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# Executive Action Plan for AI Network Evolution

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It is daunting to be an executive today trying to guide technical team leadership in developing responses to the changes being driven by AI evolution. Below is a high-level analysis of the current situation and key guiding principles that can make this job manageable.

We used to build and optimize networks based on what people wanted, needed, and how organizations sought to influence those things directly. We did that by collecting data and by combining the data with algorithms to help us create optimal architectures. GenAI has changed things so dramatically that the data we used to collect may not be useful anymore.

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If you are collecting the same data you were four years ago, you may be basing decisions on a wrong foundation. At the same time, differences between pure communication, processing, and storage are becoming blurred. This leads us into a period of ongoing dramatic changes. Changes we have to adapt to. Because of ongoing AI evolution, we must adapt not just once, but rather in a stream of adaptations.

As an executive, your most effective response is to help your team continuously:

1. Carefully monitor what data they collect and how they analyze it;
2. Track the drivers that shape the immediate environment;
3. Make the architectural adaptations necessary to meet the immediate environment while also being able to easily evolve to the next adaptation.

## Background

It is an old saying that “you get what you measure.” So, measuring the right things is critically important. Approximately 100 years ago, we started collecting more data than we could deal with manually. This led to the punch card sorting of the US Census data. Punch cards led to the early

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mainframe computers. Through the transitions from mainframes to minicomputers to PC's, to phones - from circuit-switched twisted pairs to TCP/IP, fiber, wireless, etc. we perfected what data to gather. The means for storing and analyzing the data changed. But the underlying worldview centered on human users drove what data to collect.

Now, with the advent of GenAI, this is changing. The data you were capturing four years ago may not be meaningful today. At the same time, how and where AI processing is being done is blurring the lines between communication, processing, and storage. What's worse is that things will continue to be in such a state of flux that the corrections you make today may not be viable in another year or two.

## Data Example

Four years ago it was reasonable to count the number of clicks to determine the effectiveness of an advertising or PR campaign. It was assumed that each click was a measure of human eyeballs reached and affected. To make sure that these numbers stayed reliable, organizations tried to prevent bots (built with conventional code) from being able to click. The intent was to keep the data 'pure'.

Many organizations are still counting the same way now and still analyzing the resulting data in the same way. However, GenAI has fundamentally changed things.

Now, leading-edge campaigns are seeking out bot access. They are making special provisions for Intelligent Agents to have access to content that is not visible to humans. The intent is to get the Intelligent Agents to put key messages into AI training data sets. Once in the set, the messages are trained into AI's. The essays are often created in question-and-answer form. Answers are structured so that when a user asks an AI one of the key questions, the user gets the answer the advertiser has created. But instead of getting it delivered as an advertisement, which is received with a note of skepticism, it is received in an authoritative fashion, likely to be accepted by the user as ground truth. In today's world of intelligent agents acting for people, the user may be an intelligent agent just as susceptible (and maybe more so).

Thus, today advertising effectiveness is measured by how much of the copy has been successfully inserted into training data sets, with the resulting probability that the content will be delivered by an AI in an inference response.

## Traffic Evolving

Architecting to influence AI behavior through impact on training data is just one example of a larger underlying sea change. Today, more than 50% of the traffic on the internet is machine-generated. It is likely that much of that has neither a human originator nor recipient. More than 50% of the compute/storage is AI. Those proportions will increase, as will the overall volume. Intelligent agents don't sleep. They will proliferate. The resulting factories, transportation systems, workspaces, marketplaces, political organizations, forms of art and entertainment, etc. will continue to evolve.

## Blurring of Communication, Processing and Storage

Processing and storage are going through big changes as well. The building boom in AI data centers is driving us to hub-and-spoke networks (whether public or private). Traffic flowing to and from these big AI data centers will dominate communications, electrical power generation/distribution, processing, and storage. From an AI perspective, networks will be relatively dumb. However, this too will change.

Limitations in memory semiconductor fab capacity and scale advantages in current AI implementations are currently creating economic incentives that favor these large AI data centers.

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Over time, as fab capacity increases and memory prices come down, incentives will move to more AI processing/storage at the Edge, near the Edge, and in the network.

One can think of the human nervous system as a model for the next-generation architecture. In humans, there is the brain (centralized AI data center) and a network of ganglia (Edge and near-Edge AIs ). The ganglia get smaller and more specialized as they get closer to the Edge in operation. The ganglions are generally part of our autonomic system. That is, we are generally not aware of their functioning.

For example, our brain makes a conscious decision to walk in a certain direction at a certain pace. That decision triggers a very large network of ganglia that control each of our many muscle systems. Some control our posture. Others get our legs to move. Still others control our toes to keep us balanced and standing upright. The same basic kind of tissue builds the brain, the ganglia, and the connections.

As memory prices come down and AI processors become more power efficient, we are likely to see hybrid AI systems that function in a way similar to the human nervous system. Inference requests and responses will be autonomously broken up and distributed over a network that includes Edge AI processing, modest-sized servers near the Edge, AI larger processors in networks between the servers and the large data centers, and the data centers themselves.

Because of the proliferation of Intelligent Agents interacting and cooperating with each other, the resulting network will transition from a hub-and-spoke architecture to more of a mesh-like architecture. This will make it harder to distinguish pure communications from pure processing and pure storage.

## Domain Integration

How AI will influence data, compute, and storage requirements will be very domain-dependent. Although AI will affect everything, it will not affect everything at the same rate. Today, software development is on the leading edge. Based on past experience, we can expect utilities to be on the trailing edge. As a result, evolution may come in fits and starts, especially because of the increased pressure on domain integration.

In the past, we tended to have domain-specific networks of communication, processing, and storage tied together by intermediaries. The intermediaries (domain connectors) were combinations of manual staff and public general-purpose resources. As AI and Intelligent Agent systems develop, there will be a need for more and tighter integration.

An example of impending domain integration involves factory automation. In the past, factory automation systems were isolated networks of communication, processing, and storage. They were generally air-gapped from other systems. That is, there was no physical connection with systems outside the factory, etc. This was done in part because of cybersecurity concerns. If you obtained the factory robot programming, you could replicate the product and sell it more cheaply. As we move forward with AI adaptation, it is going to be more important to be efficient than to maintain air gaps.

There are going to be networks of intelligent agents that track orders, sales, inventory status, etc. That do conventional market surveillance. Recently, consumer sentiment has been tracked by measuring the proportion of Tweets expressing positive emotions vs. negative emotions. More tracking systems will be developed with new innovative tracking algorithms. Depending on the products or services, these systems can be distributed all over the planet. In addition, the systems that track how successfully advertising messages have been embedded in AI training data (see

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above) will predict future demand for products and services.

There will also be Intelligent Agents that track inputs, supplies, and other portions of the value chain and transportation systems.

The resulting ‘flock’ of cooperating agents will interface with factory automation systems. Together, these Integrated Agents will make optimization decisions in real time. Thus, giving new meaning to ‘just in time’.

## AI Evolution Driving Further Change

The change scenarios above are just the beginning. We can only see so far into how AI evolution will impact networks of communication, processing and storage. But we can see that further change beyond what is described is likely. It is like standing at the mouth of the first mine where the first steam engine was deployed to pump water out of the mine, and trying to force all the changes from the Industrial Revolution. Thus, it is reasonable to expect more changes, although we can’t force what they will be.

Although we can’t clearly identify the changes that will follow these described here, we can prepare for them. The best way to prepare for this ongoing stream of change is to design architectures such that they can easily be disassembled and reconfigured as needed.

## Executive Action Planning

If you are an executive in an organization today, then you are facing these challenges. Here are some suggestions for how you can guide your team through a proper response.

First, ask them to carefully monitor what data they are collecting and what algorithms they direct their intelligent agents to use to analyze it.

Then, make sure that the team has an ongoing process for monitoring the progress of the AI evolution. Ask the team for regularly scheduled reviews with you. This is both to underline how important it is and to keep you up to date and well informed.

Ask your team to explain how each new architecture they develop has been designed to be able to transition to the next, as yet not fully understood, architecture - easily and efficiently. Ask them to break the problem down into domains. Track changes in each domain of interest. Finally, integrate the domain views into a comprehensive solution using Intelligent Agents, conventional code, storage, processing, communications, and manual efforts to create the best architecture for today and the near future.

Help them understand that they are in an ongoing process of change. Change is difficult and anxiety-provoking. Tell your team that you know that. Just saying it out loud will give them support. More may be required. Your team may be concerned that their work will result in losing their jobs. Provisions for such an outcome may be necessary.

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