

Resolvers Everywhere

Rethinking Client and Server Boundaries in GraphQL

Janette Cheng
Software Engineer at Meta



Outline

01 **What *is* a resolver?**

02 **Relay Resolvers**

Resolvers defined on your client!

03 **To client-resolve or not to client-resolve?**

Pros and cons of client resolvers

01 What *is* a resolver?

What is a resolver? (from the spec)

6.4.2 Value Resolution

While nearly all of GraphQL execution can be described generically, ultimately the internal system exposing the GraphQL interface must provide values. This is exposed via *ResolveFieldValue*, which produces a value for a given field on a type for a real value.

As an example, this might accept the *objectType* *Person*, the *field* "soulMate", and the *objectValue* representing John Lennon. It would be expected to yield the value representing Yoko Ono.

ResolveFieldValue(*objectType*, *objectValue*, *fieldName*, *argumentValues*)

1. Let *resolver* be the internal function provided by *objectType* for determining the resolved value of a field named *fieldName*.
2. Return the result of calling *resolver*, providing *objectValue* and *argumentValues*.

What is a resolver? (from the spec)

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`ResolveFieldValue(objectType, objectValue, fieldName, argumentValues)`

1. Let ***resolver*** be the internal function provided by *objectType* for determining the resolved value of a field named ***fieldName***.
2. Return the result of calling *resolver*, providing *objectValue* and *argumentValues*.

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The word “client” shows up 35 times...interesting!

Claim: GraphQL is agnostic when it comes to the server-client boundary

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- An API for requesting exactly the data you need
- An execution model with a specific algorithm

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GraphQL is:

- An API for requesting exactly the data you need ← **the heart and soul of GraphQL**
- An execution model with a specific algorithm ← **a “recommendation” 😊 for how you can achieve the API (can live on the server and/or the client!)**

Why would you need client resolvers?

- Centralizing the business logic that transforms server-side data models into view models
- Client-only data (UI state; encrypted/private data; persistent data stores)
- Unified data access API through a GraphQL schema

02 Relay Resolvers

Resolvers defined on your client!

02 Relay Resolvers

```
/**
 * @relayType DecryptedNote
 * @weak
 */
export type DecryptedNote = {
  plaintext_title: string,
  plaintext_body: string,
};
```

```
/**
 * @relayField Viewer.decrypted_note: DecryptedNote
 * @rootFragment ViewerDecryptedNoteFragment
 */
export function decryptedNote(
  key: ViewerDecryptedNoteFragment$key,
): DecryptedNote {
  const data = readFragment(
    graphql`
      fragment ViewerDecryptedNoteFragment on Viewer {
        encrypted_note_blob
      }
    `,
    key,
  );
  const decrypted = ClientEncryption.decrypt(data.encrypted_note_blob);
  return {
    plaintext_title: decrypted.title,
    plaintext_body: decrypted.body,
  };
}
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}
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/**
 * @relayField DecryptedNote.body_preview: String
 * @rootFragment BodyPreviewFragment
 */
export function bodyPreview(
  key: BodyPreviewFragment$key,
): string {
  const note = readFragment(
    graphql`
      fragment BodyPreviewFragment on DecryptedNote {
        plaintext_body
      }
    `,
    key,
  );

  if (note.plaintext_body.length <= 100) {
    return note.plaintext_body;
  }
  return note.plaintext_body.slice(0, 100) + '...';
}
```

```
/**
 * @relayField DecryptedNote.should_show_body_preview: Boolean
 * @rootFragment ShouldShowBodyPreviewFragment
 */
export function shouldShowBodyPreview(
  key: ShouldShowBodyPreviewFragment$key,
): boolean {
  const note = readFragment(
    graphql`
      fragment ShouldShowBodyPreviewFragment on DecryptedNote {
        plaintext_title
        plaintext_body
      }
    `,
    key,
  );

  return note.plaintext_body.length > 20
    && note.plaintext_body !== note.plaintext_title;
}
```

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  );
  return note.plaintext_body.length > 20
    && note.plaintext_body !== note.plaintext_title;
}
```

02 Relay Resolvers

```
function NoteRow({viewerRef}) {
  const data = useFragment(
    graphql`
      fragment NoteRow_viewer on Viewer {
        decrypted_note {
          plaintext_title
          body_preview
          should_show_body_preview
        }
      }
    `,
    viewerRef,
  );
  const note = data.decrypted_note;
  return (
    <Row>
      <Title>{note.plaintext_title}</Title>
      {note.should_show_body_preview && (
        <Subtitle>{note.body_preview}</Subtitle>
      )}
    </Row>
  );
}
```

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function NoteRow({viewerRef}) {
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  const note = data.decrypted_note;
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    <Row>
      <Title>{note.plaintext_title}</Title>
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        <Subtitle>{note.body_preview}</Subtitle>
      )}
    </Row>
  );
}
```

build time

```
function NoteRow({viewerRef}) {
  const data = useFragment(
    graphql`
      fragment NoteRow_viewer on Viewer {
        ...ViewerDecryptedNoteFragment
      }
    `,
    viewerRef,
  );
  const note = decryptedNote(data);
  return (
    <Row>
      <Title>{note.plaintext_title}</Title>
      {shouldShowBodyPreview(data) &&
        <Subtitle>{bodyPreview(data)}</Subtitle>
      }
    </Row>
  );
}
```

run time

run time

run time

02 Relay Resolvers

```
/**
 * @relayType NoteVault
 * @weak
 */
export type NoteVault = {
  note_count: number,
  last_decrypted_at_ms: ?number,
};
```

```
/**
 * @RelayResolver Viewer.note_vault: NoteVault
 * @live
 */
export function note_vault(): LiveState<NoteVault> {
  return {
    read(): NoteVault {
      const state = VaultStore.getState();
      return {
        note_count: state.notes.length,
        last_decrypted_at_ms: state.lastDecryptedAtMs,
      };
    },
  },

  subscribe(callback: () => void): () => void {
    // VaultStore fires listeners when notes are added/decrypted.
    return VaultStore.subscribe(callback);
  },
};
}
```

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03 To client-resolve or not to client-resolve?

Pros and cons of client resolvers

What about logic that could go on either the server or the client?

Even if your logic doesn't strictly *need* to belong on the client, it can be tempting to use client resolvers BUT...

Pros

- Fast to add! No need to coordinate with the server
- Lives and thus *dies* on the client

Cons

- Must be defined once per client (bad for logic that should be shared across different clients)
- Bad for expensive computation
- Relay Resolvers are not a full-blown GraphQL executor...

Could your client become both a GraphQL executor AND federated gateway??

Perhaps! Someone should build it and let me know how it goes 🙄

The End

