



solution

ITSF2004

An examination of the impact of Mobile Operators network evolution on synchronisation requirements.

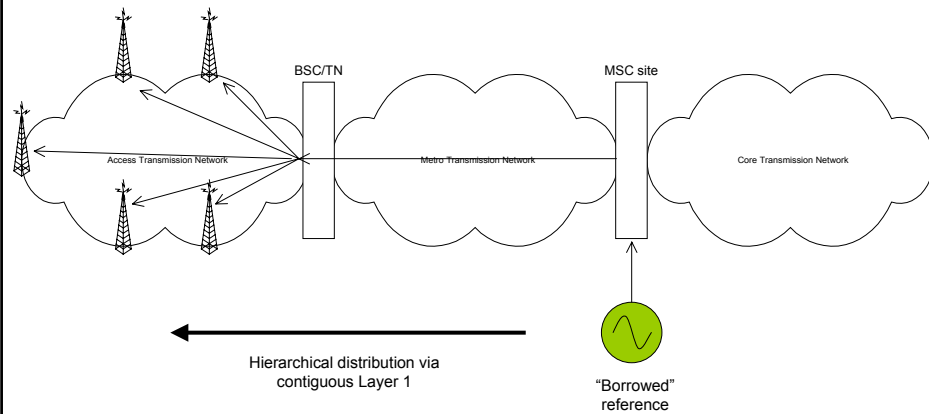
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Contents

- Review of existing 3G/GSM/GPRS transport architecture
- Sync drivers
 - Functional drivers
 - Operational drivers
 - Architectural drivers
- Preview of evolved architecture
- Evolved Sync drivers
 - Inherited drivers – some things don't change
 - New architectural drivers
- Solution candidates
 - NTP
 - 1588
 - SYNCoIP (or CE without the circuit)

Old Architecture

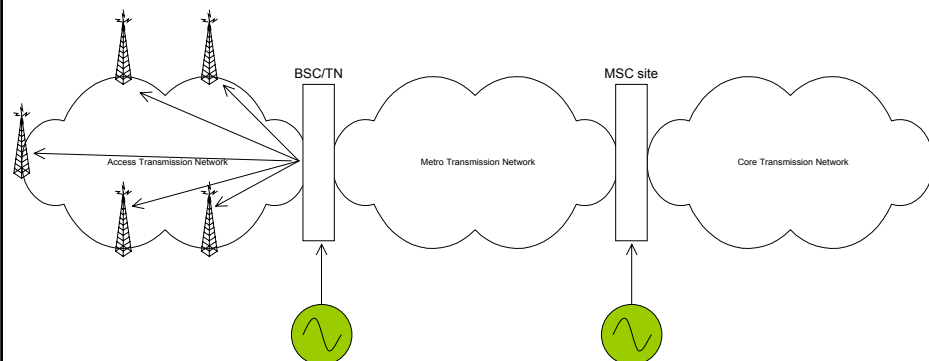


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3

Current Architecture



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4

Why did we do it that way?

- No synchronisation network planning required
- Modular approach to rollout
- Low operational complexity
- Little dependence on third parties

These benefits should be protected in any evolution of the network

Evolved Architecture

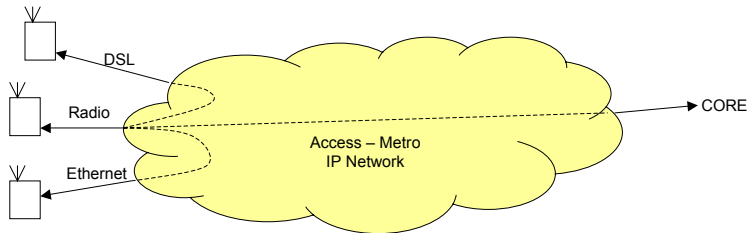
An evolved UTRAN is likely to include:

- Redistribution of functionality, leading to...
- Networking in the access domain.

- IP transport in the access domain
- Opportunistic transmission technology selection

Evolved Architecture

Or put another way:



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7

Evolved Architecture

Consequences:

For a particular base station there is no guarantee of

- Any particular type of layer 1 (or even 2) connectivity
- Any particular or unique transport topology

...which was exactly what supported our carefree synchronisation architecture!

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8

Sync in Evolved

Architecture

Drivers:

The requirements haven't changed:

- No synchronisation network planning required
- Modular approach to rollout
- Low operational complexity
- Little dependence on third parties

But now this must be achieved in an environment where the only certainty is that the base station is reachable by IP?

Sync in Evolved

Architecture

Candidate Solutions:

Each of the following has potential as a solution for synchronisation in the evolved network:

- NTP
- P1588
- SYNCoIP or CE without the circuit

Each of which has some advantages and disadvantages.

NTP

Local reference steered by NTP

Pros:

- Established protocol.
- Readily available server side.

Cons:

- Can necessary accuracy be achieved?
- Long time constant means more costly local reference.

P1588

Reference maintained and distributed through Ethernet

Pros:

- Standardised protocol.
- More than capable of required accuracy.

Cons:

- Requires Ethernet based network.
- Must be supported at each element of the network.
- New, not many implementations.

SYNCoIP

Reference transported 'CE style' over IP

Pros:

- Relies on IP only.
- Capable of required accuracy.
- Development from existing techniques.

Cons:

- Some development still needed.
- May need IP QoS support to work

Other options

All of the preceding are ways of transporting synchronisation over our own transport networks, there are other options:

- Local reference at every base station
- Reliance on 3rd party carriers references

Conclusions

There is a requirement to provide a reference to base stations in an evolved network which cannot be easily met by current techniques. We can guarantee that this requirement can be met in the future if we make synchronisation just another service supportable by the transport network. The transport network technology of choice for converged networks will be IP. Therefore, by whatever technique, we will need SYNCoIP.

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Thanks

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