Communications Subdomain

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This module (`incode-module-communications`) defines `CommunicationChannel`s (email address, postal address or phone/fax number), and also allows `Document`s (implemented by the Document subdomain module) to be sent as `Communication`s either to an email address or to a postal address.

A `Document` is an entity that holds some sort of content, either binary such as PDF or Word document or text such as HTML; they can be rendered in various ways. `Document`s can be attached to arbitrary domain objects using `Paperclip`s.

A `Communication` is an entity that is a record of sending a `Document` to some party by way of their `CommunicationChannel`; these are the "correspondents" of the `Communication`. A `Communication` can be created either by sending the `Document` by email (ie to an email address), or by post (ie to a postal address). The module does not currently provided any capability to "send" a `Document` by phone or by fax.

Email `Communication`s always have an HTML cover note `Document` generated and associated with the `Communication`; the original `Document` is also associated. This cover note is used as the body of the actual email, while the original `Document` is included as an email attachment. If the original `Document` had supporting `Document`s associated with it (eg a tax or supplier receipt for an invoice), then these supporting documents are also included as attachments.

Postal `Communication`s do *not* have any sort of cover note, and the act of sending them is manual: the end-user downloads the original `Document` "through" the `Communication`; this marks the `Communication` as having been sent. If the original `Document` had supporting `Document`s associated with it then (as a convenience) a single PDF is downloaded that merges together the original `Document` along with any supporting documents.

There is some overlap between this module and the CommunicationChannel subdomain module). At some stage we intend to refactor this module to reuse the CommunicationChannel module, and then to remove any duplicate concepts (`EmailAddress` etc).

Also, note that the discriminators for `CommunicationChannel` subtypes currently are hard-coded to those for Estatio. These can be overridden using DataNucleus `.orm` files if required.

Screenshots

The module's functionality can be explored by running the quickstart with example usage using the `org.incode.domainapp.example.app.modules.ExampleDomDomCommunicationsAppManifest`.

This creates:

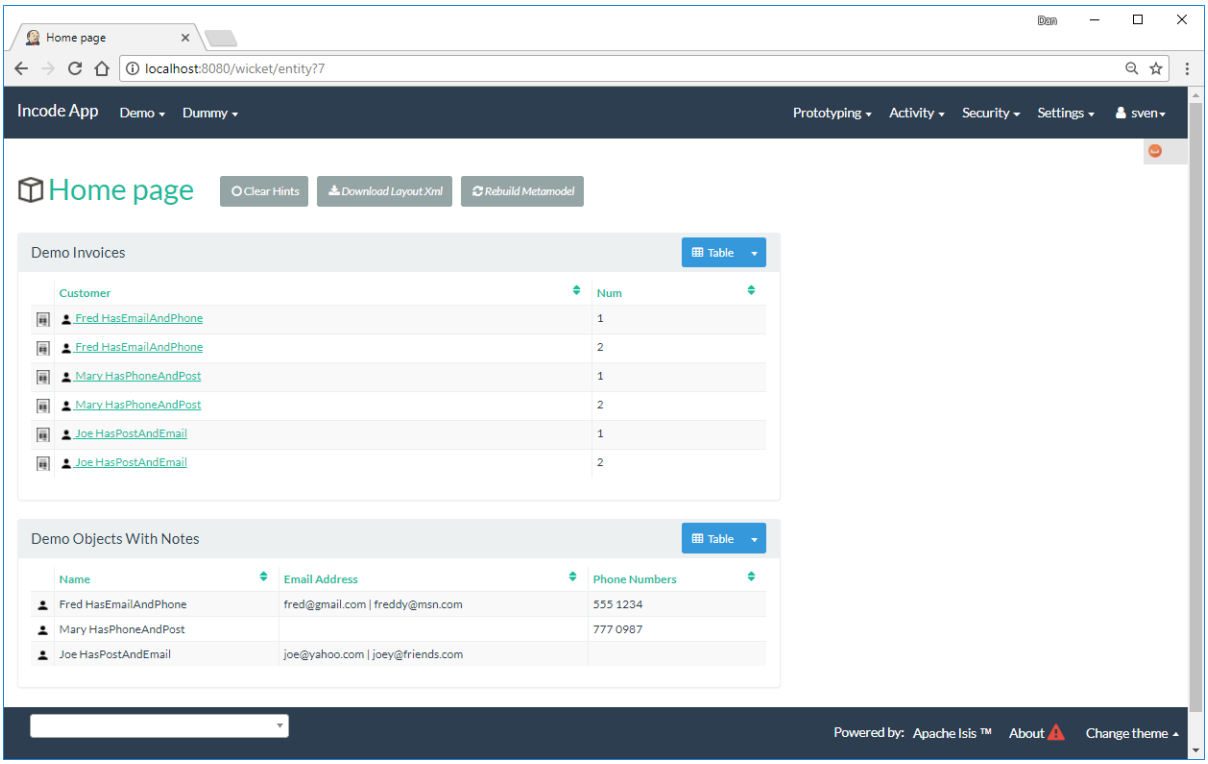
- demo customers, with a variety of `CommunicationChannel`s.
- demo invoices, each of which has a `Document` that has an associated document (simulating it having been generated already). Each invoice is also associated with ("owned" by) a customer
- prerequisite reference data to generate email cover notes:
  - A `DocumentType` for the email cover notes.

    This is referenced by the demo app's implementation of the `DocumentCommunicationSupport` SPI service

  - A corresponding `DocumentTemplate` for email cover notes
  - The Freemarker rendering strategy (from the Freemarker DocRendering library module). This is referenced by the `DocumentTemplate`, instructing the document module to render the email cover note using freemarker.
- `Country` ref data (from the Country subdomain module).

  This is required because `PostalAddress` communication channels reference the `Country`.

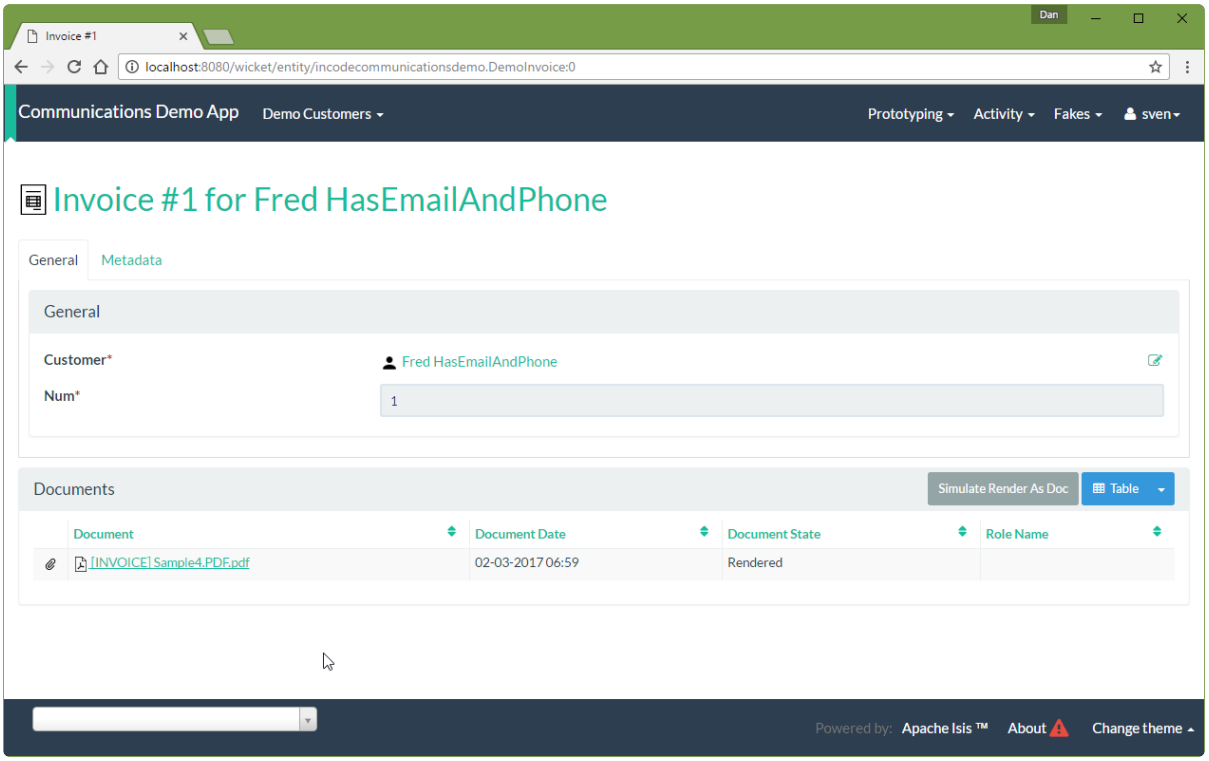
The home page lists the demo customers and invoices:



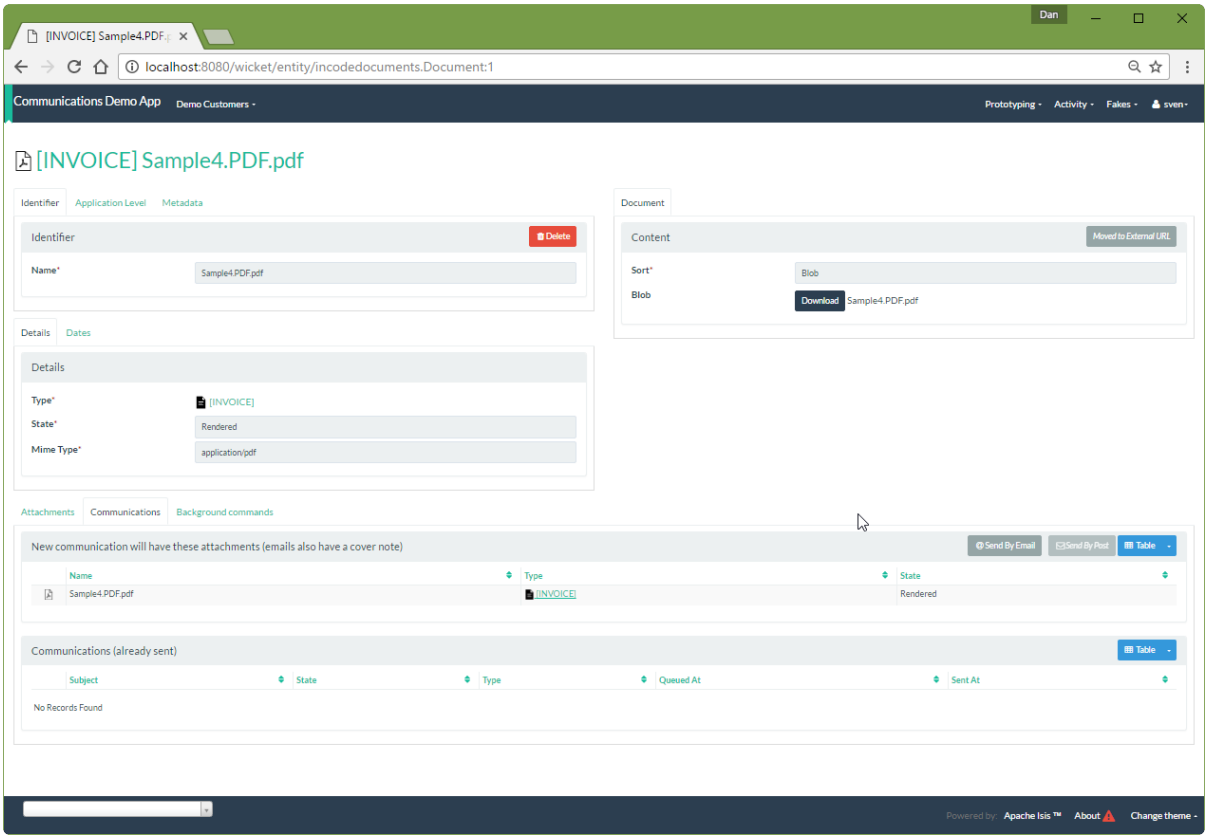
The remaining screenshots below **do** demonstrate the functionality of this module, but are out of date in that they are taken from the original isisaddons/incodehq module (prior to being amalgamated into the incode-platform).

Sending an Email

If we inspect one of the invoices for "Fred" (who has email addresses), we see it has an attached `Document` (simulating it having been generated from the invoice):

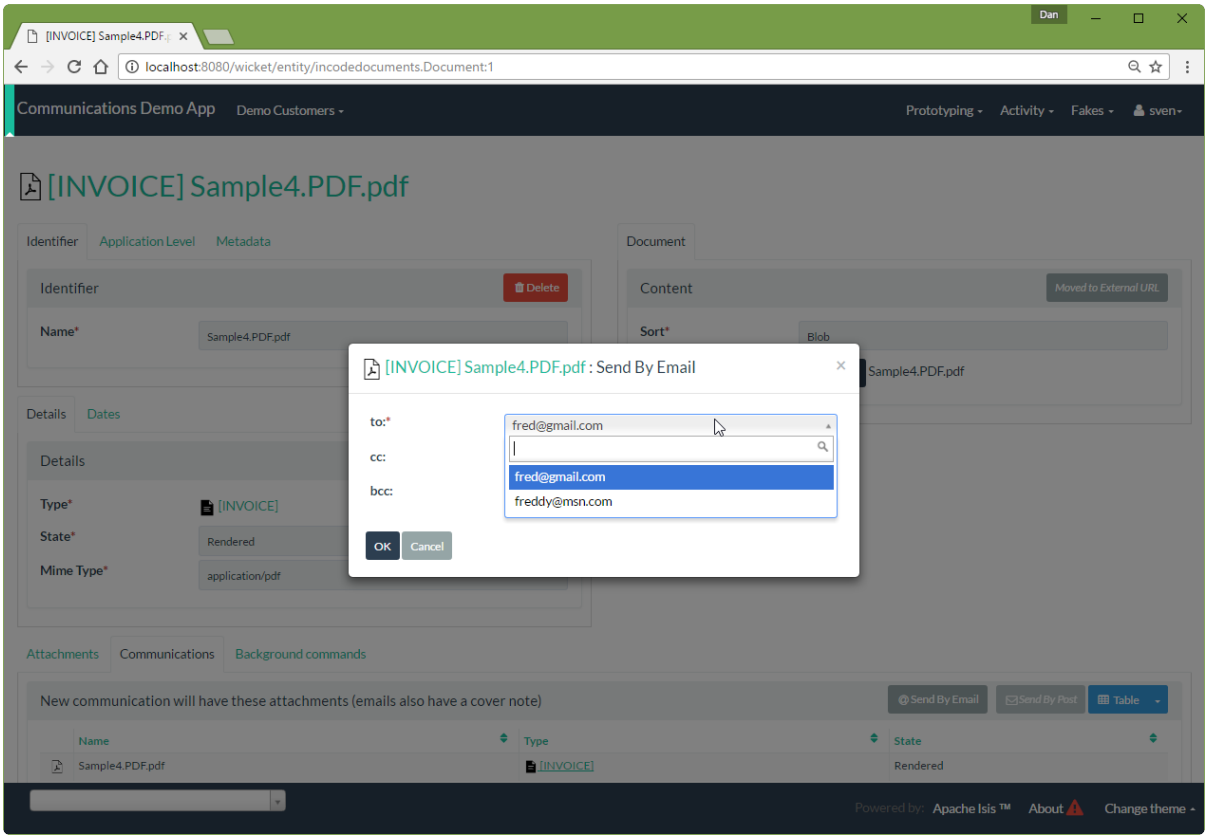


If we inspect that `Document` in turn, we can see that the "send by email" action is enabled:

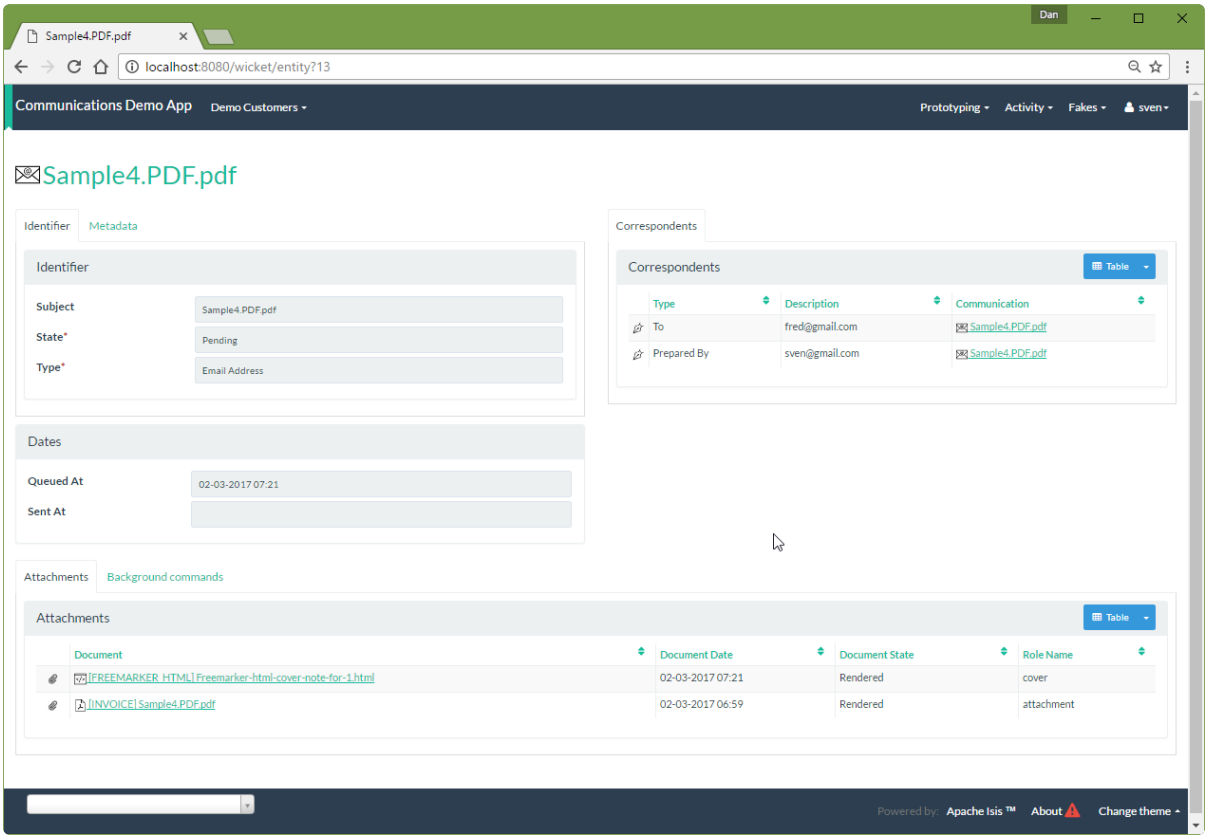


This is because the demo app's implementation of the `DocumentCommunicationSupport` SPI service was able to figure out an email address to use (the document's invoice's customer).

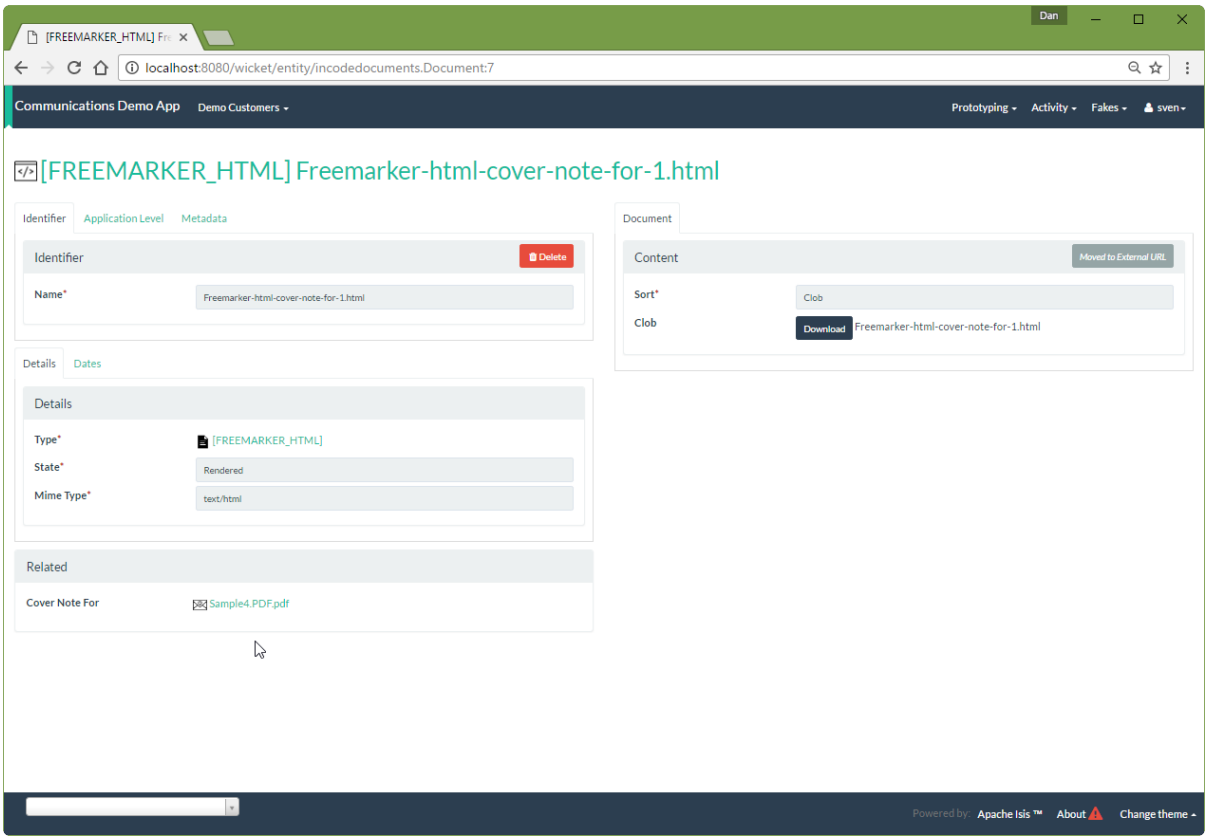
The "sendByEmail" action prompt shows these emails:



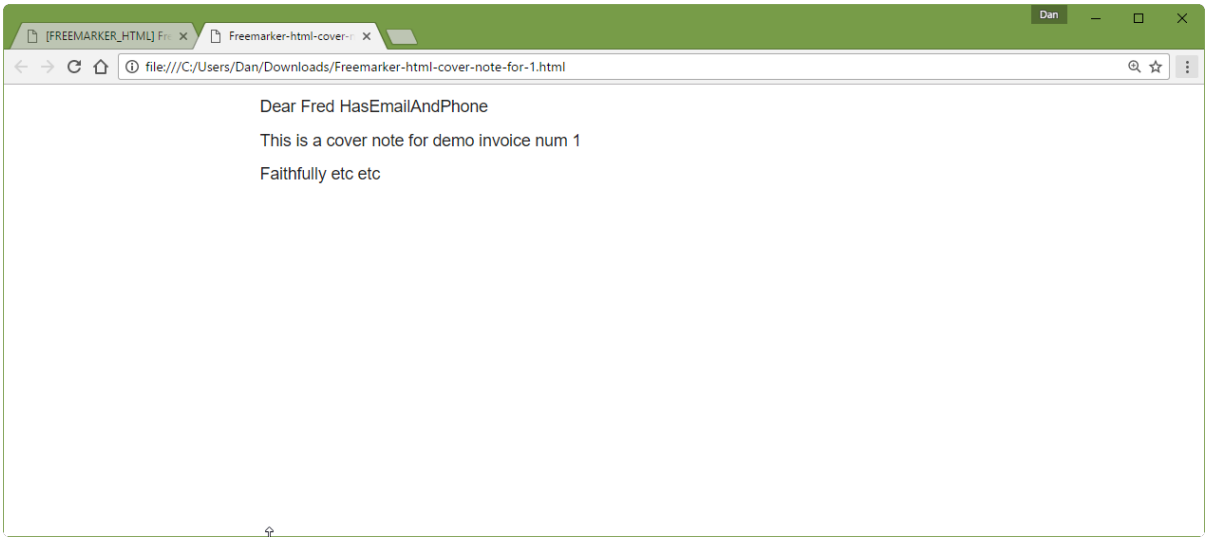
Invoking the action results in an email `Communication`:



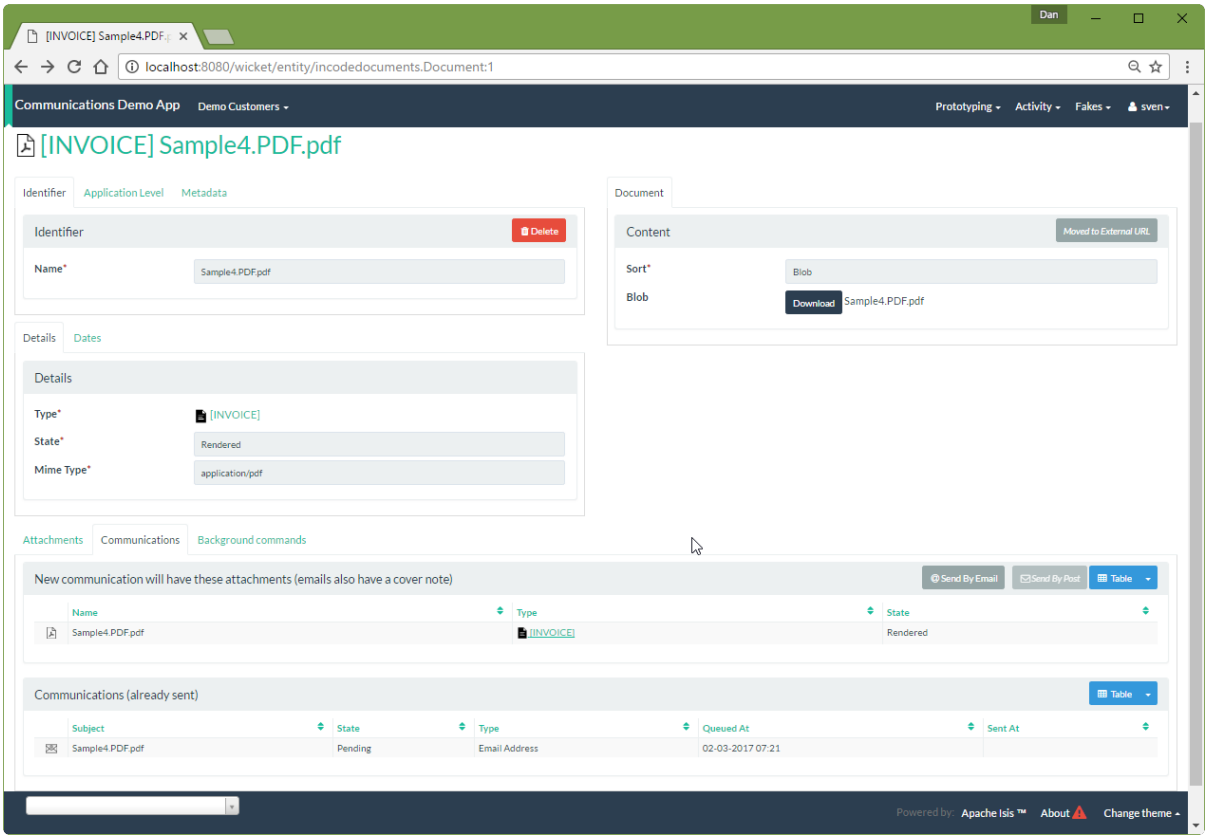
When an email `Communication` is created, it also automatically create a cover note `Document`. The cover note is used as the body of the email, while the original `Document` is sent as an attachment. The cover note `Document` is automatically associated with the `Communication`, shown by the "coverNoteFor" property:



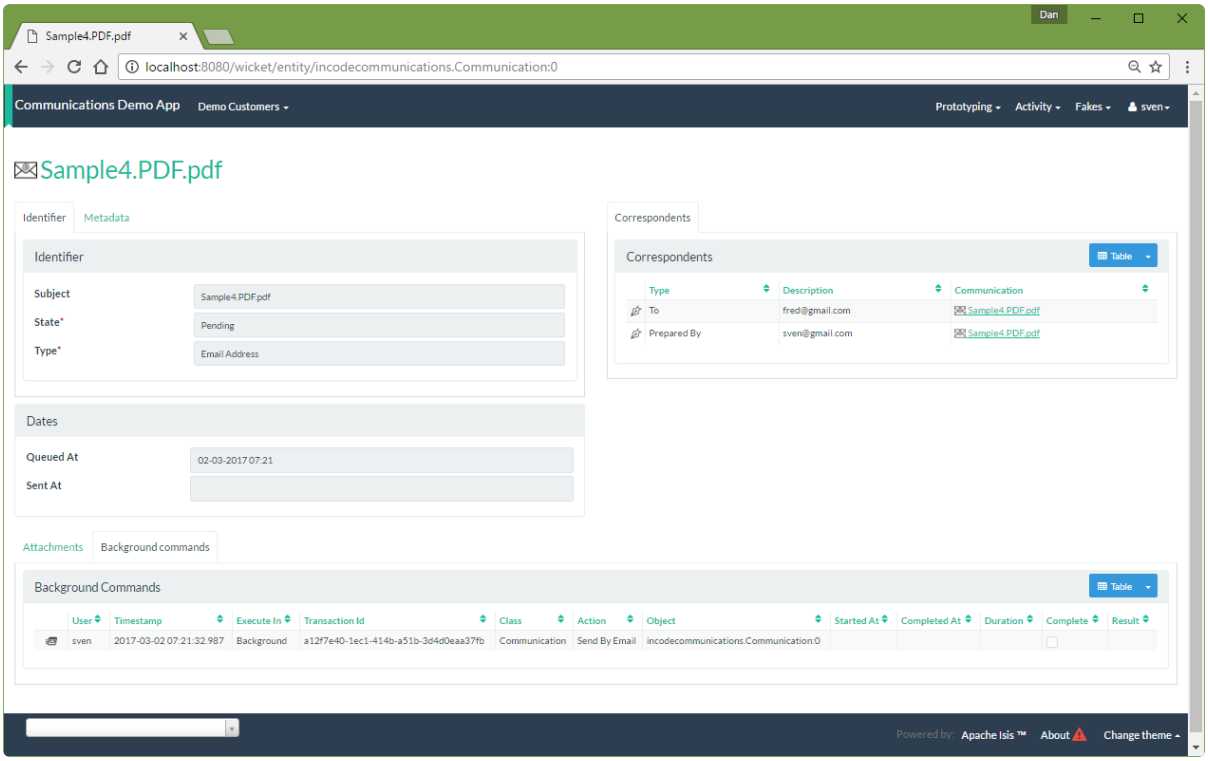
The generated cover note is required to be HTML (so that it can be used as the body of the email). In the case of the demo app this cover note is generated using Freemarker:



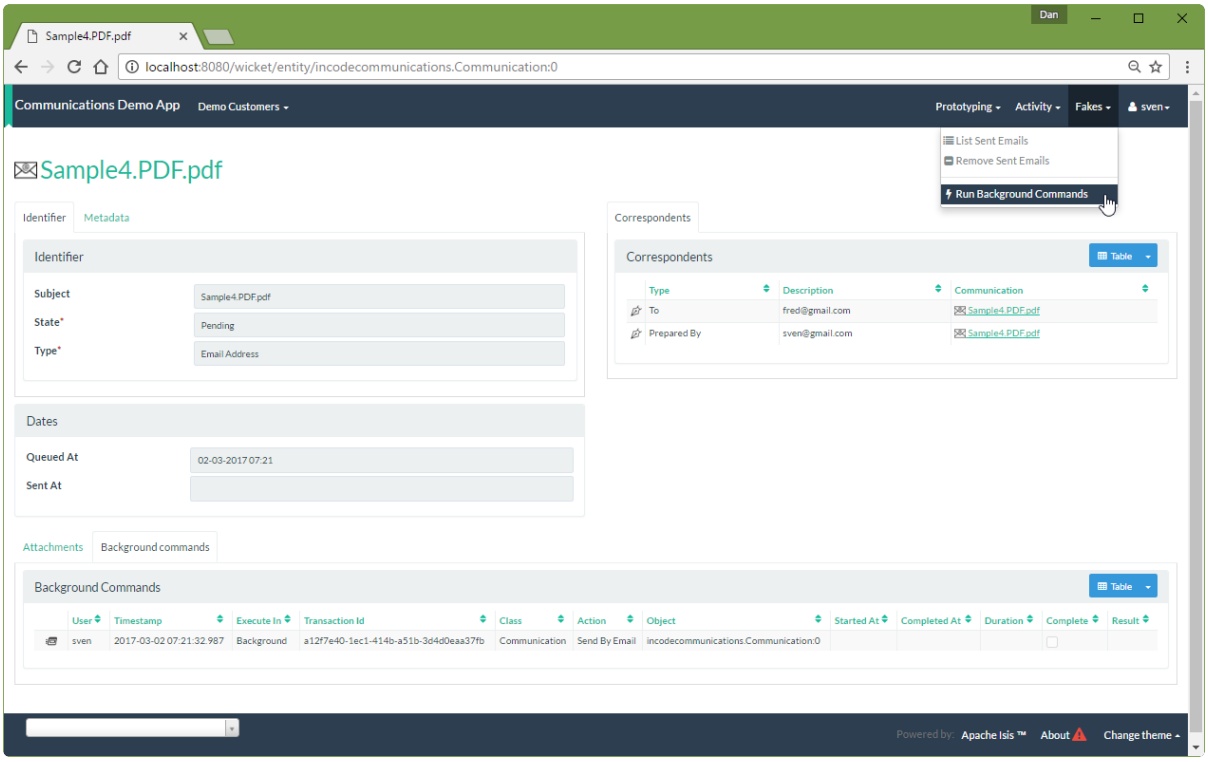
The generated `Communication` is also associated with the original `Document`:



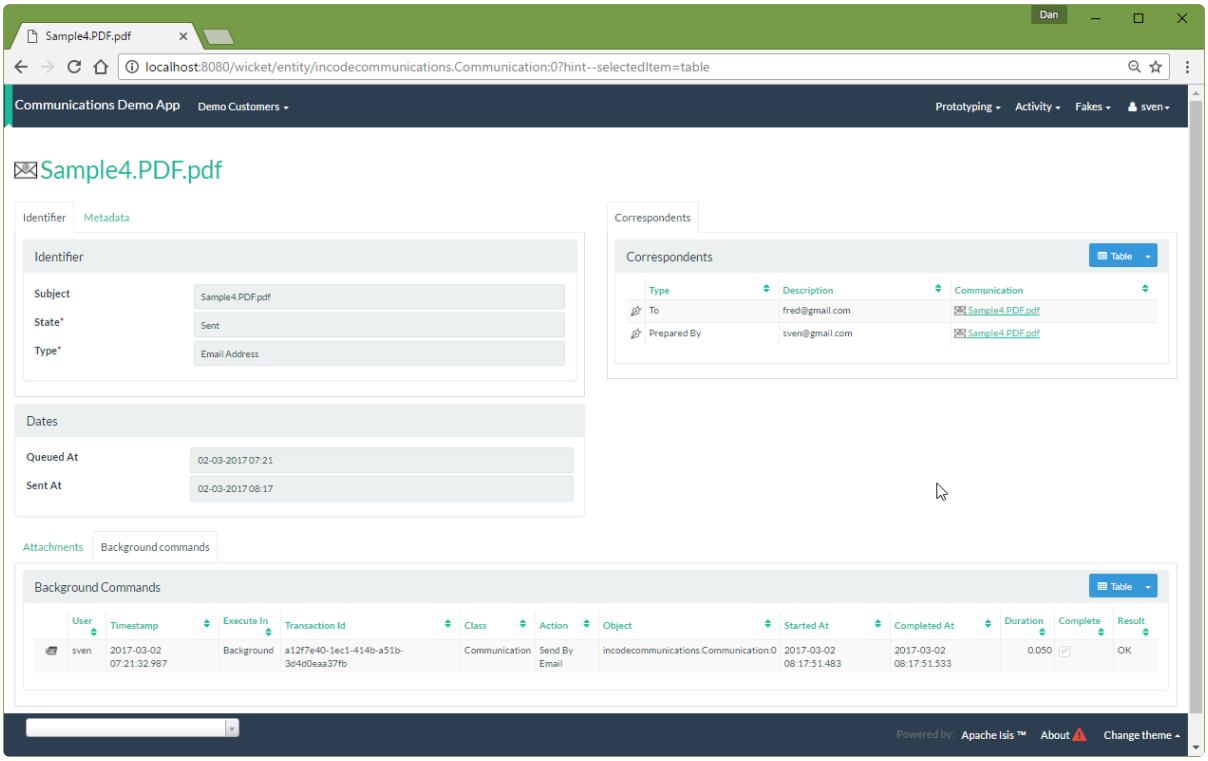
Looking again at the generated email `Communication`, we see that it is scheduled to be sent in the background command:



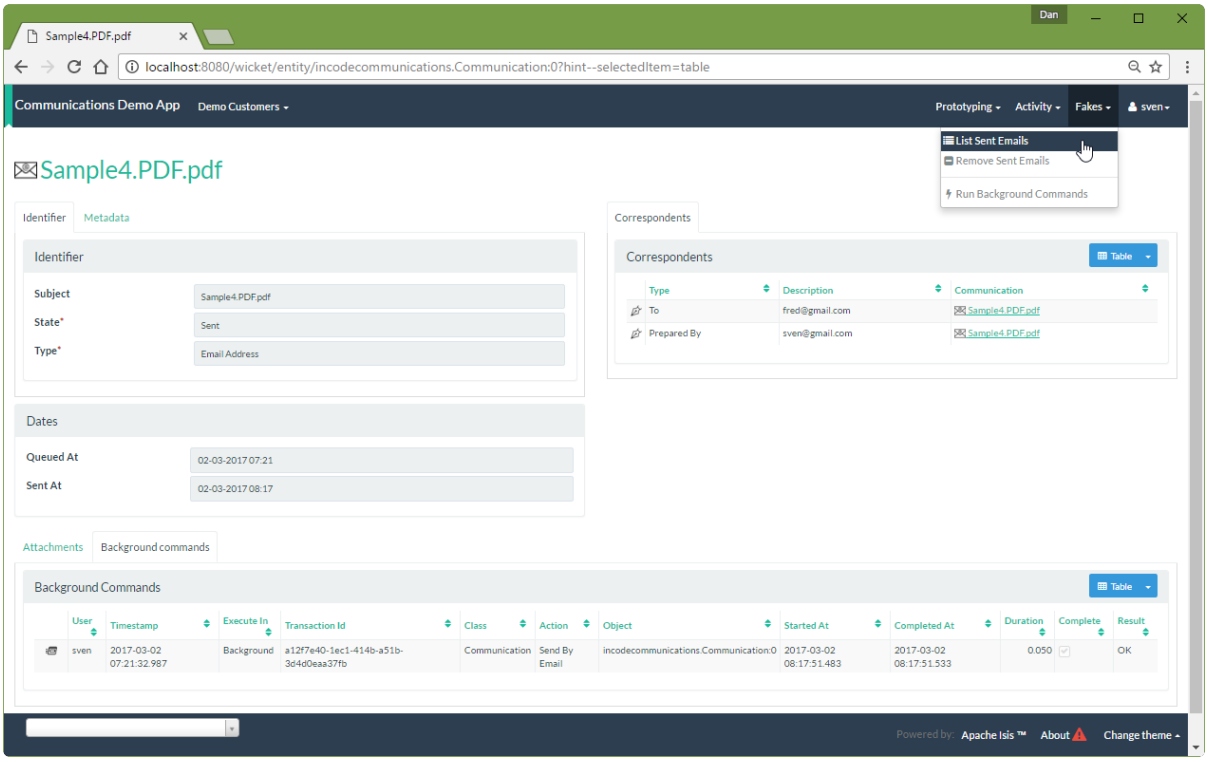
The demo app has not been configured with a background scheduler, but does provide a "fake" scheduler which can be used to run such commands:



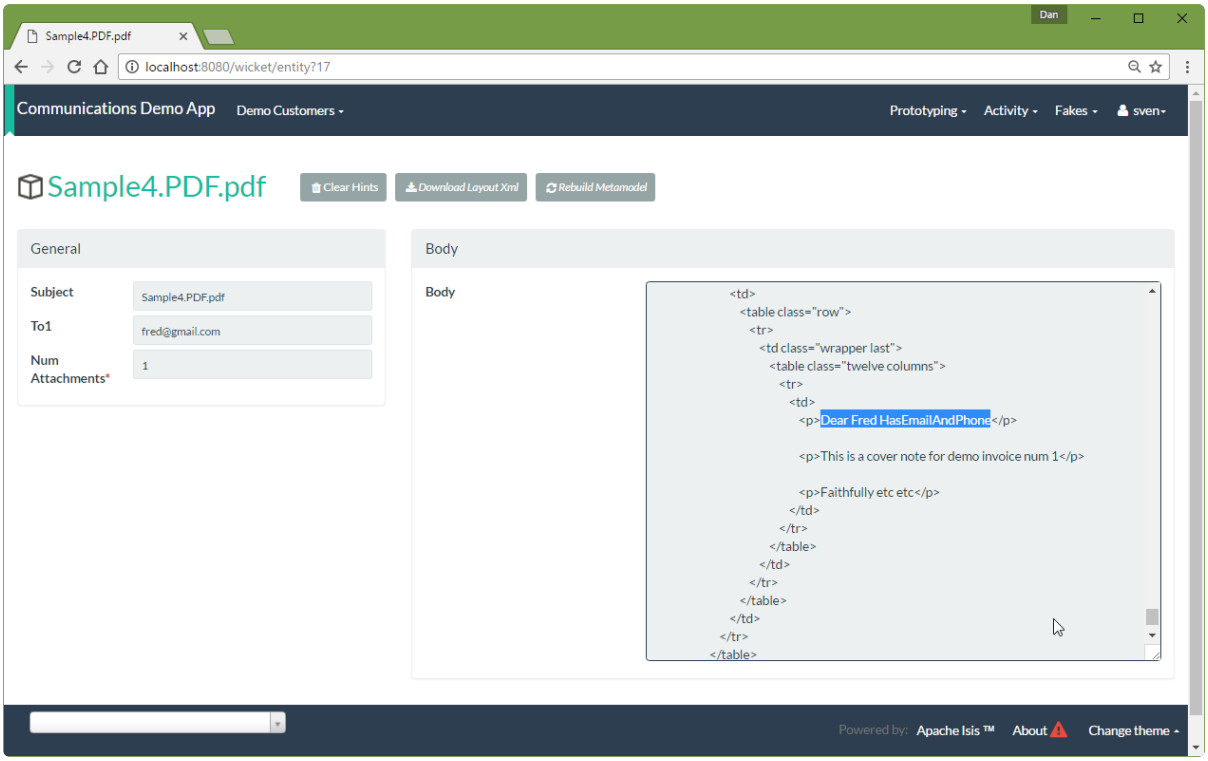
Which results in the email being sent:



In fact, the demo app is not configured with a real email service either; instead it has a fake service that allows "sent" email messages to be inspected:

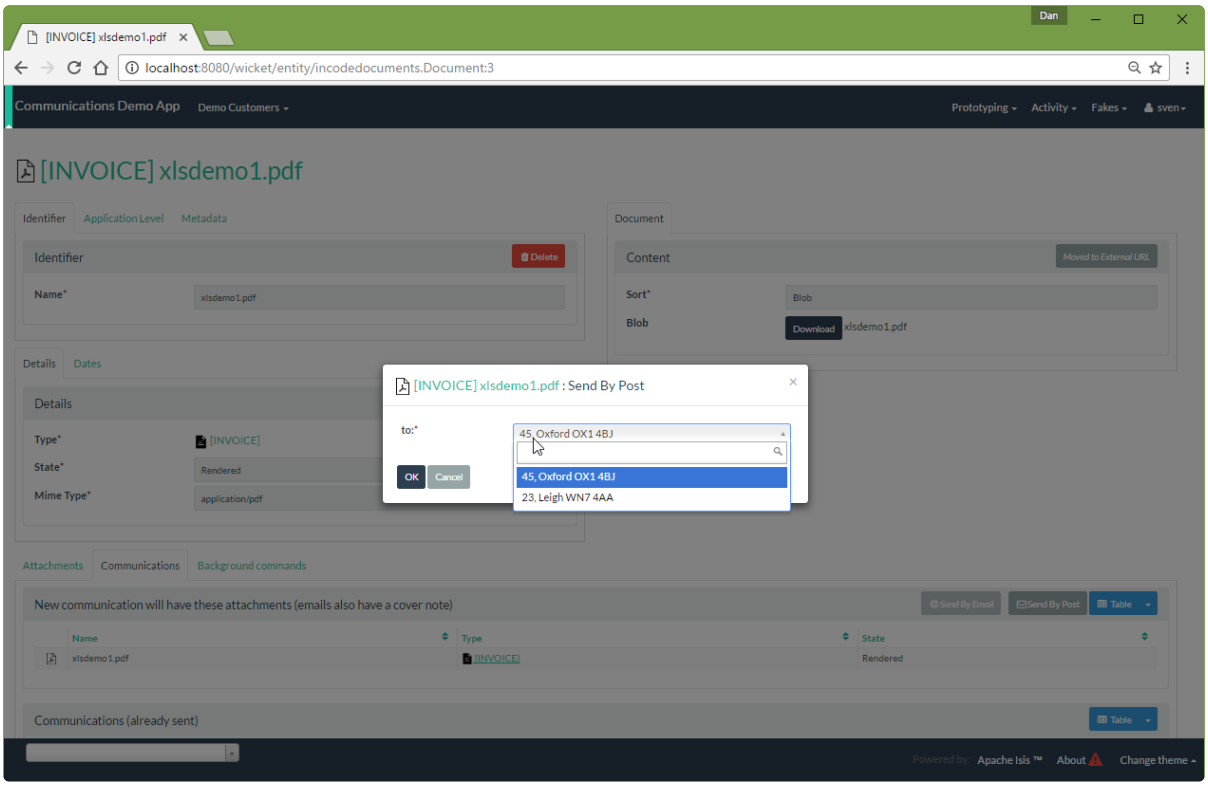


The sent email has the correct body, and one attachment (the original `Document`):

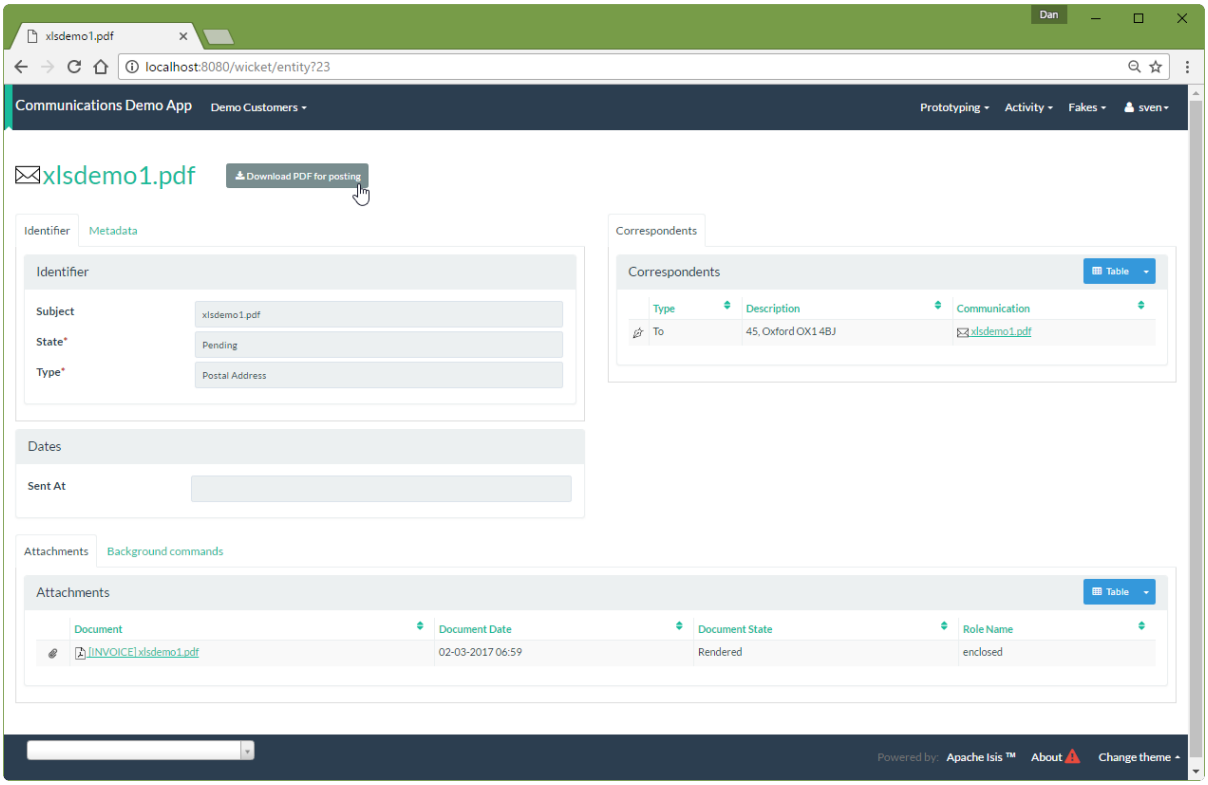


Sending a Postal Communication

The "Mary" demo customer has postal addresses, so the `Document`s attached to her invoices can be sent by post.

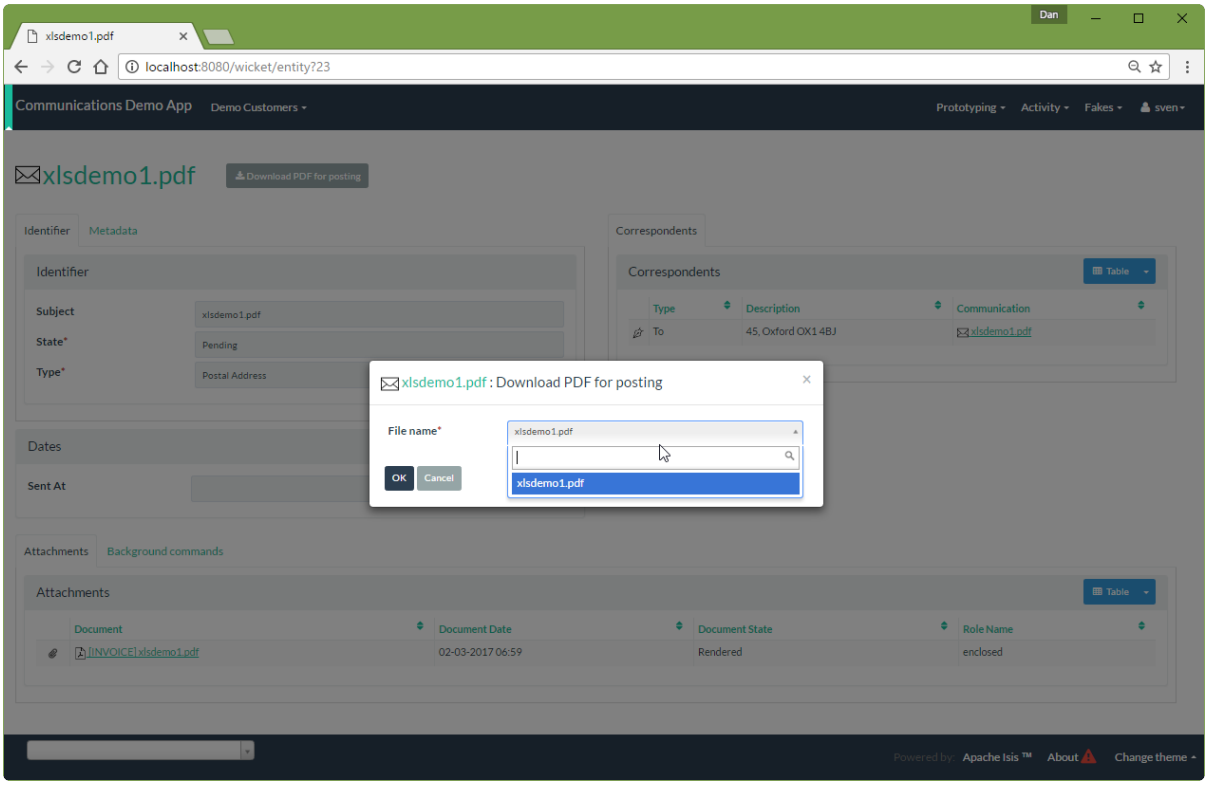


As for email, this also results in a `Communication`:

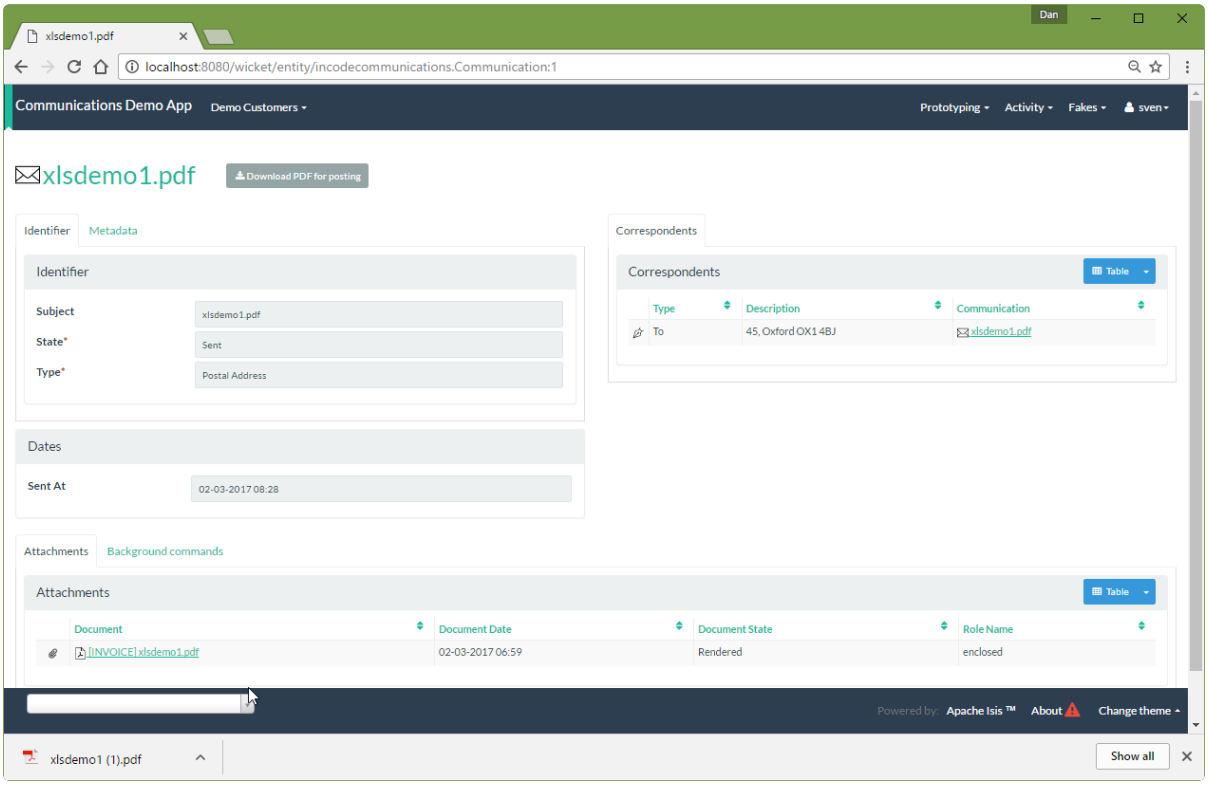


What's different here is that there is no cover note, there is no "prepared by" correspondent, and there is no background command.

Instead, the object provides the "download PDF for posting" action:



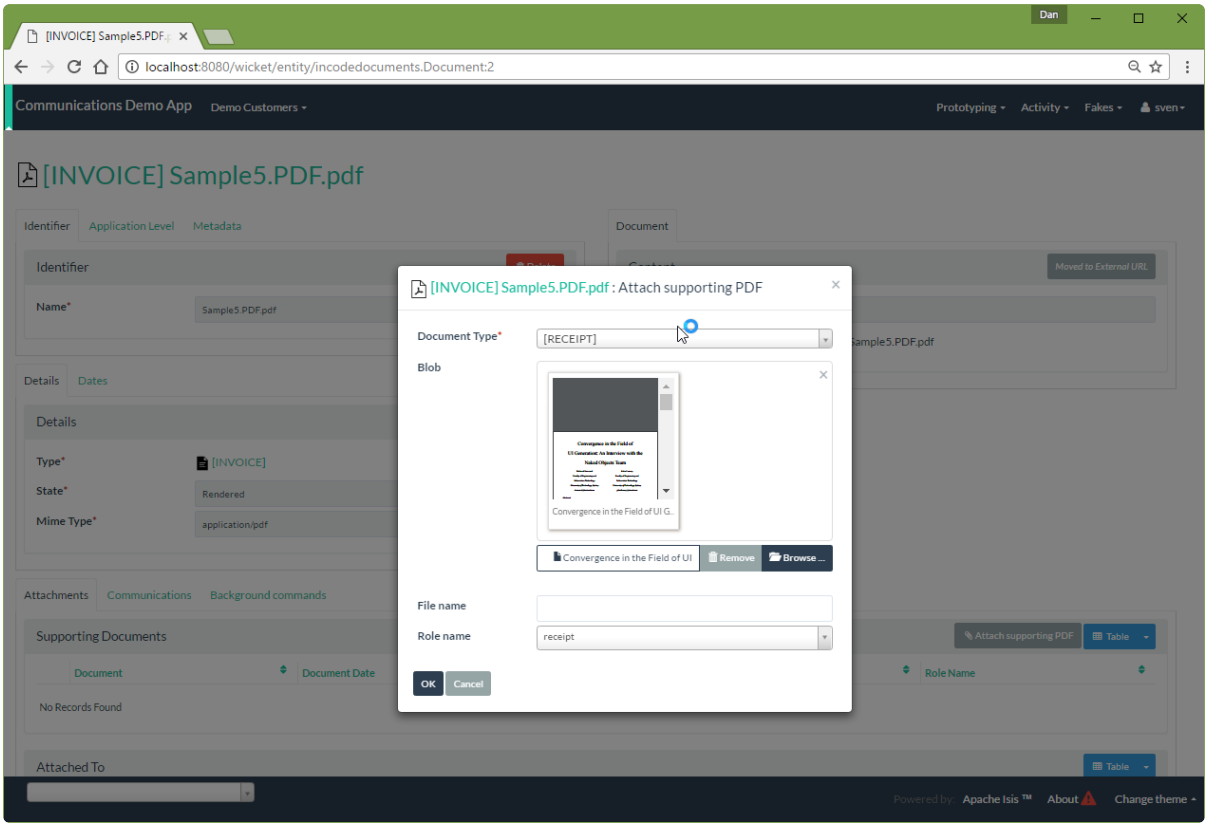
The idea is that (through the `Communication`) the user just downloads the original (PDF) `Document` that it references; the act of doing this marks the `Communication` as sent:



The user can then open up the downloaded PDF, manually print it and manually put it into an envelope.

Supporting Documents

The Document subdomain module (on which this communications module) depends has the concept of "supporting" documents. For example, a generated `Document` of an invoice might have associated tax or supplier receipts which have been previously scanned in and which are available as PDFs.


[INVOICE] Sample5.PDF.pdf
localhost:8080/wicket/entity/incodedocuments.Document:2
Communications Demo App
Demo Customers
Prototyping
Activity
Fakes
sven
[INVOICE] Sample5.PDF.pdf
Identifier
Application Level
Metadata
Document
Details
Dates
Attachments
Communications
Background commands
Supporting Documents
No Records Found
Attached To
[INVOICE] Sample5.PDF.pdf : Attach supporting PDF
Document Type*
[RECEIPT]
Blob
File name
Role name
receipt
OK
Cancel
Apache Isis ™
About
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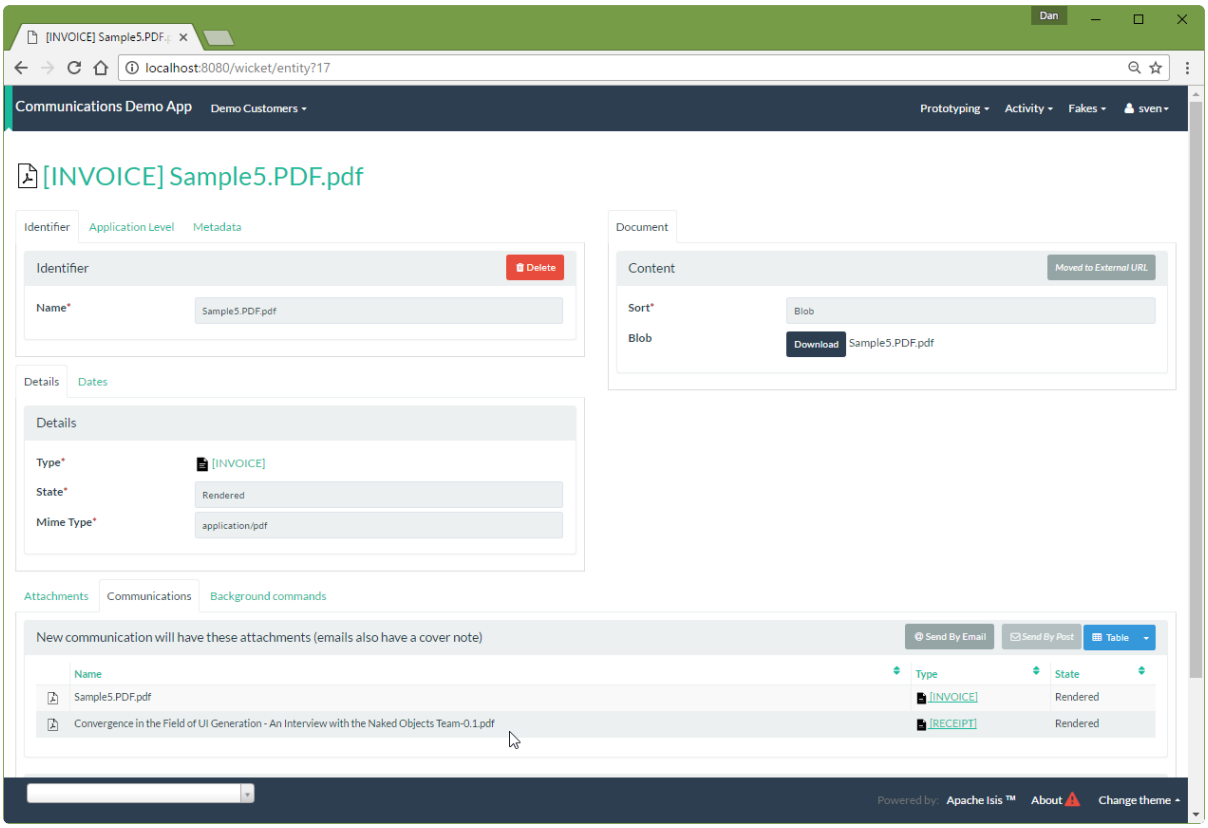
[INVOICE] Sample5.PDF.pdf
localhost:8080/wicket/entity?17
Communications Demo App
Demo Customers
Prototyping
Activity
Fakes
sven
[INVOICE] Sample5.PDF.pdf
Identifier
Application Level
Metadata
Delete
Name*
Sample5.PDF.pdf
Document
Content
Moved to External URL
Sort*
Blob
Download
Details
Dates
Type*
[INVOICE]
State*
Rendered
Mime Type*
application/pdf
Attachments
Communications
Background commands
New communication will have these attachments (emails also have a cover note)
Send By Email
Send By Post
Table
Name
Type
State
Convergence in the Field of UI Generation - An Interview with the Naked Objects Team-0.1.pdf
Apache Isis ™
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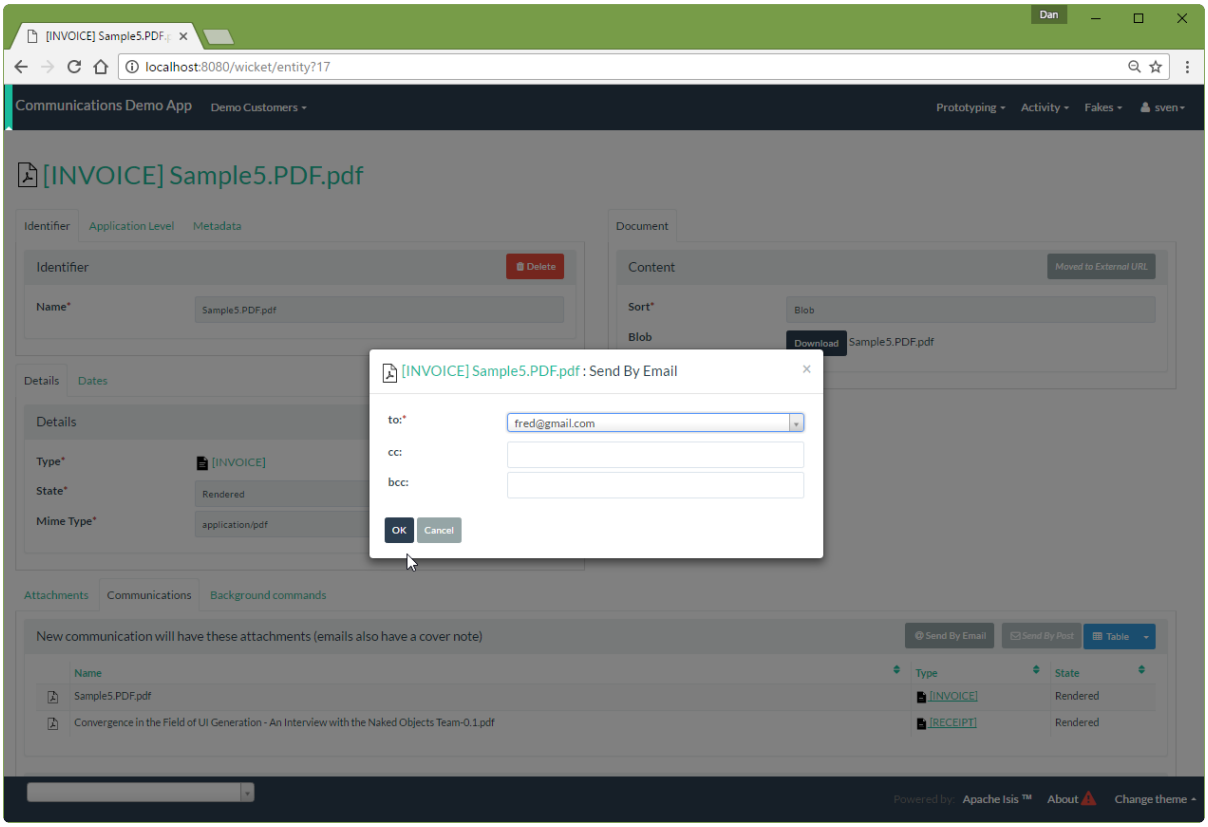
[INVOICE] Sample5.PDF.pdf
localhost:8080/wicket/entity?17
Communications Demo App
Demo Customers
Prototyping
Activity
Fakes
sven
[INVOICE] Sample5.PDF.pdf
Identifier
Application Level
Metadata
Identifier
Delete
Name*
Sample5.PDF.pdf
Document
Content
Moved to External URL
Sort*
Blob
Blob
Download
Sample5.PDF.pdf
Details
Dates
Details
Type*
[INVOICE]
State*
Rendered
Mime Type*
application/pdf
[INVOICE] Sample5.PDF.pdf : Send By Email
to:*
fred@gmail.com
cc:
bcc:
OK
Cancel
Attachments
Communications
Background commands
New communication will have these attachments (emails also have a cover note)
Send By Email
Send By Post
Table
Name
Type
State
Sample5.PDF.pdf
[INVOICE]
Rendered
Convergence in the Field of UI Generation - An Interview with the Naked Objects Team-0.1.pdf
[RECEIPT]
Rendered
Powered by:
Apache Isis ™
About
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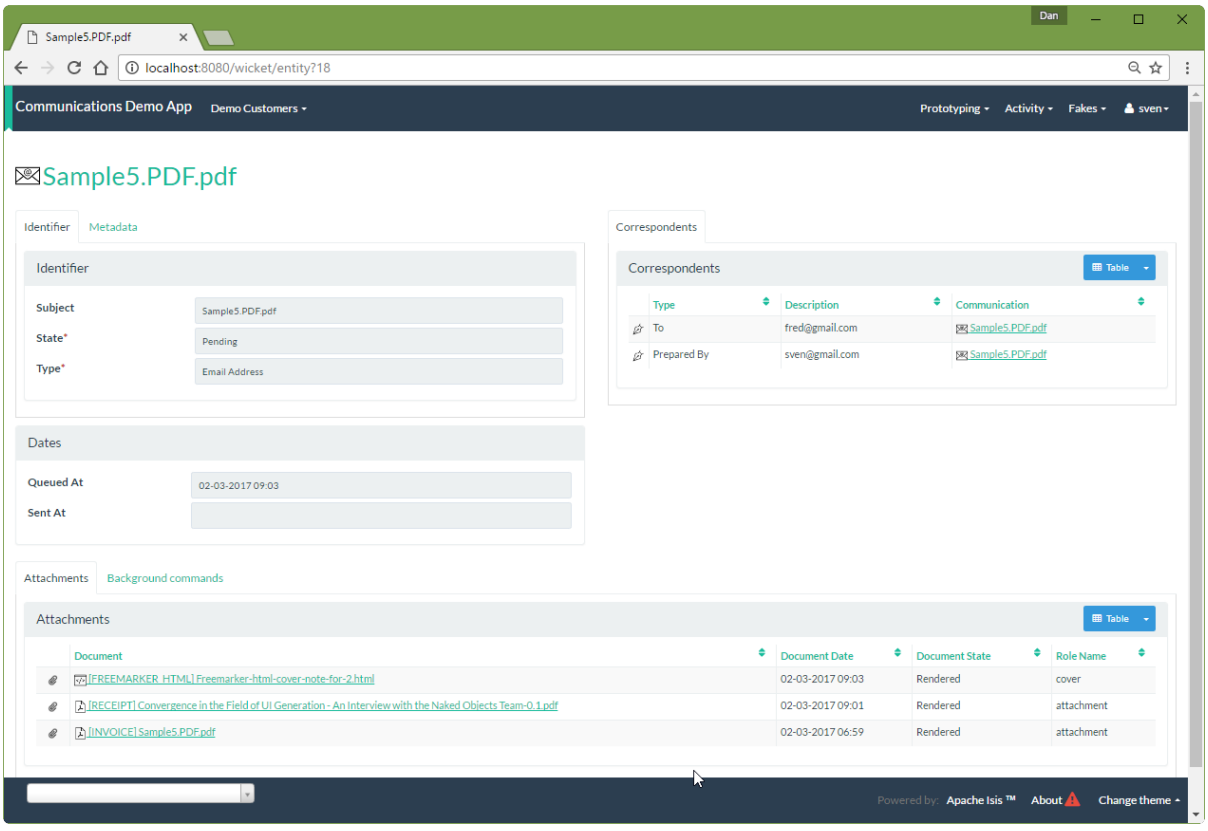
Sample5.PDF.pdf
localhost:8080/wicket/entity?18
Communications Demo App
Demo Customers
Prototyping
Activity
Fakes
sven
Sample5.PDF.pdf
Identifier
Metadata
Identifier
Subject
Sample5.PDF.pdf
State*
Pending
Type*
Email Address
Correspondents
Correspondents
Table
Type
Description
Communication
To
fred@gmail.com
Sample5.PDF.pdf
Prepared By
sven@gmail.com
Sample5.PDF.pdf
Dates
Queued At
02-03-2017 09:03
Sent At
Attachments
Background commands
Attachments
Table
Document
Document Date
Document State
Role Name
[FREEMARKER_HTML] Freemarker-html-cover-note-for-2.html
02-03-2017 09:03
Rendered
cover
[RECEIPT] Convergence in the Field of UI Generation - An Interview with the Naked Objects Team-0.1.pdf
02-03-2017 09:01
Rendered
attachment
[INVOICE] Sample5.PDF.pdf
02-03-2017 06:59
Rendered
attachment
Powered by:
Apache Isis ™
About
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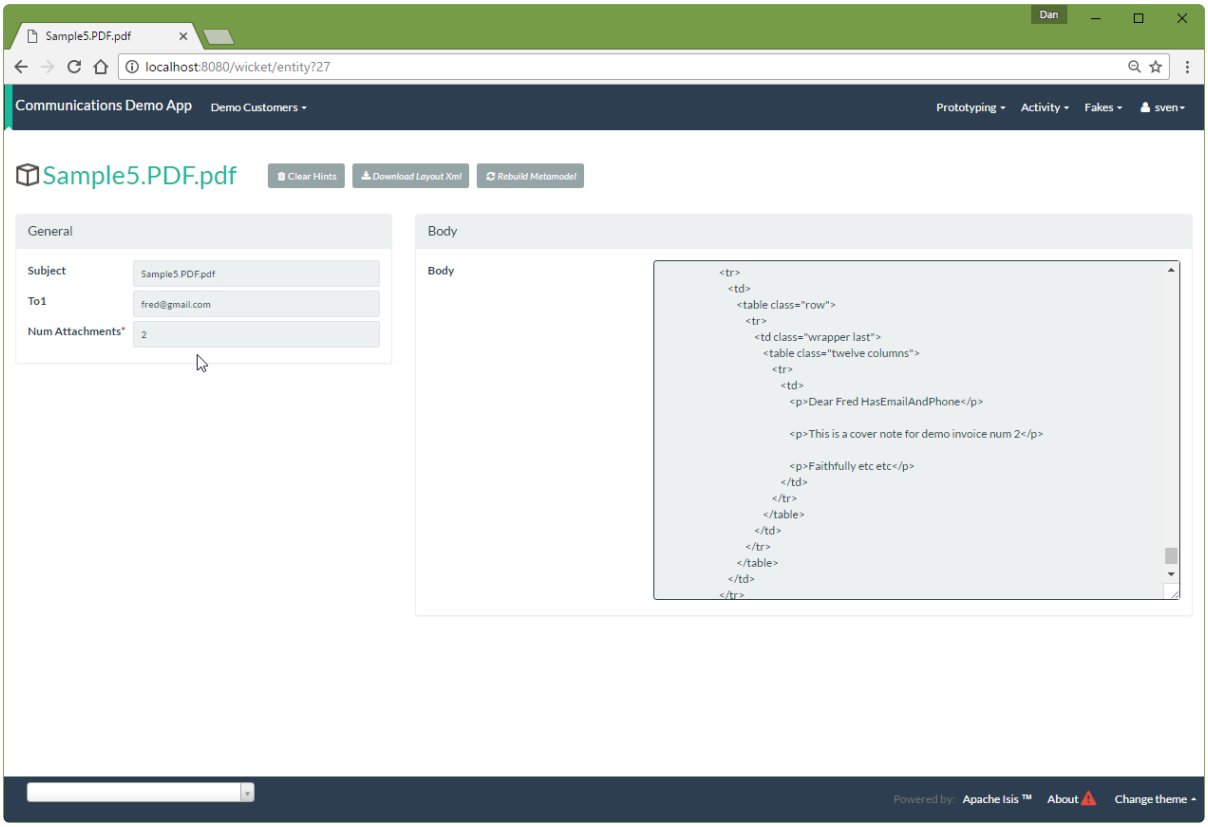
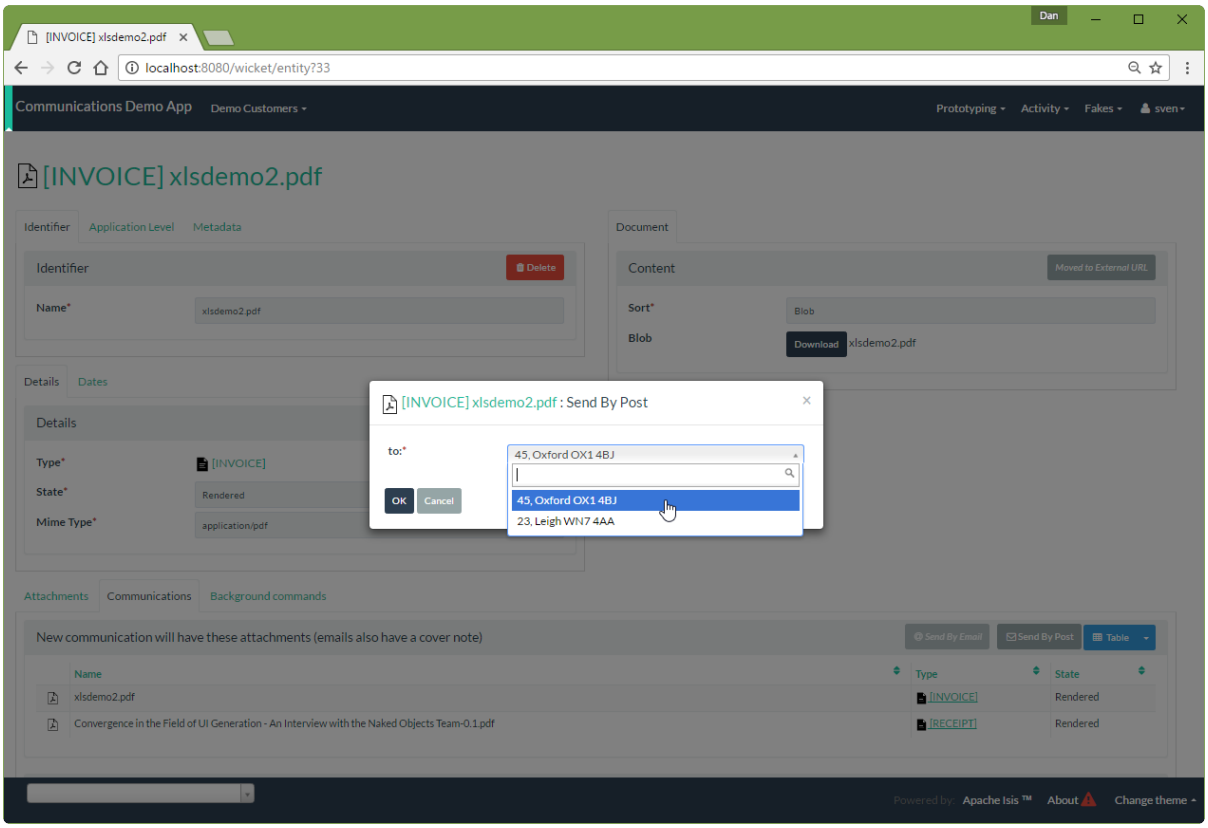
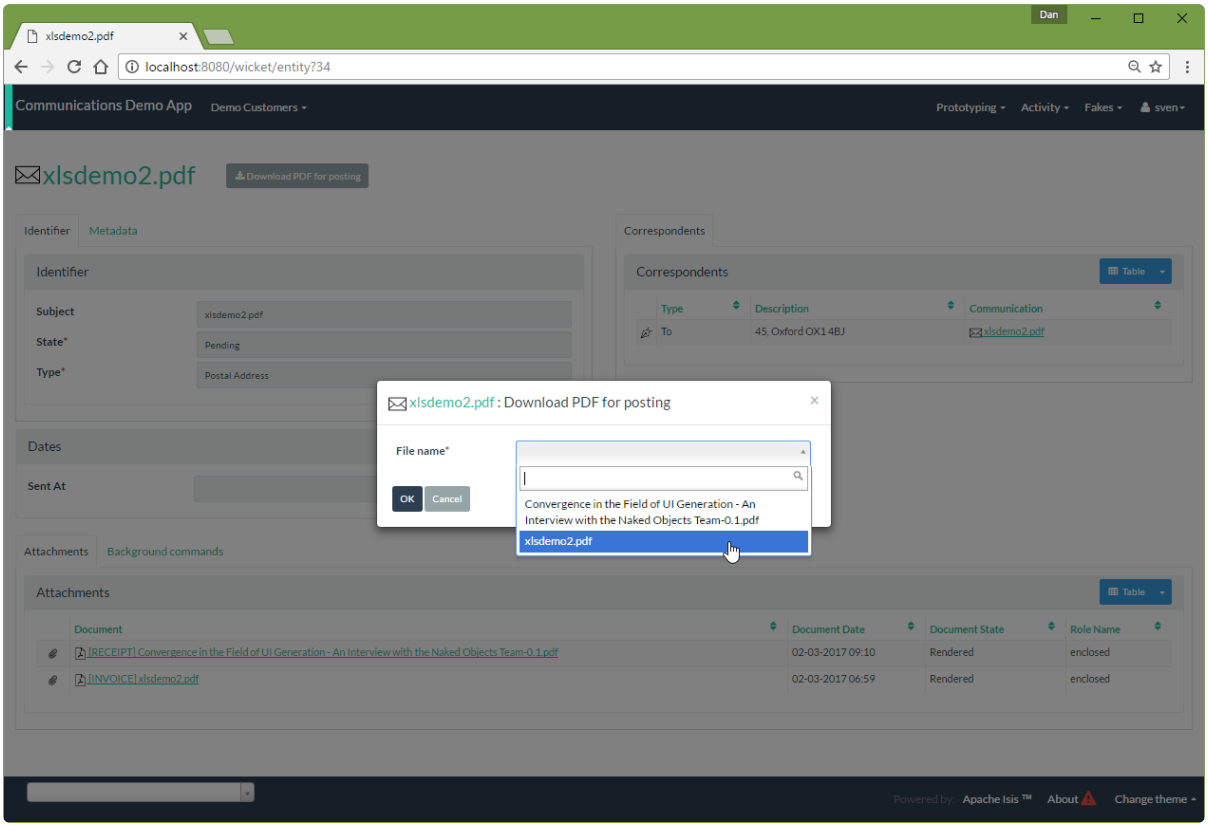


It is also possible to send a postal communication with supporting documents:



The only difference is that, when the `Document`s are downloaded for printing via the `Communication`, for convenience the PDFs will be stitched together into a single PDF for printing. The action prompt suggests a filename based on the original `Document` and supporting `Document`s.


xlsdemo2.pdf
localhost:8080/wicket/entity?34
Communications Demo App
Demo Customers
Prototyping
Activity
Fakes
sven
xlsdemo2.pdf
Download PDF for posting
Identifier
Metadata
Identifier
Subject
xlsdemo2.pdf
State*
Pending
Type*
Postal Address
Correspondents
Correspondents
Table
Type
Description
Communication
To
45, Oxford OX1 4BJ
xlsdemo2.pdf
xlsdemo2.pdf : Download PDF for posting
File name*
OK
Cancel
Convergence in the Field of UI Generation - An Interview with the Naked Objects Team-0.1.pdf
xlsdemo2.pdf
Dates
Sent At
Attachments
Background commands
Attachments
Table
Document
Document Date
Document State
Role Name
[RECEIPT] Convergence in the Field of UI Generation - An Interview with the Naked Objects Team-0.1.pdf
02-03-2017 09:10
Rendered
enclosed
[INVOICE] xlsdemo2.pdf
02-03-2017 06:59
Rendered
enclosed
Powered by: Apache Isis ™
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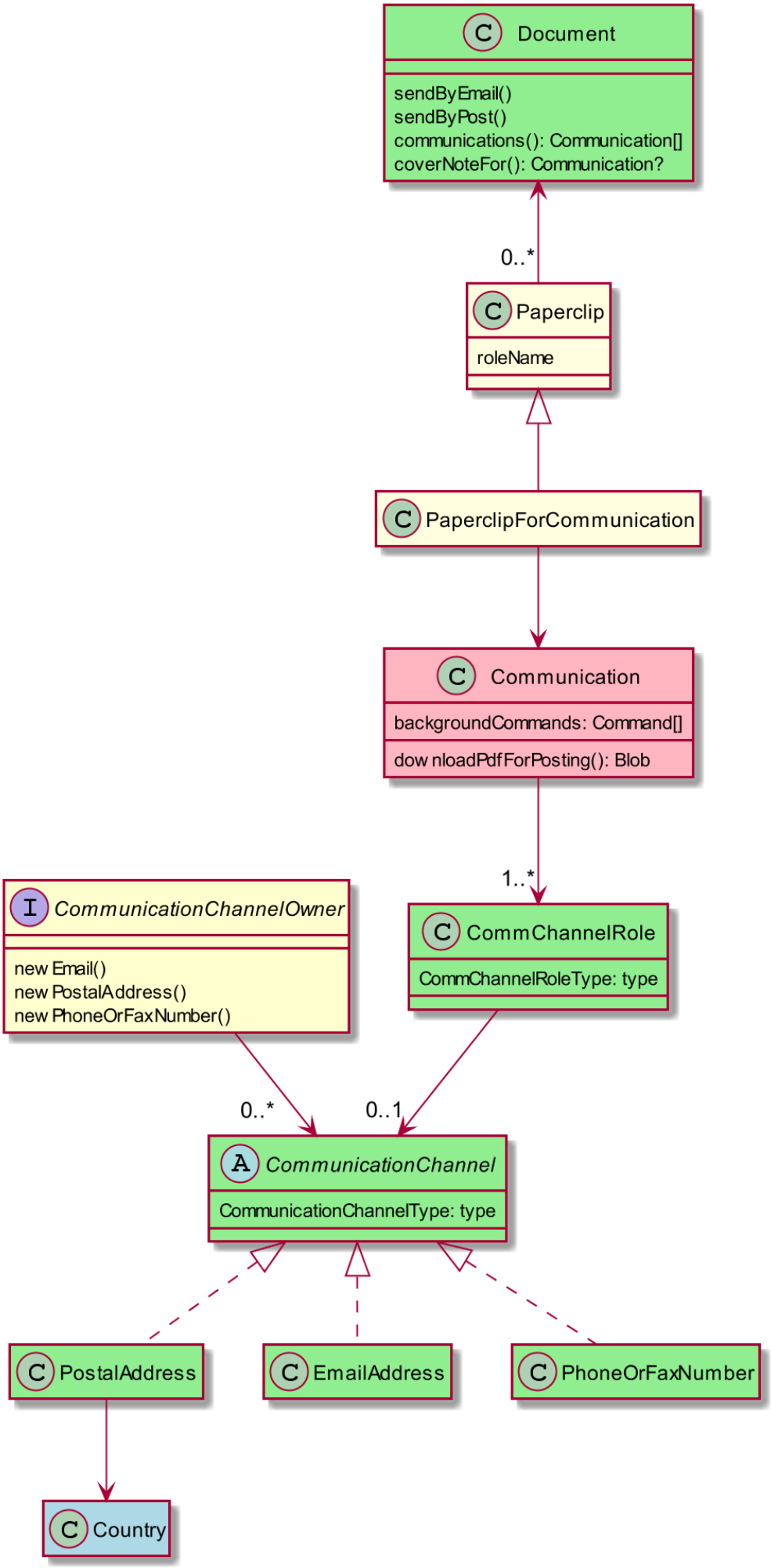
Domain Model

The main concepts of the module are shown below:


Document
sendByEmail()
sendByPost()
communications(): Communication[]
coverNoteFor(): Communication?
0..*
Paperclip
roleName
PaperclipForCommunication
Communication
backgroundCommands: Command[]
dow nloadPdfForPosting(): Blob
1..*
CommunicationChannelOwner
new Email()
new PostalAddress()
new PhoneOrFaxNumber()
CommChannelRole
CommChannelRoleType: type
0..*
0..1
CommunicationChannel
CommunicationChannelType: type
PostalAddress
EmailAddress
PhoneOrFaxNumber
Country

One side of the domain model defines `CommunicationChannel`s, owned by `CommunicationChannelOwner`s.

On the other side is `Communication`, which relates to a `Document` by way of an implementation of the (Document subdomain module's) `Paperclip` class. Each `Communication` relates to one or more `CommunicationChannel`s by way of `CommChannelRole`, basically indicating the nature of the correspondent in that `Communication`.

(CommunicationChannel) Contributions

The abstract `CommunicationChannelOwner_newChannelContributions` domain service contributes:

- `communicationChannels` collection
- `newPostalAddress` action
- `newEmailAddress` action
- `newPhoneOrFax` action

To use, the consuming application should create a subclass, for example:

```
@DomainService(nature = NatureOfService.VIEW_CONTRIBUTIONS_ONLY)
public class DemoAppCommunicationChannelOwner_newChannelContributions extends
        CommunicationChannelOwner_newChannelContributions {

    public DemoAppCommunicationChannelOwner_newChannelContributions() {
        super(DemoAppCommunicationChannelOwner_newChannelContributions.class);
    }
}
```

The `CommunicationChannelOwner_emailAddressTitles` & `CommunicationChannelOwner_phoneNumberTitles` are abstract mixins that contribute properties for use in tables; these summarise (any and all of the) emails or phone numbers that a `CommunicationChannelOwner` might have, using a specified separator.

For example:

```
@Mixin(method = "prop")
public class DemoObjectWithNotes_emailAddress extends
        CommunicationChannelOwner_emailAddressTitles {
    public DemoObjectWithNotes_emailAddress(
            final DemoObjectWithNotes demoCustomer) {
        super(demoCustomer, " | ");
    }
}
```

and

```
@Mixin(method = "prop")
public class DemoObjectWithNotes_phoneNumbers extends
        CommunicationChannelOwner_phoneNumberTitles {
    public DemoObjectWithNotes_phoneNumbers(
            final DemoObjectWithNotes demoCustomer) {
        super(demoCustomer, " | ");
    }
}
```

(Document) Mixins

The modules provides a number of mixins that, by default, will be rendered in the UI. In the case of this module, all mixins are on the `Document` entity.

The mixins can be suppressed if necessary using vetoing subscribers to their corresponding domain events.

Document_sendByEmail & Document_sendByPost

These mixins on `Document` are used to create either email or postal `Communication`s. They are supported by the `DocumentCommunicationSupport` SPI service, described below.

The DocumentCommunicationSupport SPI provides the cover note template to use.

Note that the cover note template should have an `AttachmentAdvisor` set to "atach to none"; the mixin action has the responsibility of wiring the cover note `Document` to the newly created `Communication`.

Document_communications

The `Document_communications` collection mixin shows all `Communication`s to which a `Document` has been sent as an attachment (in the case of an email) or to be printed out (in the case of a postal comm).

Note that this mixin is suppressed for cover notes; instead these have the `Document_coverNoteFor` mixin, described below.

Document_communicationAttachments

The `Document_communicationAttachments` collection mixin lists all of the `Document`s that would be included as attachments if and when a new `Communication` is created.

This list always includes the target `Document` itself, and will also include any supporting `Document`s that may have been attached (using the Document subdomain module's `Document_attachSupportingPdf` mixin).

Document_coverNoteFor

The `Document_coverNoteFor` property mixin applies only to `Document`s that have been created as email cover notes. It returns a reference to the email `Communication` to which it was associated (with a role of "cover note"); its content is used as the body of the actual email.

Services (API)

The module currently does not provide a service to programmatically create `Communication`s. Instead, the various mixins can be used.

Services (SPI)

SPI services are called by the module.

DocumentCommunicationSupport (required)

An implementation of the `DocumentCommunicationSupport` SPI domain service is required to send communications of any type. Its signature is:

```
public interface DocumentCommunicationSupport {
    DocumentType emailCoverNoteDocumentTypeFor(Document document);
    void inferEmailHeaderFor(Document document, CommHeaderForEmail header);
    void inferPrintHeaderFor(Document document, CommHeaderForPost header);
}
```

where `CommHeaderForEmail` is:

```
public class CommHeaderForEmail ... {

    @Getter @Setter
    private EmailAddress toDefault;
    @Getter
    private final Set<EmailAddress> toChoices = Sets.newTreeSet();

    @Getter @Setter
    private String cc ;
    @Getter @Setter
    private String bcc;

    @Getter @Setter
    private EmailAddress from;

    @Getter @Setter
    private String disabledReason;  ①
}
```

① Reason, if any, why the communication cannot be sent by email.

and where `CommHeaderForPost` is:

```
public class CommHeaderForPost ... {
    @Getter @Setter
    private PostalAddress toDefault;
    @Getter
    private final Set<PostalAddress> toChoices = Sets.newTreeSet();

    @Getter @Setter
    private String disabledReason;  ①
}
```

① Reason, if any, why the communication cannot be sent by post.

Note that the cover note template should have an `AttachmentAdvisor` set to "atach to none"; the mixin action has the responsibility of wiring the cover note `Document` to the newly created `Communication`.

CurrentUserEmailAddressProvider

The optional `CurrentUserEmailAddressProvider` SPI service provides the email address of the current user, in order to create a `CommChannelRole` indicating that the `Communication` was "prepared by" such-and-such a user.

Its signature is:

```
public interface CurrentUserEmailAddressProvider {
    String currentUserEmailAddress();
```

The module does provide a default implementation, `CurrentUserEmailAddressProvider.UsingMeService`, that uses the `MeService` of the security module. In many case therefore there will be no need to provide an alternative implementation of this SPI service.

How to configure/use

Classpath

Update your classpath by adding this dependency in your dom project's `pom.xml`:

```
<dependency>
    <groupId>org.incode.example.communications</groupId>
    <artifactId>incode-example-communications-dom</artifactId>
    <version>1.16.1</version>
</dependency>
```

Check for later releases by searching Maven Central Repo.

For instructions on how to use the latest `-SNAPSHOT`, see the contributors guide.

Bootstrapping

In the `AppManifest`, update its `getModules()` method, eg:

```
@Override
public List<Class<?>> getModules() {
    return Arrays.asList(
            ...
            org.incode.example.communications.dom.CommunicationsModule.class,
    );
}
```

Known issues

None known at this time.

Dependencies

Maven can report modules dependencies using:

```
mvn dependency:list -o -pl modules/dom/communications/impl -D excludeTransitive=true
```

which, excluding the Incode Platform and Apache Isis modules, returns no direct compile/runtime dependencies.

From the Incode Platform it uses:

- base library module
- poly library module
- pdfbox library module
- country example subdomain module
- document example subdomain module
- command spi module
- security spi module

The module *also* uses icons from icons8.