LLU TAM – Selective ‘In-Line’

Deployment

Proposed Usage

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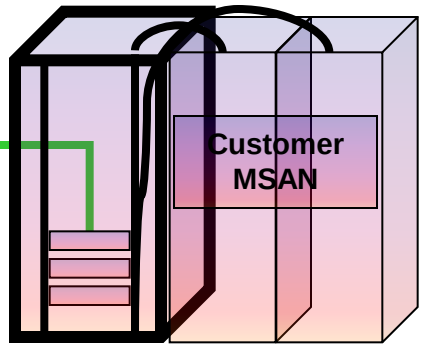
This is about MPF Service Performance

- Openreach has invested heavily in the provision of LLU TAM capacity and now has 1909 sites equipped and c1.6M TAM ports in place.
- Customer demand for MPFs is not forecast accurately at site level hence the dimensioning of LLU TAM capacity is imprecise – too little causes MPF delivery failure, too much wastes capital and infrastructure.
- The ‘as is’ LLU TAM architecture came about in the early days of LLU when line volumes were low to enable high utilisation of TAM ports.
- However, the ‘as is’ architecture is not ideal for a volume MPF world:
  - Inefficient use of MDF infrastructure drives MDF exhaustion = MPF failures.
  - Is driving up MDF costs to create physical capacity (eg extensions, re-cabling)
  - Demanding of frames jumpering resource and a cause of failures.
  - Uses more raw materials and labour than is necessary.
- The following diagram illustrates the points above.

Typical MDF (Exch side)

LLU MPF – ‘as is’ today.



Line Exch

MDF

Each MPF line:

- **Requires 2 jumper wires**
- **Routes via 4 MDF blocks**
- **Routes via 3 sections of internal cable and passes through 12 wire joints between HDF and line.**

JT46

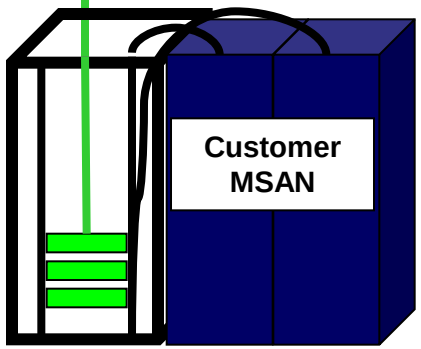
JT46

JT46

JT44

Jumper

LLUTxxxxxx
tie cable



LLU PoP HDF

LLUO DSLAM(s)

End-user X

MPF ‘X’

End-user A

MPF ‘A’

TAM RACK(S)

‘OUT’

‘IN’

TASM

TAM capacity is built using 100 port ‘TASMs’. These use multiple 25 pair plug connectors for cable end termination.

TAM capacity is ordered based on what is known to the TAM capacity manager.

TAM ports are allocated on a per MPF basis and shared by multiple customers (CPs)

Permanent TAM cabling

What is ‘In-line TAM’?

- An LLUT tie cable is routed from the HDF to one side of a TASM and plugs to it. From the other side of the TASM a cable is routed to, and terminated on, the MDF. The HDF and MDF ends are labelled with the same LLUTxxxxxx number.
- The tie cable thus has all 100 pairs routed through the TASM and a hard-wired relationship is thus created for life – ie each tie pair has a dedicated TAM port.
- This architecture requires only one jumper wire per MPF and reduces the losses of the metallic path.
- The modularity of the LLU TAM enables co-existence of conventionally cabled TASMs with those wired ‘in-line’.
- The following diagram illustrates the points above.

The 'LLU TAM-Tie Cable'.

TASMs – plug ended cabling

MDF

Line Exch

JT44

End-user A

MPF

Jumper

MPF

End-user B

MPF

End-user C

JT46

LLU-TAM

'OUT'

'IN'

Each MPF line:

- Requires 1 jumper wire
- Routes via 2 MDF blocks
- Routes via 2 sections of internal cable and passes through 8 wire joints between HDF and line (33% reduction).

Label each end as LLUTxxxxxx tie cable

Customer MSAN

LLU PoP HDF

LLUO DSLAM(s)

Dedicated 100 port TASM per LLUT tie cable. Uses 4*25pr plug connectors – M&F ended

'As is' installation of TASMs – each serving a mixture of customer MPFs.

When to use ‘In-line TAM’?

Additional tie cabling order from volume MPF consumer **and** TAM capacity expansion work is required.	Consult customer and confirm acceptability of delivering via the TAM. Enable co-ordinated plan and build of a combined ‘TAM/tie’ with 100% pairs tested. No re-work of existing tie cables or TAM necessary. Efficient way to build and test – least overall impact on MDF.
Additional tie cables are required for volume MPF orders and spare TAM capacity exists.	Consult customer and confirm acceptability of delivering via the TAM. Deliver new tie cable(s) from HDF directly onto spare TASM(s). Re-label associated MDF blocks with tie cable IDs and test 100% pairs. Build tie pair – TAM data in TMS. Recover ‘in’ cable from TASM and the MDF line side block space.
Additional TAM capacity build is required for volume MPF provision and unused customer tie cables exist in readiness.	Agree the tie cable(s) to be intercepted with the customer(s). Re-route tie cable from either HDF or MDF end to the TASM. Provide new cable to complete the TAM/tie metallic path between HDF and MDF, label and 100% pair test to prove continuity.
Opportunistic cases & service restoration/repair	Where customers wish to upgrade a tie cable. Where a tie cable needs to be replaced due to damage.
MDF capacity shortfall will otherwise jeopardise overall service delivery for customers and BT.	Identify optimum build solution to cable TASMs in-line with tie cables yet to be used for volume MPFs. May involve work with customers to re-jumper working MPFs. Enables MDF block space to be freed up for service delivery reasons.

When not to use ‘In-line TAM’?

Low MPF volume per tie cable & the absence of a customer forward plan for MPF ordering. MDF is OK.	No benefit.
Volume MPF migration requirement has already been delivered and there is no plan for further volume MPF ordering. MDF is OK.	No benefit.
There is existing TAM and tie cable capacity sufficient for expected MPF demand. MDF is OK.	No benefit.
SMPF only customers.	No need for TAM ports.
Where MPF order delivery would be put at undue risk due to in-line TAM enabling work.	Eg Cabling work cannot be undertaken due to a temporary hold – eg asbestos removal.

LLU MPF In-Line TAM

- This impacts new MPF provision and MPF migrations
- In trial at 3 sites, key stage in trial is when TMS exits IVV&T
- Pending a successful trial, Openreach would like CPs to opt in for in-line TAM where ever feasible
- We continue to use our current Prices to cover both Traditional and in-line TAM
- E2E Fulfilment process will change dependent on In-line or traditional Tam site
- The TAM will be provided either during the P&B process or as today on CCD
- Key end user benefits are reduced DOAs and shorter outage time

LLU MPF In-Line TAM – Impact on price

- LLU Regulated Prices
- wholesale local access market defined by Ofcom as a national market (UK excluding Hull)
- geographically averaged charges apply to this market
- Ofcom determined charge ceilings apply to MPF and SMPF connection, rental and migration charges (exclude bulk migrations)
- TAM costs are included in the MPF and SMPF connection charges
- The actual components of the MPF are NOT changing, just the order in which they are provided

MPF Price List

- New Line Connection £99.95
- Migration Price - £34.86
- Mass Migrations Charges
  - Normal Hours - £27.54
  - OOH Mon-Sat £32.54
  - Sunday £36.54
- Plan & Build
  - Internal Tie Cable Connection charge - £476.89

LLU MPF In-Line TAM – Next steps

- In-Line Tam cannot be deployed in 100% of exchanges, it will be on a selective basis
- We can only have one set of MPF prices
- We cannot introduce this as MPF2 as we cannot commit to it being available in all cases
- We request CPs agree to implementation of in-line TAM where circumstances make this possible.
- No prices changes
- If so In Line TAM will be considered for R800

In-Line TAM Summary

- TAM ports are allocated during the tie cable provision stage instead of on CCD during the MPF fulfilment stage
- There is a TAM port ‘hard-wired’ per tie pair within the LLUT tie cable.
- Exchanges can be retro-fitted with In Line TAM on a per exchange, per CP, per tie cable basis for existing installations.
- Retro-fit requires all pairs within the LLUT tie cable to be unused.
- Openreach would expect to agree with customers specific LLUT tie cables for retro-fit work.

In-Line TAM Benefits

- Improves Right First Time (only one jumper)
- Improves cycle time (eliminates TAM capacity problems)
- Reduces DOAs & Early life failures
- Reduces outage time during a migration as only one jumper needs to be installed
- Shortens the metallic path between end-user and DSLAM – lower loss.
- Customer has sole use of the 100 port TASM as part of own tie cable.
- Reduces the amount of MDF capacity used.
- A 100% solution would simplify the CCD fulfilment process
- Can co-exist with current LLU TAM architecture.

In-Life TAM Issues & Risks

- Increases the complexity of existing systems and processes
- The P&B process will not be automated on EMP but associated data build must be supported (non-trivial)
- Needs CP support
- Will entail increased consumption of physical TAM port hardware.
- Openreach needs ability to selectively deploy as must be sure that MPF volume justifies the cost of dedicated TAM ports hard-wired into a customer tie cable.