Output Hub System Specification and Vision

1. Introduction

1.1 Purpose

The primary purposes of Output Hub are:

1. To develop a well-organized, growing knowledge base of LLM interactions.
2. To provide a foundation for refining raw LLM outputs through human intervention.
3. To establish data relationships that enable iterative improvements in prompt engineering.
4. To facilitate advanced analysis of LLM interactions for improved productivity and insights.

1.2 Vision

Output Hub aims to become the central nexus for LLM interaction management, enabling users to:

- Build a personal or organizational "second brain" of AI-assisted knowledge.
- Continuously improve their prompt engineering skills through data-driven insights.
- Collaborate on and share effective prompts and refined outputs.
- Gain deep insights into their LLM usage patterns and effectiveness.

2. System Architecture

2.1 Database Design (PostgreSQL)

2.1.1 Main Tables

1. `customgpt`

- `id` (PRIMARY KEY)
- `name` (VARCHAR)
- `link` (VARCHAR)
- `description` (TEXT)
- `config` (TEXT)
- `creation_date` (TIMESTAMP)
- `activity_status_id` (FOREIGN KEY to `lookupactivitystatus`)
- `gpt_model_id` (FOREIGN KEY to `lookupgptmodels`)
- `gpt_rating_id` (FOREIGN KEY to `lookupgptrating`)
- `response_time_id` (FOREIGN KEY to `lookupgptresponsetimes`)
- `llm_list_id` (FOREIGN KEY to `lookupllmlist`)

2. `promptlibrary`

- `id` (PRIMARY KEY)
- `prompt_name` (VARCHAR)
- `prompt_text` (TEXT)
- `prompt_dev_stage_id` (FOREIGN KEY to `lookuppromptdevstages`)

3. `promptoutput`

- `id` (PRIMARY KEY)
- `date` (TIMESTAMP)
- `summary` (TEXT)
- `full_output` (TEXT)
- `notes` (TEXT)
- `prompt_id` (FOREIGN KEY to `promptlibrary`)

- `accuracy_level_id` (FOREIGN KEY to `lookupaccuracylevel`)
- `actionability_level_id` (FOREIGN KEY to `lookupactionabilitylevel`)
- `llm_list_id` (FOREIGN KEY to `lookupllmlist`)
- `md_conversion_status_id` (FOREIGN KEY to `lookupmdconversionstatus`)

4. `outputtag`

- `id` (PRIMARY KEY)
- `tag_name` (VARCHAR)
- `created` (TIMESTAMP)

5. `accessui`

- `id` (PRIMARY KEY)
- `ui_name` (VARCHAR)
- `custom_gpt_id` (FOREIGN KEY to `customgpt`)

6. `users`

- `id` (PRIMARY KEY)
- `username` (VARCHAR)
- `email` (VARCHAR)
- `password_hash` (VARCHAR)
- `created_at` (TIMESTAMP)
- `updated_at` (TIMESTAMP)

2.1.2 Lookup Tables

7. `lookupaccuracylevel`

- `id` (PRIMARY KEY)
- `level` (VARCHAR)
- `description` (TEXT)

8. `lookupactionabilitylevel`

- `id` (PRIMARY KEY)
- `level_name` (VARCHAR)
- `description` (TEXT)

9. `lookupactivitystatus`

- `id` (PRIMARY KEY)
- `status_name` (VARCHAR)
- `description` (TEXT)

10. `lookupagentgroups`

- `id` (PRIMARY KEY)
- `group_name` (VARCHAR)
- `group_description` (TEXT)

11. `lookupgptcats`

- `id` (PRIMARY KEY)
- `cat_name` (VARCHAR)
- `cat_desc` (TEXT)
- `created_at` (TIMESTAMP)

12. `lookupgptmodels`

- `id` (PRIMARY KEY)
- `model_name` (VARCHAR)

- `model_description` (TEXT)

13. `lookupgptoutputreviewsdone`

- `id` (PRIMARY KEY)
- `review_name` (VARCHAR)
- `review_desc` (TEXT)

14. `lookupgptrating`

- `id` (PRIMARY KEY)
- `rating` (INTEGER)
- `rating_description` (TEXT)

15. `lookupgptresponsetimes`

- `id` (PRIMARY KEY)
- `response_time` (VARCHAR)
- `min_value` (INTEGER)
- `max_value` (INTEGER)
- `description` (TEXT)

16. `lookupknowledgetypes`

- `id` (PRIMARY KEY)
- `name` (VARCHAR)
- `description` (TEXT)

17. `lookupllmlist`

- `id` (PRIMARY KEY)
- `llm_name` (VARCHAR)
- `llm_desc` (TEXT)
- `year_released` (INTEGER)

18. `lookupmdconversionstatus`

- `id` (PRIMARY KEY)
- `status_name` (VARCHAR)

19. `lookupmediatypes`

- `id` (PRIMARY KEY)
- `name` (VARCHAR)
- `description` (TEXT)

20. `lookupprojecttags`

- `id` (PRIMARY KEY)
- `tag_name` (VARCHAR)
- `tag_desc` (TEXT)

21. `lookuppromptdevstages`

- `id` (PRIMARY KEY)
- `stage_name` (VARCHAR)
- `stage_desc` (TEXT)

2.1.3 Junction Tables

22. `customgpt_agentgroups`

- `customgpt_id` (FOREIGN KEY to `customgpt`)
- `agentgroups_id` (FOREIGN KEY to `lookupagentgroups`)
- PRIMARY KEY (`customgpt_id` , `agentgroups_id`)

23. `customgpt_gptcats`

- `customgpt_id` (FOREIGN KEY to `customgpt`)
- `gptcats_id` (FOREIGN KEY to `lookupgptcats`)
- PRIMARY KEY (`customgpt_id`, `gptcats_id`)

24. `customgpt_outputreviewsdone`

- `customgpt_id` (FOREIGN KEY to `customgpt`)
- `outputreviewsdone_id` (FOREIGN KEY to `lookupgptoutputreviewsdone`)
- PRIMARY KEY (`customgpt_id`, `outputreviewsdone_id`)

25. `customgpt_projecttags`

- `customgpt_id` (FOREIGN KEY to `customgpt`)
- `projecttags_id` (FOREIGN KEY to `lookupprojecttags`)
- PRIMARY KEY (`customgpt_id`, `projecttags_id`)

26. `customgpt_promptlibrary`

- `customgpt_id` (FOREIGN KEY to `customgpt`)
- `promptlibrary_id` (FOREIGN KEY to `promptlibrary`)
- PRIMARY KEY (`customgpt_id`, `promptlibrary_id`)

27. `customgpt_promptoutput`

- `customgpt_id` (FOREIGN KEY to `customgpt`)
- `promptoutput_id` (FOREIGN KEY to `promptoutput`)
- PRIMARY KEY (`customgpt_id`, `promptoutput_id`)

28. `promptlibrary_projecttags`

- `promptlibrary_id` (FOREIGN KEY to `promptlibrary`)
- `projecttags_id` (FOREIGN KEY to `lookupprojecttags`)
- PRIMARY KEY (`promptlibrary_id`, `projecttags_id`)

29. `promptoutput_knowledgetypes`

- `promptoutput_id` (FOREIGN KEY to `promptoutput`)
- `knowledgetypes_id` (FOREIGN KEY to `lookupknowledgetypes`)
- PRIMARY KEY (`promptoutput_id`, `knowledgetypes_id`)

30. `promptoutput_mediatypes`

- `promptoutput_id` (FOREIGN KEY to `promptoutput`)
- `mediatypes_id` (FOREIGN KEY to `lookupmediatypes`)
- PRIMARY KEY (`promptoutput_id`, `mediatypes_id`)

31. `promptoutput_projecttags`

- `promptoutput_id` (FOREIGN KEY to `promptoutput`)
- `projecttags_id` (FOREIGN KEY to `lookupprojecttags`)
- PRIMARY KEY (`promptoutput_id`, `projecttags_id`)

32. `promptoutput_promptlibrary`

- `promptoutput_id` (FOREIGN KEY to `promptoutput`)
- `promptlibrary_id` (FOREIGN KEY to `promptlibrary`)
- PRIMARY KEY (`promptoutput_id`, `promptlibrary_id`)

33. `promptoutput_tags`

- `promptoutput_id` (FOREIGN KEY to `promptoutput`)
- `tag_id` (FOREIGN KEY to `outputtag`)
- PRIMARY KEY (`promptoutput_id`, `tag_id`)

2.2 Key Relationships

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2.2.1 Many-to-Many (M2M) Relationships

1. Custom GPTs and Agent Groups: There is a many-to-many relationship between Custom GPTs and Agent Groups. The database tables are `customgpt` and `lookupagentgroups`, with `customgpt_agentgroups` as the junction table. Each Custom GPT can be associated with multiple Agent Groups, and each Agent Group can be linked to multiple Custom GPTs.
2. Custom GPTs and GPT Categories: There is a many-to-many relationship between Custom GPTs and GPT Categories. The database tables are `customgpt` and `lookupgptcats`, with `customgpt_gptcats` as the junction table. A Custom GPT can belong to multiple categories, and each category can contain multiple Custom GPTs.
3. Custom GPTs and Output Reviews: There is a many-to-many relationship between Custom GPTs and Output Reviews. The database tables are `customgpt` and `lookupgptoutputreviewsdone`, with `customgpt_outputreviewsdone` as the junction table. Each Custom GPT can have multiple output reviews, and each output review can be associated with multiple Custom GPTs.
4. Custom GPTs and Project Tags: There is a many-to-many relationship between Custom GPTs and Project Tags. The database tables are `customgpt` and `lookupprojecttags`, with `customgpt_projecttags` as the junction table. A Custom GPT can be tagged with multiple projects, and each project tag can be applied to multiple Custom GPTs.
5. Custom GPTs and Prompt Library: There is a many-to-many relationship between Custom GPTs and the Prompt Library. The database tables are `customgpt` and `promptlibrary`, with `customgpt_promptlibrary` as the junction table. Each Custom GPT can use multiple prompts from the library, and each prompt in the library can be associated with multiple Custom GPTs.
6. Custom GPTs and Prompt Outputs: There is a many-to-many relationship between Custom GPTs and Prompt Outputs. The database tables are `customgpt` and `promptoutput`, with `customgpt_promptoutput` as the junction table. Each Custom GPT can generate multiple prompt outputs, and each prompt output can be associated with multiple Custom GPTs.
7. Prompt Library and Project Tags: There is a many-to-many relationship between the Prompt Library and Project Tags. The database tables are `promptlibrary` and `lookupprojecttags`, with `promptlibrary_projecttags` as the junction table. Each prompt in the library can be tagged with multiple projects, and each project tag can be applied to multiple prompts.
8. Prompt Outputs and Knowledge Types: There is a many-to-many relationship between Prompt Outputs and Knowledge Types. The database tables are `promptoutput` and `lookupknowledgetypes`, with `promptoutput_knowledgetypes` as the junction table. Each prompt output can be associated with multiple knowledge types, and each knowledge type can be linked to multiple prompt outputs.
9. Prompt Outputs and Media Types: There is a many-to-many relationship between Prompt Outputs and Media Types. The database tables are `promptoutput` and `lookupmediatypes`, with `promptoutput_mediatypes` as the junction table. Each prompt output can be associated with multiple media types, and each media type can be linked to multiple prompt outputs.
10. Prompt Outputs and Project Tags: There is a many-to-many relationship between Prompt Outputs and Project Tags. The database tables are `promptoutput` and `lookupprojecttags`, with `promptoutput_projecttags` as the junction table. Each prompt output can be tagged with multiple projects, and each project tag can be applied to multiple prompt outputs.
11. Prompt Outputs and Prompt Library: There is a many-to-many relationship between Prompt Outputs and the Prompt Library. The database tables are `promptoutput` and `promptlibrary`, with `promptoutput_promptlibrary` as the junction table. Each prompt output can be associated with multiple prompts from the library, and each prompt in the library can be linked to multiple outputs.
12. Prompt Outputs and Output Tags: There is a many-to-many relationship between Prompt Outputs and Output Tags. The database tables are `promptoutput` and `outputtag`, with `promptoutput_tags` as the junction table. Each prompt output can have multiple tags, and each tag can be applied to multiple prompt outputs.

2.2.2 Many-to-One (M2O) Relationships

1. Custom GPTs and Activity Status: There is a many-to-one relationship between Custom GPTs and Activity Status. The database tables are `customgpt` and `lookupactivitystatus`. Many Custom GPTs can have the same activity status, but each Custom GPT has only one activity status at a time.
2. Custom GPTs and GPT Models: There is a many-to-one relationship between Custom GPTs and GPT Models. The database tables are `customgpt` and `lookupgptmodels`. Many Custom GPTs can use the same GPT model, but each Custom GPT is associated with only one GPT model at a time.
3. Custom GPTs and GPT Ratings: There is a many-to-one relationship between Custom GPTs and GPT Ratings. The database tables are `customgpt` and `lookupgptrating`. Many Custom GPTs can have the same rating, but each Custom GPT has only one rating at a time.
4. Custom GPTs and Response Times: There is a many-to-one relationship between Custom GPTs and Response Times. The database tables are `customgpt` and `lookupgptresponsetimes`. Many Custom GPTs can have the same response time category, but each Custom GPT is associated with only one response time category at a time.
5. Custom GPTs and LLM List: There is a many-to-one relationship between Custom GPTs and the LLM List. The database tables are `customgpt` and `lookupllmlist`. Many Custom GPTs can use the same LLM, but each Custom GPT is associated with only one LLM at a time.
6. Prompt Library and Prompt Development Stages: There is a many-to-one relationship between the Prompt Library and Prompt Development Stages. The database tables are `promptlibrary` and `lookuppromptdevstages`. Many prompts in the library can be at the same development stage, but each prompt is associated with only one development stage at a time.
7. Prompt Outputs and Accuracy Levels: There is a many-to-one relationship between Prompt Outputs and Accuracy Levels. The database tables are `promptoutput` and `lookupaccuracylevel`. Many prompt outputs can have the same accuracy level, but each prompt output is associated with only one accuracy level at a time.
8. Prompt Outputs and Actionability Levels: There is a many-to-one relationship between Prompt Outputs and Actionability Levels. The database tables are `promptoutput` and `lookupactionabilitylevel`. Many prompt outputs can have the same actionability level, but each prompt output is associated with only one actionability level at a time.
9. Prompt Outputs and LLM List: There is a many-to-one relationship between Prompt Outputs and the LLM List. The database tables are `promptoutput` and `lookupllmlist`. Many prompt outputs can be generated by the same LLM, but each prompt output is associated with only one LLM at a time.

10. Prompt Outputs and MD Conversion Status: There is a many-to-one relationship between Prompt Outputs and MD Conversion Status. The database tables are `promptoutput` and `lookupmdconversionstatus`. Many prompt outputs can have the same MD conversion status, but each prompt output has only one MD conversion status at a time.
11. Access UI and Custom GPTs: There is a many-to-one relationship between Access UI and Custom GPTs. The database tables are `accessui` and `customgpt`. Many Access UI entries can be associated with the same Custom GPT, but each Access UI entry is linked to only one Custom GPT at a time.

3. Functional Requirements

3.1 Data Capture and Management

- Automated capture of LLM interactions via API integrations
- Manual input for prompts and outputs
- Bulk import/export functionality for data migration
- Version control for edited outputs

3.2 Analysis and Improvement

- Prompt effectiveness scoring based on output quality and user feedback
- Trend analysis for prompt usage and effectiveness over time
- Comparative analysis of outputs across different LLM models
- Suggestions for prompt improvements based on historical data

3.3 Collaboration and Sharing

- Team workspaces for shared prompt libraries
- Prompt and output sharing with granular permission controls
- Collaborative editing and refinement of prompts and outputs

3.4 Integration and Extensibility

- API for third-party integrations
- Plugin system for extending functionality
- Webhook support for automating workflows

4. User Interfaces

4.1 Web-based UI

4.1.1 Dashboard

- Overview of recent activities
- Quick access to frequently used prompts
- Visualizations of usage statistics and trends

4.1.2 Prompt Library

- Hierarchical view of prompt categories
- Search and filter functionality
- Inline editing of prompts

4.1.3 Output Manager

- List and detail views of outputs
- Side-by-side comparison of original and edited outputs
- Tagging and categorization interface

4.1.4 Analysis Tools

- Interactive charts and graphs for prompt effectiveness
- Model comparison tools

- Custom report builder

4.1.5 Settings and Administration

- User and team management
- Integration configuration
- System-wide preferences

4.2 Mobile App

- Simplified interface for on-the-go access
- Voice input for prompts
- Push notifications for collaborative features

4.3 Browser Extension

- Quick capture of web content as prompts
- Contextual prompt suggestions based on current webpage

5. Potential Use Cases

5.1 Content Creation

- Developing and refining blog post outlines
- Generating and iterating on marketing copy
- Collaborative scriptwriting for videos or podcasts

5.2 Research and Analysis

- Literature review assistance
- Data interpretation and summary generation
- Hypothesis generation and refinement

5.3 Software Development

- Code documentation generation
- Bug report analysis and solution brainstorming
- API design and documentation

5.4 Education and Training

- Creating personalized learning materials
- Generating practice questions and scenarios
- Developing and refining course outlines

5.5 Customer Support

- Building and maintaining a knowledge base of common issues and solutions
- Generating response templates for customer inquiries
- Analyzing customer feedback for product improvement

6. Non-Functional Requirements

6.1 Performance

- Response time < 2 seconds for most operations
- Support for concurrent users (initially up to 100, scalable to 10,000+)
- Efficient handling of large datasets (millions of prompts/outputs)

6.2 Security

- End-to-end encryption for data in transit and at rest
- Multi-factor authentication
- Regular security audits and penetration testing

6.3 Scalability

- Microservices architecture for independent scaling of components
- Horizontal scaling capabilities for database and application servers

6.4 Reliability

- 99.9% uptime SLA
- Automated backups with point-in-time recovery
- Comprehensive error logging and monitoring

7. Future Enhancements

- AI-powered prompt generation and optimization
- Integration with other AI tools and platforms (e.g., image generation, voice synthesis)
- Advanced natural language processing for deeper content analysis
- Virtual reality interface for immersive data exploration
- Blockchain integration for prompt and output verification and tracking