Fly on the Cloud

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*Abstract*—L’obiettivo di questo documento è quello di descrivere l’architettura dell’applicazione, le scelte progettuali effettuate, l’implementazione realizzata, le limitazioni riscontrate e la piattaforma software usata per lo sviluppo.

Keywords—microservizio.

# Architettura e scelte progettuali

## Descrizione dell’applicazione

L'applicazione, dal nome *Fly on the Cloud*, consente di effettuare l'acquisto di biglietti aerei. Esistono due tipologie di utenti: i turisti, che acquistano i biglietti, e le compagnie aeree, che forniscono le informazioni relative ai voli. Entrambe le tipologie di utenti hanno la necessità di registrarsi al sito per poter sfruttare le funzionalità del sistema.

Il turista può acquistare i biglietti aerei per conto di una o più persone. A tal proposito, se vuole, ha la possibilità di selezionare il posto (o i posti) a sedere e i servizi aggiuntivi di cui vuole usufruire (i.e. bagaglio in stiva aggiuntivo medio, bagaglio in stiva aggiuntivo grande, bagaglio speciale, animale domestico in cabina, assicurazione bagagli e trasporto neonato). Prima della conferma di prenotazione, il sistema fornirà qualche suggerimento sull’acquisto dei biglietti: in particolare, indicherà all’utente in quale data potrebbe essere più conveniente effettuare la prenotazione nell’ottica di risparmiare sul prezzo dei biglietti. Tale suggerimento viene generato sulla base dell’andamento dei prezzi dei biglietti di tutti i voli al variare del tempo. Per portare a termine la prenotazione, l’utente dovrà effettuare il pagamento.

La compagnia aerea può aggiungere un nuovo volo disponibile all’interno del sistema e può cambiare il prezzo di un volo inserito precedentemente, della selezione dei posti a sedere e dei servizi aggiuntivi.

## Descrizione dell’architettura

Come richiesto dalle specifiche, per lo sviluppo dell’applicazione è stata usata un’architettura a microservizi, dove ciascun microservizio mira a risolvere uno specifico sottoproblema relativo al funzionamento dell’applicazione. In particolare, sono stati individuati i seguenti microservizi: front-end, iscrizione al sito (**registration**), prenotazione di un volo (**booking**), gestione delle informazioni sui voli (**flights management**), suggerimento sull’acquisto dei biglietti (**suggestions**) e pagamento (**payment**). Più precisamente:

* Il microservizio di front-end comunica direttamente con tutti gli altri microservizi in modo tale da poter visualizzare a schermo tutte le informazioni necessarie e, in generale, fare da intermediario tra il client e la logica applicativa dell’applicazione (implementata appunto dagli altri microservizi).
* Il microservizio payment comunica col microservizio booking per poter registrare i pagamenti assieme alle informazioni relative a ciascun volo prenotato.
* Il microservizio flights management comunica col microservizio booking perché, per prenotare un volo o per aggiungerlo/modificarlo, sono necessarie sia le informazioni strettamente correlate con booking (i.e. lista dei voli disponibili e dei posti liberi per ciascun volo), sia le informazioni strettamente correlate con fligt management (i.e. prezzo aggiuntivo per la selezione dei posti a sedere e per la selezione dei servizi extra).
* Il microservizio booking comunica col microservizio suggestions poiché quest’ultimo deve disporre dello storico dei prezzi di ciascun volo; dunque, periodicamente, booking deve inviare a suggestions il prezzo attuale di tutti i voli disponibili in modo tale che suggestions aggiorni il proprio storico.

## Descrizione delle scelte progettuali

La comunicazione tra i vari microservizi avviene mediante RPC (Remote Procedure Call) oppure mediante coda di messaggi. In particolare si è scelto di inserire una coda di messaggi nell’interazione tra booking e suggestions poiché qui è sufficiente che booking invii (attraverso un meccanismo di push) delle informazioni a suggestions, senza dover ricevere un messaggio di risposta: dunque, in questo contesto, una comunicazione one-to-one asincrona che offra disaccoppiamento temporale è adeguata. In tutti gli altri casi, si è scelto di utilizzare una comunicazione basata su RPC poiché si tratta di interazioni basate su richiesta-risposta dove il servizio client, per poter proseguire correttamente la sua esecuzione, deve in ogni caso attendere un riscontro da parte del servizio server.

Per migliorare la scalabilità dell’applicazione, tutti i microservizi, eccetto suggestions, sono stati implementati in maniera stateless, ovvero in modo tale che il database non sia incluso all’interno dei microservizi stessi, bensì in un ambiente esterno.

Per migliorare il disegno dell’architettura a microservizi, sono stati applicati alcuni design pattern, di cui il database per service (per far sì che ciascun microservizio disponga di un proprio database privato) e il saga (per gestire agevolmente le transazioni che coinvolgono più microservizi, dato che si tratta di transazioni che insistono su molteplici database).

# Ease of Use

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* Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as “3.5-inch disk drive”.
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Identify applicable funding agency here. If none, delete this text box.

* Use a zero before decimal points: “0.25”, not “.25”. Use “cm3”, not “cc”. (*bullet list*)

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*a**b* 

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## Some Common Mistakes

* The word “data” is plural, not singular.
* The subscript for the permeability of vacuum **0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter “o”.
* In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
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* Be aware of the different meanings of the homophones “affect” and “effect”, “complement” and “compliment”, “discreet” and “discrete”, “principal” and “principle”.
* Do not confuse “imply” and “infer”.
* The prefix “non” is not a word; it should be joined to the word it modifies, usually without a hyphen.
* There is no period after the “et” in the Latin abbreviation “et al.”.
* The abbreviation “i.e.” means “that is”, and the abbreviation “e.g.” means “for example”.

An excellent style manual for science writers is [7].

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1. Table Type Styles

| Table Head | Table Column Head | | |
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| Table column subhead | Subhead | Subhead |
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##### Acknowledgment *(Heading 5)*

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks ...”. Instead, try “R. B. G. thanks...”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

##### References

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