.blog.repository.RoleRepository; import
org.modelmapper.ModelMapper;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.boot.CommandLineRunner; import
org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication; import
org.springframework.context.annotation.Bean;

@SpringBootApplication
public class SpringbootBlogRestApiApplication implements CommandLineRunner {
   @Autowired
   private RoleRepository roleRepository;

@Bean
   public ModelMapper modelMapper(){
return new ModelMapper();
   }
   public static void main(String[] args) {
      SpringApplication.run(SpringbootBlogRestApiApplication.class, args);
   }

   @Override
   public void run(String... args) throws Exception {
Role adminRole = new Role();
adminRole.setName("ROLE_ADMIN");
roleRepository.save(adminRole);

      Role userRole = new Role();
userRole.setName("ROLE_USER");
roleRepository.save(userRole);
   }
 }
```

Step 3: Create Amazon AWS Account

Link: https://portal.aws.amazon.com/billing/signup?refid=14a4002d-4936-4343-8211b5a150ca592b&redirect_url=https%3A%2F%2Faws.amazon.com%2Fregistrationconfirmation#/start/email

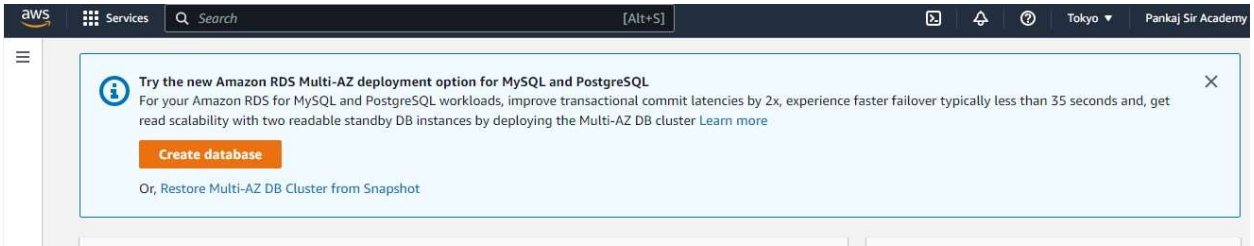
Creating Environment and setting up database in AWS

Step 1: Search for RDS Service:

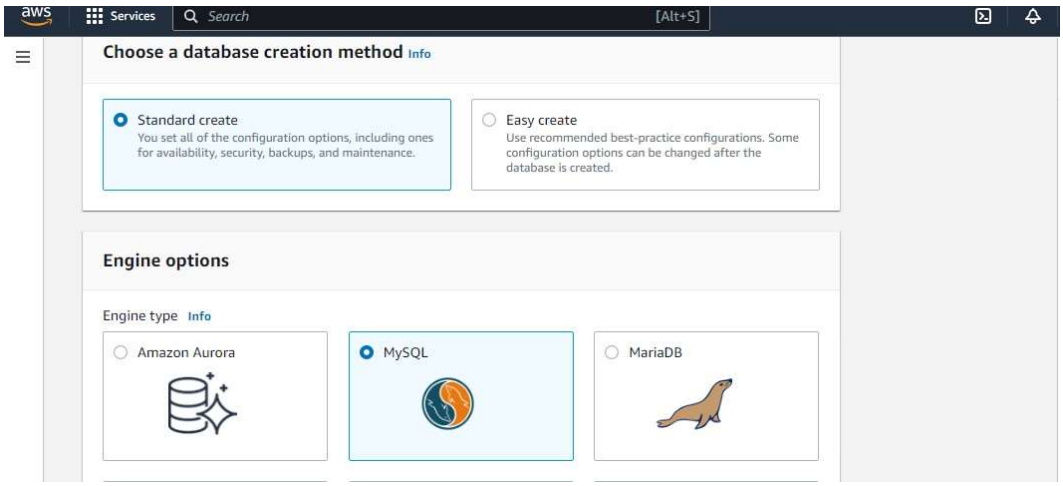


And Click on Dashboard

Step 2: Click on create database



Step 3: Select MySQL Database:



Step 4: Select Version and Free Tier

Show versions that support the Multi-AZ DB cluster Info
Create a A Multi-AZ DB cluster with one primary DB instance and two readable standby DB instances. Multi-AZ DB clusters provide up to 2x faster transaction commit latency and automatic failover in typically under 35 seconds.

Show versions that support the Amazon RDS Optimized Writes Info
Amazon RDS Optimized Writes improves write throughput by up to 2x at no additional cost.

Engine Version

MySQL 8.0.28

Templates

Choose a sample template to meet your use case.

- Production — Use defaults for high availability and fast, consistent performance.
- Dev/Test — This instance is intended for development use outside of a production environment.
- Free tier — Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS. Info

Step 5: Give Database Instance Name, Username(root) & Password(Mysql123$):

DB instance identifier Info

Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.

pankajsiracademy

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). Constraints: 1 to 60 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

Credentials Settings

Master username Info

Type a login ID for the master user of your DB instance.

root

1 to 16 alphanumeric characters. First character must be a letter.

Manage master credentials in AWS Secrets Manager - *new*
Manage master user credentials in Secrets Manager. RDS can generate a password for you and manage it throughout its lifecycle.

Auto generate a password
Amazon RDS can generate a password for you, or you can specify your own password.

Master password Info

••••••••

Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), '(single quote), "(double quote) and @ (at sign).

Confirm master password Info

••••••••

Instance configuration

The DB instance configuration options below are limited to those supported by the engine that you selected above.

DB instance class Info

- Standard classes (includes m classes)
- Memory optimized classes (includes r and x classes)
- Burstable classes (includes t classes)

db.t3.micro
2 vCPUs 1 GiB RAM Network: 2,085 Mbps

Include previous generation classes

Storage

Storage type Info

General Purpose SSD (gp2)
Baseline performance determined by volume size

Allocated storage Info

Storage

Storage type Info

General Purpose SSD (gp2)
Baseline performance determined by volume size

Allocated storage Info

20 GiB

The minimum value is 20 GiB and the maximum value is 6,144 GiB

Storage autoscaling Info

Provides dynamic scaling support for your database's storage based on your application's needs.

☑ Enable storage autoscaling
Enabling this feature will allow the storage to increase after the specified threshold is exceeded.

Maximum storage threshold Info

Charges will apply when your database autoscales to the specified threshold

1000 GiB

The minimum value is 22 GiB and the maximum value is 6,144 GiB

Connectivity Info

Compute resource

Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

- (●) **Don't connect to an EC2 compute resource**
  Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.
- ( ) **Connect to an EC2 compute resource**
  Set up a connection to an EC2 compute resource for this database.

Network type Info

To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.

- (●) **IPv4**
  Your resources can communicate only over the IPv4 addressing protocol.
- ( ) **Dual-stack mode**
  Your resources can communicate over IPv4, IPv6, or both.

Virtual private cloud (VPC) Info

Choose the VPC. The VPC defines the virtual networking environment for this DB instance.

Default VPC (vpc-04d4e878bb0953735)

Only VPCs with a corresponding DB subnet group are listed.

DB subnet group Info

Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB instance can use in the VPC that you selected.

default

Public access Info

- (●) **Yes**
  RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.
- ( ) **No**
  RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

VPC security group (firewall) Info

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

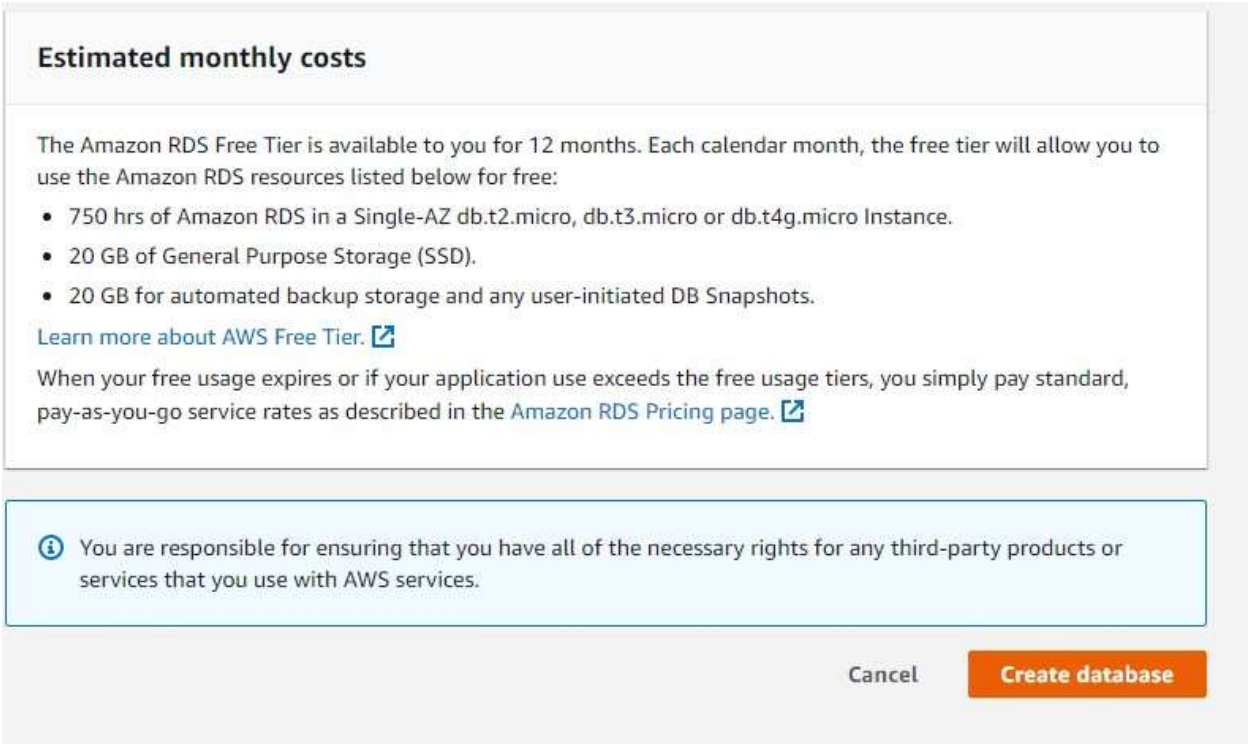
- (●) **Choose existing**
  Choose existing VPC security groups
- ( ) **Create new**
  Create new VPC security group

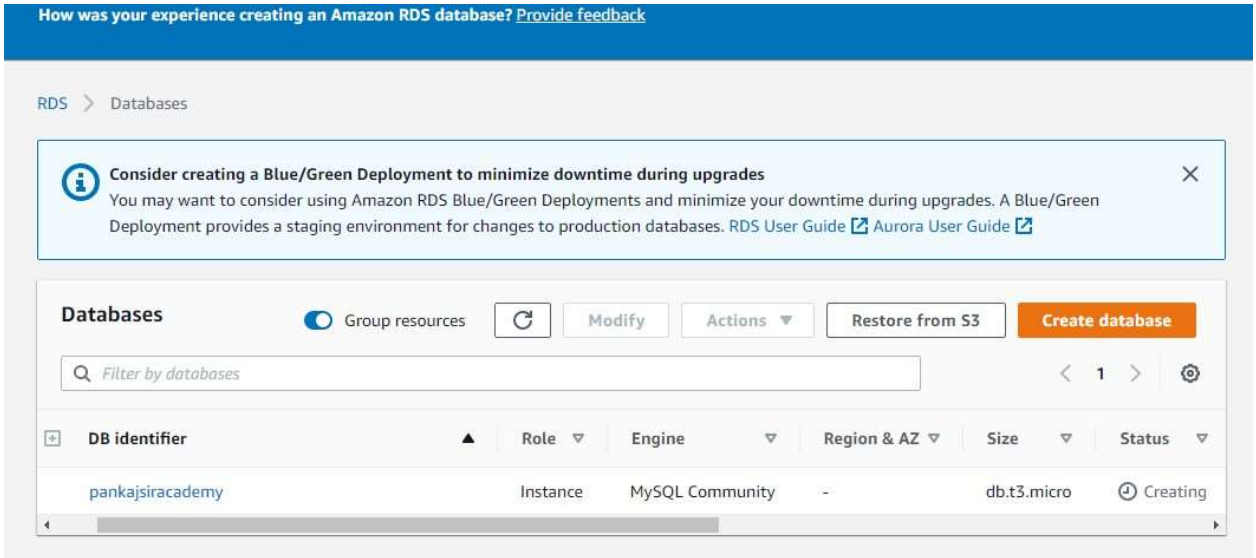
Existing VPC security groups

Choose one or more options

default ×

Keep all further things default…. Click on create database





Successfully created database pankajsiracademy

How was your experience creating an Amazon RDS database? Provide feedback

View connection details

RDS > Databases

Consider creating a Blue/Green Deployment to minimize downtime during upgrades
You may want to consider using Amazon RDS Blue/Green Deployments and minimize your downtime during upgrades. A Blue/Green Deployment provides a staging environment for changes to production databases. RDS User Guide Aurora User Guide

Databases Group resources Modify Actions Restore from S3 Create database

Filter by databases

DB identifier	Role	Engine	Region & AZ	Size
pankajsiracademy	Instance	MySQL Community	ap-northeast-1d	db.t3.micro

RDS > Databases

Consider creating a Blue/Green Deployment to minimize downtime during upgrades
You may want to consider using Amazon RDS Blue/Green Deployments and minimize your downtime during upgrades. A Blue/Green Deployment provides a staging environment for changes to production databases. RDS User Guide Aurora User Guide

Databases Group resources Modify Actions Restore from S3 Create database

Filter by databases

Click Here

DB identifier	Role	Engine	Region & AZ	Size
pankajsiracademy	Instance	MySQL Community	ap-northeast-1d	db.t3.micro

Connectivity & security

Use this end point to connect to the database

Endpoint & port

Endpoint
pankajsiracademy.cmua4mt8llob.ap-northeast-1.rds.amazonaws.com

Port
3306

Networking

Availability Zone
ap-northeast-1d

VPC
vpc-04d4e878bb0953735

Subnet group
default-vpc-04d4e878bb0953735

Subnets
subnet-0aff303f3c0fafdd1
subnet-09b0507ef4d5bef74

Security

VPC security groups
default (sg-07faaa7751a4072c1)
Active

Publicly accessible
Yes

Certificate authority Info
rds-ca-2019

Certificate authority date
August 22, 2024, 10:08 (UTC-

Connectivity & security | Monitoring | Logs & events | Configuration | Maintenance & backups | Tags

Connectivity & security

Endpoint & port

Endpoint
pankajsiracademy.cmua4mt8llob.ap-northeast-1.rds.amazonaws.com

Port
3306

Networking

Availability Zone
ap-northeast-1d

VPC
vpc-04d4e878bb0953735

Subnet group
default-vpc-04d4e878bb0953735

Subnets
subnet-0aff303f3c0fafdd1
subnet-09b0507ef4d5bef74

Security

Click here..

VPC security groups
default (sg-07faaa7751a4072c1)
Active

Publicly accessible
Yes

Certificate authority Info
rds-ca-2019

Certificate authority date
August 22, 2024, 10:08 (UTC-

Security Groups (1/1) Info

Actions | Export security groups to CSV | Create security group

Filter security groups

search: sg-07faaa7751a4072c1 | Clear filters

Name	Security group ID	Security group name	VPC ID	Description
–	sg-07faaa7751a4072c1	default	vpc-04d4e878bb0953735 ...	default VPC security gr...

Click here...

sg-07faaa7751a4072c1 - default

Details | Inbound rules | Outbound rules | Tags

Owner	Inbound rules count	Outbound rules count
658080380044	1 Permission entry	1 Permission entry

Inbound rules | Outbound rules | Tags

You can now check network connectivity with Reachability Analyzer | Run Reachability Analyzer

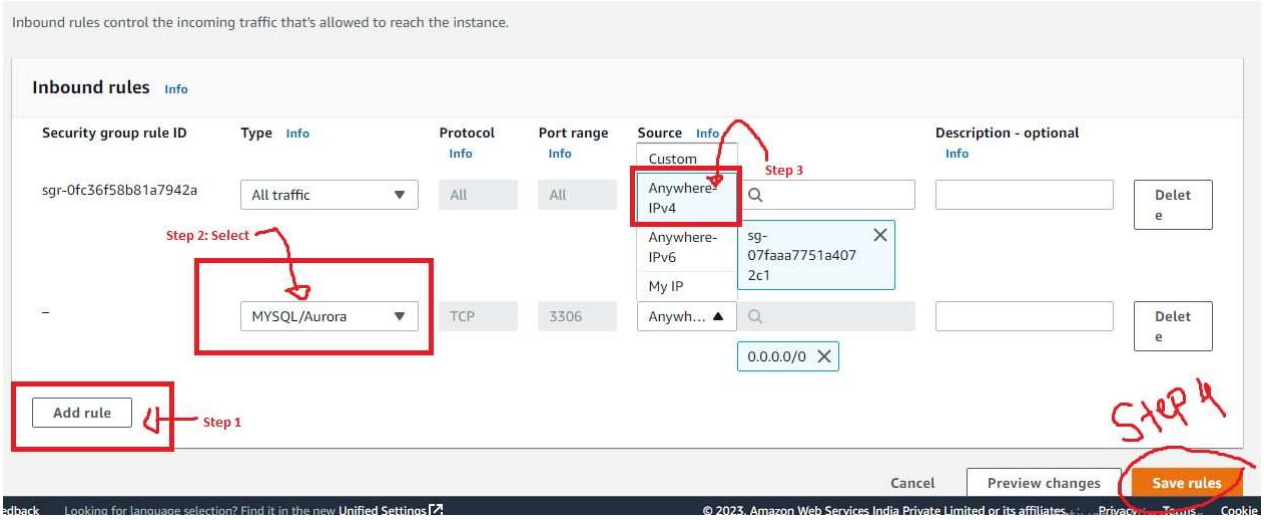
Click here...

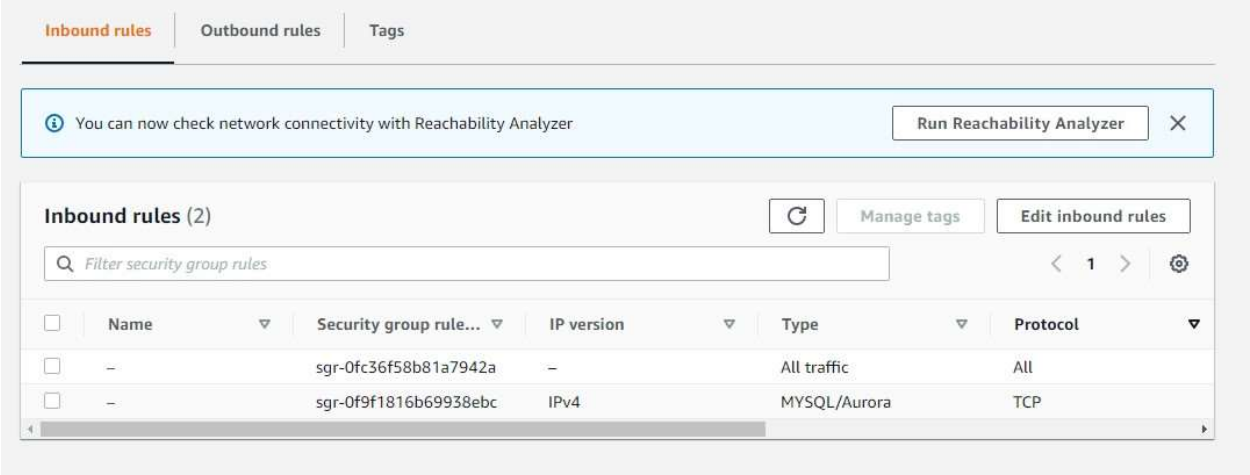
Inbound rules (1/1)

Manage tags | Edit inbound rules

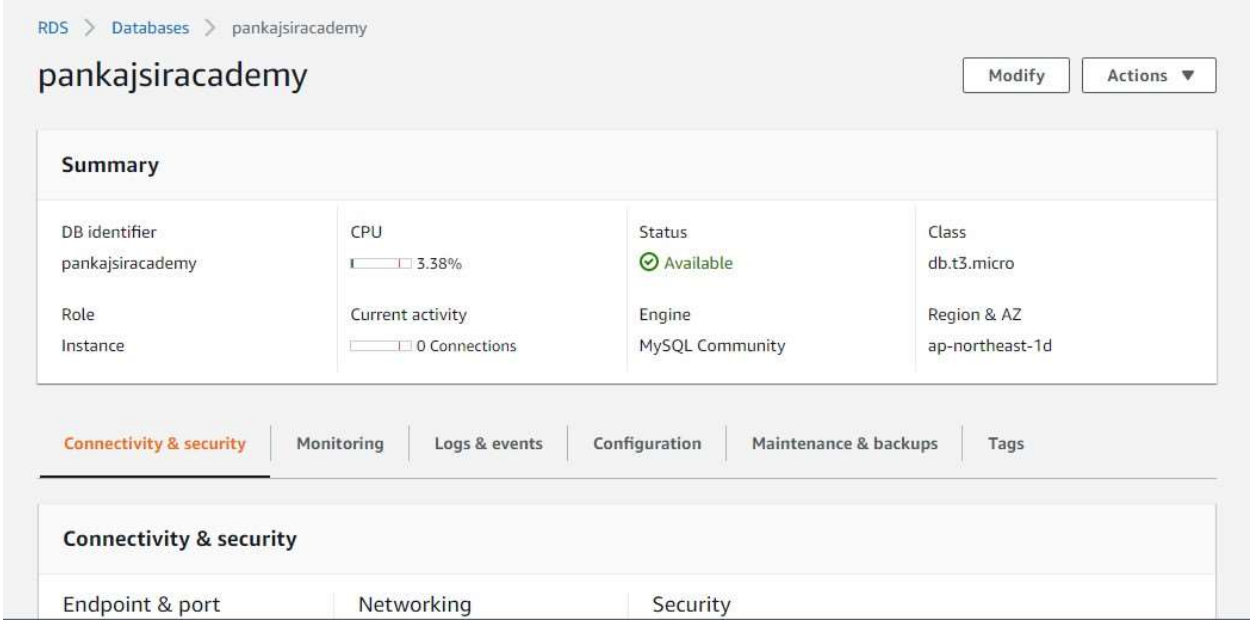
Filter security group rules

Name	Security group rule...	IP version	Type	Protocol
–	sgr-0fc36f58b81a7942a	–	All traffic	All



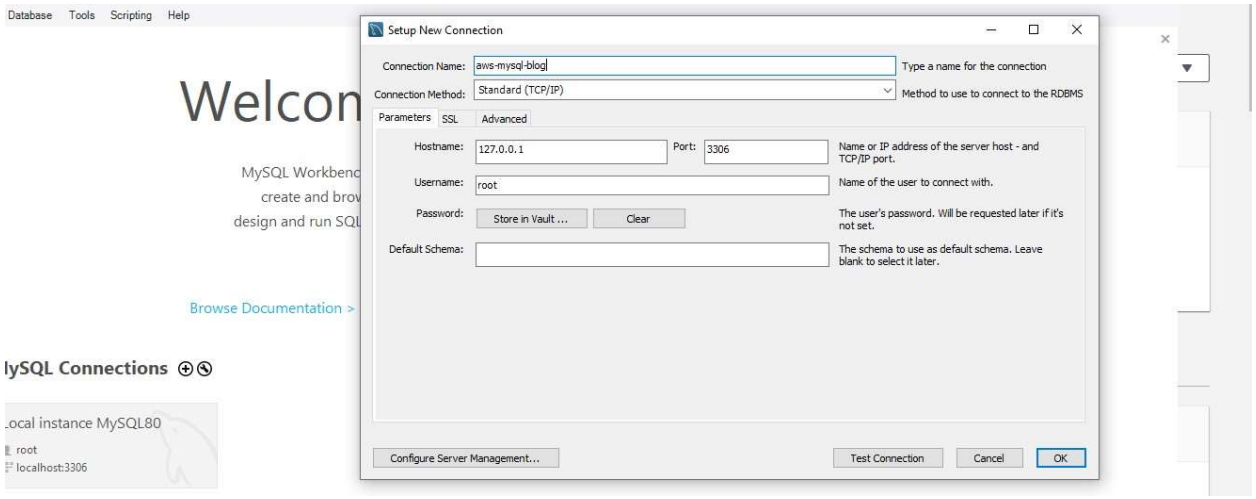


Go to DB Instance Now…

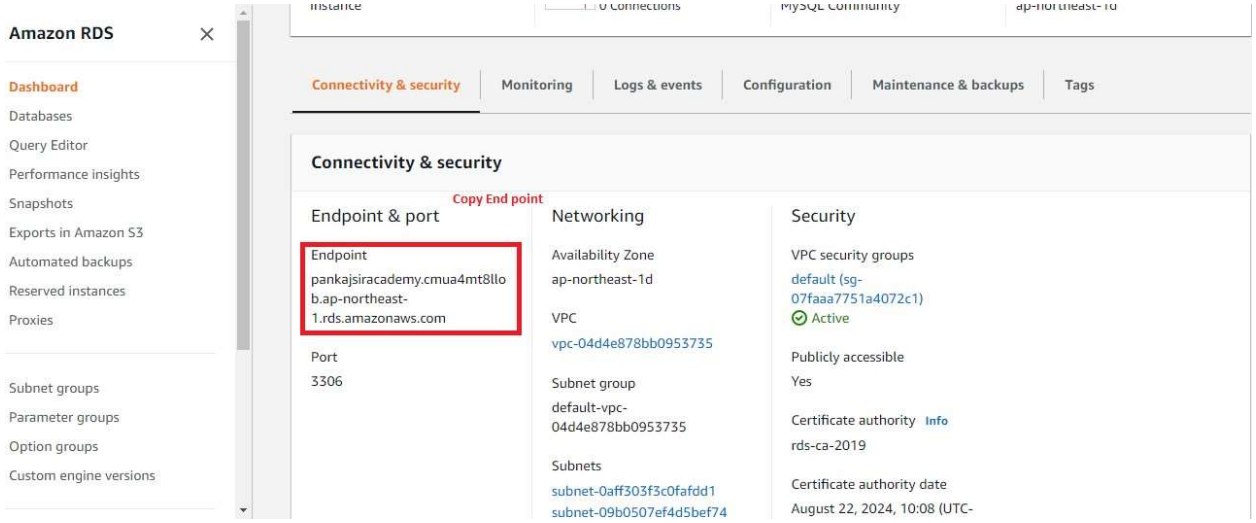


Connecting AWS MySQL Database to MySQL Workbench

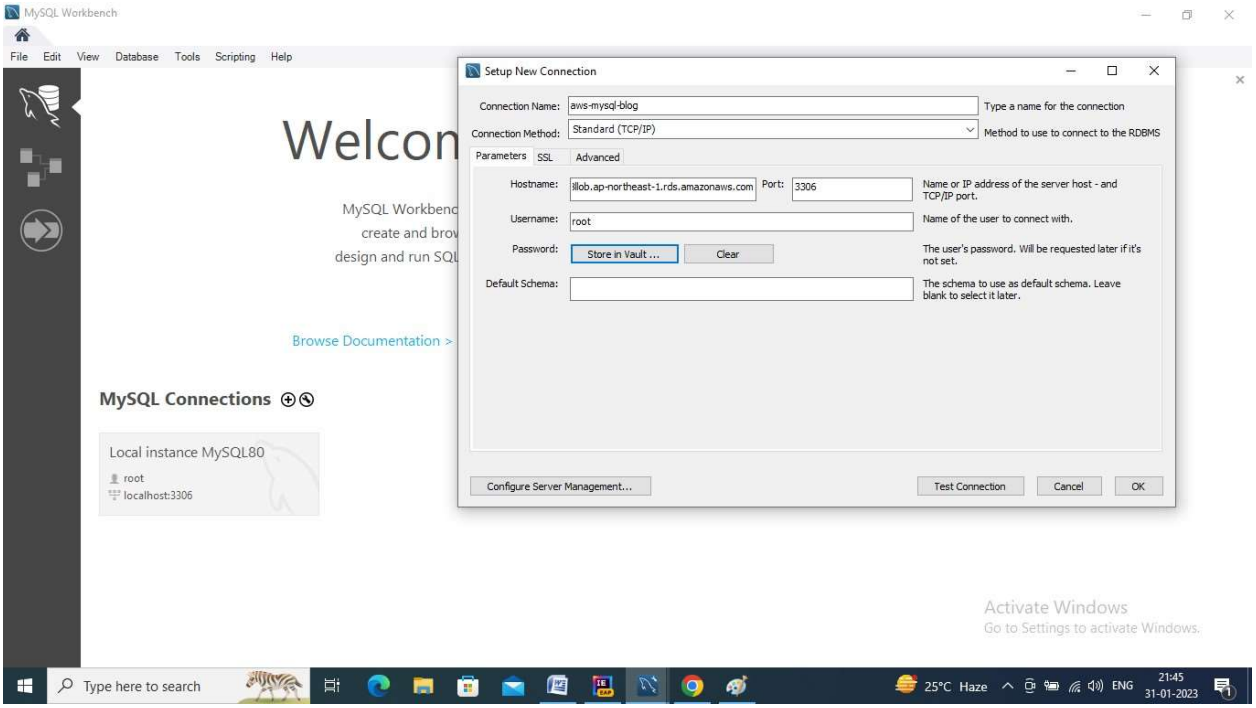
Step 1:



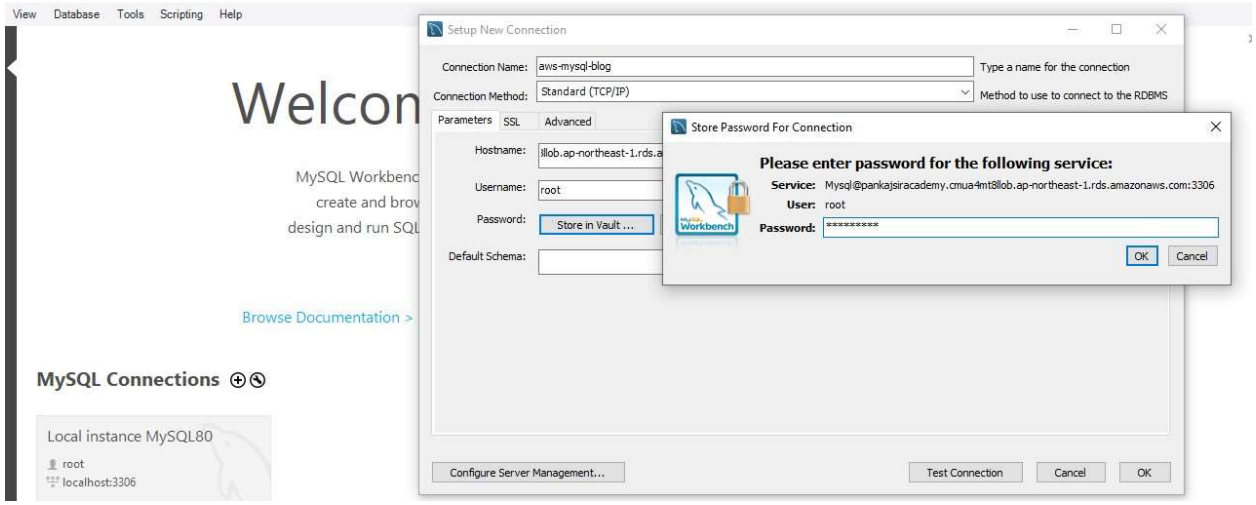
Step 2: Go to AWS:



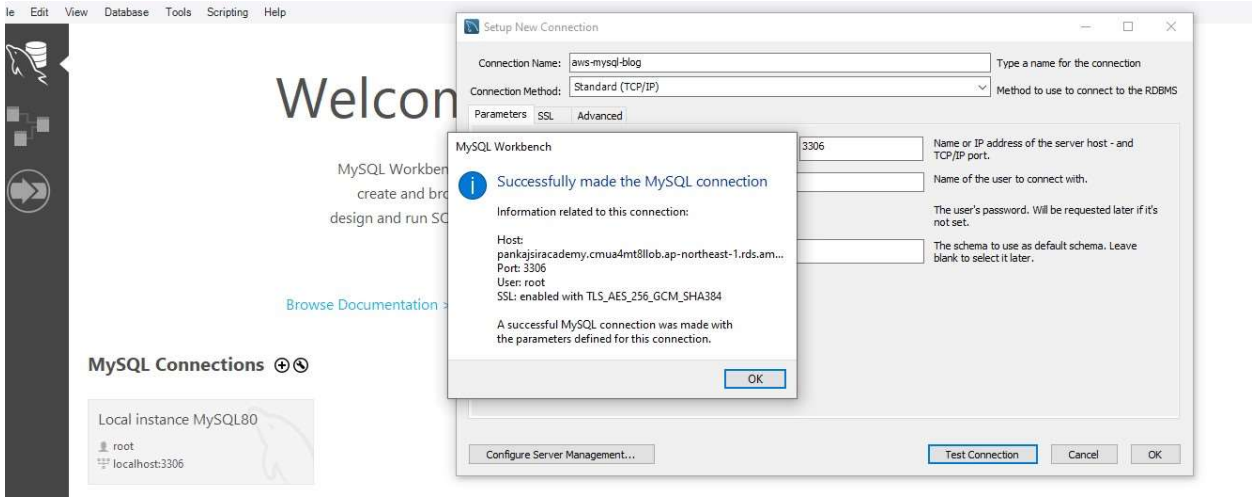
Step 3: Update Localhostname



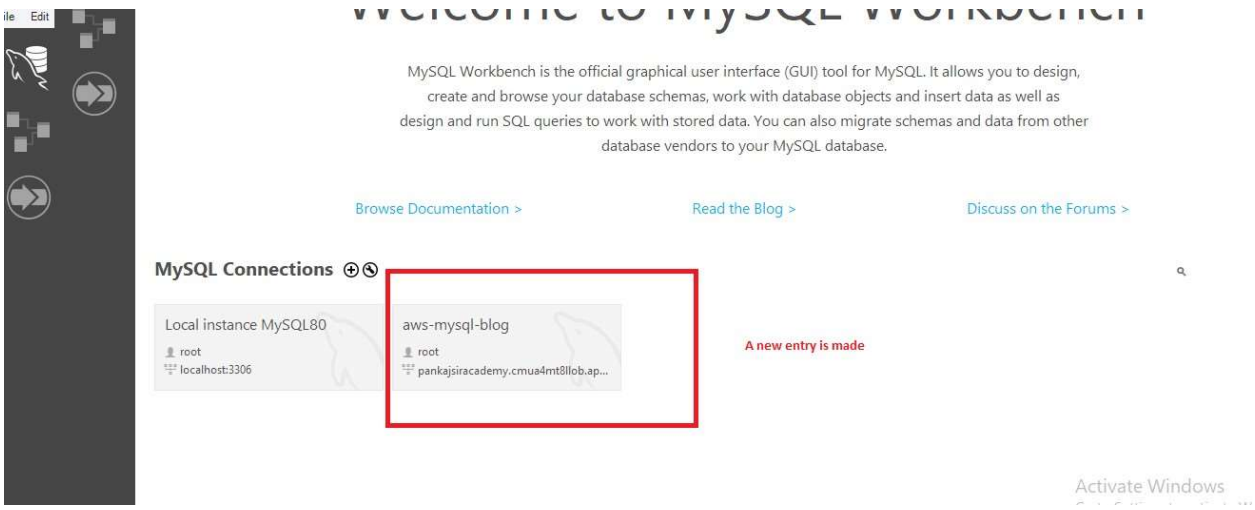
Step 4: Give aws password by clicking on store in vault



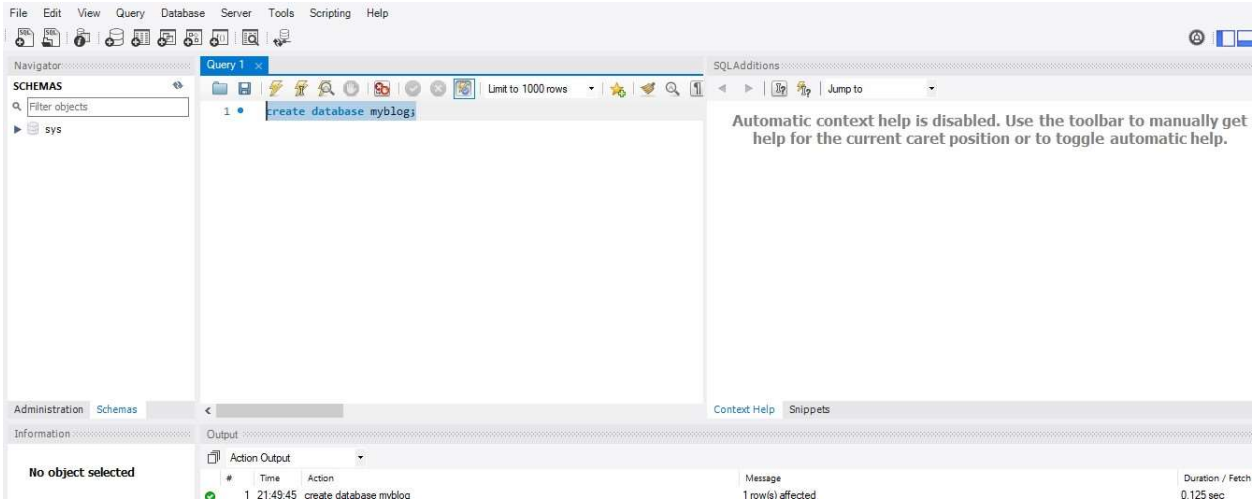
Step 5: Click okay and test the connection



Step 6: Click on ok

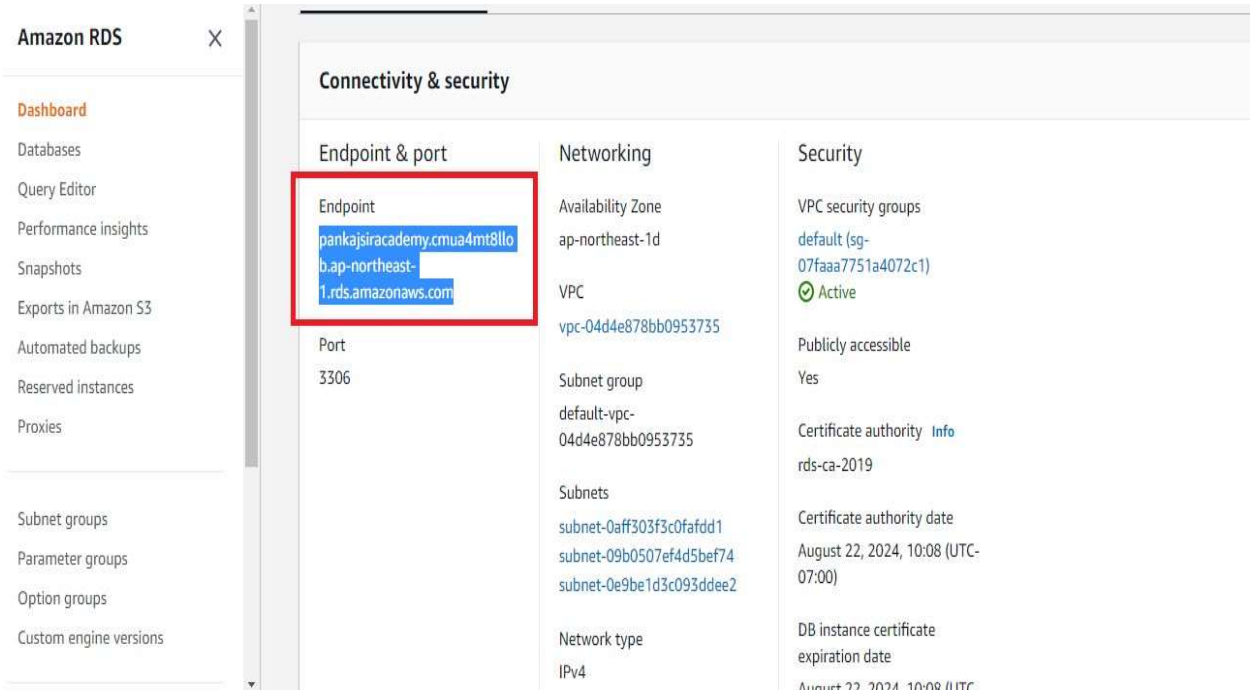


Step 7: Create Database in aws throughmysql workbench



Package Spring Boot App as jar file

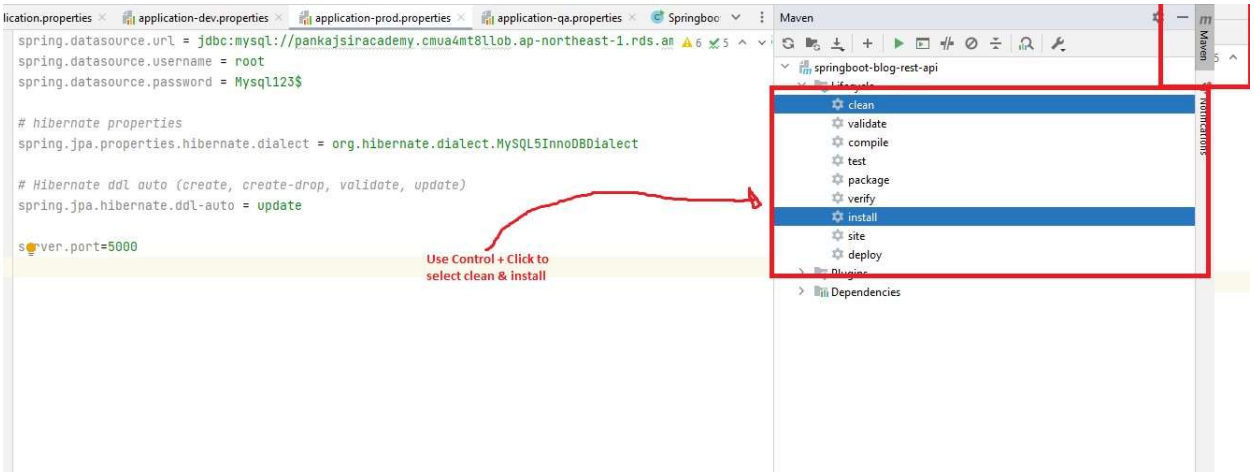
Step 1: Copy endpoint from AWS



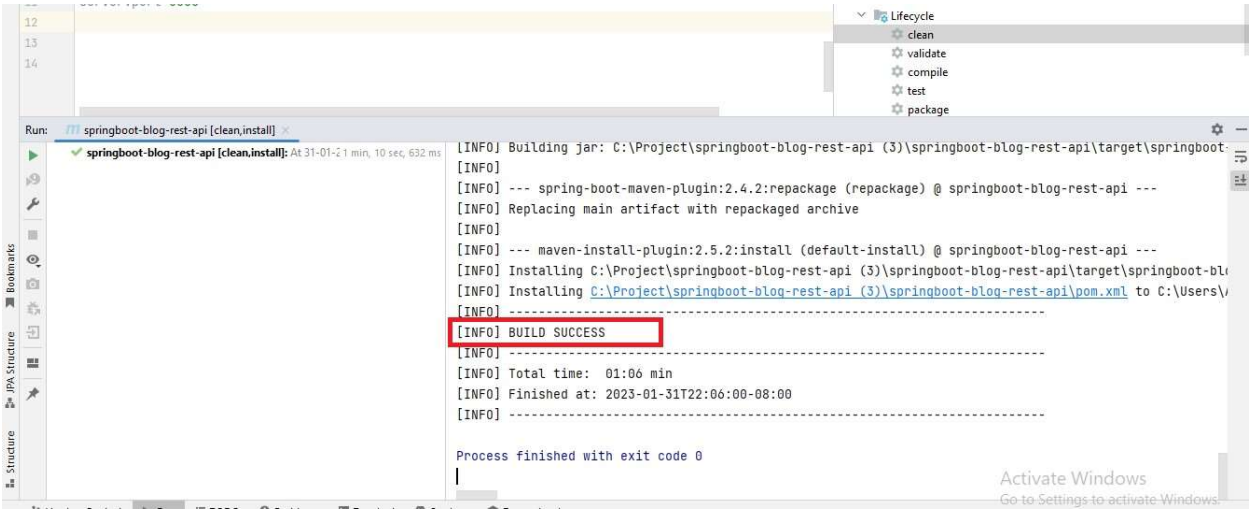
Step 2: Update application-prod.properties file:

```
spring.datasource.url = jdbc:mysql://pankajsiracademy.cmua4mt8llob.ap-northeast-1.rds.amazonaws.com:3306/myblog
spring.datasource.username = root
spring.datasource.password = Mysql123$

# hibernate properties
spring.jpa.properties.hibernate.dialect = org.hibernate.dialect.MySQL5InnoDBDialect

# Hibernate ddl auto (create, create-drop, validate, update)
spring.jpa.hibernate.ddl-auto = update

server.port=5000
```

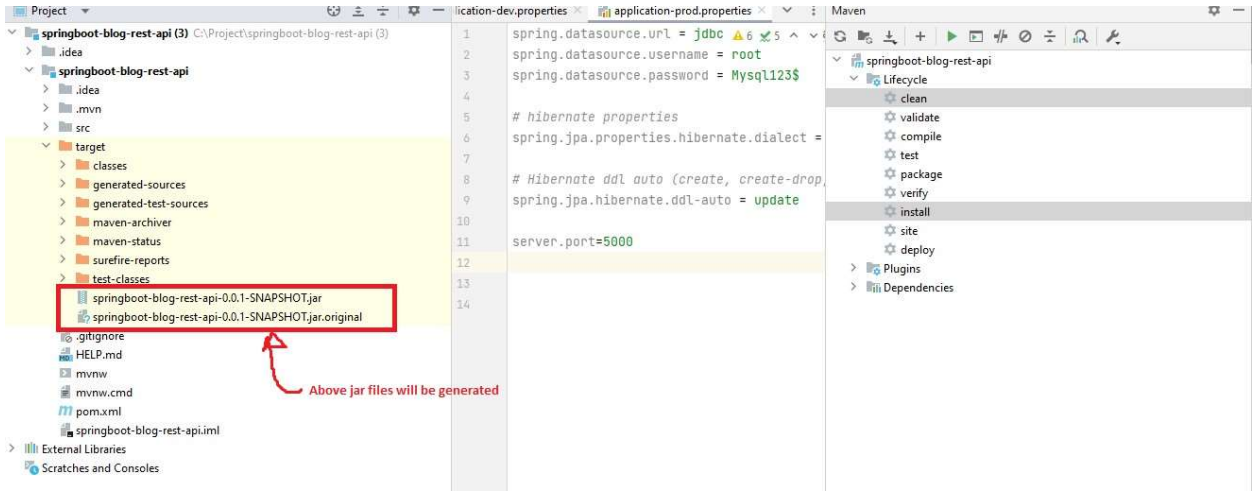
Step 3: Perform maven clean & Install



Step 4: In run you should see the following message:



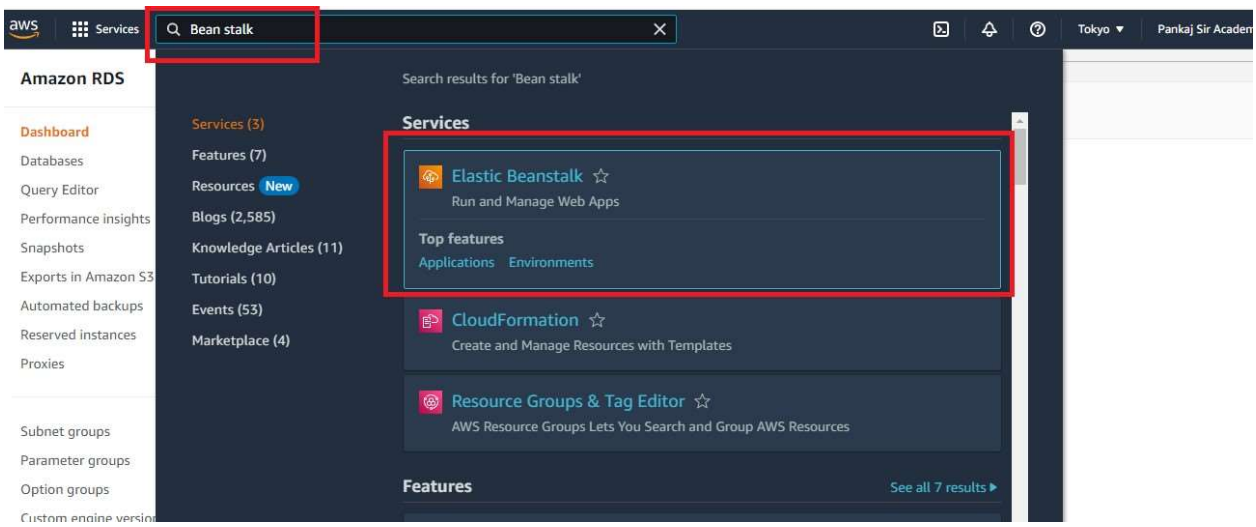
Step 5: See the jar files in intelliJ generated below:



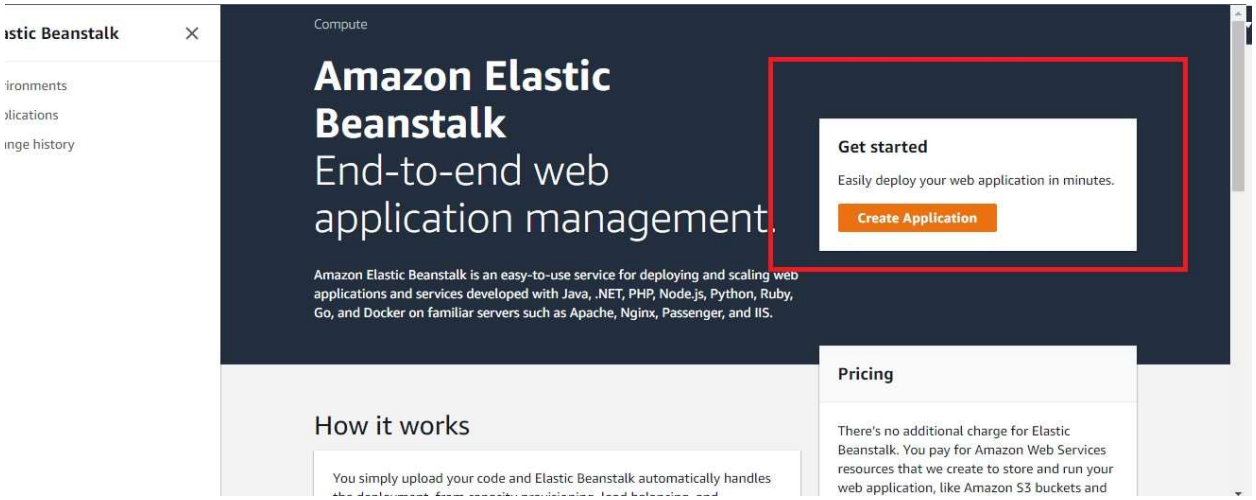
Deploy Spring Boot JAR file on AWS Cloud using Elastic BeanStalk

---

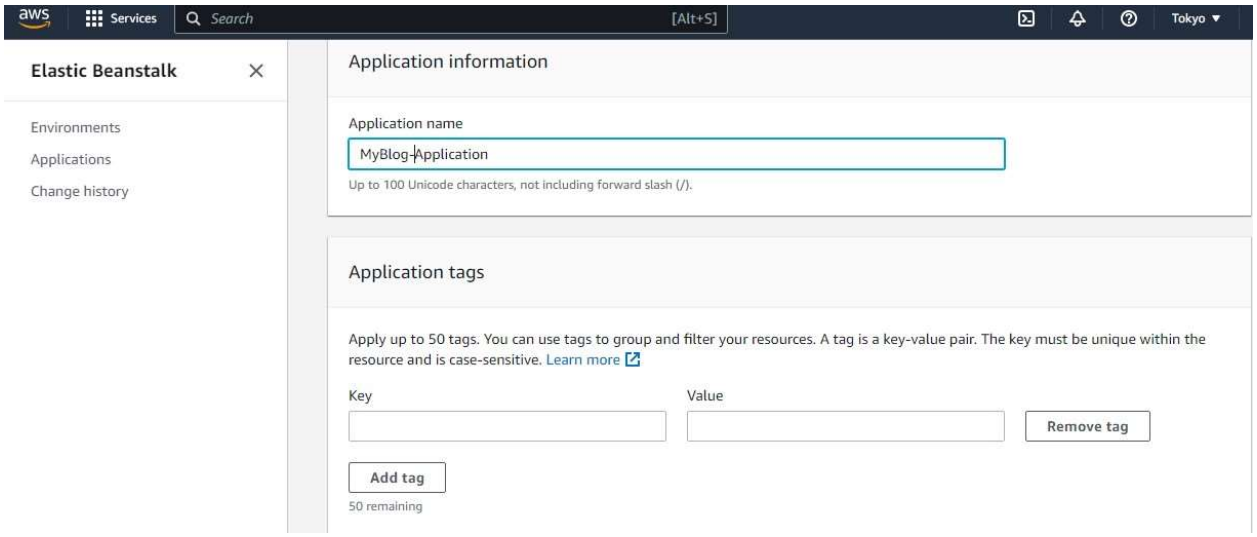
Step 1: Go Elastic BeanStalk in AWS Console:



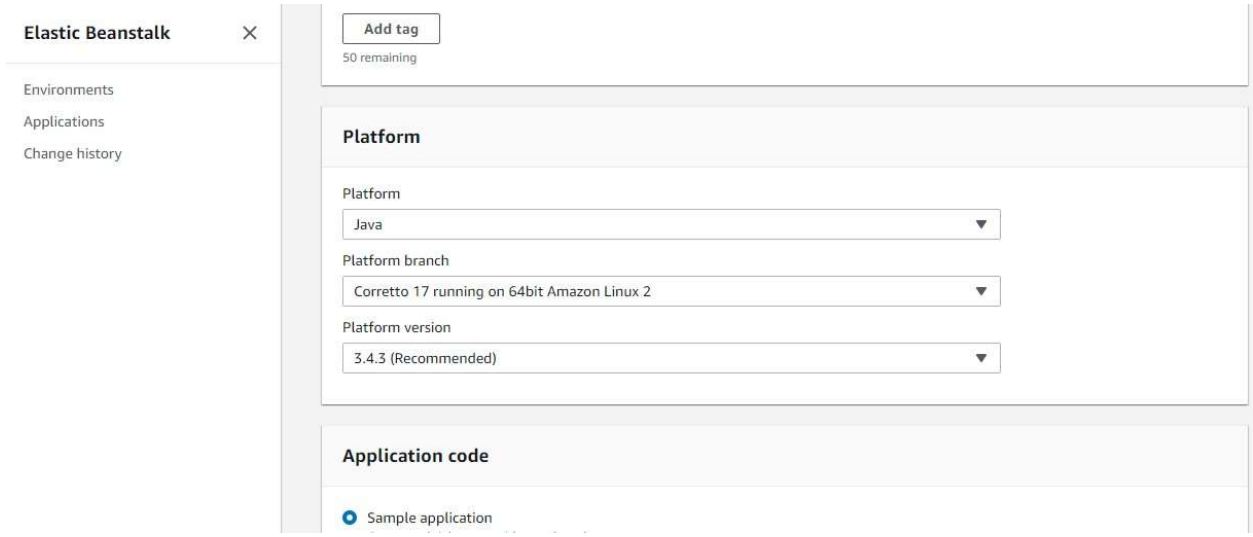
Step 2: Click on create Application:



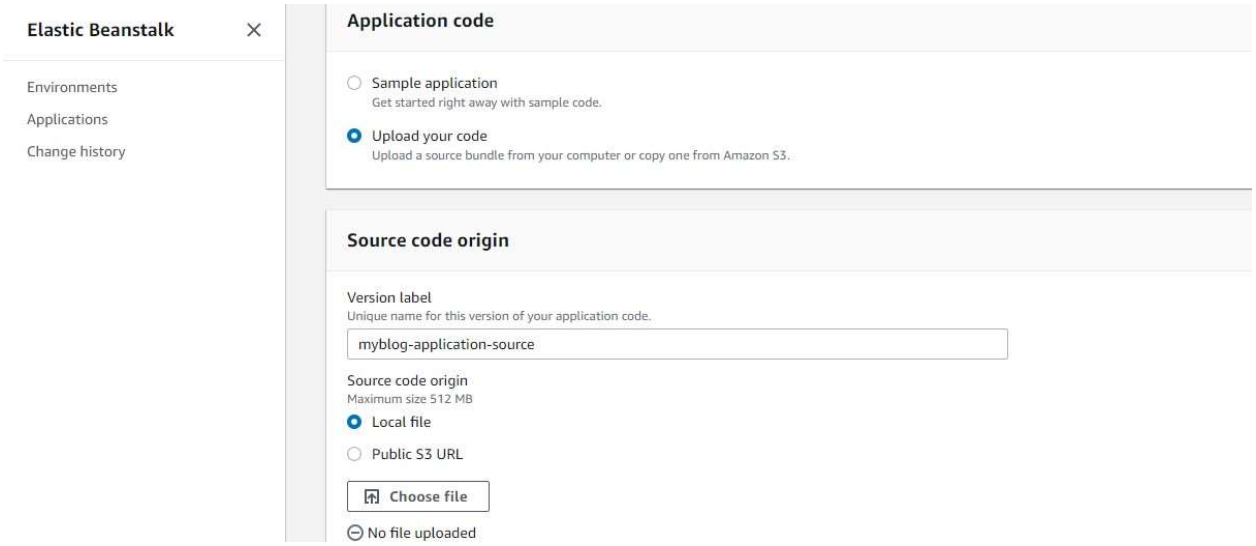
Step 3:


aws
Services
Search
[Alt+S]
Tokyo
Elastic Beanstalk
Environments
Applications
Change history
Application information
Application name
MyBlog-Application
Up to 100 Unicode characters, not including forward slash (/).
Application tags
Apply up to 50 tags. You can use tags to group and filter your resources. A tag is a key-value pair. The key must be unique within the resource and is case-sensitive. Learn more
Key
Value
Remove tag
Add tag
50 remaining

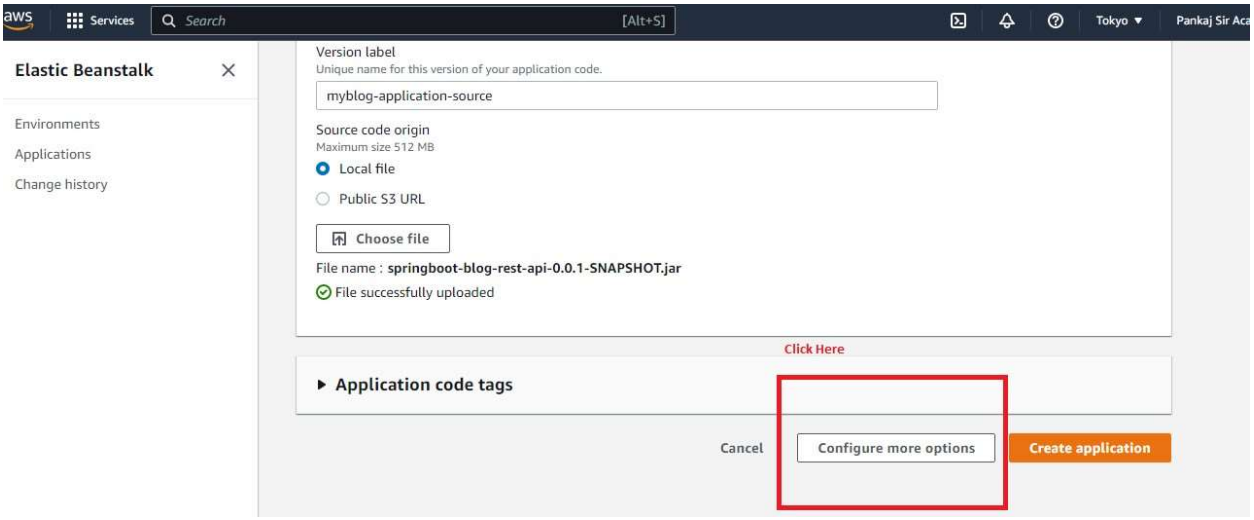
Step 4:


Elastic Beanstalk
Environments
Applications
Change history
Add tag
50 remaining
Platform
Platform
Java
Platform branch
Corretto 17 running on 64bit Amazon Linux 2
Platform version
3.4.3 (Recommended)
Application code
Sample application

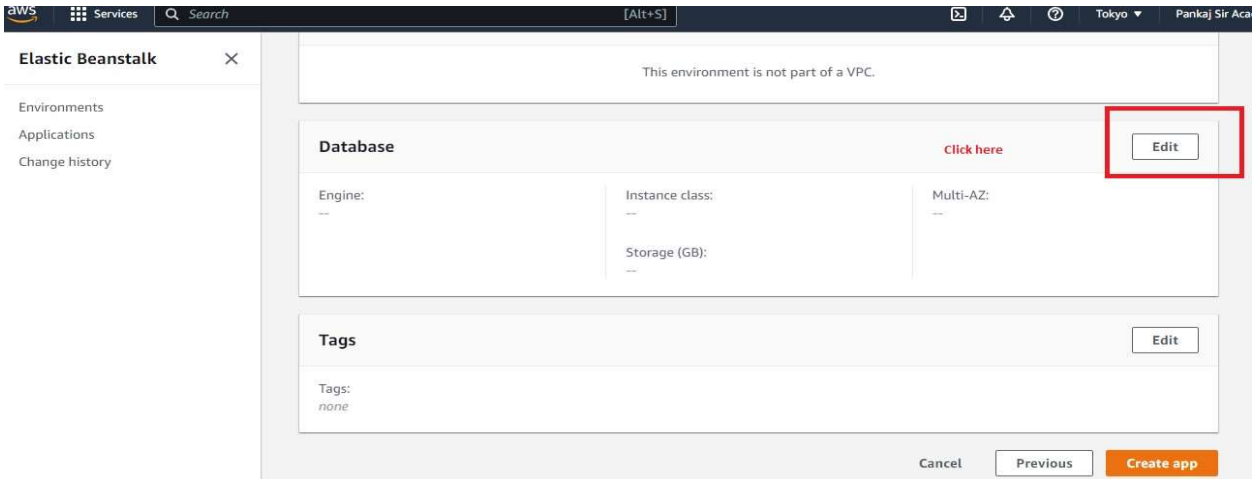
Step 5:



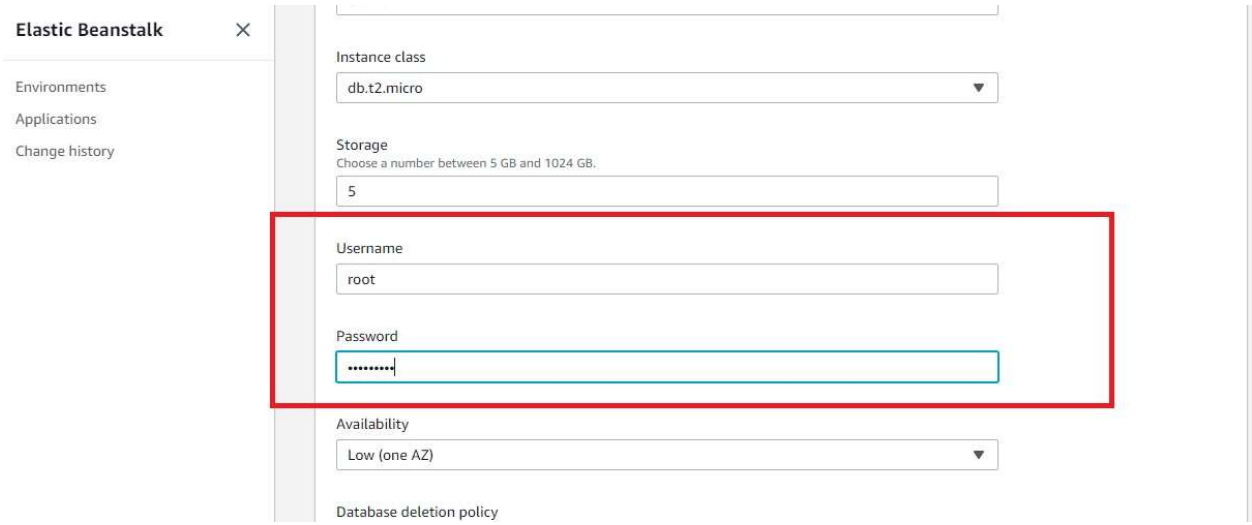
Step 6:



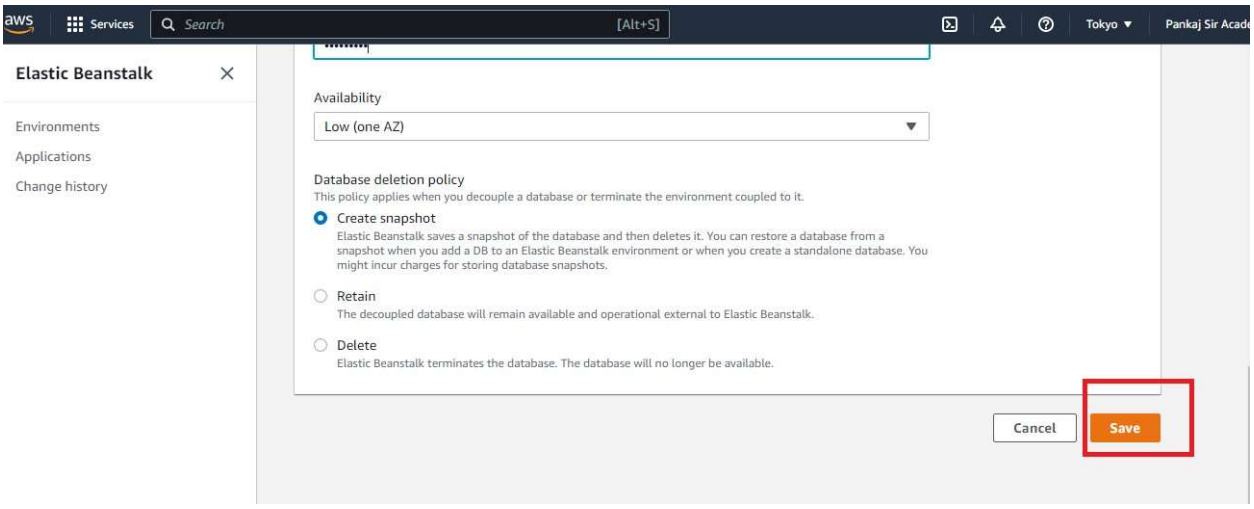
Step 7:



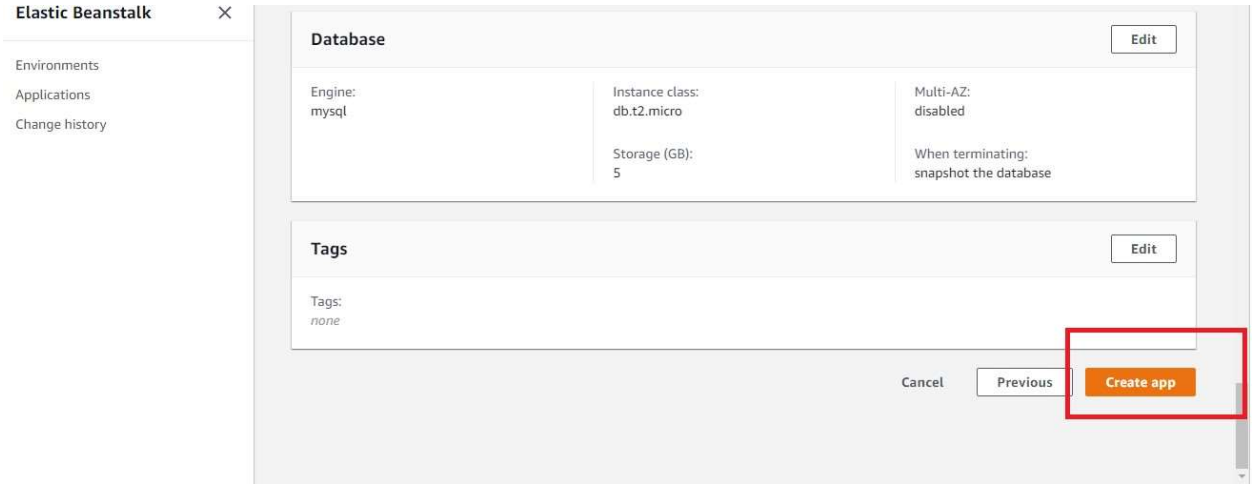
Step 8:



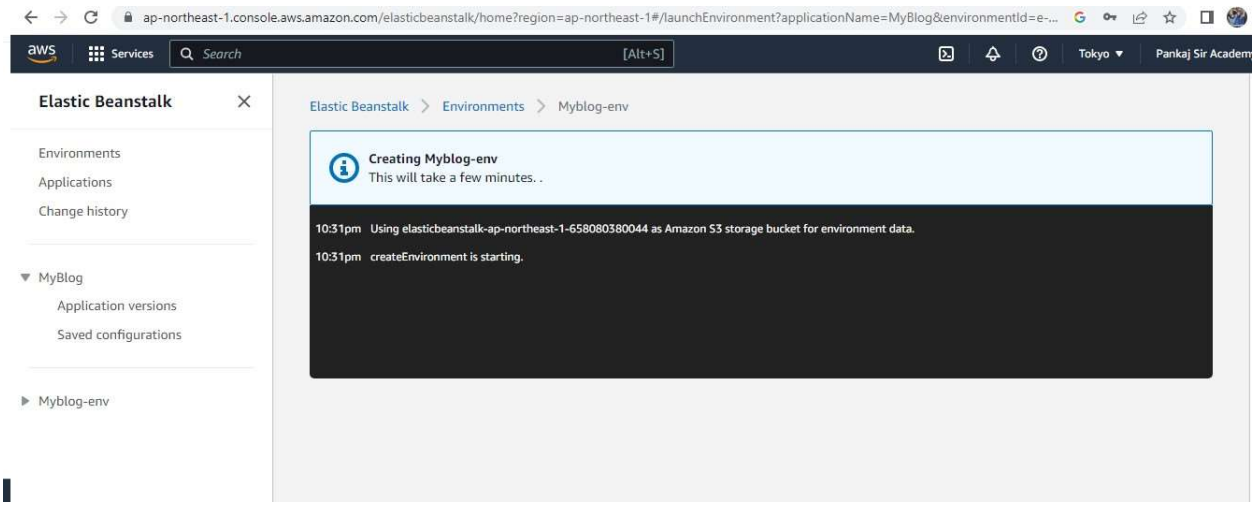
Step 9: Click on save



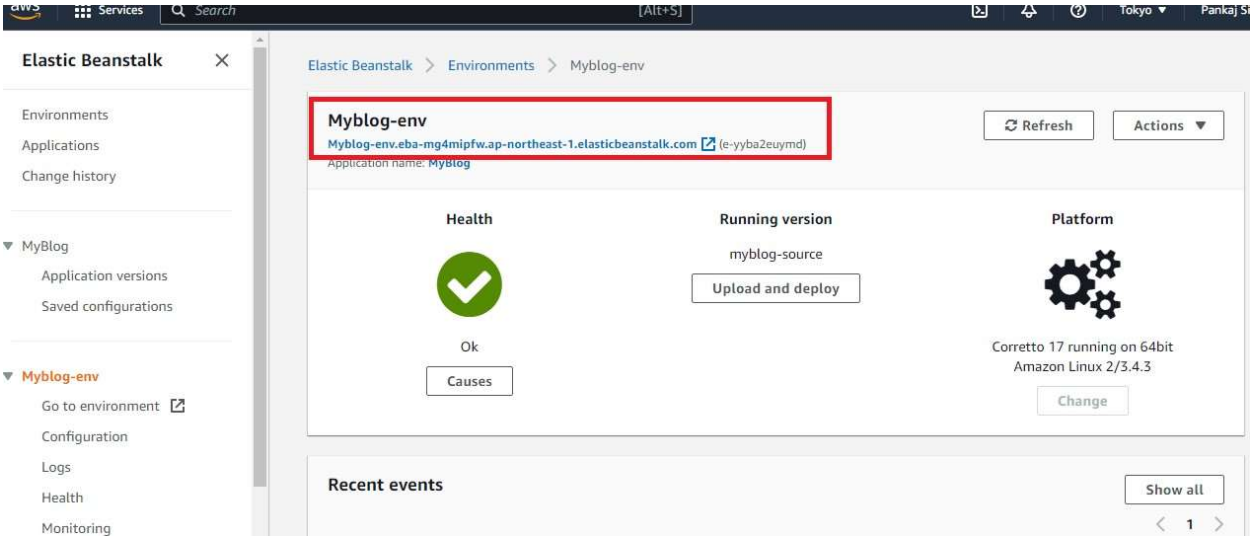
Step 10:



Step 11:



Step 12:



PDF GENERATOR CODE

```
package com.app.util;

import com.app.entities.TicketBook;
import com.itextpdf.text.Document;
import com.itextpdf.text.DocumentException;
import com.itextpdf.text.Element;
import com.itextpdf.text.Paragraph;
import com.itextpdf.text.pdf.PdfPTable;
import com.itextpdf.text.pdf.PdfWriter;

import java.io.FileNotFoundException;
```

```
import java.io.FileOutputStream;

public class PDFGenerator {

   public static void generateTicketDetailsPDF(TicketBook ticketBook, String filePath) throws
FileNotFoundException, DocumentException {
      // Create a new PDF document
      Document document = new Document();
      PdfWriter.getInstance(document, new FileOutputStream(filePath));
      document.open();

      // Add the Ticket Details header
      Paragraph header = new Paragraph("Ticket Details");
      header.setAlignment(Element.ALIGN_CENTER);
      document.add(header);

      // Create the Booked bus table
      PdfPTable table = new PdfPTable(6);
      table.setWidthPercentage(100);

      // Add table headers
      table.addCell("ID");
      table.addCell("Arrival City");
      table.addCell("Bus No");
      table.addCell("Departure City");
      table.addCell("Price");
      table.addCell("Route");

      // Add table rows with data
      table.addCell(ticketBook.getId().toString());
      table.addCell(ticketBook.getArrivalCity());
      table.addCell(ticketBook.getBusNo());
      table.addCell(ticketBook.getDepartureCity());
      table.addCell(ticketBook.getPrice().toString());
      table.addCell(ticketBook.getRoute());

      // Add the table to the document
      document.add(table);

      // Close the document
      document.close();
```

```
  }
}
```

CALLING IT WHILE SAVING

```
@PostMapping("/{passengerId}")
@Transactional
public ResponseEntity<TicketBook> saveTicket(@RequestBody TicketBook ticketBook,
@PathVariable("passengerId")long passengerId) throws DocumentException, FileNotFoundException
{
 TicketBook ticket =  ticketBookService.saveTicket(ticketBook,passengerId);

 // Generate PDF for the booked ticket with a unique file path
  String uniqueId = UUID.randomUUID().toString();
  String filePath = "G:\\Bus booking app\\Pdf generator\\" + uniqueId + ".pdf";
  PDFGenerator.generateTicketDetailsPDF(ticket, filePath);

  return new ResponseEntity<>(ticket, HttpStatus.CREATED);
}
```