



ICT Training Center

Il tuo partner per la Formazione e la Trasformazione digitale della tua azienda



Note

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SPRING AI

GENERATIVE ARTIFICIAL INTELLIGENCE CON JAVA

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Corso avanzato per Venis S.p.A, Venezia, Italia

Novembre 2025

Note

[illegible]



METHOD AS TOOL - INTERAZIONE CON DB

Note

[illegible]

-  Simone Scannapieco

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```
...
<dependency>
  <groupId>org.springframework.boot</groupId>
  <artifactId>spring-boot-starter-data-jpa</artifactId>
</dependency>
<dependency>
  <groupId>org.projectlombok</groupId>
  <artifactId>lombok</artifactId>
  <scope>annotationProcessor</scope>
</dependency>
...
```

```
spring:
  ...
  jpa:
    hibernate:
      ddl-auto: update
```

[illegible]

Sei un assistente virtuale di helpdesk, responsabile di assistere i clienti con i loro problemi. Il tuo obiettivo principale è fornire soluzioni chiare, accurate e utili ai problemi più comuni.

Se il problema di un utente non può essere risolto tramite la tua risposta, offriti di:

- Creare un nuovo ticket helpdesk per il problema segnalato dal cliente
- Verificare lo stato dei ticket helpdesk esistenti

Cerca sempre di essere cortese, proattivo e orientato alle soluzioni.

Aderisci alle seguenti linee guida:

- Se esiste già un ticket relativo allo stesso problema per lo stesso cliente, non creare duplicati
- Se non sei sicuro della natura del problema prima di creare il ticket, chiedi al cliente di spiegare meglio la problematica o chiedi maggiori informazioni
- Chiedi sempre conferma esplicita al cliente prima di aprire un nuovo ticket
- Quando rispondi riguardo allo stato dei problemi esistenti, mantieni la risposta breve con lo stato del ticket e il tempo stimato di risoluzione (ETA).
- Usa i tool forniti dall'utente per fornire la tua risposta

Note

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```
package it.venis.ai.spring.demo.entity;

import java.time.LocalDateTime;

import jakarta.persistence.*;
import lombok.*;

@Entity
@Getter
@Setter
@Builder
@NoArgsConstructor
@AllArgsConstructor
@Table(name = "helpdesk_tickets")
public class HelpDeskTicket {

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

    private String username;

    private String issue;

    private String status; // e.g., OPEN, IN_PROGRESS, CLOSED

    private LocalDateTime createdAt;

    private LocalDateTime eta;
}
```

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```
package it.venis.ai.spring.demo.model;

public record TicketRequest(String issue) {
}
```

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```
package it.venis.ai.spring.demo.repository;

import java.util.List;

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

import it.venis.ai.spring.demo.entity.HelpDeskTicket;

public interface HelpDeskTicketRepository extends JpaRepository<HelpDeskTicket, Long> {

    List<HelpDeskTicket> findByUsername(String username);

}
```

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```
package it.venis.ai.spring.demo.services;

...

@Service
@RequiredArgsConstructor
public class HelpDeskTicketService {

    private final HelpDeskTicketRepository helpDeskTicketRepository;

    public HelpDeskTicket createTicket(TicketRequest ticketInput, String username) {

        HelpDeskTicket ticket = HelpDeskTicket.builder()
            .issue(ticketInput.issue())
            .username(username)
            .status("OPEN")
            .createdAt(LocalDateTime.now())
            .eta(LocalDateTime.now().plusDays(7))
            .build();

        return helpDeskTicketRepository.save(ticket);

    }

    public List<HelpDeskTicket> getTicketsByUsername(String username) {

        return helpDeskTicketRepository.findByUsername(username);

    }

}
```

Note

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```
package it.venis.ai.spring.demo.tools;

...

@Component
@RequiredArgsConstructor
public class HelpDeskTools {

    private static final Logger LOGGER = LoggerFactory.getLogger(HelpDeskTools.class);

    private final HelpDeskTicketService service;

    @Tool(name = "createTicket",
        description = "Genera un nuovo ticket di assistenza.",
        returnDirect = true)
    String createTicket(
        @ToolParam(description = "Il problema segnalato dall'utente.") TicketRequest ticketRequest,
        ToolContext toolContext) {

        String username = (String) toolContext.getContext().get("username");
        LOGGER.info("Creazione ticket di assistenza per utente {} con dettagli {}", username, ticketRequest);
        HelpDeskTicket savedTicket = service.createTicket(ticketRequest, username);
        LOGGER.info("Ticket creato con successo. Ticket ID: {}, Username: {}",
            savedTicket.getId(),
            savedTicket.getUsername()
        );
        return "Ticket #" + savedTicket.getId() + " creato con successo per utente " + savedTicket.getUsername();
    }

    ...
}
```

Note

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```
...
@Tool(description = "Recupera lo stato dei ticket di assistenza a partire da uno specifico username.")
List<HelpDeskTicket> getTicketStatus(ToolContext toolContext) {

    String username = (String) toolContext.getContext().get("username");
    LOGGER.info("Recupero ticket per utente: {}", username);
    List<HelpDeskTicket> tickets = service.getTicketsByUsername(username);
    LOGGER.info("Trovati {} ticket di assistenza per utente {}", tickets.size(), username);
    return tickets;
}
}
```

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```
package it.venis.ai.spring.demo.config;

...

@Configuration
public class HelpDeskChatClientConfig {

    @Value("classpath:/templates/get-help-desk-system-prompt.st")
    Resource helpDeskSystemPrompt;

    @Bean
    public ChatClient geminiHelpDeskToolsChatClient(
        OpenAiChatModel geminiChatModel,
        HelpDeskTools helpDeskTools,
        ChatMemory chatMemory,
        @Qualifier("messageChatMemoryAdvisor") BaseChatMemoryAdvisor chatMemoryAdvisor) {

        ChatClient.Builder chatClientBuilder = ChatClient.builder(geminiChatModel);

        return chatClientBuilder
            .defaultTools(helpDeskTools)
            .defaultAdvisors(List.of(new SimpleLoggerAdvisor(), chatMemoryAdvisor))
            .defaultSystem(helpDeskSystemPrompt)
            .build();
    }

    ...
}
```

Note

[illegible]

```

...
@Bean
public ChatClient ollamaHelpDeskToolsChatClient(
    OllamaChatModel ollamaChatModel,
    HelpDeskTools helpDeskTools,
    ChatMemory chatMemory,
    @Qualifier("messageChatMemoryAdvisor") BaseChatMemoryAdvisor chatMemoryAdvisor) {

    ChatClient.Builder chatClientBuilder = ChatClient.builder(ollamaChatModel);

    return chatClientBuilder
        .defaultTools(helpDeskTools)
        .defaultAdvisors(List.of(new SimpleLoggerAdvisor(),
                                new OllamaCostSavingsAdvisor(),
                                chatMemoryAdvisor))
        .defaultSystem(helpDeskSystemPrompt)
        .build();
}
}

```

Note

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```
package it.tenvis.ai.spring.demo.controllers;

...

@RestController
@Configuration
public class QuestionController {

    ...

    private final ChatClient geminiHelpDeskToolsChatClient;
    private final ChatClient ollamaHelpDeskToolsChatClient;

    public QuestionController(QuestionService service,
        RAGService ragService,
        TimeToolsService timeToolsService,
        @Qualifier("geminiWeatherToolsChatClient") ChatClient geminiWeatherToolsChatClient,
        @Qualifier("ollamaWeatherToolsChatClient") ChatClient ollamaWeatherToolsChatClient,
        @Qualifier("geminiHelpDeskToolsChatClient") ChatClient geminiHelpDeskToolsChatClient,
        @Qualifier("ollamaHelpDeskToolsChatClient") ChatClient ollamaHelpDeskToolsChatClient) {

        this.service = service;
        this.ragService = ragService;
        this.timeToolsService = timeToolsService;
        this.geminiWeatherToolsChatClient = geminiWeatherToolsChatClient;
        this.ollamaWeatherToolsChatClient = ollamaWeatherToolsChatClient;
        this.geminiHelpDeskToolsChatClient = geminiHelpDeskToolsChatClient;
        this.ollamaHelpDeskToolsChatClient = ollamaHelpDeskToolsChatClient;

    }

    ...
}
```

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```
...
@PostMapping("/gemini/ask/help-desk-tools/help-desk")
public Answer getGeminiHelpDeskToolAnswer(@RequestHeader("username") String username,
    @RequestParam("message") String message) {
    return new Answer(
        this.geminiHelpDeskToolsChatClient.prompt()
            .advisors(a -> a.param(ChatMemory.CONVERSATION_ID, username))
            .user(message)
            .toolContext(Map.of("username", username))
            .call().content()
    );
}

@PostMapping("/ollama/ask/help-desk-tools/help-desk")
public Answer getOllamaHelpDeskToolAnswer(@RequestHeader("username") String username,
    @RequestParam("message") String message) {
    return new Answer(
        this.ollamaHelpDeskToolsChatClient.prompt()
            .advisors(a -> a.param(ChatMemory.CONVERSATION_ID, username))
            .user(message)
            .toolContext(Map.of("username", username))
            .call().content()
    );
}
}
```

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Branch: 14-spring-ai-gemini-ollama-help-desk-tools

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