GEDDES Fresh thinking

Performance and Supply Chain Management

FOR THE SOFTWARE TELCO

A WHITE PAPER

HOW TO BECOME A ‘SOFTWARE TELCO’?

Many network operators are currently engaged in the transformation to become a ‘software telco’. Programmable networks deliver more efficiency and flexibility from the underlying fixed physical network assets. However, this also introduces new business and technical risks.

Commercial & technical issues

In our experience, all operators find themselves struggling with similar challenges:

- How do I contract performance with my suppliers?
- What are the right service level metrics and agreements?
- How do I measure and manage operational performance?
- How can I know that I am getting the value that I was promised?
- How do I isolate faults and attribute responsibility for resolution?
- How do I safely use SDN/NFV technology whilst containing technical risk?

THE SOFTWARE TELCO IS A FUNDAMENTAL CHANGE

To improve efficiency and flexibility, telecoms network operators aspire to reproduce the apparent success of cloud data centres, with virtualised resources under software control. This move to a 'software telco' involves a fundamental business and engineering transition. The performance hazard space to be managed is very different from other computing or networking environments.

Whereas previously network resources were provisioned on a timescale of months, they may now be allocated in milliseconds. Performance issues that could before be resolved by over-allocation of resources can no longer use that approach. Indeed, the very point of a software telco is to under-allocate resources compared to peak demand load, and to increase contention for them. Physical resources are then traded between supply and demand, in both space and time.

The successful operator of the future is one who manages this highly dynamic 'trading' behaviour of networks being driven (by design) into overload. The process involves optimising resource allocation over ever-shorter timescales, with ever-greater rates of change.

The very point of a software telco is to under-allocate resources compared to peak demand load, and to increase contention for them.

The successful operator of the future is one who manages this highly dynamic 'trading' behaviour of networks being driven (by design) into overload.

To reason about performance and failure in overload requires a new approach to network performance and supply chain management. Techniques that work in data centres cannot be directly transferred to wide-area networks. Likewise, historical network management practises from circuit-based telecoms are not necessarily suitable for a software telco.

THE TECHNICAL CHALLENGE OF THE 'SOFTWARE TELCO'

In a data centre, you have a single management and administrative domain, with highly aggregated demand, and in a single physical location. SDN technology has evolved in an environment where there is a high level of vertical integration, with physically co-located resources, and generally no requirement for end-to-end application performance management.

In contrast, with a telecoms network, you have highly distributed systems, often at global scale, that may cross several boundaries of control. The speed of light alone imposes limitations on the ability to coordinate resources at short timescales. The end user is often looking to buy a complete end-to-end managed service. Yet virtualising resources makes delivering managed performance more difficult, since it introduces a whole new level of variability in timing.

On top of this, in wide-area networks you have a much higher rate and diversity of faults to deal with than in a data centre. This added complexity means such systems may suffer catastrophic failure modes under stress.

The danger of making the wrong trades

Today's networks are managed on a static basis, with stepwise changes typically measured in months (or longer). The shift to dynamic resource allocation on a scale of milliseconds involves ten orders of magnitude of change. This provokes a whole new class of management issues. Specifically, you need to understand how supply resources and demand interact, so you can make good decisions about what 'trades' to make. The resulting system should be (provably) stable under all loads and failure scenarios.

Whilst the 'software telco' may use cheap commodity hardware inputs, the processes and mechanisms to make the 'trades' and turn these into a service are not yet commoditised. Indeed,the general level of industry maturity to manage the performance hazards of such complex distributed systems is relatively low. That means there is a danger of the predictive resource allocation system making the wrong trades, which results in customer performance issues, or system stability crises.

A business risk management challenge

Network operators are aware of these risks, and want to create suitable contracts with their suppliers so they are allocated and adequately managed. The challenge is to identify and draw the correct boundaries with the right contract terms.

That means operators face two key risks:

A contracting risk. How do you know what to outsource to suppliers? How do you construct contracts with suppliers that allow you to effectively express demand, and to ensure that the software-controlled network makes the right tra

An execution risk. How do you know you got what you intended and paid for? Then, no matter what the SLA says, or what penalties are, at the end of the day the network operator is carrying the reputation risk of catastrophic service failure. How do you know you have contained your residual risk?

Network Performance Science is the answer

We bring a fresh perspective to the problems that operators and their suppliers are grappling with. Recent advances in applied mathematics have given birth to a new discipline: Network Performance Science. This rigorously links the customer experience and service quality management domains. As a result, the performance hazards of a 'software telco' can be quantitatively measured, modelled and managed.

Bringing a fresh perspective to the problems that operators and their suppliers are facing

Your performance science partner for the ‘software telco’

We offer a unique service to help you. We can provide the insight and tools to help you manage the performance hazards and business risks.

Our offer comprises three key elements:

1. **A curriculum for skills development:** We help both operators and their suppliers to better understand the nature of contracting and managing performance for complex distributed systems.
2. **Consulting services to help you to contract, design and architect SDN/NFV systemS:** We ensure that performance is being proactively managed from inception, not as a reactive activity only after disaster strikes.
3. **Practical tools to measure and monitor network performance:** We use high-fidelity metrics to assure the system is performing to specification. Our scientific approach reliably isolates operational issues and manages responsibility for resolution.

OUR APPROACH TO NETWORK PERFORMANCE SCIENCE

We believe that new concepts are best adopted in a bottom-up manner, by those who get the tangible benefits. Our recommended approach is to connect a small circle of key stakeholders, and engage their curiosity and imagination.

Our contribution is to bring both the business and technical language to the table in an open and non-threatening manner. This allows for the initial cycle of organizational engagement and learning to emerge: expand “who knows”, identify “who cares”, and engage with those “who can”. The first engagement step is a series of two webinars, each 2 hours long, where we outline how to look at your network from a different perspective and to reframe your task. This introduces the language and primary concepts, and reveals the real opportunity: predictable network performance and the ability budget and contract this.

We then facilitate a one-hour session with internal stakeholders to review the concepts, and discuss barriers and opportunities for these concepts, in order to plan the next phase of engagement. A summary report captures the key issues and makes recommendations.

We bring both the business and technical language to the table in an open and non-threatening manner. This allows for the initial cycle of organizational engagement and learning to emerge

Team members

Martin Geddes SCIENTIFIC ADVISOR & PROJECT LEADER

Telecoms scholar, entrepreneur, writer and speaker. Formerly held senior technical or executive roles at BT, Telco 2.0, Sprint and Oracle.

Dr Neil Davies SCIENTIFIC SUPERVISOR & DOMAIN EXPERT

An expert in resolving the practical and theoretical challenges of large scale distributed and high-performance computing.

Kelly Fitzsimmons BUSINESS CONTACT

Serial tech entrepreneur, who has founded five startups – her earliest four in information security, and her latest an Intelligent Voice Services company.

Safely get the cost and performance benefits of SDN/NFV

By working as your trusted scientific advisor, we will we will help you to build the right supply chain and supporting contracts and SLAs, create the right architecture, and manage operational faults and service quality. As a result, we can help you to safely and fully exploit SDN and NFV technology to its performance and cost limits.

To arrange a call to discuss how you can begin this journey to a scientific approach to the software telco, please get in touch.

Register for the free *Future of Communications* newsletter at www.martingeddes.com

Registered Office	Martin Geddes Consulting Ltd 17-19 East London Street Edinburgh EH7 4BN United Kingdom
Email	sales@martingeddes.com
Web	www.martingeddes.com
Linkedin	www.linkedin.com/in/mgeddes
Twitter	@martingeddes