

Dynamic Trust Network – A Web based Model

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ABSTRACT

*While social or professional networking sites allow individuals to create networks, yet these networks have open access and lack mutual trust among individuals. To create and promote culture of trust in an organization, the trustworthiness of individuals need to be made visible so that individuals can be part of a trust network and trust relations can be built. This paper propose a web based model for creating a **Dynamic Trust Network (DTN)** that will allow individuals in an organization to rely on each other and experience believable communication.*

Key Words: - Trust Handshake, Trustworthiness Level, Trust Relation, Trust Score, Transitive Trust, Trust Vote

I.INTRODUCTION

One of the basic social need and foundation for building positive relationships is ‘**trust**’. According to Dr. Dunane C. Tawy , “ trust is the state of readiness for unguarded interaction with someone or something” [1]. In a society where people trust each other, a culture of trust is experienced and trust as social capital gets generated. According to Dr. Maria Czerepaniak-Walczak & Dr. Elżbieta Perzycka, “Trust is the basis for the development of capital” [2]. In today’s global world, actions and interactions can be interpersonal and impersonal. We’re already experiencing the level of global connectivity through social and professional networking sites, however, mutual trust among users in such networks generally seems lacking as trust gaps exist in such networks because of invisibility of trust. Research conducted by Reina and Reina found that nine out of every 10 employees have reported experiencing some sort of breach of trust in the workplace on a regular basis [3]. A Deloitte survey on ethics in the workplace underlined the erosion of trust in the workplace and the negative financial effects on organizations struggling to regain their footing after the recent recession [4]. As such, trust gap needs to filled and this paper addresses this issue by presenting a web based model that provides members of an organization a platform where they could be part of a dynamic trust network based on trust votes, trust scores & trustworthiness levels of individuals.

II.SYSTEM MODEL

The system model of DTN for an organization is based on the fact that trust begets trust. Individuals of an organization who form the core team of that organization generally know and trust each other based on sharing interpersonal relations mutually. In DTN system model such core team is referred as ‘**Core Peer Group**’. (Fig.1) The Core Peer Group would be the administrators of DTN website and they would take the initiative of expanding the DTN by inviting members of that organizations by means of email or provide them the URL of the DTN website. In DTN system model such invitations is referred as ‘**trust handshake**’. (Fig.1) The invited member

would be free to accept or reject the trust handshake. If the invitation is accepted then an account would be created for this invitee through a sign up process and a new member would be part of DTN by means of this link. In DTN system model such link is referred as '*Trust Chain*' or '*Trust Relation*'. (Fig.1). The new invitee would bring in more members by offering trust handshakes to his/her peers and in this way the DTN would expand, however, all the trust chains in DTN would be dynamic and may even break between members based on their experiences/interactions with the passage of time. The DTN website would also have additional features of online chat, off line messaging, file sharing and discussion forum for facilitating reliable communication.

III. ASSESSING THE LEVEL OF TRUST IN DTN

In order to ensure that the DTN remains a trust network, the assessment of Trustworthiness level of members needs to be made visible so that positive trust relations are built. The main issue is how unknown individuals of an organization form trust chains or trust relations. For example, If member 'A' invites member 'B' and member 'B' invites member 'C', then on what basis **transitive trust chain** between member A and member C would be created?

To address this issue, trustworthiness levels, trust score and trust votes of members would play a vital role. Each member would be voted by other members based on key parameters that build trust. In this model we are focusing on five such parameters, however, they may vary from one organization to another. These parameters in alphabetical order are:

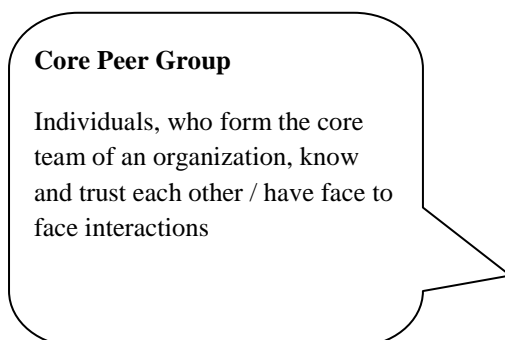
I.Collaborative trust: - Looking for mutual gain, consider what the other person needs, wants, or what is important to him. This may also be referred as **cooperation, contribution or consideration.**

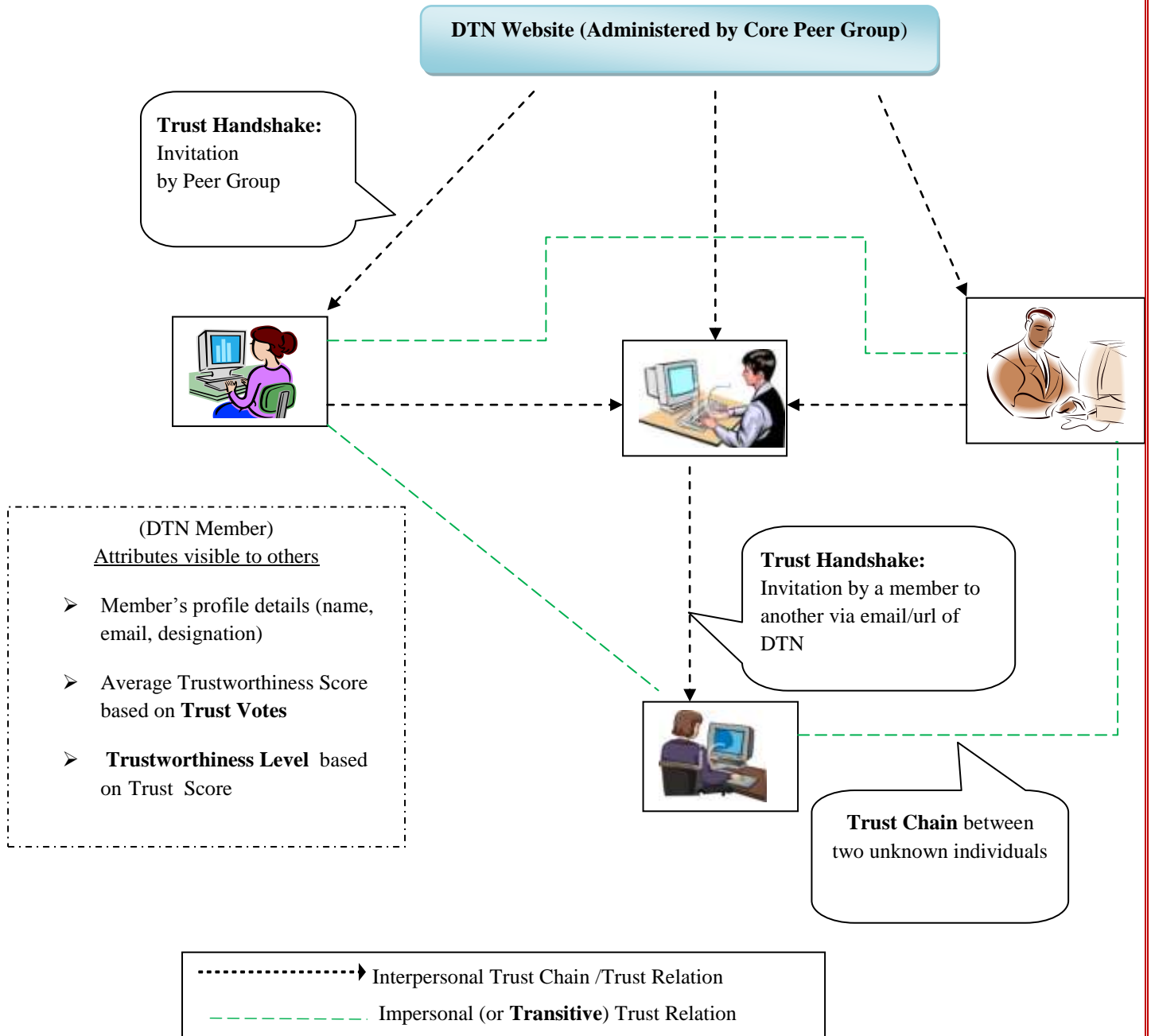
II.Competency trust: - One's perception of how capable another person is to perform competently, to come through based on what's needed. This may also be referred as **Capability, Ability, Or Consistency.**

III.Communication trust: - Sharing information, providing constructive feedback and speaking with good purpose about people.

IV.Integrity trust: - Being open and visible without hidden agendas, tell the truth. This may also be referred as **Transparency, Credibility or Honesty.**

V.Responsibility trust: - Being consistent in terms of keeping agreements and managing expectations. This may also be referred as **Dependability.**





(Figure 1) System Model of Dynamic Trust Network (DTN)

3.1. Trust Vote, Trust Score and Trustworthiness Level in DTN

Members of DTN website would have an option to vote in favour of their peers and based on their interactions rate them. For example, Mr. A would be voted and rated by other member say 'B' on following parameters

(1) Collaborative trust vote



Clicking on third star by member 'B' would mean that three votes out of five are casted in favour of member 'A' for Collaborative trust vote

(2) Competency trust vote



(3) Communication trust vote



(4) Integrity trust vote



(5) Responsibility trust vote



The **average** of all above votes would determine the aggregate **Trust Score** of a member.

Illustration 1: Suppose a member 'A' is rated by 'B' as follows (Table 1):

Trust Building Parameters	Rating (On a Scale of 5)
Collaborative trust vote	3
Competency trust vote	3
Communication trust vote	3
Integrity trust vote	4
Responsibility trust vote	4

Table 1

Trust Score of A by B = (3+3+3+4+4) out of 25 => (17/ 25) = 0.68

Illustration 2: Suppose a member ‘A’ is rated by ‘B’ and ‘C’ as follows (Table 2):

Trust Building Parameters	Rating (On a Scale of 5) By ‘B’	Rating (On a Scale of 5) By ‘C’
Collaborative trust vote	3	4
Competency trust vote	3	3
Communication trust vote	3	3
Integrity trust vote	4	4
Responsibility trust vote	4	4

Table 2

Trust Score of A by B = (3+3+3+4+4) out of 25 => (17/ 25) = 0.68 (Table 2)

Trust Score of A by C = (4+3+3+4+4) out of 25 => (18/ 25) = 0.72 (Table 2)

In this case we’ll take the average of two scores.

Average Trust Score of A = (0.68 + 0.72)/2 = 0.70

The above Trust score would be dynamic and may change based on the votes of member A by coworkers with the passage of time.

3.2. Trustworthiness Level in DTN:

The Trustworthiness Level of an individual would be then taken into consideration based on the Trust Score and a scale can be devised for quantization. This paper proposes the following scale for classification of individuals; however, the scale may vary from one organization to another.

Trust Score Range (Scale range 0 to 1)	Trustworthiness Level of a DTN Member
0.00 to 0.20	Extremely Low Trustworthy
0.21 to 0.40	Low Trustworthy

0.41 to 0.60	Average Trustworthy
0.61 to 0.80	High Trustworthy
0.81 to 1.0	Very High Trustworthy

Illustration: If a member say ‘A’ has a trust score of 0.70, he would be rated as ‘**High Trustworthy**’ as per this scale. Since trust score is dynamic, so would be the trustworthiness level. This trustworthiness level would be visible to all members of **DTN**, so that they can create trust chains with member ‘A’.

IV. CONCLUSION

This web based model can facilitate the creation of high trust organizations by creating a web interface where individuals of an organization have the opportunity to interact and create trust relations with known and unknown members based on the trust score and trustworthiness levels of members. This will result in fruitful incentives for an organization and its members like

- feeling able to rely upon a coworker
- sharing of knowledge and skills between known/ unknown workers
- cooperating with and experiencing teamwork with a group
- taking thoughtful risks

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