**MVS Implementation Notes:**

**Topology:**

2800 ISR (which also runs CME)

CUCM version 8.x

MVS version 5.x

BES version 5.x

**SIP trunks**:

Between CUCM and MVS (Port 6060)

Between CUCM and ISR (Port 5060)

All trunks have MTP configured on them. This allows us to ensure that DTMF relay is consistent between MVS and the ISR gateway. Without this, strange things happened.

Note that there is a specific SIP trunk profile used for MVS; the parameters on here are important.

DTMF and codecs are \*really\* important all needs to match up (these were all of the issues that I had when I initially set it up). None of this works if you remove MTP from the trunks.

MVS communicate with CUCM over a SIP trunk (port 6060).This is used for general signalling between MVS and CUCM.

**CUCM Handset Definitions:**

In addition, each Blackberry Smartphone needs a SIP phone defined on CUCM. The device name should be the same as the extension number allocated the device. Again, you’ll see all of these on our CUCM. There is a new device pack that needs to be added to the CUCM cluster so that you can define the device as a “Blackberry MVS Client”.

**MVS Configuration**:

The configuration on MVS is pretty simple. I can’t get on there at the moment to check it (as I can’t remember the URL), however in a nutshell there is:

1. Configuration for the “telephony connector” – which is the MVS side of the SIP trunk to CUCM. I think this also includes the concept of a “route pattern” – so MVS knows where to send calls. There is also something called an ANI required – which is the telephone number associated to the MVS process (more on where this is used later). This should be a dedicated DDI for MVS. It’s required to set this as the CLID for outgoing calls from MVS (for PBX initiated dialling – again, more later).

2. Configuration for each user handset. This basically associates a blackberry user (and by inference their specific smartphone which is assigned to them in the BES database) to their CUCM extension. MVS registers via SIP with the CUCM device assigned in the previous section. All registrations on CUCM will show as being assigned to the MVS server (the smartphone never communicates directly to CUCM, it always goes via MVS).

Information for each user includes their extension number, mobile GSM number, permissions and whether it uses PBX initiated dialling, or Smartphone initiated dialling. This last bit deserves a section on its own which will be coming shortly.

**Handset Communication:**

The handset ALWAYS communicates with the BES Server first. If it’s attached via WiFi then it uses that. If not, it uses the same data channel that the BES server uses to connect to the Internet for normal email delivery. SIGNALLING messages to / from the MVS are sent \*through\* the BES server in each direction so handsets never communicate directly with MVS for signalling.

**Call Flow**:

When handset is attached via WiFi (most simple case).

Handset communicates directly with BES over IP. Signalling for calls placed via handset are routed over the data channel to BES, and from there to MVS. MVS signals over the SIP trunk to CUCM. For external calls, the SIP trunk to the gateway is used. As we have MTP on all call legs I assume (haven’t checked this) that RTP is split into each of the same call legs.

Calls from external to internal use the same flow in reverse. Obviously dial peers on the CUCM are required to route these calls back.

WiFi stuff is pretty simple to get up and working.

When handset is NOT attached over WiFi

This is a \*little\* complicated. When the handset is outside of WiFi coverage, MVS gets CUCM to call the GSM number of the device, and hairpins call legs together. This allows someone for instance to call my number “2001” from an office handset and my mobile will ring, even when I’m not in the office. The call to the GSM number is done in one of two ways:

**Device Initiated Call: MVS signals to the handset to dial the PBX**

**PBX Initiated Call: MVS signals the PBX to dial the handset**

Reason for this option is tariffs. We use Device Initiated Calling as calls from our mobiles into our ISDN-30 are free. Other customer tariffs may be the other way around. The choice of calling is controlled on a per handset basis, and is one of the MVS handset configuration parameters.

MVS needs to have its own DDI number allocated to it, which needs to have route-patterns in place on the gateway and CUCM.

Device Initiated Calling:

Call from office to handset (e.g. office handset dials 2001).

* CUCM signals MVS that extn 2001 is being called.
* MVS confirms that device is not registered over WiFi and signals to handset through BES. BES talks to handset over “email” data channel (over t’interweb).
* MVS tells device to call the ANI number of MVS (in our case 01926310249)
* Device calls in. Call is routed by route patterns to CUCM, and from there into MVS (over SIP trunk).
* DTMF is passed between device and MVS for security etc. This is the bit that I had to use MTP to get working – and I had to manually set DTMF relay on all call legs. If this doesn’t work, then the call gets disconnected after about 10 seconds.
* CUCM hairpins the call legs together.

Call from handset to office (e.g. I dial extension 104 from my blackberry’s MVS line).

* Handset signals to MVS through BES “email” data connection that call is to be placed.
* MVS tells handset to dial the MVS ANI (01926 310249). At the same time, MVS signals CUCM to dial the target number (104).
* Handset dials in, call is routed over SIP trunk to CUCM, and from there into MVS.
* Handset and MVS validate each other using DTMF tones.
* CUCM hairpins call legs together.

This is by far the most complicated bit of it all.

PBX Initiated Calling:

This is much easier!

Call from office to handset (e.g. dialling 2001 from desk phone).

* CUCM signals to MVS that there is a call for extn 2001
* MVS checks that device is not registered over WiFi. Tells CUCM to place a call to the GSM number allocated to the handset.
* MVS signals to the mobile through BES “email” connection that there will be a call for it including the details of who is calling (line label).
* Mobile Device answers (again DTMF relay is used).
* CUCM hair pins the call legs together.

Call from handset to office: (e.g. dialling 104 from blackberry)

* Device signals to MVS through BES “email” connection that it wants to dial a number.
* MVS signals to CUCM to place a call to the GSM number. MVS signals to handheld that a call will be coming in shortly.
* MVS signals to CUCM to place a call to the other number (104) at the same time.
* Blackberry answers GSM call. DTMF validates each other.
* Extension 104 answers.
* CUCM hairpins the calls together.